Official Journal of
ARRL
The national association
for AMATEUR RADIO

QST

devoted entirely to
AMATEUR RADIO

May 2002

QST reviews
ICOM IC-746PRO
HF/VHF transceiver

Arctic DXing

2002 ARRL Field Day rules

The W8ZR EZ-Tuner

$4.99 U.S. $6.99 Can.

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

IC-PCR1000 The original black box

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

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

computer not included
**Windows 3.1/95 only*

IC-R75 Pull out the weak signals

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

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

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

TUNE IN THE WORLD WITH ICOM

IC-R8500 The experts choice

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

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

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

IC-R2

Excellent audio, tiny package

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

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

"The IC-R3 communications receiver is more than just another scanner. With live video reception of broadcast and amateur television, and short range RF based video systems, Icom has opened up a new frontier for the progressive wide spectrum scanner enthusiast."
– QST, 2/01

IC-R3

See & Hear all the action

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

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

IC-R10

Advanced performance

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

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

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

NiMH Rechargeable Battery

AA 1800 mAh / AAA 700 mAh

- Rechargeable up to 1000 times.
- Ultra high capacity.
- Memory free operation.
- Low impedance battery design.

RECHARGEABLE UP TO 1000 TIMES

MH-C204F

SMART CHARGER FOR 2 / 4 AA / AAA NiMH & NiCD

- Microprocessor controlled 3 hr. rapid charge.
- Automatic trickle charge to prevent overcharging.
- Conditioning feature to rejuvenate your batteries.
- Optional car kit.

ULTRA HIGH CAPACITY NiMH BATTERY PACKS FOR TWO-WAY RADIOS

- Ultra high capacity NiMH rechargeable battery packs.
- Memory-free operation.
- Diverse selection of battery packs for various two-way radios, backed by Maha's one-year limited warranty.

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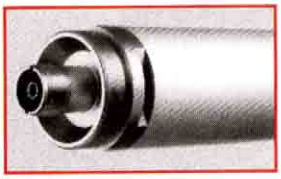
DIAMOND ANTENNAS

The Standard By Which All Others Are Judged.

Acclaimed as the technological leader in single & multiband antennas

- Wide-band Performance • Factory Adjusted–No Tuning Required • Highest Gain
- UPS Shippable • High Wind Rating • Fiberglass Radome • DC Grounded • Stainless Hardware

X500HA (UHF-Conn.)
X500HNA (Type-N Conn.)
Ruggedized Base/Repeater Antenna



COAX CONNECTION AT BASE END

HEAVY DUTY BASE/ RADIAL ASSEMBLY

STRONG JOINT COUPLINGS

X50NA

The X50NA is an excellent choice where ruggedness is required in a medium–gain, dual-band, base/repeater application.

Features

- Wide frequency bandwidth
- Heavy duty fiberglass radome
- Stainless steel mounting hardware and radials
- Type–N Cable connection
- Compact size for easy mounting/ installation

Specifications:

Freq.: 2m: 144–148MHz
70cm: 440-450MHz
Power: 200 watts
Wind Rating: 135 MPH (no ice)
Height: 5.6 feet

X500HNA

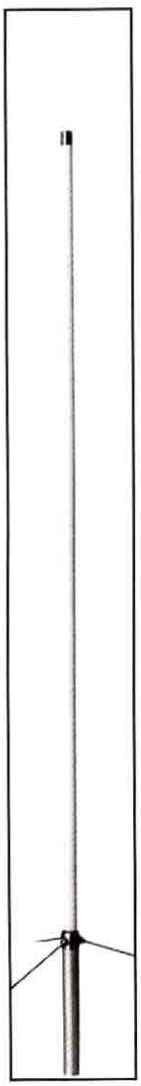
Diamond Antenna's best base station repeater antenna. Designed for strength and performance, the X500HNA is pretuned to achieve maximum gain in both the 2m and 70cm amateur bands.

Features

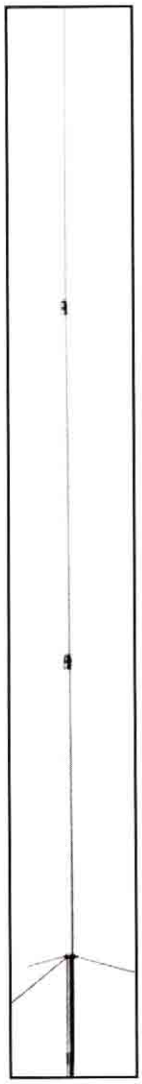
- Heavy duty fiberglass radome
- Overlapping outer shells for added strength
- Stainless steel mounting hardware and radials
- Strong–waterproof joint couplings
- Type–N Cable connection
- Wide band performance

Specifications:

Freq.: 2m: 144–148MHz
70cm: 440-450MHz
Power: 200 watts
Wind Rating: 90 MPH (no ice)
Height: 17.8 feet



X50NA



X500HNA

DIAMOND Mono-Band Base/Repeater Antennas

MODEL	BAND (MHz)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No. Ice)
CP22E [1]	144	200	UHF	9.0	90
DPGH62 [1,6]	50	200	UHF	21.0	78
F22A	144	200	UHF	10.5	112
F23A	144	200	UHF	15.0	90
F718A [2]	440	250	N	15.0	90

DIAMOND Dual-Band Base/Repeater Antennas

MODEL	BAND (MHz)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No. Ice)
X50A	144/440	200	UHF	5.6	135
X50NA	144/440	200	N	5.6	135
X200A	144/440	200	UHF	8.3	112
X510NA [3]	144/440	200	N	17.2	90
X510MA	144/440	200	UHF	17.2	90
X500HNA	144/440	200	N	17.8	90+
X700HNA	144/440	200	N	24.0	90
X2200A	144/222	150	UHF	11.5	112
U200	440/1240	100	N	5.9	135

DIAMOND Tri-Band Base/Repeater Antennas

MODEL	BAND (MHz)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No. Ice)
U5000A	144/440/1240	100	N	5.9	135
V2000A [4,6]	52/144/440	150	UHF	8.3	110
X3200A [5]	146/222/440	100/200	UHF	10.5	112
X6000A	144/440/1240	100/60	N	10.5	112

1 Heavy duty aluminum construction.
2 F-718A: 440-450MHz., F718L: 420-430MHz.
3 X510NJ: 144-147/430-440MHz.
4 1/4λ rated in dBi. Most requirement: 1.4"-2.4".
5 2m: 146-148; 100 watts
6 52-54MHz. only; DPGH62 adjustable from 50-54MHz.

BAND: 144=144-148MHz., 222=222-225MHz., 420=420-430MHz.,430=430-440MHz., 440=440 450MHz., 1240=1240-1300MHz.

www.rfparts.com/diamond

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QST

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News and Features

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

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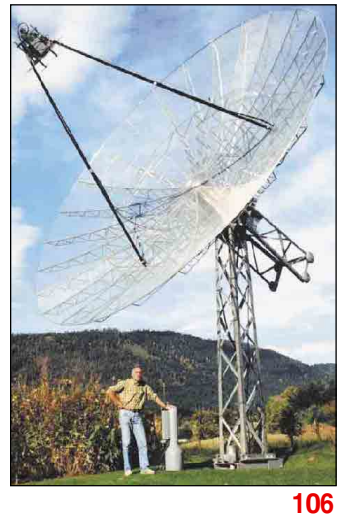

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Operating

Departments

Our Cover:
More than a challenging and useful project; the EZ-Tuner could also be called a work of art. Part 2 of the series delves into the design details. Next month's installment will cover the automatic version—one of the most sophisticated tuners to grace the pages of *QST*. This month's article begins on page 28.

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

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

TH-D7A(G) / TM-D700A

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!

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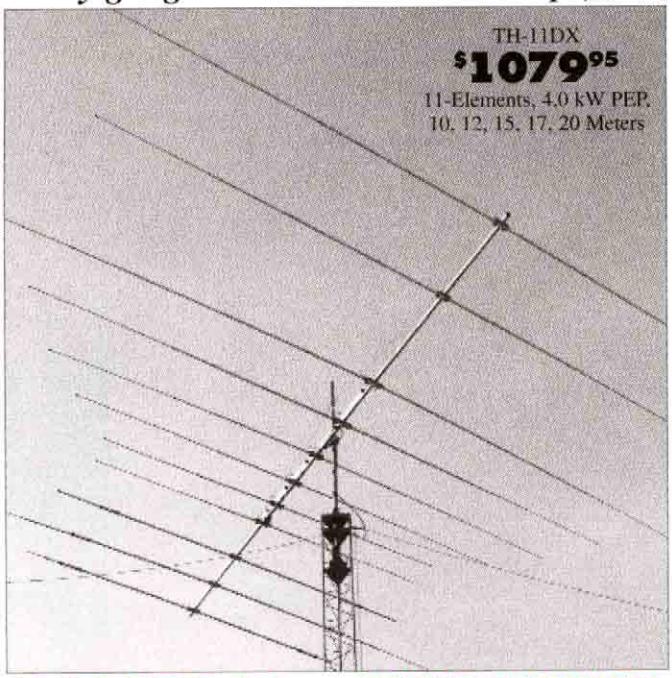
hy-gain® HF BEAMS...

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



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

The choice of top DXers.

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

Handles 2000 Watts continuous, 4000 Watts PEP.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Fits on average size lot with room to spare -- turning radius is just 15.3 feet. Four piece boom is ideal for DXpeditions. Rotates with CD-45II or HAM-IV rotator.

Features *Hy-Gain BetaMatch*™ for DC ground, full power *Hy-Q*™ traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

TH-2MK3, $339.95. 2-element, 1.5 kW PEP, 10,15,20 Meters

The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander.

For just $339.95 you can greatly increase your effective radiated power and hear far better!

Ruggedly constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

EXP-14, $549.95. 4-element, 1.5 kW PEP, 10,15,20 Meters

Revolutionary 4-element compact tri-bander *lets you add 40 or 30 Meters!* Has 14 foot boom and tight 17.25 feet turning radius. Fits on roof tri-pod, mast or medium duty tower.

Hy-Gain's *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP.

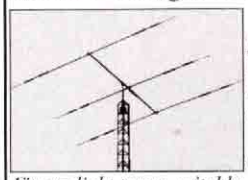
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

Truly *competitive against giant tri-banders at half the cost!*

QK-710, $169.95. 30/40 Meter option kit for EXP-14.

Compact 3-element 10, 15, 20 Meter Tri-Bander

For limited space . . . Installs anywhere . . . 14.75 ft turning radius . . . weighs 21 lbs . . . Rotate with CD-45II, HAM-IV



Fits on light tower, suitable guyed TV pole, roof tri-pod

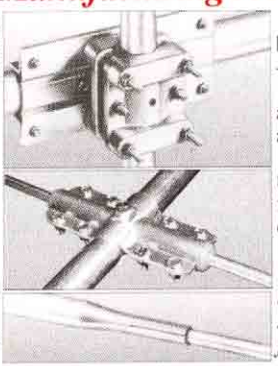
TH-3JRS, $329.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

Excellent gain and F/B ratio let *you* compete with the "big guns".

Tooled manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	• Hy-Gain catalog		**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	• Call toll-free		600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	800-973-6572		**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4			1500	10,15,20 (with 30/40)	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

Tooled Manufacturing . . . Highest Quality Materials



1. Hy-Gain's famous super strong *tooled* die cast *Boom-to-Mast Clamp*

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

3. Thick-wall *swaged* aluminum tubing

Tooled *manufacturing* is the difference between Hy-Gain antennas and the others -- they just don't have it (it's expensive!).

Die-cast aluminum boom-to-mast bracket and element-to-boom compression clamps are made with specially *tooled* machinery.

Hy-Gain antennas feature *tooled* swaged tubing that is easily and securedly clamped in place. All tubing is deburred and cleaned for smooth and easy assembly.

Durable precision injection molded parts.

Hy-Gain *antennas are stronger, lighter, have less wind surface area, better wind survival, need no adjustments, look professional and last years longer.*

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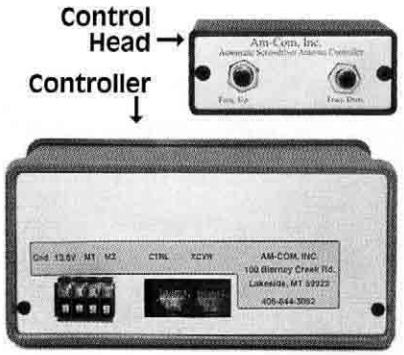
LEAVE THE TUNING TO US

The Am-Com Automatic Screwdriver Antenna Controller connects with **The High Sierra HS-1500MKII Antenna** for push-button convenience and smooth, continuous tuning.



The Am-Com Screwdriver Antenna Controller automatically tunes a screwdriver antenna to resonance. On the touch of a button, it will search for antenna position that provides an SWR level equal to or lower than a preselected value.

Am-Com Antenna Controller

- Remembers your most recent frequency of operation
- No modifications to antenna or transceiver
- Automatic/Manual modes
- Eyes-free operation
- Sets antenna resonance to a specific frequency NOT just a band
- Integrates with ICOM IC-706 type transceivers
- Works with all transceivers
- Works with all screwdriver antennas
- Size: Controller: 5.5" W x 2.5" H x 6" D
  Control Head: 2.75" W x 1" H x 3" D

The High Sierra HS-1500MKII Antenna is exceptionally compact and provides smooth, continuous tuning from 3.5 to 30MHz—essentially the entire HF spectrum! The typical SWR is less than 1.5:1 across the entire tuning range. This wide tuning range is remarkable for an HF antenna.

HS-1500MKII Antenna

- High Performance
- Tunes the entire HF spectrum
- For Base or Mobile use
- Available in six baked-on colors
- Universal Mounting Brackets make installing easy
- Package Deals with discounted prices!
- Available with the Am-Com Controller rather than a switch
- 1000 watt rated
- Height: 9 feet tall with 6 ft. whip
- Weight: 5.9 lbs.

Purchase as a set or separately.

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"IT SEEMS TO US..."

Ever Upward

One of the longest and most colorful threads in the historical fabric of Amateur Radio is the ongoing quest to use higher and higher frequencies. In the early days of radio, groundwave propagation was thought to be the best if not the only way to send signals beyond the line of sight. This led to the low frequencies—the lower the better—being the most highly prized part of the radio spectrum. Of course, there is a limit to how low you can go. There is also a limit to how much information can be conveyed over a low-frequency transmitter. For the early commercial radio engineers the principal challenge was to figure out how to transmit information fast enough to make the enormous investment in huge antennas and high-power transmitters pay off.

Unable to play that game, amateurs took a different road. They began to explore the higher frequencies (or shorter wavelengths, in the jargon of the day). Getting there was not easy. They couldn't simply copy commercial techniques nor could they simply buy off-the-shelf hardware. The pioneers had no way of knowing whether their efforts would lead to anything worthwhile. There are still a few among us who can remember hearing the incredibly exciting news that amateurs had spanned the Atlantic, but most of us can only imagine what it must have been like.

No doubt some optimists initially thought that "the higher the better" was the answer, and that we would enjoy worldwide communication all the time if only we could figure out how to transmit and receive at a high enough frequency. It took a few years to discover that there is a limit, albeit one that is constantly changing, to how high in frequency you can go before the signal simply penetrates the ionosphere and dissipates into space. It took a while longer to begin to understand the factors that influence this limit. Our understanding is still far from perfect, which is one of the reasons why radio continues to attract and to hold the interest of inquisitive minds.

As pioneering amateurs continued upward past the limit of ionospheric propagation they discovered influences on propagation closer to the earth's surface, in the troposphere. With patience and one eye on a weather map, amateurs hundreds of miles apart sometimes could make contact on frequencies that "everyone knew" were only useful for line-of-sight distances. This time it turned out that higher *was* better. Ducts form along the earth's surface, particularly over water, that will guide microwave signals right around the curvature of the earth for hundreds or thousands of miles while providing little or no enhancement at lower frequencies. Amateurs have explored tropospheric ducting on frequencies as high as 10 GHz, but there is more to know and more to accomplish.

At the next higher amateur frequency band, 24 GHz, a new factor begins to come into play. Water-vapor absorption causes high attenuation at that frequency, and the conventional wisdom was that the band would be useful only for short-range communication. Last August W5LUA and VE4MA proved otherwise by completing the first two-way EME contact on 24 GHz! K6GZA and AD6FP set the North American terrestrial DX record of 375 km in September 2000. Clearly there is more to be done in this band.

What about the higher frequencies? On the plus side, thanks to little-heralded accomplishments by the International Amateur Radio Union (IARU) at the 1979 World Administrative Radio Conference most of the amateur bands above 24 GHz consist of a primary allocation alongside a wider shared allocation. There is room to roam, along with a reasonable expectation that amateurs will continue to enjoy access in the future. On the minus side, atmospheric attenuation is a significant if not overwhelming obstacle up to at least 1 THz (that's 1,000 GHz or 1,000,000 MHz) and construction requires a steady hand and a large magnifier. Still, impressive work is being done. Between two California mountaintops on March 1, W0EOM and AD6FP set a new world distance record of 177 km on 76 GHz and W0EOM and KF6KVG worked on 47 GHz over the same path. On the same day on the other side of the country, WA1ZMS and W4WWQ extended their own record on 322 GHz by working over a 500-meter path. A few days later the pair extended their record on 241 GHz to 11.4 km. The distances may sound modest, but Marconi started out doing less.

There are no allocations to specific services above 275 GHz, so we are beginning to venture into uncharted territory. A future World Radiocommunication Conference will make allocations in the range 275-1000 GHz; in anticipation the IARU has identified bands of potential interest to amateurs that will not conflict with the requirements of radioastronomers. Above 1000 GHz (1 THz) atmospheric attenuation becomes a bit more benign and there may be new fields to explore once we know how to get there.

It is sometimes said that amateurs cannot hope to compete with deep-pocketed commercial interests in the microwave bands. What can we contribute that hasn't already been done in an R&D lab? The answer lies in the fact that we are looking for two different things. Commercial labs are developing marketable products that require high reliability; they're interested only in propagation that works 99.99% of the time. By contrast, amateurs are interested in the exceptions.

Today's amateur pioneers of the microwave bands readily admit that they are only scratching the surface and they are most willing to share their enthusiasm with newcomers. One place to hook up with hams active on the microwave frequencies is the North Texas Microwave Society Web site at **www.ntms.org**. Want to be an explorer? The frontier beckons and the natives are friendly.

— *David Sumner, K1ZZ*

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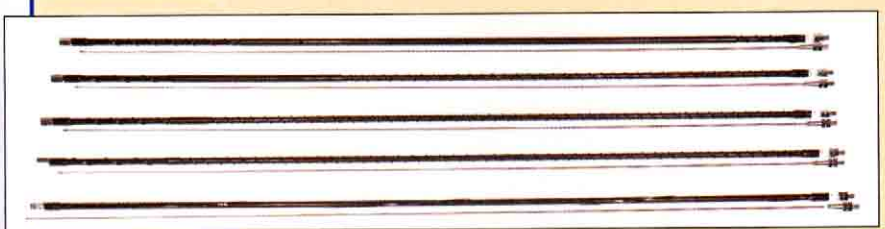

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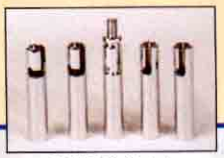

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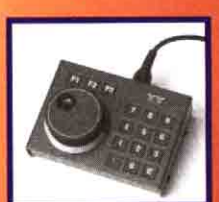

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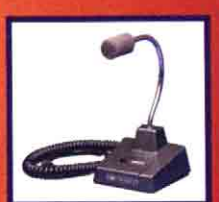

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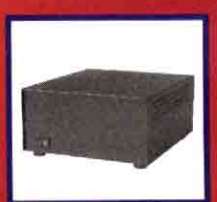

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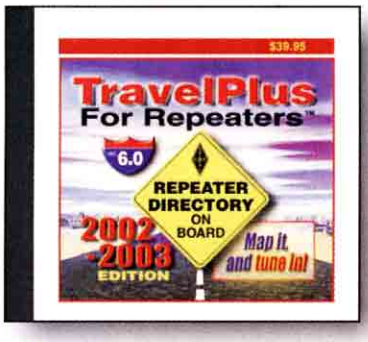

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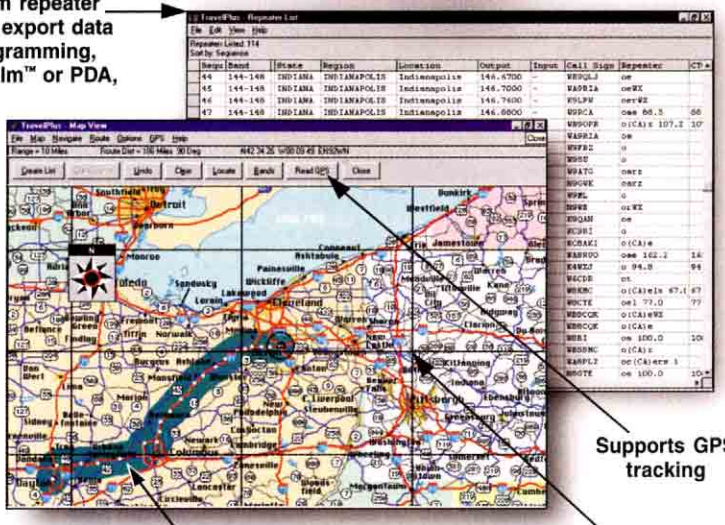

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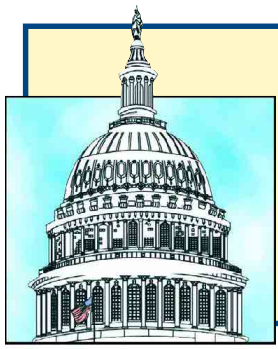


DC Currents

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.

President Haynie Calls DC Visit "Best Yet" for Ham Radio

"In my mind, it was the best trip we ever had," ARRL President Jim Haynie, W5JBP, said recently, referring to a recent League Washington visit to Federal agencies and Congress. "This was more of a working trip than any of our previous group ventures. We had a hard, busy, full week, and we took advantage of every bit of it."

Haynie says Amateur Radio got a positive reception during this, his fourth visit to Washington, DC, to visit with regulators and lawmakers. Haynie headed a contingent of ARRL officials and staff members as the year opened, on visits to the FCC and Capitol Hill among other stops. The League entourage included ARRL General Counsel Chris Imlay, W3KD; Hudson Division Director Frank Fallon, N2FF; Legislative and Public Affairs Manager Steve Mansfield, N1MZA; and Technical Relations Specialist Jon Siverling, WB3ERA, of the ARRL's Washington office.

Meetings with the FCC

Haynie and Imlay met with staff members in the Office of Engineering and Technology and new OET Chief Edward Thomas. The FCC stop included a second *ex parte* presentation by Haynie and Imlay to OET staff members on a proposal by SAVI Technology to deploy Part 15 RF identification tags in the vicinity of 433 MHz at much greater field strengths and duty cycles than those now permitted for such devices (see additional story on page 16, "ARRL Says FCC Overstepping"). Other topics of discussion included the ARRL's pending petitions for low-frequency allocations at 136 kHz and 160-190 kHz, and for a new domestic allocation in the vicinity of 5 MHz.

Coordination with the "Homeland Security" Effort

The centerpiece of the series of Washington visits was ARRL's participation in the emerging National Public Safety Telecommunications Council (NPSTC) (**rmlectc.dri.du.edu/**) brainstorming session, chaired informally by Gene McGahey, AL7GQ, of the National Law Enforcement and Corrections Technology Center (**www.nlectc.org/**). That session considered improved means to incorporate Amateur Radio into public safety and Homeland Security planning. Participants also looked at the possibilities of increasing the role of ham volunteers in public safety and emergency communication.

Among other topics, discussion focused on strengthening recognition by public safety agencies of Amateur Radio as a resource and further upgrading the level of professionalism among Amateur Radio Emergency Service (ARES) and Radio Amateur Civil Emergency Service (RACES) volunteers through enhanced accreditation and training. The session also touched on the need for a universally recognized identification card or credentials for amateur volunteers.

Representatives of the Federal Emergency Management Agency (FEMA), the American Red Cross, The Salvation Army, the FCC and the Association of Public Safety Communications Officials (APCO) were among those on hand for the session. Haynie told the gathering that amateurs are looking for opportunities to participate in disaster relief, that they are typically resourceful and that they have an innate curiosity about solving technical issues. Ham volunteers not only can bridge a communication gap when conventional means fail, Haynie suggested, but could be recruited to help restore service or offer on-site guidance to resolving technical and communications problems.

Other discussion focussed on the possibility of forming a highly trained first-response cadre of Amateur Radio volunteers who would undergo training and accreditation plus periodic credentialing. "We will be going to ARES and RACES to recruit the best and the brightest," Haynie said.

A follow-up meeting will be held this spring at ARRL Headquarters. "I think you'll see a lot of positive results and concrete ideas from the next meeting," Haynie predicted. "The next meeting will have a more detailed agenda."

While in Washington, Haynie also met with a representative of the US Department of Transportation concerning ham radio's potential role in homeland security. A meeting will be set to discuss ideas in greater depth, he said.

Capitol Hill

The ARRL party also touched base with several members of Congress or their staff to explore the possibilities of legislation concerning private deed covenants, conditions and restrictions—CC&Rs—as they affect the ability of radio amateurs to erect outdoor antennas. Haynie and ARRL officials also discussed Amateur Radio's role in the aftermath of the September 11 attacks. On the list were meetings with Rep Steve Israel of New York, whose father, Howard, is K2JCC; Mike Iger, legislative assistant to Rep Maurice Hinchey of New York; Sharon Tucker, legislative assistant to Rep Jerry Kleczka of Wisconsin; Rep Greg Walden, WB7OCE, of Oregon; and Rep Pete Sessions of Texas and Jeff Koch, NU5Z, his legislative assistant.

"I was encouraged," Haynie said after the round of meetings. "Since September 11, people have begun thinking in greater depth about what role Amateur Radio can play." He said some congressional staff talked about how telephone service was out or intermittent following the attack on the Pentagon.

Haynie said he has perceived "a greater level of awareness" on Capitol Hill and in Washington as to what Amateur Radio might be

While visiting Congress (l to r) ARRL Hudson Division Director Frank Fallon, N2FF, poses with Representative Steve Israel (D-NY-2nd), the son of Amateur Radio operator Howard Israel, K2JCC, of Phoenix, Arizona, and Jim Haynie, W5JBP.

able to bring to the table "The reception we got was extremely cooperative and very friendly," he said. During the Washington trip, the ARRL renewed its *Memorandum of Understanding (MOU)* with FEMA, which sponsors RACES. The *MOU* calls on FEMA to encourage state and local emergency management officials to establish cooperative relationships with ARRL field volunteers. Under the agreement, FEMA and ARRL will "encourage the use of Amateur Radio resources in the development of state and local emergency operating plans and the use of those plans to support exercises. It became especially important after September 11," Haynie said of the updated MOU. "The sense of urgency was magnified."

ARRL Says FCC is Overstepping its Part 15 Authority

In three separate proceedings, the ARRL has challenged the limits of the FCC's authority to permit unlicensed operation of radio devices that may interfere with licensed services, and suggested that the Commission has expanded the concept of unlicensed devices far beyond what its original concept allowed and far beyond what is permissible.

In comments filed February 12 in ET Docket 01-278, the League said the FCC "cannot legally proceed with the rules proposed for unlicensed RFID tags at 433 MHz," and it asked the Commission not to adopt them. The comments were part of ARRL's continued opposition to what it has called "this ill-conceived proposal" of SAVI Technology to deploy unlicensed transient RF identification devices on 70 cm at much higher field strengths and duty cycles than Part 15 rules now permit for such devices. Among other applications, RFID tags are used to track and inventory parcel shipments and vehicles.

The ARRL hammered away at the issue in its reply comments filed a month later, admonishing the FCC to "not create Part 15 rules to accommodate a single company's product or even one type of RF device." The League also once again asserted that FCC approval of SAVI's proposal would undermine Part 15.

"The proposed elimination of the periodic rate limitations in Section 15.231 constitutes the abandonment of the entire philosophy of regulation underlying the current Part 15 rules governing unlicensed intentional radiators," the ARRL said. "Devices operating at the proposed parameters inherently possess an interference potential which makes unlicensed operation impossible."

The ARRL reiterated its argument that the RFID tags cannot be operated in the US under current Part 15 rules for unlicensed devices and in numerous European and Asian countries cannot be operated at all. The League has pledged to "do whatever it takes" to keep the FCC from permitting the RFID tags on 70 cm and already has made two *ex parte* presentations on the topic to staff members in the FCC's Office of Engineering and Technology.

"The only way to mitigate the interference in this case would be for SAVI to select another band and abandon its plan for high-power, high-duty-cycle operation at 425-435 MHz," the ARRL declared. Opening a second front in its campaign, the League subsequently filed a *Petition for Reconsideration* in response to an FCC *Report & Order* in ET Docket 98-156 to allow fixed point-to-point transmitters in the 24.05 to 24.25 GHz band to operate at field strengths 10 times the level currently permitted under Part 15. The ARRL has asked the FCC to reconsider and reverse a portion of its Order that addresses the FCC's jurisdiction to authorize unlicensed operation of RF devices that pose significant interference potential to licensed services.

"The Commission has expanded the concept of unlicensed devices far beyond what its original concept allowed," the ARRL argued, "and far beyond what is permissible pursuant to Section 301" of the Communications Act of 1934. Amateur Radio is primary at 24.0 to 24.05 GHz and secondary on the rest of the band. The AO-40 satellite includes beacon, digital and analog transmitters in the vicinity of 24.048 GHz.

The FCC proposed permitting the Part 15 devices at the elevated field strengths in response to a *Petition for Rule Making* from Sierra Digital Communications Inc. In its *Order*, the FCC took issue with ARRL's assertion that the FCC should acknowledge that Part 15 devices are only allowed under the Communications Act when they pose no interference potential to licensed services. Calling the ARRL interpretation "overly conservative," the FCC said Part 15 rules appropriately provide for unlicensed devices to "share spectrum with licensed services" and provide adequate protection to licensed services if interference does occur.

In its *Petition for Reconsideration*, filed February 13, the ARRL said the issue is not whether the FCC has jurisdiction to enact reasonable regulations concerning RF devices. "Rather," the League said, "it is whether or not a device which has substantial interference potential to licensed radio services must be *licensed*." The ARRL said the limit of the FCC's jurisdiction to permit unlicensed operation of RF devices "is reached when it is concluded that the operation of such devices has a substantial interference potential to licensed services."

The FCC also had disagreed with ARRL that permitting Part 15 devices at the higher field strengths—up to 2500 mV per meter—would increase the risk of interference to amateur operations at 24.05 to 24.25 GHz. The Commission noted that Part 15 field disturbance sensors have operated in the band at 2500 mV/m field strengths "for years with no adverse affects to other users in the band, including amateur operations."

The ARRL *Petition for Reconsideration* reiterated earlier comments that the proposed power levels and antenna gain figures—33 dBi—were "entirely inappropriate for Part 15 unlicensed facilities." The proposal is tantamount to "a request that additional spectrum be allocated for fixed, point-to-point microwave applications" such as those licensed routinely under FCC's Part 101 rules, the League said.

The FCC "is incorrect in its assumption that it has unfettered jurisdiction" to authorize unlicensed devices regardless of their interference potential, the ARRL concluded. It asked the FCC to make no changes in Part 15 and to "review the rules adopted" by its *Order* "in view of the limits on its jurisdiction" raised by the ARRL.

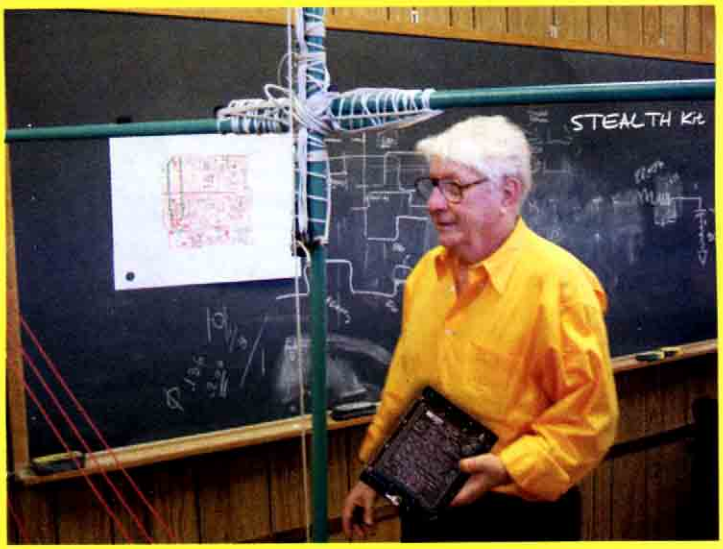
Commenting in a third proceeding, RM-10371—*Petition for Rule Making*—filed by the Wireless Ethernet Compatibility Alliance (WECA), the ARRL again noted that the FCC has routinely acted to authorize unlicensed Part 15 intentional radiators "without technical evidence allowing it to conclude that the devices so authorized will not interfere with incumbent licensed radio services."

WECA has asked the FCC to make additional spectrum in the vicinity of 5 GHz available for radio local area networks (RLANS) and other unlicensed devices. The ARRL said that since the FCC cannot conclude that granting the petition would not interfere with Amateur Radio operation at 5.650 to 5.925 GHz, "it cannot allow the marketing and deployment of unlicensed Part 15 devices without violating Section 301 of the Communications Act of 1934."

Science and Technology Mobilization Act

• As he has earlier hinted (see February 2002 DC Currents), Oregon Senator Ron Wyden, Chairman of the Senate Science, Technology and Space Subcommittee, has begun circulating a draft of his Science and Technology Emergency Mobilization Act, S.2037. This is the legislation that outlines Senator Wyden's NetGuard concept. Wyden is said to be aiming for a hearing in the spring, so the bill may begin to draw media attention. The concept is basically to create a nationwide pool of experts who, in times of major disaster, can be mobilized (like the National Guard) to help put the nation's communications networks back together after an attack. ARRL was asked to provide "input" on the bill before it was drafted, and part of that input may be found at **www.arrl.org/govrelations/arhomeland.html**

A letter from Pierre Goral, President of SGC



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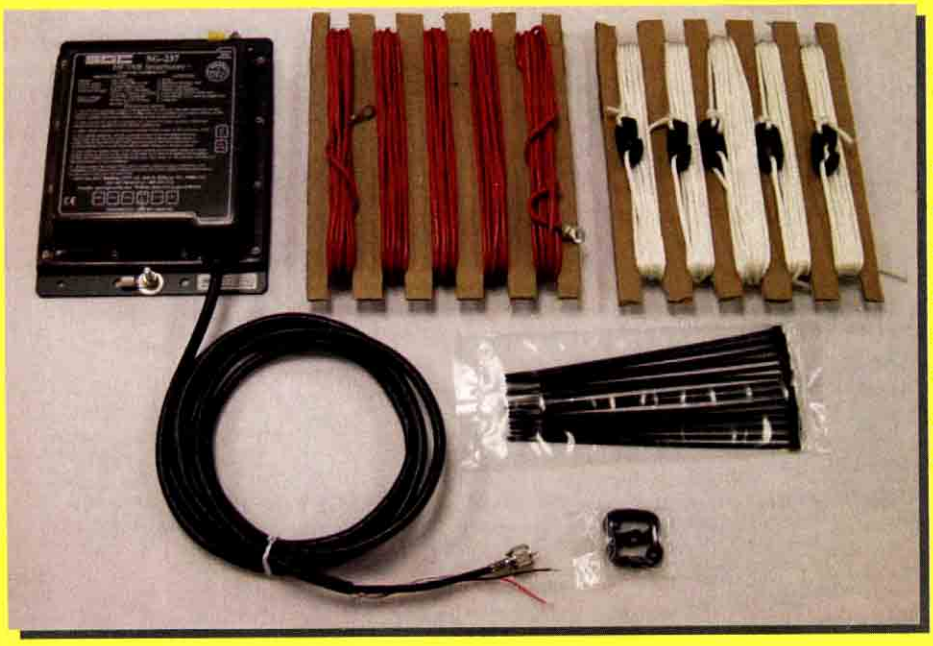

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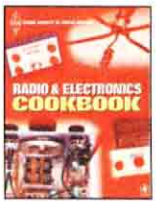

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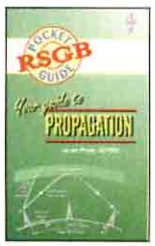

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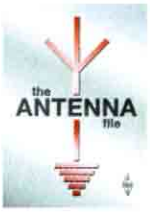

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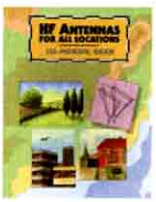

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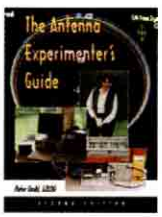

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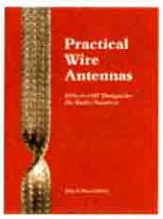

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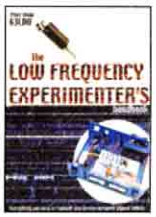

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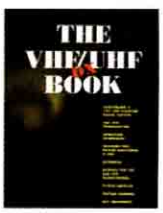

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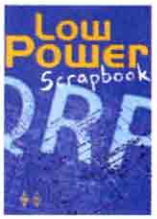

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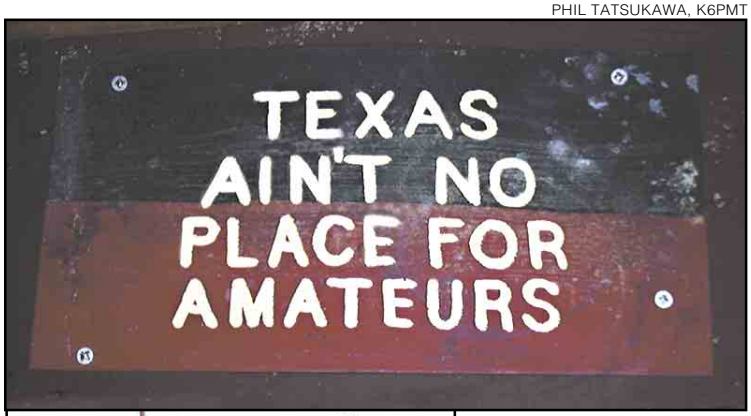
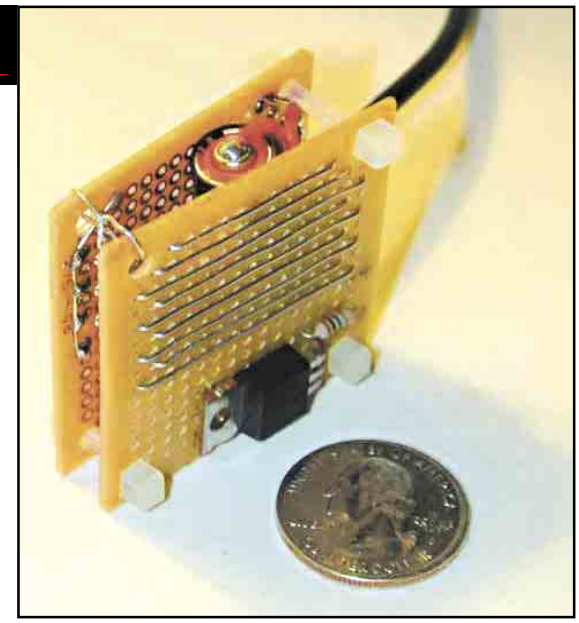


JOE RAUCHUT, N3CRP

Not real hospitable, are they? Phil Tatsukawa, K6PMT, of Glendale, California, found the sign in the above photo posted in Joe's Crab Shack, Grapevine, Texas. The one on the left is in Traumbersville (near Quakertown), Pennsylvania. Joe Rauchut, N3CRP, of Harleysville, comments: "I guess if we're passing through this town March 10, we'd better make sure we're not wearing an H-T or anything else identifying us as a ham. Sounds like these folks are serious!"

WILLIE HEW, KH6NO/W7



In his October 2001 *QST* article, Sam Ulbing, N4UAU, solicited photos and descriptions of designs based on his Touch Pad keyer. Willie Hew, KH6NO/W7, of Las Vegas, Nevada, wrote: "This is my prototype Touch Pad keyer, and best CW QSO was on 20 meters with CT1GPQ—operating stationary mobile with HamStick and 7 W of power!" Willie's version uses a 12-V car door remote control battery.

FRANK GIAMBRONE, KA2VTI

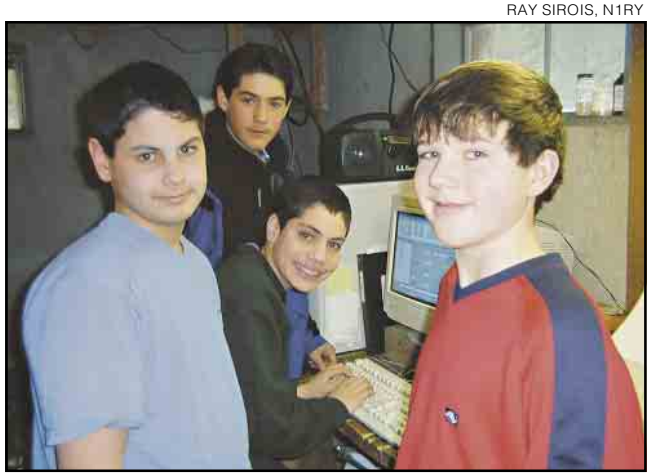
Frank Giambrone, KA2VTI, of Blairstown, New Jersey, asks: "What amount of pressure should I use in the tires this year on the way to Field Day?" While the ARRL Technical Information Service ponders this one, we thought readers would like to see how some Field Day ops will be approaching next month's exercise. For the curious, it's a military surplus AB 1309 Portable Extendable Mast, and it sells for a cool $166,000.

BOB ALLPHIN, K4UEE

BOB ALLPHIN, K4UEE

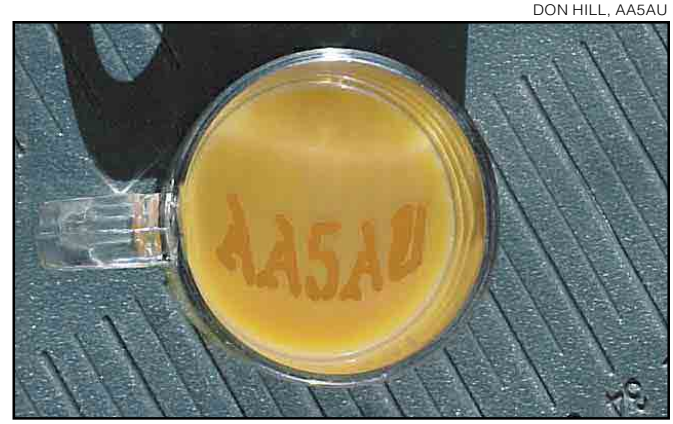
DXpedition Lite: Bob Allphin, K4UEE, of Marietta, Georgia, provided these glimpses of a forbidding land—South Thule Island, part of the South Sandwich Islands. Bob, along with the other members of the 2002 South Sandwich-South Georgia DXpedition, VP8THU, was on South Thule from January 18-21. During the four days, the group braved howling winds and snow, but still managed to make 26k QSOs during 80 hours of operating four barefoot Kenwood TS-50 transceivers. The photo at the left shows the transport and supply ship, R/V *Braveheart*, just offshore. At the right, the array of vertical dipoles, oriented along a cliff to exploit the benefits of salt water. The "back to basics" VP8THU expedition proved that small radios, light generators and simple antennas can get the job done.

RAY SIROIS, N1RY



Four newly licensed hams/Boy Scouts visited K1MV's QTH in North Yarmouth, Maine, in February to join the world championship Yankee Clipper Contest Club and to learn about contesting. They are (l-r) Allen Michaels, KB1HPQ, Jesse Cottingham, KB1GWT, John Shively, KB1GWW, and Andrew Baer, KB1FYQ. Over the past year, they have earned their Radio Merit badge and ham licenses along with most of their dads.

DON HILL, AA5AU



What's going on here? Don Hill, AA5AU, of Harvey, Louisiana, was startled to see a familiar series of letters and numbers in his coffee one recent morning. His explanation: "When I walked outside the back of my office to open the back gate, I set my coffee cup down on an ice chest. When I returned, I noticed my call sign was showing in the coffee. Actually, the coffee cup is a clear mug with my call sign engraved in the side. It was given to me as a gift from Randy, WX5L, during a house warming party. Thanks for the cup, Randy, and the interesting effect it gives."

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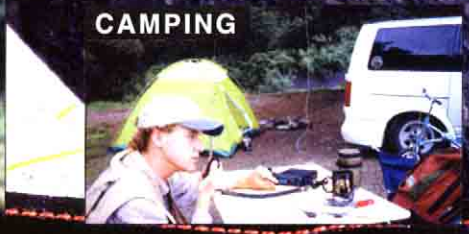

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HAVE WE LOST "THE BASICS"?

♦ I am a fairly new ham; I took the Tech exam back in 1998. I haven't had any formal electronic training since 1970. At that time I was in school and working at the local TV shop. I worked on many black and white, tube type TVs. So my electronics background is limited to trying to remember that far back. I didn't realize I was that old!

While reading the November issue of the *QST*, I realized that a lot of the subject matter is over my head. the "Sardine Sender" article talks about "How to use the A_L factor to wind toroids." I have no idea what he is talking about. I know other hams feel the same way I do. There seems to be a trend away from building or modifying your own equipment. Today it seems that everything is geared to a "buy and throw away" mentality.

Ham radio as a whole used to be geared to building your own equipment and sharing ideas. I feel that we need to get back to that concept because ham radio is losing the essence of its being. Where will the new radio engineers come from if an interest in building and testing your own equipment is not resurrected? How can you instill the pride of accomplishment to the children if "the basics" are lost? How can you teach them?

I live in a rural area and electronics classes are not available to anyone here. The only alternative is to buy books and learn for yourself. As far as I can determine there is nothing available. I contacted ARRL this morning and talked to John Hennessee from Regulatory Info and Mike Tracy from the Technical Department to find some answers. They said that the ARRL does not have an electronics home study course. Why not? They both were really helpful and suggested some publications that would help. Why isn't there a list of ARRL publications that could be put in a package for an electronics home study course? If a "course" could be published and offered by the ARRL, this would help ham radio more than any other program available to hams at present. This "course" should be in book form. I have found that books never run out of power, freeze screen or cannot open because file is corrupted.

I have wanted to do a few projects but realized that I don't have the background for it. I would like to build a tube-type 2-meter FM or HF amplifier. Where in the world would I find that info? What about a solid-state amp? What about the different power supplies? There was a book offered on eBay named *Building Power Supplies*. It is supposed to explain all the different power supplies and how to build them. Where can I get this book? What about simple circuits such as an LED indicator light for a positive or negative voltage circuit. What about an LED circuit that "samples" the signal or voltage?

There should be more articles published geared to the beginner ham. How else will he or she learn? I have seen some of the articles from the '40s, '50s or '60s that are great. Why not reprint more of them? Seems that the hams then were more technically informed than we are now.

It concerns me that this knowledge is being lost. All you have to do is watch the news and wonder what is going to happen to this nation. If we have a catastrophic disaster, will we be able to communicate? What can be done if the power grid goes down for years or there is an EMP attack and most of the electronic equipment is destroyed. Who, at this day and time, can build their own station from scratch? I feel that we, the ham community, are letting ourselves and country down by letting this knowledge get lost. There are many great hams out there that will see what I am talking about and the importance of saving this knowledge. I guess I am putting out a call to all Elmers to help beginning ham operators learn to be better and to not let this irreplaceable information get lost.—*W. A. Brown, KG4AQH, Kingstree, South Carolina*

[Editor's Note: See the ARRL Bookshelf elsewhere in this issue or **www.arrl.org/catalog/** for such publications as *The ARRL Handbook*, *Understanding Basic Electronics* and the *Power Supply Cookbook*.]

TO CODE OR NOT TO CODE

♦ Reference the letter from Eric Funderburk, K5III (March *QST*): I don't know a single CW op who wishes to impose their mode upon anyone; I for one don't even care if the testing requirement is done away with. CW ops will work CW; phone ops will work phone. What we care very much about is the prospect of doing away with the phone sub-bands, which would allow 20 meter SSB roundtables on 14.005… NOT a happy thought.

Then there is the usual wishful promotion about "that old code that no one uses anymore." This morning, on 12 meters, the CW area of the band was alive with signals. I had several very good CW ragchews with fellows in Europe, while the phone sub-band had two QSOs going, details of which related to weather and aches/pains.—*William F. Hiller, N7DM, Port Angeles, Washington*

♦ A recent letter complained that CW is "a barrier to entering the world of HF." CW is my main ham interest, and the only reason why I recently became a ham. CW is not a barrier for many of us. CW is what attracts people like me to ham radio in the first place.

The letter writer says: "On any day, just check out the CW portions of the HF bands with many kHz of dead silence, except for one or two stations. Then compare the phone portions of the bands where interference is common and an open frequency a rarity."

My experience as a CW operator is that there's always plenty of chatter on the CW and data bands. CW uses a ridiculously small bandwidth, so a lot of people make a smaller impact on the band. But in these days of tight spectrum space, that's a good thing, isn't it?—*Peter Hamlin, KC0CXI, Northfield, Minnesota*

OLDER IS BETTER

♦ While younger people are still getting licensed, the majority of our hobbyists has always been in the older age brackets. When I got my Novice license in 1958 I joined one of the only ham clubs in Southern New York. I was 16. The age of the next youngest member was about 25. The next after that was about 40 and up it went to the Old Timers in their 80s.

The younger members were not that experienced and neophytes like me. I sure learned plenty from those Old Timers.

Don't believe the naysayers trying to make licensing requirements easier and easier by claiming that ham radio is dy-

ing because it's full of old guys. My local club just got an 11 year old as a new member. He simply read about it in a book. Certainly it may be difficult for a youngster to enter a meeting full of people 40 to 50 years his senior. He has to have a real desire and nerve. But it happens year in and year out.

Look around at other hobbies that are frequented mainly by males: R/C modeling, hi-fi audio, photography, flying, hot rodding, classic cars, auto racing, sailing, boating, etc. You'll see their club meetings are also full of elder statesmen, many of whom are willing to help those youngsters with the zeal to enter their world. And you don't see those hobbies dying out.

Those "old" guys are a wonderful source of knowledge. Give 'em the respect they deserve. Be thankful they are still around!—*Jay Kolinsky, NE2Q, Pound Ridge, New York*

PROGRESS?

♦ After a decade's absence from Amateur Radio, I re-entered our hobby recently with the purchase of two new "easy to use" transceivers. With luck, a hamfest customer with a degree in computer science will swap me an "old-fashioned" rig for my two unused state-of-the-art (?) transceivers.—*Ed Jones, WB2DVL, Highland Park, New Jersey*

♦ Gigantic 80 foot tall sky-piercing antennas prove what? Why not resurrect old WSC and WJZ rigs? They at least required some degree of craft and skill. Now you crank up the $5k rig and blast holes in the atmosphere. So much for progress.

Does *QST* really believe that the ever-increasing number of "contests" really benefit Amateur Radio? Why not limit contests to a portion of the bands? —*E. J. Hannon, W3BPQ, Downingtown, Pennsylvania*

TNX L1AR

♦ Thanks to the April 2002 issue of *QST* ("Up Front in *QST*"), I just had an epiphany! I have been troubled for years why my signals don't radiate too well over the big hill in my backyard. Now I find out through the pioneering work of Dr Beldar, L1AR, that perhaps they're too heavy! I've been told over the years that certain things flow downhill but never thought of RF energy being one of them. Lars, my trusty lab assistant and ham "wannabe," poses the following question for the good doctor: Is the Gravitational Gain of an RF signal proportional or inversely proportional to the frequency? Since we now know (?) that radio waves have weight (in order for them to be affected by gravity), would a signal on 160 meters have more gain than one on, say, 10 meters since its wavelength is longer (and would, theoretically, be heavier) than the higher frequency signal. Or would it just hit the ground sooner? What a poser! Lars and I have been unable to perform any experiments on this due to an unfortunate accident. Just when we had everything all set up, I sneezed and hit the mike button, zapping Lars with a non-fatal but painful jolt of RF. When he regained his composure, he muttered something that sounded like "gesundheit." I know I've heard that word before but just can't remember where or when.

Also, since I have been licensed for 45 years, would the absorption of RF energy over a long period of time explain my weight gain over the years? If so, maybe this would get me out of the XYL's doghouse. Inquiring minds want to know!

I am troubled by one thing, though. Does Norway have an allocation for 220 MHz? Just wondering.—*Stephen Bird, WS7R, Wickenburg, Arizona*

♦ After 25 years in ham radio, I have finally found the answer to a question that has long eluded me: Why can I hear the DX station so well, but he can't hear me?

Thanks to the short article concerning the gravitational gain experiments being conducted by Dr Beldar, L1AR (page 21, April 2002 *QST*), the answer is now crystal clear. When I receive a signal from my antenna located 60 feet in the air, I get a huge gravitational gain as it falls down the coax to my shack. Thus the strong receive signals. But when I transmit, I'm trying to push my signal up that same 60 foot hill, and the poor signal is too pooped to propagate by the time it reaches the antenna!

Fortunately, the solution is clear. I will move my receiver to the basement of my house and continue to use the 60 foot antenna for receive. I will then move my transmitter to the attic, and connect it to a ground mounted vertical. Thus, I will have gravitational gain on both transmit and receive! No more hearing the DX and them not hearing me! And I sure all the running up and down the steps will make my doctor happy—he keeps telling me I need to exercise!

Thanks for such an eye opening tidbit. I hope you can spare more space in a future issue for Dr Beldar's continued research.—*Joseph L. Rossmiller, AG9Y, Macomb, Illinois* QST

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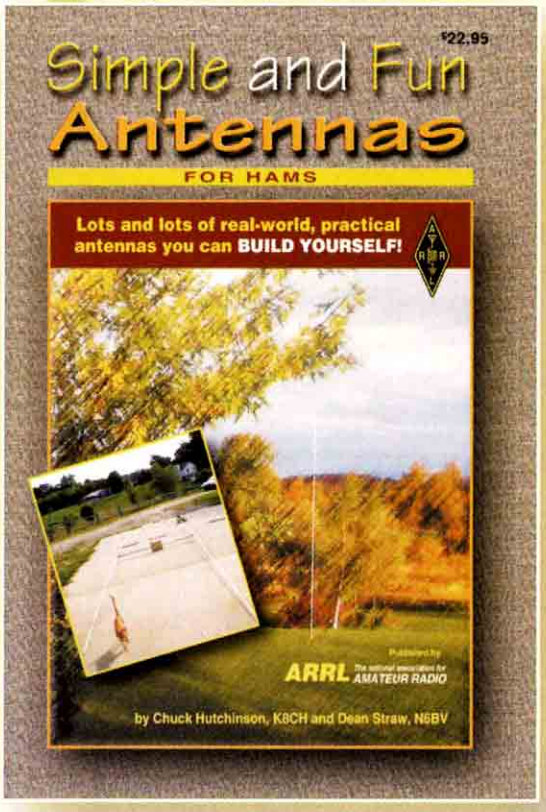

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By James C. Garland, W8ZR

The EZ-Tuner

Part 2—Peek under the hood and see how the EZ-Tuner works its magic.

The EZ-Tuner is a wide range automatic "memory" antenna tuner based on the versatile T-network. Using the powerful BASIC Stamp BS2sx microcontroller, the EZ-Tuner matches a wide range of balanced or unbalanced loads on all HF amateur bands at the legal amateur power limit. The first article in this series analyzed the design of the EZ-Tuner's switched-inductor T-network. Now we're ready to tackle the EZ-Tuner's circuitry, including the RF matching section and microcontroller electronics, the program logic, and the tuner operation. Interested readers can download a complete set of schematic diagrams and fully annotated program listing from the Internet.[8]

Design Overview

The EZ-Tuner consists of two major sections. The first is the T-network matching circuit, which is housed in a shielded internal compartment and whose major components are two high-voltage variable capacitors, a large switched inductor, a toroidal transformer for matching balanced feedlines, and miscellaneous relays and fixed capacitors. Two stepper motors and a rotary solenoid turn the variable capacitors and inductor switch, respectively (Figure 4). A Bird Electronics RF wattmeter line section is mounted on the outside rear panel and measures forward and reflected RF power. The RF matching circuit may be constructed as a stand-alone manual tuner.

The second major section is the controller electronics, which decode the front-panel pushbuttons and rotary encoders (used for manual tuning), store in memory the capacitor and inductor settings and operating frequencies, display current settings on a front-panel liquid crystal display, and move the variable capacitors and inductor switch to their appropriate positions. Most controller components mount on three small printed circuit boards, one of which contains the BS2sx microcontroller, frequency counter interface circuit, and solenoid and

[8]Notes appear on page 34.

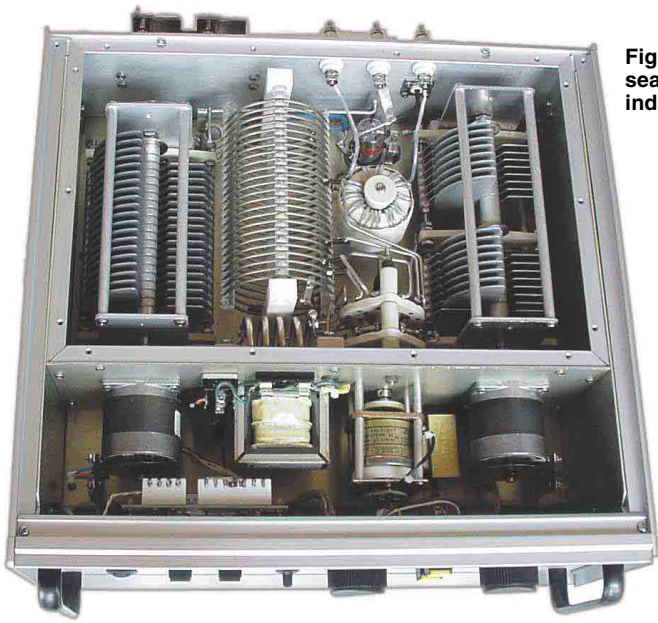
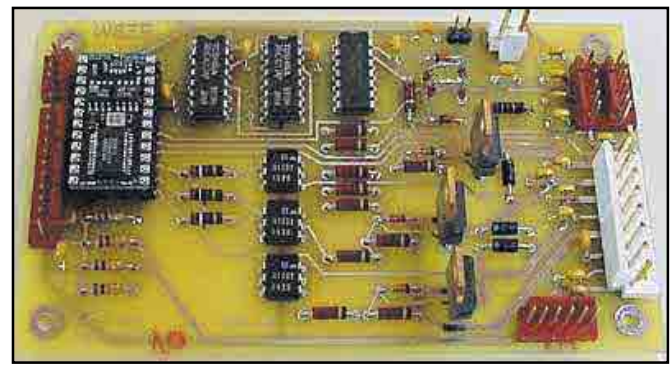


Figure 4—Stepper motor and rotary solenoid shafts extend into the sealed RF subenclosure to operate the T-network capacitors and inductor switch. The 4:1 balun is visible behind the inductor switch.



The BASIC Stamp BS2sx is in the left rear of the 3- × 5-inch printed circuit controller board.

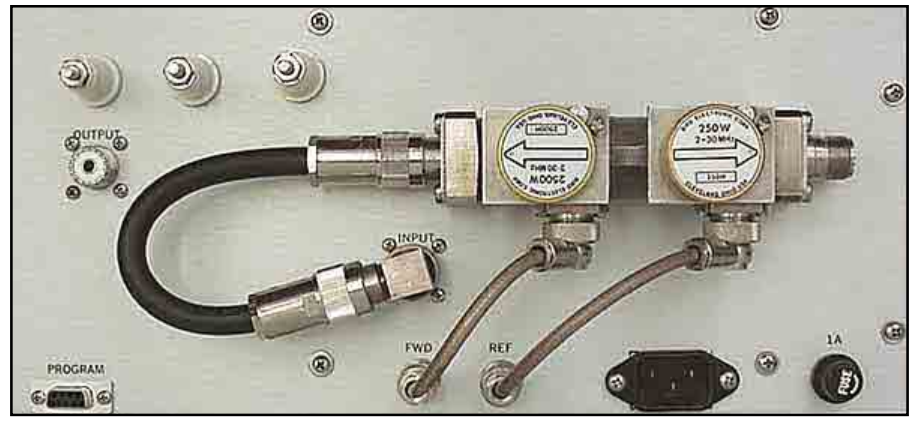
relay drivers. The other two boards contain identical circuits for driving the two stepper motors.

RF Matching Circuit

As shown in Figure 5, RF power first passes through a Bird dual-line section wattmeter and then to bypass relay K2. Two RF sampling elements plug into the line section, a 2500 W (full scale) element for forward power and a 100 or 250-W element for reverse power. Forward or reverse power is selected by meter switch S2 and displayed on front panel meter M1. Plug-in elements having lower power ratings can be used for "barefoot" operation, e.g., with 100-W transceivers.

The T-network's input capacitor C1 is a dual-section variable capacitor rated at 19-202 pF per section, and 3500 V. In order to preserve a low minimum capacitance on the highest frequency bands, the second section of the capacitor is used only on the six highest inductance settings and is switched into the circuit by wafer S1A on the inductance switch.

The T-network inductance is provided by L1 and L2, with S1B selecting 11 possible inductance values up to a total of 20.5 µH. A homemade capacitor C5 samples the RF voltage at the input of the matching network for the controller's internal frequency counter. The output capacitor C2 is a single-section variable capacitor rated at 36-496 pF at 3500 V.



The serial programming port is visible on the bottom left of the rear panel of the EZ-Tuner. A Bird dual line section measures forward and reflected RF power.

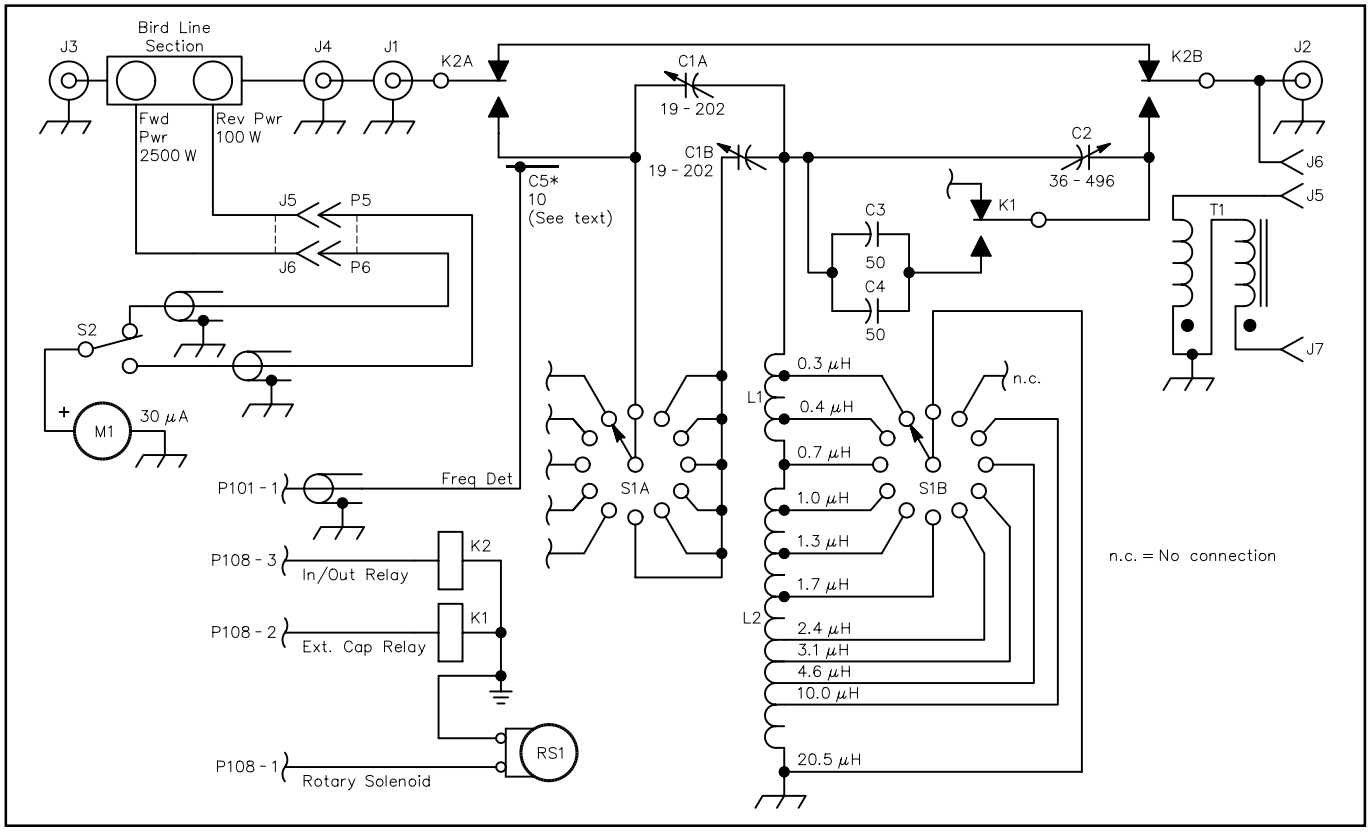


Figure 5—Schematic diagram of the EZ-Tuner matching network.

C1—Variable capacitor, dual-section 19-202 pF/section at 3500 V (Cardwell-Johnson 153-503-1).
C2—Variable capacitor 36-496 pF at 3500V (Cardwell-Johnson 153-6-1).
C3, C4—50 pF at 5000 V ceramic transmitting capacitor (Centralab 858 or equivalent).
C5—10 pF at 3500 V custom capacitor (2.5-inch RG-58/U coax braid over Teflon-insulated #10 wire).
K1—SPDT high-voltage vacuum relay, 26.5-V coil (Jennings RF3A or equivalent).
K2—DPDT high-voltage vacuum relay, 26.5-V coil (Kilovac H16/S1 or equivalent).
M1—Panel meter, 30 µA full scale (Coaxial Dynamics 88953-A and bezel).
L1—0.7 µH (4 turns on 1.5-inch diameter, $^{3}/_{16}$-inch copper tubing).
L2—20 µH (25 turns #10 tinned copper, 3-inch diameter, 4 turns per inch—B&W 2404TL).
RS1—Rotary solenoid, 12 steps per revolution, 24 V dc at 3.11 A (Ledex series 50-L).
S1—2-pole 11-position high-voltage ceramic rotary switch (Radio Switch #86 or equivalent).
S2—1-pole 2-position rotary switch.
T1—Balun, 12 turns, #12 Teflon-insulated wire, bifilar wound on 3 Amidon T-200-2 (red) toroid cores. Cores are insulated with Fiberglass tape.
Wattmeter: Bird Electronics dual-line section with 100H and 2500H elements.

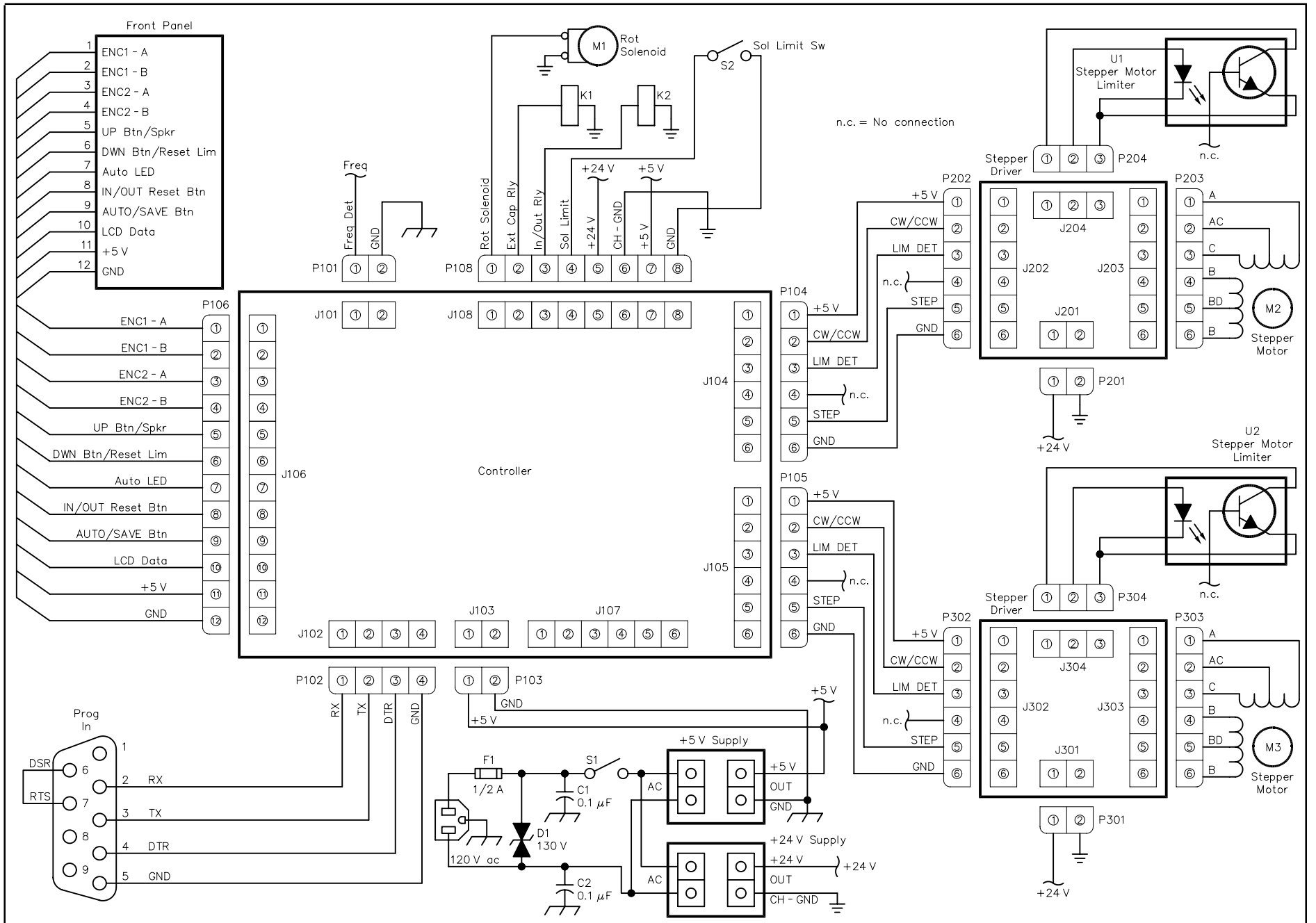
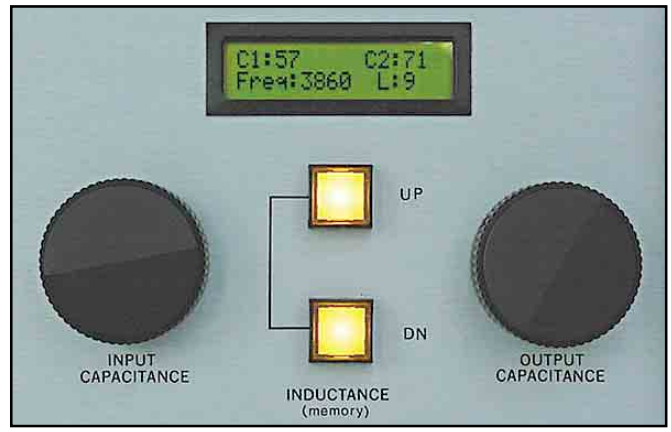

Front Panel
ENC1 - A
ENC1 - B
ENC2 - A
ENC2 - B
UP Btn/Spkr
DWN Btn/Reset Lim
Auto LED
IN/OUT Reset Btn
AUTO/SAVE Btn
LCD Data
+5 V
GND
P106
J106
Controller
J101
J102
J103
J104
J105
J107
J108
P101
P102
P103
P104
P105
P108
Freq
Freq Det
M1
Rot Solenoid
K1
K2
S2
Sol Limit Sw
Ext Cap Rly
In/Out Rly
Sol Limit
+24 V
CH - GND
n.c. = No connection
U1
Stepper Motor Limiter
U2
Stepper Motor Limiter
Stepper Driver
P202
P204
P302
P304
J201
J202
J203
J204
J301
J302
J303
J304
P201
P301
M2
M3
Stepper Motor
CW/CCW
LIM DET
STEP
Prog In
DSR
RTS
RX
TX
DTR
F1
1/2 A
S1
C1
0.1 µF
C2
0.1 µF
D1
130 V
120 V ac
+5 V Supply
+24 V Supply
AC
OUT

Figure 6

Figure 6—Block diagram of the EZ-Tuner's microcontroller circuitry. The controller block is described in the text and complete schematic diagrams of the other blocks can be downloaded from www.w8zr.net/eztuner/.



In the manual mode, knob-turned optical encoders adjust the variable capacitors and pushbuttons rotate the inductor switch. In the automatic mode, the pushbuttons ramp the EZ-Tuner through its 134 memories.

Relay K1 adds twin 50 pF/5000 V transmitting capacitors in parallel with C2 to extend the network's low-impedance matching range on 160 meters. A built-in 4:1 toroidal balun transformer can be strapped to the unbalanced output of the tuner for matching balanced feedlines.

Controller Highlights

The brain of the EZ-Tuner is a Parallax BASIC Stamp BS2sx microcontroller. Having a 50-MHz clock speed and 16 I/O ports, the BS2sx incorporates a real-time "P-BASIC" interpreter in its internal firmware. P-BASIC is an easily learned programming language specifically intended for control applications.

Figure 6 shows the overall organization of the EZ-Tuner's control electronics, the heart of which is a small 3- × 5-inch printed circuit controller board containing the BS2sx and some peripheral components. The main purpose of the controller board is to operate two unipolar stepper motors (which turn the variable capacitors), a rotary solenoid (which turns the inductor switch) and two relays.[9] In addition, the controller board receives input signals from several front panel controls and pushbuttons, and it also sends serial data about current capacitor and inductor settings to a front panel LCD display. The BS2sx is programmed via an ordinary DB-9 serial connector on the back panel of the EZ-Tuner.

The two stepper motors have their own optically isolated driver circuits that are contained on identical circuit boards. These driver circuits receive stepping pulses from the controller, and a voltage level specifying the rotation direction (CW or CCW) and convert these to the phased voltages required by the stepper motors. Each stepper motor also has an optical limit-detect circuit. A slotted metal disk is mounted on the rear shaft of each motor and blocks an LED light beam to a phototransistor, except when the capacitor plates are fully meshed. The driver circuits also contain timers, which power down the stepper motors about 200 mS after their destinations have been reached. The stepper motors, rotary solenoid and relays are powered by an unregulated +24-V 2-A power supply, and the other controller circuitry by a regulated +5-V 1-A power supply.

Figure 7 shows the EZ-Tuner's controller board circuitry. Connector J102 receives serial programming data, while the front panel controls are connected to J106, most pins of which are in turn connected to I/O ports P0-P8 on the BS2sx. The software specifies all I/O ports either as input or output ports. For example, ports P0-P3 are input ports, since they receive signals from the two rotary encoders, whereas port P6 is an output port, since its function is to light an LED when the tuner is in the automatic mode. Some ports serve double duty, such as P4, which in its input state detects when the UP pushbutton is pressed, but which in its output state sends a "beep" to a small speaker.

Ports P9-P11 are connected to opto-isolators U105-U107, which control switching transistors Q101-Q103. The purpose of Q101 is to pulse the rotary solenoid with +24 V; each 50-mS pulse rotates the solenoid shaft 30 degrees. Transistors Q102 and Q103, upon command from the BS2sx, activate the external capacitor relay and the in/out (bypass) relay. The purpose of U105-U107 is to keep +24-V switching transients out of the low-level microcontroller circuitry. The +5-V circuits and the +24-V circuits have separate, isolated ground returns.

The stepper motor driver boards are connected to J104 and J105. The BS2sx outputs a TTL low or high level to specify rotation sense, and a rising-edge step to advance the motors. J107 is intended for a third stepper motor. It is unused in the EZ-Tuner, but is included as a convenience for those who want to use a third stepper motor instead of a rotary solenoid to turn the inductor switch.

Connector J101 receives a sample of the RF voltage appearing at the input of the EZ-Tuner. The RF voltage is buffered by U101A and divided by 100 by decade dividers U102 and U103. The divided square wave output from U102 is read by input port P15 and counted by the BS2sx to determine the transmitter's operating frequency.

Software Description and Program Flow

The logic flow of the EZ-Tuner's control program is lengthy but straightforward. Upon powering up, the controller displays a startup message on the LCD display and begins an initialization sequence that homes the inductor switch, moves the variable capacitors to their fully-meshed positions, and zeros the internal software counters.

After initialization, the controller then executes an auto-recovery routine. The capacitors and inductor are restored to their last-used settings, the tuner is toggled online, and the automatic mode is selected. This auto-recovery feature means that the EZ-Tuner can be operated remotely, without concern about power failures.

In its automatic mode, the tuner looks continuously for an RF carrier at its input. When it finds a carrier of approximately 10 W or more, it measures the frequency to verify that it is in a valid amateur band and then moves the capacitors and inductor switch to the appropriate stored settings. Once the settings have been reached, which typically take about 1 second, the values are displayed on the LCD display.

The software subdivides the amateur bands into 134 frequency segments, which range in width from 10 kHz on 160 meters, to 50 kHz on 10 meters. If the user has not previously stored capacitor and inductor settings for a particular segment, the tuner defaults to settings corresponding to a 50 Ω (1:1 VSWR) match. These 50 Ω "presets" are stored in the BS2sx's EEPROM at the time the control program is loaded.

If the operator subsequently changes frequency or bands, the EZ-Tuner auto-

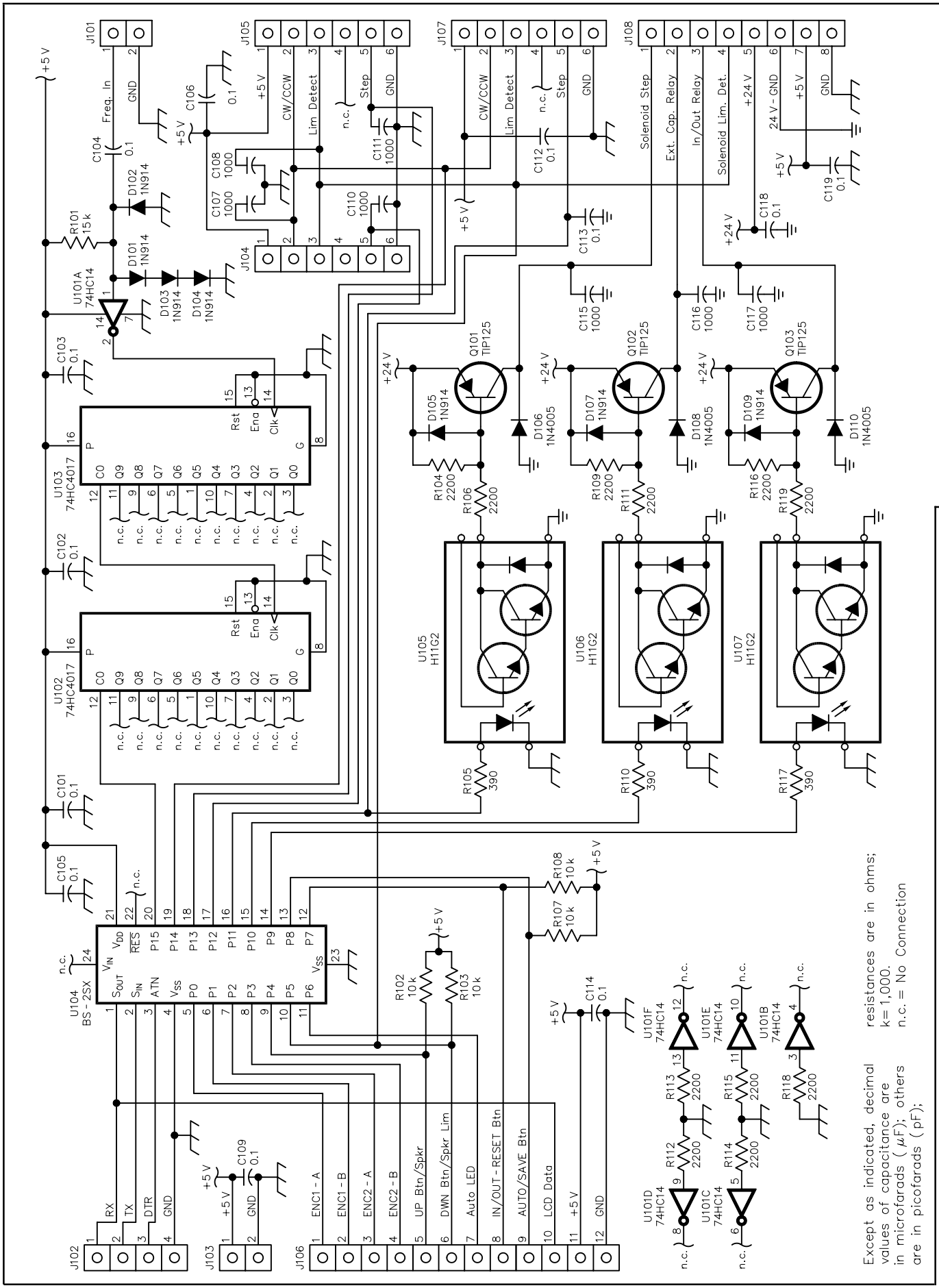

J101
Freq. In
GND
J104
J105
CW/CCW
Lim Detect
Step
GND
J107
CW/CCW
Lim Detect
n.c.
Step
GND
J108
Solenoid Step
Ext. Cap. Relay
In/Out Relay
Solenoid Lim. Det.
+24 V
24 V - GND
+5 V
GND
U101A 74HC14
U101B 74HC14
U101C 74HC14
U101D 74HC14
U101E 74HC14
U101F 74HC14
U102 74HC4017
U103 74HC4017
U104 BS-2SX
U105 H11G2
U106 H11G2
U107 H11G2
Q101 TIP125
Q102 TIP125
Q103 TIP125
J102
RX
TX
DTR
GND
J103
+5 V
GND
J106
ENC1 - A
ENC1 - B
ENC2 - A
ENC2 - B
UP Btn/Spkr
DWN Btn/Spkr Lim
Auto LED
IN/OUT - RESET Btn
AUTO/SAVE Btn
LCD Data
+5 V
GND
Except as indicated, decimal values of capacitance are in microfarads (μF); others are in picofarads (pF);
resistances are in ohms; k= 1,000.
n.c. = No Connection

Figure 7

Figure 7—(left) Schematic diagram of the controller circuit board. Parts are available from Mouser (tel 800-346-6873; www.mouser.com), Digikey (tel 800-344-4539; www.digikey.com), or Jameco (tel 800-831-4242; www.jameco.com). Equivalent parts can be substituted.

C101-C106, C109, C112, C114, C118, C119—0.1 µF ceramic capacitor, 100 V.
C107, C108, C110, C111, C113, C115, C116, C117—1000 pF ceramic capacitor, 100 V.
D101 - D105, D107, D109—1N914 diode.
D106, D108, D110—1N4005 diode, 1 A at 600 PIV.
J101, J102, J104-J107—SIP header, Molex 0.100 in. Number of pins as indicated.
J103, J108—SIP header, Molex 0.156 in. Number of pins as indicated.
Q101-Q103—TIP125 PNP power transistor.
U101—74HC14 CMOS hex inverter.
U102, U103—74HC4017 CMOS high-speed decade divider/counter.
U104—BASIC Stamp BS2sx microcontroller (Parallax Inc, tel 888-512-1024; www.parallaxinc.com/).
U105-U107—H11G2 optocoupler.
Resistors—All resistors are 1/4-W metal film, 5% tolerance, values as indicated.

matically tracks the changes, updating the settings and display as necessary. In the automatic mode, the tuner can also be stepped through its memories by pressing the front panel UP and DOWN buttons, with the LCD display indicating the lower frequency end of each stored segment.

The EZ-Tuner is toggled into its manual mode either by briefly pressing the MODE/STORE button, or by turning either of the front panel knobs. In the manual mode, the knobs tune the variable capacitors with a 5:1 electronic "vernier," and the UP and DOWN buttons step the inductor switch through its 11 possible positions. The LCD display always indicates the updated settings.

Pushing the MODE/STORE button for 0.5 seconds stores the current settings in memory. Briefly pressing the OFF-LINE/RESET button toggles the tuner online or off-line, with the change in status confirmed by a message on the LCD display. Pushing the OFF-LINE/RESET button for 0.5 seconds resets the EZ-Tuner's microcontroller and initiates the power-up sequence. Short beeps confirm brief button presses, while musical 3-tone beeps confirm extended presses.

The EZ-Tuner's frequency-measuring routine illustrates the power of the BASIC Stamp programming language. Measuring the transmitter frequency is more complicated than one might imagine, because an SSB or CW transmission has dead periods that can lead to frequency measurement errors. To overcome this problem, the EZ-Tuner measures the frequency three times. The first time, it briefly polls input port P15 (for 400 µS) just to see if a signal is present. If no signal is detected, then no further polling takes place. If a signal is detected, then port P15 is polled again for 100 mS, the longer polling time being necessary to obtain an accurate measurement. Finally P15 is polled yet again for 100 mS seconds, and in order for a valid frequency to be recorded, both the second and third measurements must agree. All of this logic is implemented in just five P-BASIC program steps:[10]

```
COUNT 15, 1, x
(REM:count voltage steps at P15 for
400us, store result in "x")

IF x=0 THEN skip
(REM:jump to program labeled
"skip" if no signal present)

COUNT 15, 250, freq
(REM:otherwise count again for
100mS, store result in "freq")

COUNT 15, 250, freq1
(REM:count a third time for 100mS,
store result in "freq1")

IF NOT freq=freq1 THEN skip
(REM:jump to "skip" if 2nd and 3rd
measurements differ
(REM:and continue if they agree)
```

The EZ-Tuner's actual frequency-measuring routine is a bit more complicated than shown here, because the code also corrects for timing inaccuracies in the BS2sx internal clock and for rotary encoder "slippage" during the times the counting gate is open. Nevertheless, the example illustrates the ease with which rather complex operations can be implemented.

Operation and Performance

In the automatic mode, the tuner instantly tracks transmitter frequency changes. However, in order to take advantage of this feature, it is first necessary to adjust the tuner manually for each antenna and band segment of interest and

Table 2
A Summary of the Matching Performance of the EZ-Tuner

			Amateur Band (meters)								
SWR	**Load**		160	80	40	30	20	17	15	12	10
16:1	3.1Ω	**Tap #**	10	8	4,5	3	2	2	1	1	1
		Loss	25%	25%	16%	18%	24%	24%	14%	16%	19%
8:1	6.3Ω	**Tap #**	10	8	4,5	3	2	2	1	1	1
		Loss	17%	17%	—	11%	15%	15%	—	—	11%
4:1	12.5Ω	**Tap #**	10	8	4,5	3	2,3	2	1	1	1
		Loss	11%	11%	—	—	—	—	—	—	—
2:1	25Ω	**Tap #**	10	8	6	3,4	3	2	1,2	1	1
		Loss	—	—	—	—	—	—	—	—	—
1:1	50Ω	**Tap #**	10	8,9	6	4,5	3,4	3	2	1,2	1
		Loss	—		—	—	—	—	—	—	—
2:1	100Ω	**Tap #**	11	9	6,7	5,6	4	3	2	2	1
		Loss	—	—	—	—	—	—	—	—	—
4:1	200Ω	**Tap #**	11	9,10	7	6	4,5	3	*	2	1#
		Loss	—		—	—	—	—	*	—	—
8:1	400Ω	**Tap #**	11	10	7,8	6	5	3#,4#	3	2#	2
		Loss	—	—	—	—	—	—	—	—	—
16:1	800Ω	**Tap #**	11	10	8	6	5	4	3	*	2
		Loss	—	—	—	—	—	—	—	*	—

Notes
(1) Table shows the preferred inductor tap number for each band and load. If two numbers are shown in a category, either provides a suitable (low loss) 1:1 match. A pound sign (#) means only a partial match (VSWR ≤ 1.7) can be obtained, and an asterisk (*) signifies no match is possible.
(2) Loss is the estimated percentage of transmitter power dissipated as heat in the tuner for the given tap number. If more than two taps are listed, the loss is that corresponding to the first number. If no power loss is shown, it means the loss is 10% or less.

then to store the settings in the tuner's memory. Pressing the MODE/STORE button for 0.5 seconds overwrites the default 50-Ω presets with the current capacitor and inductor values. This process needs to be done only once for each band segment, since the tuner memory retains settings indefinitely and restores the last-used settings on power-up.

Manually adjusting the EZ-Tuner is not difficult, especially compared to adjusting a roller inductor tuner. However, as with any T-network transmatch, it is important to minimize power loss in the matching network at high power levels. For example, under key-down conditions at the amateur legal limit, a 1-dB power loss means about 315 W of heat are dissipated in the tuner's components.

Fortunately, there are two factors that mitigate this problem. The first is that the duty cycle of SSB or CW signals is significantly lower than 50%, which greatly reduces the average heat load on tuner components. Secondly, losses in a properly adjusted T-network are generally a worry only with low-impedance loads. This fact does not imply that users should avoid matching low impedances, but only that care be taken with extended transmissions (e.g., with RTTY) at high power levels.

Table 2 summarizes the matching performance of the EZ-Tuner on all HF amateur bands. For each load resistance (up to a 16:1 VSWR) and amateur band, the table shows the best inductor switch setting for a match, and the approximate power loss in the matching components. Because of the versatility of the T-network, most loads can be matched with several inductance settings. Using the minimum available inductance assures the lowest possible loss.

From the table, we see that there is not a large performance price to pay for the convenience of the EZ-Tuner's switched inductor. There are only two narrow gaps in the matching range, one on 15 meters and one on the 12-meter band, and tweaking the inductor tap positions could probably have eliminated these. Furthermore, although it is not evident from the table, the EZ-Tuner will tune at least a 32:1 VSWR mismatch on most bands. It will also match a full range of impedances on a future 60-meter band (5.3 MHz), recently proposed by the ARRL.

Part 3 of this series will focus on the construction of the EZ-Tuner. Here, we will provide construction hints, a procedure for positioning the inductor taps, and advice for parts selection and substitution. Information will also be provided for programming the EZ-Tuner and for building a manual version of the tuner.

Notes

[8]**www.w8zr.net/eztuner/**.

[9]A complete circuit description and parts listing of the stepper controller boards can be found in the accompanying Web site; see Note 8. The stepper motors are dual-shaft Superior Electric Slo-Syn models M061-FD-6102 and are rated at 11.2 V at 0.44 A and 200 steps per revolution.

[10]A programming manual for the BASIC Stamp BS2sx can be downloaded free from **www.parallaxinc.com**.

You can contact the author at 310 E High St, Oxford, OH 45056; **w8zr@arrl.net**. QST

NEW PRODUCTS

FIELD SERVICE TOOL KIT FROM XURON

◊ Xuron's TK2100 Field Service toolkit features a precision flush cutter, a heavy-duty stainless steel scissors and a rugged needle-nose pliers that fit into a roll-up, fabric pouch. Packaged primarily for cable and LAN installers, the compact kit fits easily into an attache case or toolbox. The flush cutter and the pliers have cushioned grips and precision return springs; the scissors has beveled, heat-treated blades.

List price: $47. For more information, contact Xuron at 62 Industrial Park Rd, Saco, ME 04072; tel 207-283-1401, fax 207-283-0594; **info@xuron.com**; **www.xuron.com**.

LONG-LASTING CONTACT CLEANER FROM CAIG LABS

◊ CAIG Labs has improved its DeoxIT contact cleaner to provide what it said to be longer-lasting protection for electrical connectors and conductors. DeoxIT is formulated to dissolve oxidation, increase current-handling capacity and provide continuous protection for metal surfaces that are subject to wear, abrasion and atmospheric contamination.

DeoxIT is available in spray, pump, pen, wipe, precision and bulk containers/applicators. For more information, see your favorite electronics parts supplier or contact CAIG Labs at 12200 Thatcher Ct, Poway, CA 92064; tel 858-486-8388, fax 858-486-8398; **caig123@caig.com**; **www.caig.com**. QST

Next New Products

By Matt Kastigar, N0XEU

The St Louis Switcher

Need an inexpensive bench supply that will also run an HF rig for under $10? PC power supplies are getting cheap and used computer chassis are piling up in landfills!

The quickly advancing PC industry has yielded a cornucopia of component opportunities for Amateur Radio homebrewers in the form of discarded equipment. Older PCs are sitting idle in basements and dumpsters just waiting to be dissected for their internal connectors, memory chips, cases—and *power supplies*. Yes, these old computers often have perfectly good switching power supplies that can be suitable for powering a 100-W transceiver requiring 13.8 V at 20 A or more. All you need to do is extract it from the computer cabinetry, clean it up a bit, bump up the terminal voltage and install some connectors, a meter, a fuse and a switch. Here's the step-by-step process I followed in creating a top-notch 20-A supply for my operating bench.

Getting the Parts

You'll first need to procure a PC power supply with a rating of at least 250 W if you wish to ultimately power a 50-W mobile rig, or preferably select a power supply rated at 350 W or more if you wish to power a 100-W transceiver. I bought a 300-W unit at a local surplus house for $5. While there, pick up a set of binding posts ($0.25 each), a 20-W 3-Ω resistor ($0.50 for a metal-cased one with mounting tabs), a power switch if your supply does not have one ($0.75), four stick-on rubber feet ($0.10 each), a 1.5-inch diameter ferrite FT140-43 toroid core ($0.50) and a power cord ($1). The total is about $9, but a well-stocked junk box can reduce this overall price.

Before making any modifications, make sure you have a working unit. Test the supply by loading the 5-V side so that the regulator works. Here's how:

- Verify that the supply is not plugged in. Remove the power cord and put it out of reach.
- Solder the 3-Ω, 20-W resistor across the red wire (5 V) and a black wire (ground).

Connect a multimeter across the yellow wire (+12 V) and black wire (ground). Plug in a power cord and power up the supply if it has a switch. You should measure 12 V and the fan should run. If you've successfully reached this point, you can proceed. If not, get another supply and try again.

Starting the Modifications

Unplug the power cord from both the wall outlet and the supply and set it aside. Unsolder the 20-W resistor and set it aside for now. Open up the supply—it will be dirty and will need to be "blown out." Disassemble the unit as much as possible and clean the supply chassis and fan. An old toothbrush comes in handy here, as will a cheap paintbrush; better yet, you could use a can of compressed air. Be careful not to bend any component leads or to brush too hard; it does not take much to get the tumbleweeds out.

Wires Wires Everywhere

Either 12 or 5 V dc powers the fan, and you should leave these fan wires intact. If the PC board is not marked with voltages where the many wires emanate from it, you can probably assume the following color scheme: red wires are 5 V, yellow wires are +12 V, and black wires

Building the St Louis Switcher

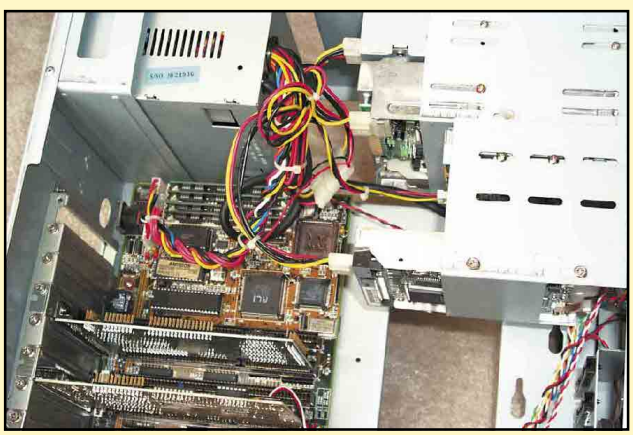
George Heron, N2APB
n2apb@amsat.org

I was quite thrilled to follow N0XEU's guidance in the accompanying article to produce a standard accessory on my operating bench, and with Matt's blessing I present a pictorial essay to augment his fine project.

Here's the finished product. The "standard" switching power supply was removed from an old PC, doctored up in the manner described by N0XEU, and has a new "front panel" fashioned out of printed-circuit board (PCB) material. See how this was accomplished in the following photos.

Step 1—Find an Old PC

With the cover off, you can see the motherboard, bunches o' wires, and then the switching power supply in the upper left hand corner of this photo.

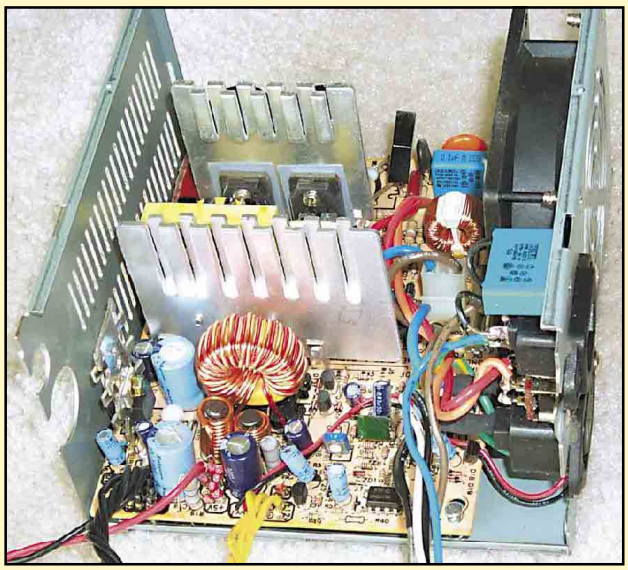


Step 2—Remove the Supply

You probably need to remove other components (like the floppy and hard drives) and various screws holding the supply in the chassis in order to extract it. Be careful not to remove any of the screws in the power supply box itself, as these often hold the ac receptacles.

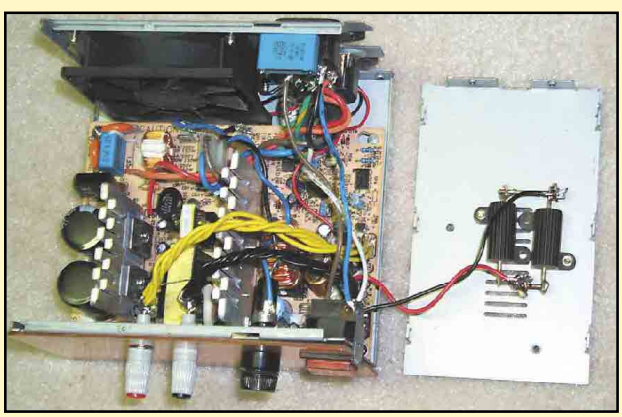
Step 3—Open up the Supply

You may find it a bit tricky to open up the enclosure of the PC switching supply. They often manufacture these things for a simple snap fit. It'll be like trying one of those Chinese Puzzle Boxes you had as a kid. Once you find the tabs holding it in place the top should pop off to expose the PCB and wires inside.



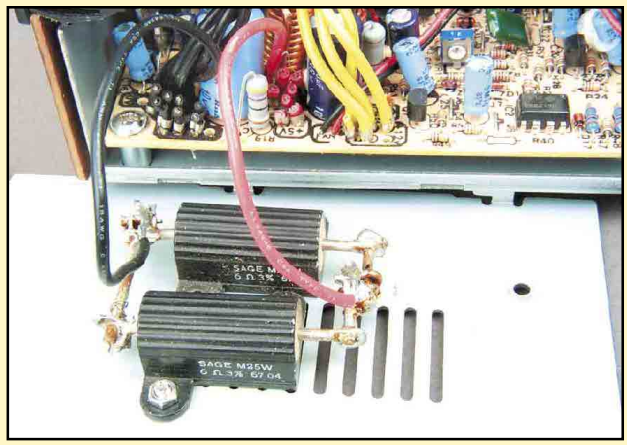
Step 4—Identify the Wires

Once you separate all the wires and untangle them as they come off the PCB, you'll probably have a bunch of red wires (5 V), black wires (ground), yellow wires (12 V), and perhaps another color or two for other purposes. You'll want to snip off (or unsolder) all but a few of each, as N0XEU describes in the text.



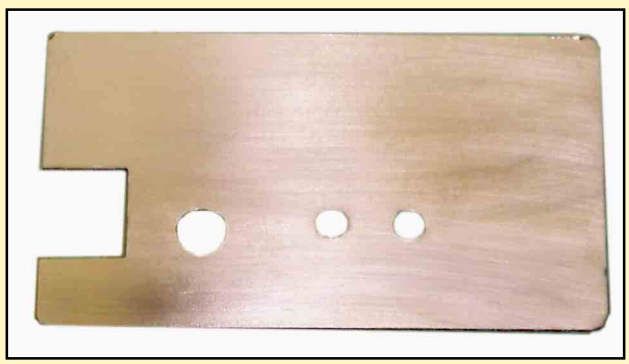
Step 5—Internal Load Resistor

It's important to put a decent load on the 5-V lines to enable the regulator to…well, to regulate! Here you see two 10-Ω power resistors wired in parallel connected to the 5-V wires, providing a constant 1-A load for the regulator circuit.



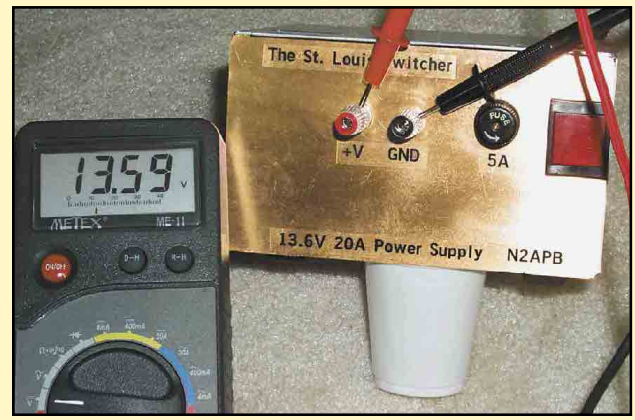
Step 6—The Front Panel

The original power supply chassis "front panel" had some ugly holes, and when the extra holes were put into it for the fuse, binding posts and power switch, it looked awful. So, I cut some double-sided PCB material to size, shined it up and protected it with some Krylon clear lacquer. The components actually held the panel in place over the ratty-looking original chassis.



Step 7—Testing!

I was lucky to find an internal potentiometer in the regulator circuit to allow me to adjust the terminal voltage up to almost 13.6 V, as shown in this photo. Interestingly, as Matt points out in the article, the 5-V line also went up, providing even more "load current" and heat in the power resistors, but that's okay.



Step 8—Using it!

Here you see the St Louis Switcher in proud display being used on my operating bench with the Yaesu FT-817 QRP transceiver, my homebrew Z-match tuner and an SWR bridge. As it turns out, I've recently acquired an ICOM IC-756 transceiver and the St Louis Switcher nicely supplies the added *oomph* on the rare occasion when I need to use the extra power of this 100-W rig.

are ground. Other colored wires may have –5 V and –12 V, but you won't be using these. In fact, you should unsolder (or clip off) all wires but one red, four black and four yellow. You can now remove these extra wires, and snip off the PC motherboard connectors from the seven wires still coming from the supply's PC board. This should clear away lots of space for you to finish up the job.

Mounting the Power Resistor

Mount the power resistor in a clear area on the inside of one of the chassis sides. Use screws, nuts and washers so that the heat generated in the resistor will be "sinked" to the metal side of the supply chassis. Solder a red (+ 5 V) and black (ground) wire to the resistor and use heat shrink tuning or tape to insulate the connections in case they come in contact with anything else (the heat sink, case or other components). The 5 V portion of the supply has to have a load for regulation to occur and this resistor provides it.

Mount the Connectors and Controls

In this section you'll be drilling holes in the supply chassis for mounting the binding posts, power switch, fuse holder and possibly a meter. Before you drill any holes, consider the internal layout of the supply, being aware of heat sinks and vertically mounted parts that you'll need to avoid while installing the extra components.

I mounted two binding posts on the "front" of the supply, but if the back (the power cord side) has more space, or if it is your preference, go for it. Be careful to avoid internal heat sinks and board-mounted components. After mapping out

the holes for the new connectors and controls, drill the holes in the panel being careful to thoroughly remove all metal chips from the PC board and chassis area.

Next, connect the PC board to the binding posts. You can use the existing black and yellow wires, or you can remove them and replace them with single runs of #14 wire. If you use the existing wires, you'll need to use at least 3 of each to handle the current. If you decide to replace them with runs of #14, look for a common area on the PC board where all the yellow wires and all the black wires are connected. You will need to remove the wires at the PC board and enlarge one of the holes to handle the #14 wire. Be careful not to get too close to neighboring copper traces.

In order to ensure that RF hash would not be delivered to the radio ultimately being powered, I wound the wires between the PC board and the binding posts around an FT140-43 toroid. Twelve to 15 turns will do it. This step was necessary in my case, but others might find the supply clean enough without it as N2APB did.

There is usually an on-board miniature fuse—mine was 3.5 A. I removed it and wired the ends of its holder to a panel-mounted fuse holder on the front of my supply and put a 3AG fast-blow fuse in it.

I broke the black (hot) ac line and put a 5-A toggle switch in series with it, mounted on the front panel for convenience. Your supply might already have a power switch.

If you want voltage and current meters, mount and wire these now. The voltage meter connects across the output binding posts (in parallel). The ammeter is in series with the positive post—the "+" meter terminal to the board and the "–" meter terminal to the red binding post.

Check all wiring and remember that there are lethal voltages in this small box!

Increasing the Terminal Voltage

At this point you have a 12-V bench supply, capable of supplying at least 12 A. But many mobile radios will not work or will not operate at full output power with only a 12 V supply, as they are specified for 13.8 V (automobile voltage). You'll probably be able to adjust your supply to provide this increased terminal voltage.

There is usually a single regulator used for both the 5 V and the 12 V portions of the supply and changing its voltage divider resistors will change both output voltages. Voltage regulation is usually achieved by means of pulse-width modulation and the IC is probably a house-numbered part. If your supply has a voltage adjust pot, you're in great shape and you can easily adjust the supply up to 13.8 V. If not, however, before you even start this project, you should determine whether the IC in the power supply you want to use has enough identification to allow you to obtain a data sheet that tells you how to set up the voltage dividers. There are plenty of power supplies available for a few dollars at most ham flea markets, so it should be easy enough to find one you can work with. In some cases, 12 V may be perfectly fine for your application, so you may not need to adjust the supply at all.

If you can change the voltage divider, follow the traces from the pins on the regulator to find the control resistors, which are most likely the only precision resistors on the board. This is a vague description, but because of the different flavors of power supplies, I cannot be more specific. I replaced two resistors according to the component data sheet example and the output went from 12.0 V up to 13.5 V, which was close enough to my 13.8 V target.

Stress-Testing the Power Supply

When I put a load on this supply, I found that it was able to maintain 13.2 V up to a load of 15 A (200 W). The voltage drops to 12.5 V at a load of 17 A. The heat sink gets warm to the touch—caution: some heat sinks are electrically "hot"! With a load of 17.5 A, the 3.5-A fuse on the ac side of the supply let go. With a 350-W supply, 20 A (continuous) can be reached. The 5-V supply now draws minimal power, with the lion's share being available for the 13.5-V terminal output. Further increases in load current are not feasible as we are reaching the limitations of the PC board traces for current.

N2APB's version of the power supply (described in the sidebar of this article) was tested in the ARRL Lab with generally good results. Noise on the output was about the same as current ham-market switching supplies. You can always add the ferrite mentioned earlier if you want to reduce it even more. Output ac ripple was quite low at 15 mV worst case. Load regulation was a bit on the poor side—no-load voltage was 13.55 V, and with a 20-A load the output was 12.77 V. Although not a serious drawback, it isn't as good as higher-cost switchers. This is, however, an economical approach even if you buy a 400+ W PC supply new from a dealer. Such a supply might cost about $50, which is still quite a bit less than a ham-market switching supply.

Batten Down the Hatches!

Now that you're done making the mods to turn your PC supply into a custom accessory, you can button up the chassis. Be careful not to pinch any wires during reassembly. Take your time and use nylon tie wraps to keep wiring away from heat sinks and the fan blades.

If you build this supply, please send me an e-mail describing how it worked for you and what modifications you made. A local ham, Ken Gianino, WB0QNA, tied several "stock" switchers together to form a 24-V supply for a telephone system at his office. What applications do *you* have?

You can contact the author at 28 Woodcrest Dr, Ladue, MO 63124-1468; **n0xeu@arrl.net**.

NEW PRODUCTS

RIGRUNNER DC POWER PANEL

◊ The RIGrunner offers a safe, convenient way to power up to 12 devices from a single dc source. The panel is rated at 40 A maximum, fuse protected. Each RIGrunner outlet uses secure Anderson PowerPole connectors and is individually fused with automotive ATC/ATO fuses (supplied). The fuses are easily accessible for quick changing if necessary. The RIGrunner also provides visual (LED) and audible overvoltage and undervoltage indicators. West Mountain Radio, 18 Sheehan Ave, Norwalk, CT 06854; tel 203-853-8080; **www.westmountainradio.com**. $99.95.

Previous • Next New Products

STRAYS

2002 NORTH AMERICAN METEOR SCATTER RALLY

◊ The 2002 North American Meteor Scatter Rally will be held 0000 UTC April 27, 2002 through 2359 UTC May 5 during the Eta Aquarids meteor shower. The object is to work as many stations as possible, in as many Maidenhead grid locators as possible, via meteor scatter on the amateur bands above 50 MHz. Complete Rally rules are available on the Web at **www.qsl.net/wa5ufh/**.

Next Strays

By Taylor Davidson, N4TD

A Microphone Adapter for the IC-706

Want to add the flexibility of using desk mikes, headset mikes and sound card audio with your portable ICOM transceiver—without constantly plugging and unplugging a maze of cables? This easy-to-build adapter will fit the bill!

Since its introduction, the ICOM IC-706 compact transceiver (in its various flavors) has been very popular. I've enjoyed using my Mark IIG model for mobile and fixed-station operating. One characteristic I found inconvenient, however, was the microphone connector. I wanted to be able to use my ICOM SM-20 desk microphone or a headset (with a boom microphone) with the otherwise-versatile IC-706. One solution is ICOM's OPC-589 adapter cable, which converts the rig's eight-pin modular connector to an eight-pin circular jack that can accommodate standard ICOM desk microphones. Although the adapter is useful, I wanted a bit more flexibility and the ability to connect ICOM desk microphones, other microphones, boom microphones and even computer sound cards for digital operation. The simple project described here meets all of these requirements.

Circuit Description

Refer to the schematic diagram shown in Figure 1 to see which components are associated with each of the various functions.

J2 is an eight-pin circular microphone jack for connecting conventional ICOM microphones, such as the SM-6, SM-8 or SM-20.

J4 allows mikes with electret condenser elements (found in many boom mikes) to be used. C2 blocks the dc voltage present on the microphone input lines of most ICOM transceivers. R2 and R3 form a voltage divider to set the dc voltage supplied to the condenser microphone plugged into J4. The values of R2 and R3 were chosen to drop the 8 V dc from the transceiver to 1.5 V, when loaded down by a typical electret microphone. You may need to adjust the value of R2—with the microphone element connected—to obtain the voltage required for your particular microphone.

J5 is an audio input jack for microphones (with dynamic or other non-electret elements) or other sources such as computer sound cards, tape recorders, etc. Capacitor C4 blocks the 8 V dc on the transceiver's microphone line.

Switch S1 switches the transceiver's microphone input to the external microphone jack, J2, or auxiliary audio source on J4 or J5. I found this switch convenient in that I can select the desk microphone, a headset microphone or a computer interface without unplugging a bunch of cables. Switch S1 can be eliminated, and all input sources tied together, if you do not plan to connect more than one input source at a time.

J6 is the receive-audio output jack. I used a $^1/_8$-inch miniature stereo phone jack so stereo headphones can be used without an inconvenient adapter. Resistors R4 and R5 add a little series resistance to prevent dead-shorting the audio signal to ground if a mono plug is inserted in the jack. The receive audio provided at the radio's microphone connector is controlled by the front-panel volume control. To mute this audio you need to insert a plug in the IC-706 headphone jack.

The interface box provides some useful flexibility in controlling the transceiver's push-to-talk line. The line is connected to pin 5 of microphone connector J2 so the push-to-talk switch on the microphone works as expected. Switch S2 is a momentary pushbutton switch for controlling the PTT function when using boom mikes or other microphones that don't have built-in PTT switches. Switch S3 is an SPST switch that can be "locked on" for longer transmissions. An external PTT switch (such

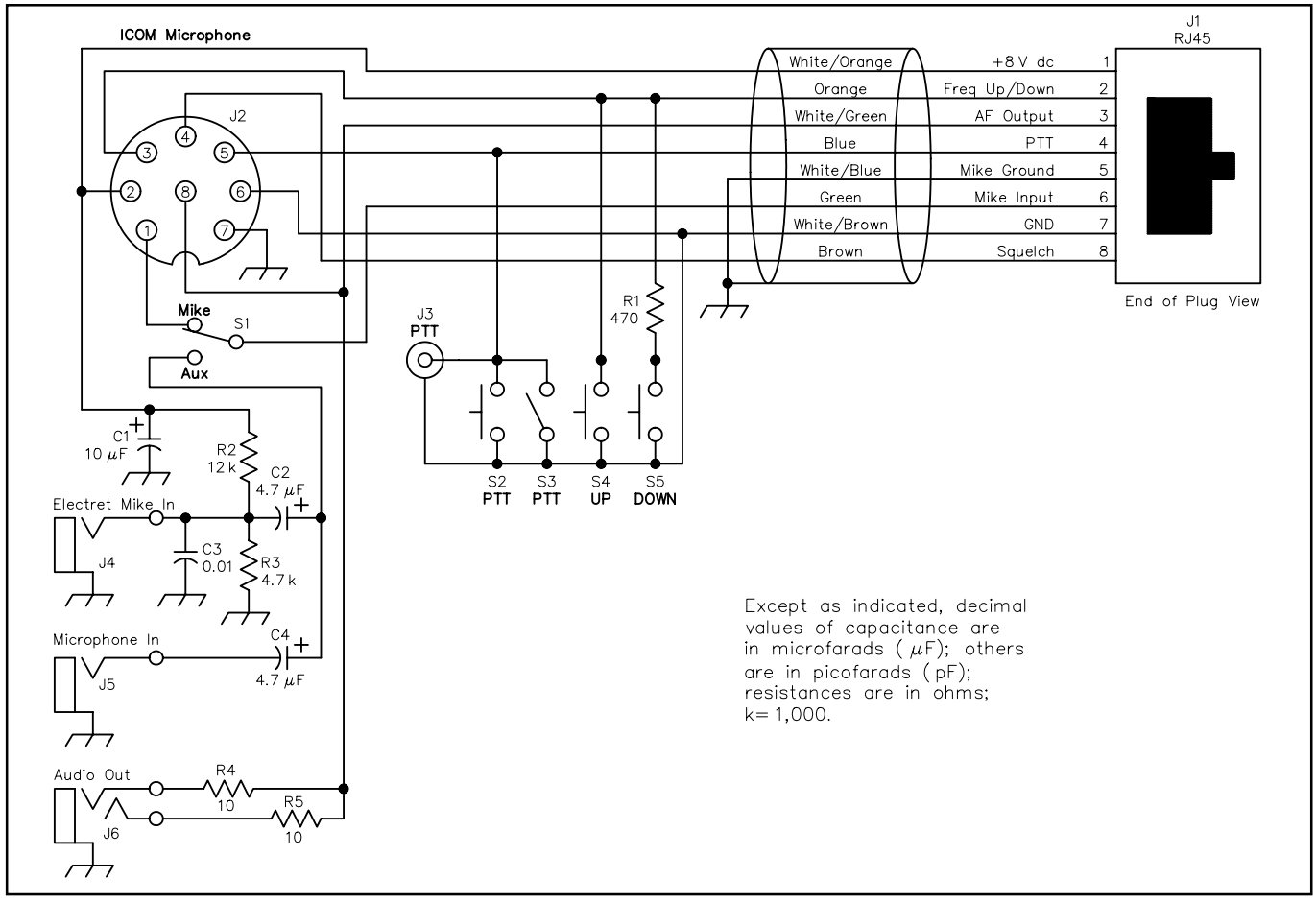


Figure 1—The schematic diagram of the IC-706 microphone adapter. Except as noted, all parts are available from RadioShack (www.radioshack.com), Mouser Electronics (1-800-346-6873 or www.mouser.com) or Digi-Key (1-800-344-4539 or www.digikey.com). Part numbers in parentheses are RadioShack.

C1—10-µF electrolytic or tantalum, 10 V or higher (900-2160).
C2, C4—4.7-µF electrolytic or tantalum, 10 V or higher (272-1024).
C3—0.01-µF ceramic capacitor (272-160).
J1—RJ-45 connector and cable assembly (278-790).
J2—8-pin panel-mount mike connector (available from Ocean State Electronics, tel 1-800-866-6626; www.oselectronics.com; part no. P700).
J3—RCA phono jack (274-346).
J4, J5—1/8-inch mini mono phone jack (274-251).
J6—1/8-inch mini stereo phone jack (274-246).
R1—470-Ω, 5%, 1/8 or ¼ W (271-1317).
R2—12-kΩ, 5%, 1/8 or ¼ W (900-0244).
R3—4.7-kΩ, 5%, 1/8 or ¼ W (271-1330).
R4, R5—10-Ω, 5%, ¼ W (271-1301).
S1—Submini SPDT toggle switch (275-613).
S2—Momentary pushbutton switch (275-1566).
S3—Submini SPST toggle switch (275-612).
S4, S5—Momentary pushbutton switch (275-644).
Case—Hammond 1590ABK (Mouser part no. 546-1590A-BK).

as a foot-operated switch or a computer-controlled switching circuit) can be plugged into jack J3.

Switches S4 and S5 serve the same purpose as the UP and DOWN switches on ICOM microphones. They can be used to tune the transceiver's frequency up or down in VFO mode or to select channels in memory mode.

J1 is the modular microphone connector that plugs into the IC-706 microphone jack. The pin numbers for J1 shown in the schematic are the same as those found in the radio's instruction manual.

Construction

This is a relatively simple project that should be good for first-time home-brewers. The wiring isn't critical, as the highest frequencies involved are in the audio range. The component count is low and all of the parts are relatively easy to obtain. Builders may want to substitute on-hand parts for the switches and connectors. One of the great things about home-brewing is that you can make it the way you want it.

My starting point for building this project was finding a suitable enclosure. After searching the catalogs I settled on a box made by Hammond Manufacturing. The Hammond part number is 1590ABK. This enclosure is of cast aluminum construction, which I prefer because cast aluminum boxes are very rigid and provide excellent shielding.

I wanted to keep the finished product as small as possible and, as shown in Figure 2, the project fits in this enclosure without much room to spare. If you are concerned about wiring in a tightly packed box or prefer larger connectors or switches, simply use a larger box. Again, construction isn't critical, and any enclosure that has enough space to mount the components can be used—as long as it's made of metal to ensure adequate shielding.

The modular microphone connector found on IC-706 radios was a technical issue in building the audio interface. A crimping tool is required to install these modular connectors, and the correct wire type must be used to assure a good connection.

While investigating this connector I discovered that the IC-706 microphone connector is same eight-pin RJ-45 modular connector used on standard Ethernet (LAN) cables. So, I took the cheap and easy approach and cut off one end of a standard Ethernet cable with the connector already installed.

Shielded Ethernet cables are available, but I couldn't find one locally and I already had an unshielded cable on hand. I added shielding by slipping a length of shield braid that I removed from a piece

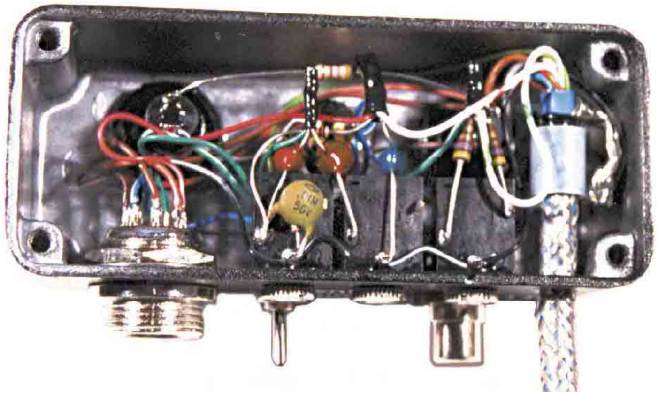


Figure 2—A view of the internal wiring of the adapter.

Figure 3—The adapter's mike cable (a piece of RJ-45 LAN cable) is shielded with braid from a piece of RG-58 coax and fixed in position with heat-shrink tubing.

Figure 4—The front/top view of the adapter.

Figure 5—The rear/top view of the adapter shows the button, switches and connectors.

of RG-58 coaxial cable over the outer jacket of the mike cable.

Figure 3 shows the shield braid on the outside of the cable, fixed in place by heat-shrink tubing over the braid end to prevent raveling. The wire color code for the cable, as shown in Figure 1, is based on the EIA/TIA 568B Ethernet cable standard. To make sure everything works the first time, however, verify the color code with an ohmmeter. Some manufacturers play fast and loose with cable color codes.

The only other construction note involves the ground and common connections on the IC-706 microphone connector. ICOM uses separate ground connections for the microphone element and the PTT/control switch. In other words, the common connection for the PTT and the UP/DOWN switches is not the same common connection used for the microphone. I kept the commons separate to comply with ICOM's wiring scheme. To do so I isolated the external PTT phono connector shield from the enclosure with shoulder washers. All other connector frames and the enclosure are connected to the microphone common for correct audio shielding.

Figure 6—The rear/bottom view.

Operation

I've found this microphone adapter to be a very useful accessory for my IC-706. The eight-pin microphone connector allows me to use my ICOM SM-20 desk microphone with the IC-706. The interface should also work with the SM-6, SM-8 or other microphones that work with current ICOM transceivers.

Headset operation has also been enjoyable. I used several inexpensive headset/mike units marketed for use with computer sound cards. They're available with double (stereo) or single headphones. The single headphone versions, leaving one ear open, would be useful for mobile operation.

All of the computer headsets I looked at had electret microphone elements, and all were rated to operate at 1.5 V dc. Simply plug the microphone into J4 and the earphone into J6. You may need to adjust the microphone gain in the IC-706 menu for correct modulation with particular boom microphones. My headset microphone, however, works fine at the same gain setting used for the radio's HM-103 hand microphone. I've received good transmit audio reports when using low-cost computer headsets. And if you turn on the VOX or plug a footswitch you're set for hands-free operation. Figures 4, 5 and 6 show the location of the jacks and switches.

Heat up the soldering iron and build this simple adapter—it will add a lot of operating convenience to the IC-706.

Taylor Davidson, N4TD, was first licensed in 1965 as WN4YIC. He earned his Amateur Extra class license in 1972, and has had his present call sign since 1977. He has been an ARRL member since 1965. His professional experience includes hardware design, software development, product and software testing, project management and quality management. You can reach the author at PO Box 30506, Knoxville, TN 37930-0506; **taylor.davidson@att.net** *or* **n4td@arrl.net**.

By L. B. Cebik, W4RNL

A 6-Meter Quad-Turnstile

Looking for improved omnidirectional, horizontally polarized performance? This 6-meter turnstile uses the quad loop as a foundation.

Turnstile Principles and Limitations

Figure 1 shows the classic turnstile configuration: Two dipoles at right angles to each other. The main feed line feeds one of the dipoles. A ¼ λ phasing line runs from the first dipole and feeds the second. If the phasing line is exactly ¼ λ long (or 90° electrically) and if the impedance of that line is a match for the resonant impedance of the individual dipoles (70 Ω), then the second dipole will have a current magnitude that is identical to that of the first dipole but the dipole currents will be 90° out of phase. Proper current phasing is required to obtain a nearly circular pattern with no more than about 1 dB gain variation. This ideal condition is called quadrature.

The standard dipole-turnstile has some limitations. The system feedpoint impedance is 35 Ω and requires a matching system if the 1.45:1 SWR level is not satisfactory. Special impedance-based systems that simultaneously obtain proper phasing and a 50-Ω match tend to show distorted patterns because, while they present a good match to the main feed line, they fail to achieve the proper current conditions on the two dipoles. Indeed, the SWR curve for any turnstile is so broad that it is useless as an indicator of proper antenna operation.

The dipole-turnstile has a second limitation: If we operate the antenna too far from the design frequency or if we carelessly construct the antenna or phasing line, then the pattern will no longer be omnidirectional. Instead, it becomes a bidirectional oval with an increasing differential between maximum and minimum gain as we drift from the design frequency. Unfortunately, SWR will give us

An overall view of the quad-turnstile on the assembly and test stand. I took this photo during initial tests before adding the perimeter cord and taping down the phasing line and feed line.

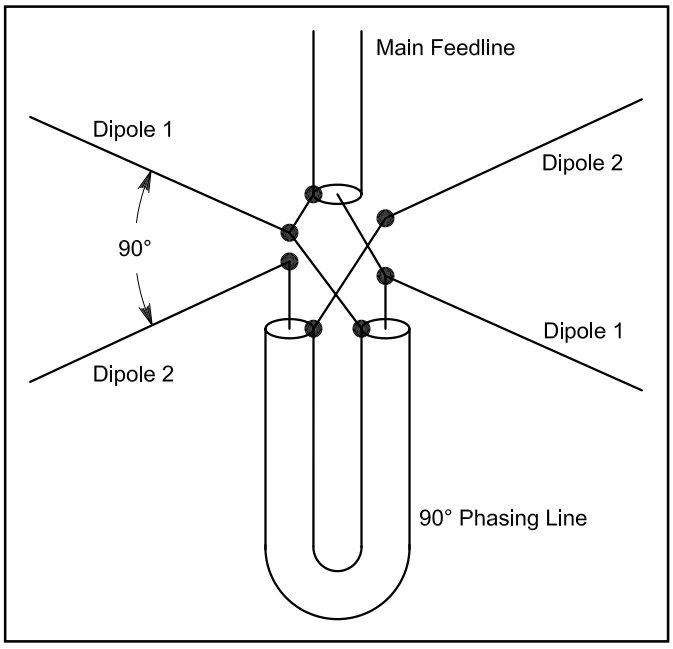


Figure 1—The general outline of a dipole-turnstile. The feedpoint connection scheme also applies to the quad-turnstile described in the text.

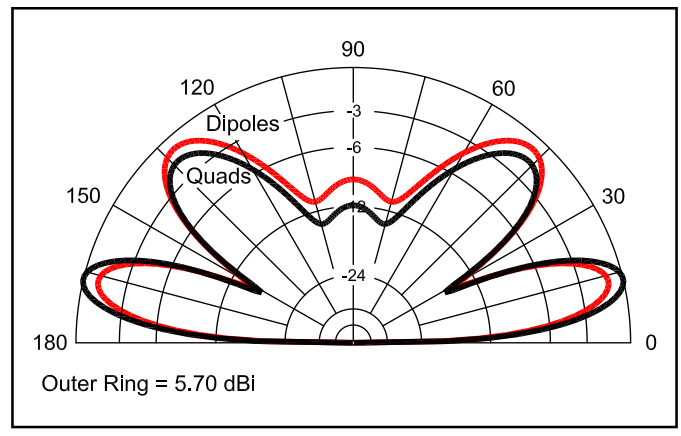


Figure 2—Comparative elevation patterns for a dipole-turnstile and a quad-turnstile when both antennas are 1 λ above ground.

no clue to the drift. Careful design and construction are the keys to effective turnstile operation.

A third limitation of the dipole-turnstile results from the fact that the strongest radiation is broadside to the pair of dipoles. In free space, the H-plane radiation is stronger than the E-plane radiation. Ground reflections permit the dipole-turnstile to develop a usable pattern. Figure 2 shows the elevation pattern for the dipole-turnstile. At 1 λ above ground the second elevation lobe is actually stronger than the lowest, the lobe we use for point-to-point 6-meter communications. One wavelength is about 20 feet at 6 meters—a typical height for casual operation.

Figure 2 also shows the elevation pattern for a pair of quad loops in a turnstile configuration that partially corrects the radiation pattern problems. This antenna's lower lobe is the strongest and in addition, shows about 1 dB additional gain. Figure 3 compares the azimuth patterns for the two antennas at an elevation angle of 14°. The quad-turnstile not only has more gain, but its pattern is slightly more circular than that of the dipole-turnstile.

For contrast, Figure 4 shows the azimuth patterns of the lower lobes with the antenna operated 5% off-frequency (53.025 MHz). The effect—a radically distorted pattern—is equivalent to cutting the loops 5% too long. The current magnitudes on the elements of both types of antennas are no longer the same, and the current phase angle between elements is no longer 90°. The quad-turnstile may offer a bit more gain, but it is just as susceptible as the dipole-turnstile to both construction and operating errors.

Regardless of important design sensitivities of turnstiles in general, the quad-turnstile has enough advantages over the dipole-turnstile to warrant consideration if you are just beginning to look for an omnidirectional horizontal antenna for 6 meters.

Building a Quad-Turnstile

The photographs will give some perspective views of the basic quad-turnstile, while the sketches of construction details provide dimensions and details. A quad-turnstile will maintain its omnidirectional pattern with about a 1-2% error either in construction or operating frequency. Therefore, the quad-turnstile shown here has been optimized for 50.5 MHz using AWG 14 bare copper wire. Do not use the listed dimensions with insulated wire, since insulation gives antenna wire a velocity factor that ranges from about 0.95 to 0.99, depending upon the thickness and composition of the insulating material. If you choose to use insulated wire, first construct a single quad loop element and bring it to resonance at the design frequency. The dimensions you obtain for this antenna can be copied to the second loop.

Figure 5 shows the dimensions of a quad-turnstile based on a diamond configuration. There is no significant radiation difference between a square quad loop and a diamond-shaped loop. The diamond allowed a very simple form of construction and became the basis for the quad-turnstile. Table 1 is a bill of materials for the antenna.

The Phasing line

A resonant quad loop has a feedpoint impedance of just about 125 Ω. We connect the two loops of the quad-turnstile exactly as we would connect a dipole-turnstile. We need a 90° (¼ λ) phasing line having this characteristic impedance (Z_0). RG-63, carried by the Wireman, is ideal for the job. The resulting antenna feedpoint impedance is 62 Ω, which requires no special matching to a standard 50-Ω main feed line if a 1.25:1 SWR is acceptable. (In practice, the minimum SWR may be about 1.3:1 to 1.4:1, depending upon the reactance introduced by the leads between the loops and the coax connectors.)

A wavelength at 50.5 MHz is 233.72 inches, so a quarter-wavelength is 58.43 inches. However, the listed velocity factor of RG-63 is 0.84. Therefore, 49.1 inches (58.43 × 0.84) will be the correct physical cable length to give a 90° electrical length. When cutting the cable, include the coax connectors in the measurement of total cable length, since they are part of the shielded cable section.

Having prepared the phasing line for

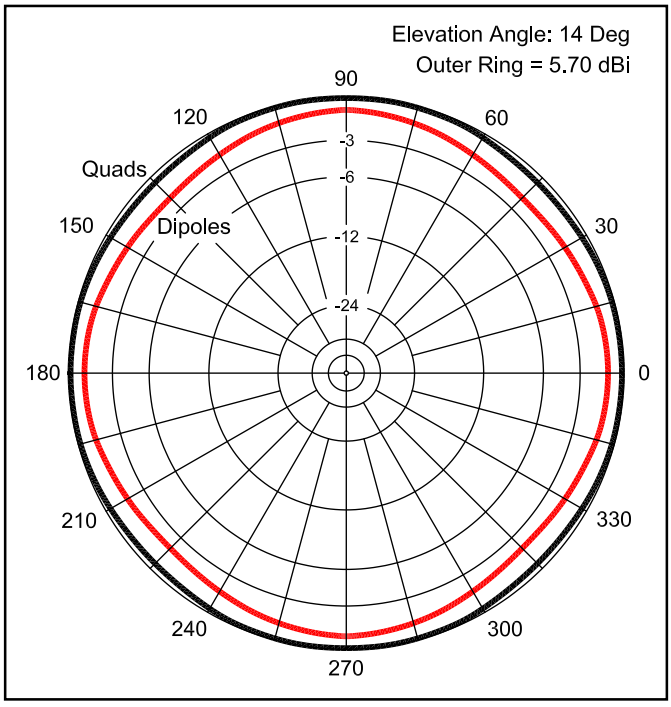


Figure 3—Comparative azimuth patterns for a dipole-turnstile and a quad-turnstile when both antennas are 1 λ above ground. The elevation angle is 14°.

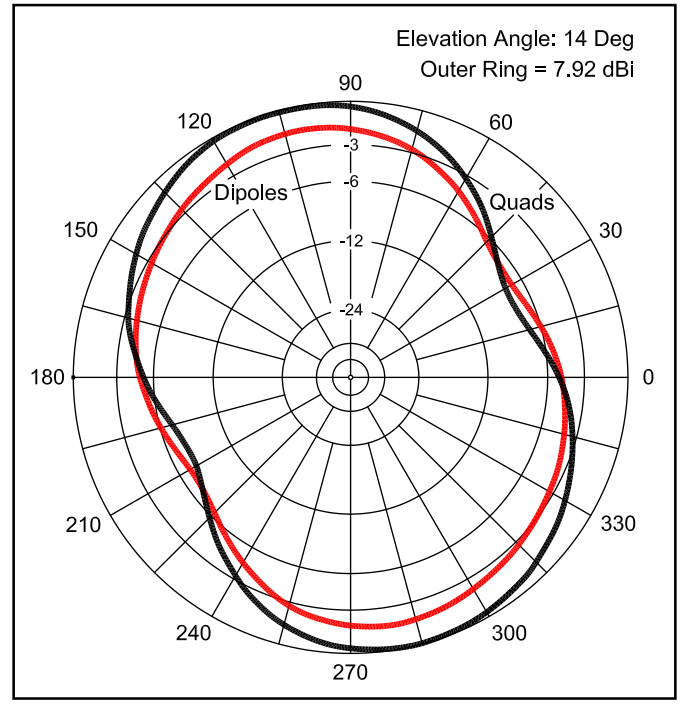


Figure 4—Comparative azimuth patterns for a dipole-turnstile and a quad-turnstile when both antennas are 1 λ above ground at 5% above the design frequency. The elevation angle is 14°.

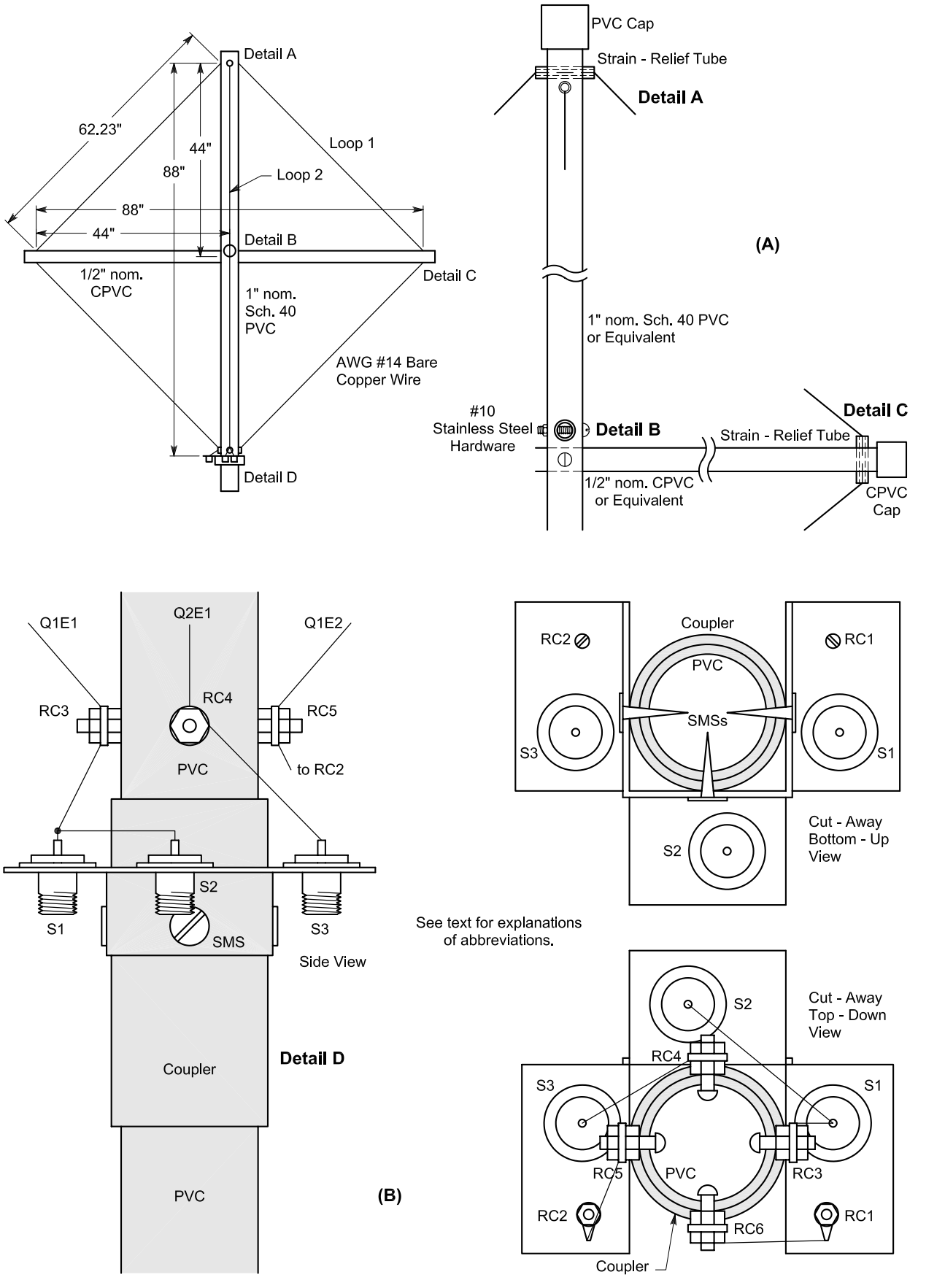


Figure 5—The general outline and dimensions of each quad loop in the quad-turnstile. Details A, B and C show the main post-to-crossarm connection and the slip tubes and end caps at the quad loop corners. Detail D shows several views of the antenna base connections and the coax connector assembly.

A close-up view of the base and connector assemblies. The photo preceded the final waterproofing of all exposed connections.

Table 1
Bill of Materials

Quantity	*Material Description*
43′ min	AWG 14 stranded or solid bare copper wire.
5′	RG-63/U coaxial cable.
2 – 8′ sections	½″ nominal CPVC pipe (gray electrical conduit may be substituted).
1 – 8′ section	1″ nominal Schedule 40 PVC pipe (gray electrical conduit may be substituted).
4	½″ CPVC pipe cap.
1	1″ PVC pipe cap.
1	1″ PVC pipe coupler.
3 to 4″	1″ aluminum L-stock (also called angle stock).
3	SO-239 single-hole connectors.
2	#10 1½″ stainless steel bolt.
6	#10 ¾″ stainless steel bolt.
2	#10 stainless split-O steel lockwasher.
10	#10 stainless steel nut.
8	#10 stainless steel flat washer.
3	#10 stainless steel sheet metal screws.
6 – 2″ pieces	Nylon or plastic tubing (see text).
2	#10 ring terminals.

the quad-turnstile, let's build the antenna itself. My support structure consists of a center pole and two cross arms. The center pole is 1 inch nominal Schedule 40 PVC. In some areas of the country, white PVC is not adequately protected from ultra-violet degradation, so the gray electrical conduit of the same size may be a better choice. The cross arms consist of ½ inch nominal CPVC, which is strong enough to support the wires with minimal weight. The cross arms pass through holes (at right angles to each other) in the center pole. A 1½-inch #10 stainless steel bolt, lock washer and nut secure each cross arm. The cross-arm holes in the main pole should be immediately above and below one another without overlapping.

At each end of the cross arms I drilled a $^{3}/_{16}$ inch hole. I epoxied a piece of plastic tubing in the hole to reduce abrasion on the antenna wires. Nylon or other plastics, as well as AWG 12 house wiring insulation, will do the job if the #14 wire passes through smoothly. [US Plastic Corp (tel 1-800-809-4214; **www.usplastic.com**) sells flame-retardant and UV-resistant polyethylene tubing, recommended for this application.—Ed.] For ease of handling, I used tubing pieces that are longer than needed. Once the epoxy had set, I trimmed the tube ends about ¼ inch beyond the cross arm. Figure 5A shows the rough details of the crossarm and main pole end treatments.

The main support pole has two $^{3}/_{16}$ inch wire holes near the top, very close to each other and at right angles. These holes align with the cross arms and pass each quad loop while maintaining a small separation. Both holes receive the strain-relief tubing treatment. The cross arms and the main pole top end have about an extra inch of PVC, permitting the addition of caps to keep water out of the support pipes. For true water-tightness, seal the opening in the main support where the cross arms pass through, as well.

The Loop Wires and Connector Assembly

We can prepare the top three corners of the quad loops simply by measuring, drilling, cementing, and bolting. However, let's proceed more slowly with the rest of the antenna. The first step is to measure the wire for each loop. For AWG 14 bare wire (stranded or solid), the loop circumferences are 20.74 feet or 249 inches as close as your tape measure will permit. Leave (and mark) about 2 inches of extra wire on each end for connection leads. Tin—that is, coat with solder—the first and last 3 inches of each wire, whether stranded or solid.

Set the wire aside and examine Figure 5B. In the following notes, the abbreviations used on the drawing appear in parentheses. At the base of the main PVC post a coupler—a short PVC connector designed to join two sections of PVC pipe—will be installed. We shall also construct a bracket to hold the three coax connectors we need—one for each end of the phasing line and one for the main feed line.

The bracket was made from a piece of $^{1}/_{16}$ inch thick aluminum L-stock that was 1 inch on a side. I measured the PVC coupler outside diameter and marked the L-stock accordingly. I then drilled $^{5}/_{8}$ inch holes in the L-stock top plate for single-hole SO-239 coax connectors (S1, S2, S3). As shown in the drawing, the holes are as close to the open edge of the L-stock as the connector mounting hardware would permit. I also offset them from the center of each section of stock. The offset permits easy installation of the bracket mounting screws, and the near-edge position provides clearance for the male coax connector shell to fit between the SO-239 and bracket. #10 stainless steel hardware provides mounting points for the ring terminals (RC1 and RC2) that will terminate each quad loop on the coax braid side.

Once the drilling is complete, hacksaw through the top plate of the L-stock so that you can bend it around the PVC coupler, making the three-sided bracket. On each side, drill a hole in the L-stock to pass a #10 stainless steel sheet metal screw (SMS). Fit the bracket very close to the top of the coupler and drill smaller holes so that the screws will bite and tap the coupler. Attach the bracket to the coupler with the sheet metal screws. However, do not yet glue the coupler and connector assembly to the main post.

Take one of the loop wires and temporarily clamp or tape it to the post just above the point where you think that you will mount the base assembly. Now thread the wire through the cross arms and main post holes so that both ends approach the base of the main post at the marks you made on the wire indicating

the ends of the loop. Mark the post for the four #10 stainless steel bolts and nuts (RC3, RC4, RC5, RC6). From the bolt position, leave enough extra PVC (about 1 1/8 inches) to allow mating with the coupler and then cut off the main post. Drill four holes in the main post and install #10 bolts with a single nut on each one.

Remove the connector bracket from the coupler. Cement the coupler to the main post using good quality PVC cement, maintaining good alignment between the connectors and the cross arm assemblies. Once the PVC cement dries (less than 1 minute), drill through the holes in the coupler into the main post. Reattach the connector bracket. The double thickness of PVC will provide a secure assembly with only three #10 sheet metal screws.

Installing the Loops

Start the installation of the first loop. Leaving enough wire to reach the RC1 or RC2 terminal, wrap a single tight turn of the antenna wire around the connector bolt. This relieves strain from the coax and ground connectors on the base assembly. Add a washer and nut and tighten this connection. As an alternative, you may cut the loop wire and use ring connectors on this bolt. Now add (crimping and soldering) the ring connector that attaches to the connector assembly plate, trimming any excess from the wire-end lead.

At the other end of the wire, similarly attach the loop wire to the proper bolt on the main post. Tension the wire enough so that the loop does not flop about, but not so much as to bend the cross arms. Run the loose wire end lead to the appropriate SO-239 terminal (S1 or S3), trim any excess, and solder. Repeat this process for the second loop. Be sure to add a bridge wire from the main feed line connector (S1) to the first phasing line connector (S2).

You can optionally add at each cross arm a thin wire soldered to the loop wire above and below the slip tube and run on the outside of the arm. These wires will tend to keep the cross arms from drooping with time, sun, and wind. For additional resistance to wind effects, you may add a perimeter UV-resistant cord, looping and knotting the cord at the ends of each cross arm. The result is an octahedron with considerable sturdiness, despite the light materials.

Completing the Antenna

When you have finished the basic antenna construction, you should have some leftover 1 inch PVC. Cement one end of this tubing into the bottom of the coupler. To mount the antenna on a standard TV mast, you can cement or bolt a length of this tubing into 1¼ inch nominal Schedule 40 PVC to make a fitting that will slip over the mast. A few wraps of electrical tape around the TV mast will provide a tight fit for the larger PVC, while the 1 inch stock will come to rest on the mast top.

Since coaxial cable tends to be heavy, when you install the main feed line and the phasing line, tape them to the main mast. A pair of tape wraps about 1 foot apart will provide adequate strain relief for the cables, antenna, and fittings. For minimum interactions among lines, place the phasing line on one side of the mast and run the main feed line down the other side. Once you have tested the antenna, waterproof all coax fittings and connections.

Conclusion and the Next Step

I have relied on construction details that will assure an antenna that is close to optimal, because normal ham equipment does not permit very meaningful performance measurements. If you choose to use a different wire or construction scheme, the first step will be to resonate a single quad loop at the design frequency. A single loop will show a 125-Ω resistive impedance with little or no reactance at resonance. You can then use this wire length for both of the quad-turnstile loops. The required wire lengths for bare AWG 18 through AWG 10 are within the recommended 1% tolerance, so you may use the listed dimensions with any of these wire sizes.

The performance expectations that I have shown are based on placing the base of the antenna at a height of 1 λ above ground. Additional height will lower the elevation angle of the lowest lobe and improve performance. There will be a limit to wind survival, however, with the fairly light construction shown.

Beyond the quad-turnstile, for added omnidirectional horizontally polarized gain, we might turn to a pair of dipole turnstiles vertically stacked about 1/2 λ apart. However, the design of such a stack involves paying close attention to the mutual coupling between the dipoles. That interaction results in the need for a non-standard phasing line Z_0, along with other complexities of in-phase feeding of the arrays. The assembly is also considerably wider and taller than our simple quad-turnstile.

As an intermediate step in the process of improving omnidirectional antenna performance, the quad is a notch better than the dipole. However, the care with which we constructed the quad-turnstile, if applied to a dipole turnstile, can go a long way toward getting the most out of the more elementary antenna. Phase-feeding elements, even in simple-looking arrays like the dipole and quad-turnstiles, requires all the care that we can bring to the shop.

*L. B. Cebik, W4RNL, retired from The University of Tennessee, Knoxville, a few years back to devote his time to research and writing, as well as a Web site primarily focused on antennas (**www.cebik.com**). His articles have appeared in nearly all ARRL periodicals. He has done books on quads and LPDAs, as well as a number of beginning antenna enthusiast volumes. He serves the League as both Technical and Educational Advisor and recently authored the ARRL on-line course on antenna modeling. You can reach the author at 1434 High Mesa Dr, Knoxville, TN 37938-4443;* **cebik@cebik.com**.

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By Steve Ford, WB8IMY

One Stealthy Delta

This HF antenna keeps a low visual profile while attracting plenty of attention on the air.

Loop antennas have always fascinated me. From a common-sense standpoint they seem impossible. I mean, how can you have a short circuit at the output of your transceiver and call it an antenna? I'd call it bright flash, smoke, and stream of obscenities.

But the magic we call radio is never so straightforward. Yes, a loop antenna is unquestionably a short circuit at the output of your radio—if your radio produced dc. Radio frequency energy, however, is ac and it views a loop quite differently. A loop represents an impedance load to RF. The impedance value depends on the size of the loop, the frequency of the RF and other factors, but it is most definitely *not* a short circuit.

The October 1998 *QST* carried an article of mine titled "One Stealthy Wire" in which I used a remotely tuned antenna coupler to match my radio to a random-wire antenna supported by a lonely maple tree in my back yard. If artists and musicians can go through creative "periods" when their muses suddenly decide to speak in different tongues, so can amateurs. The

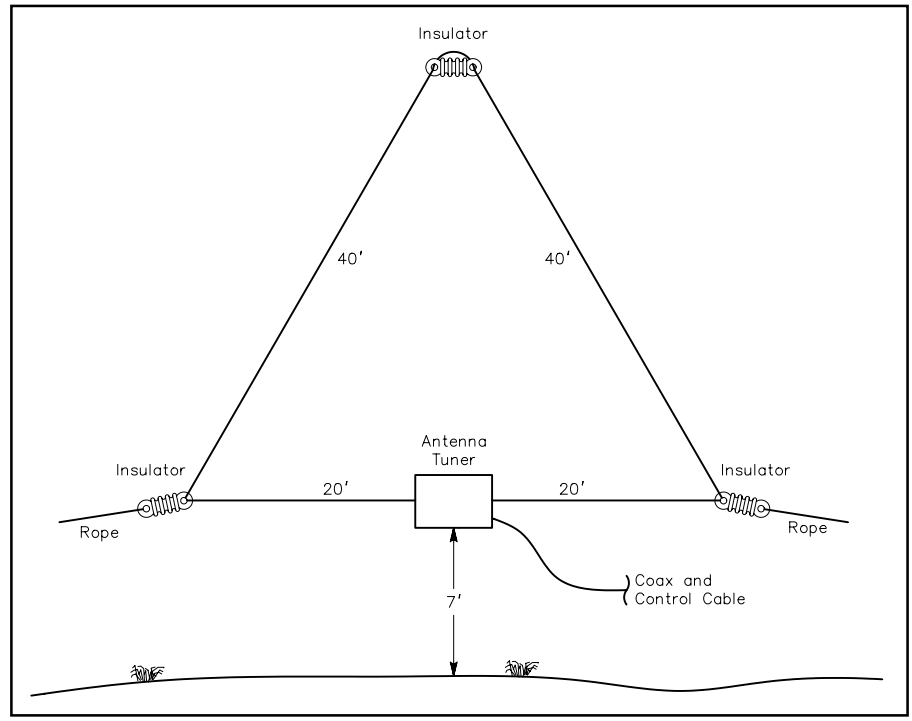
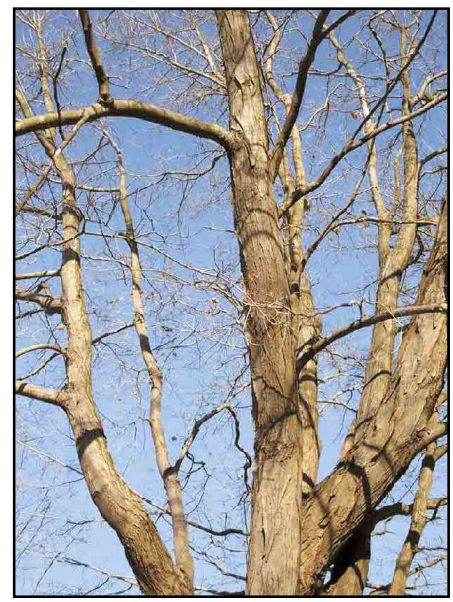
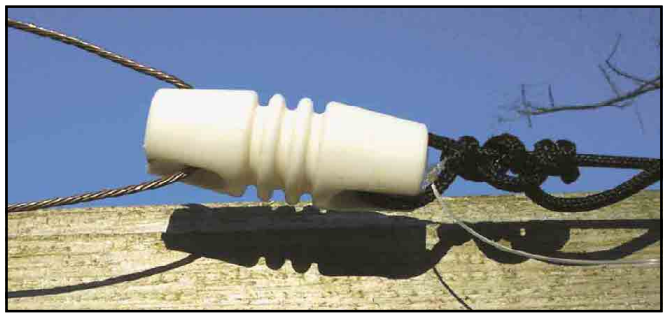


Figure 1—A diagram of the Stealthy Delta.

The SG-237 tuner hangs on a wood privacy fence, just behind the tree trunk.



Do you see an antenna in this picture? Probably not!



The privacy fence also acts as an anchor for one of the legs of the Stealthy Delta.

maple tree is still here and so am I, but I've abandoned my single-wire period and have embarked on the year of the loop. Or to quote Daffy Duck in the memorable cartoon, "I swear, your honor, I will never paint a malicious mustache on a work of art again… *I'm doin' beards now!"*

The Problem Remains the Same

Little else has changed in four years. I still exist on a house lot the size of a postage stamp. The local squirrels have easements written into my deed. I still have a wife who distrusts my every move and despises every antenna I attempt to create. When I wonder aloud about where I can erect my next abomination, her reply is "Cleveland."

I asked Dean Straw, N6BV, our resident ARRL antenna guru, how I could improve my situation. The exchange went something like this…

Dean: Put up a tower and a triband Yagi antenna.

Me: Do these things come with divorce documents?

Dean: How about a 100-foot dipole 50 feet above the ground?

Me: Supported by what two tastefully designed 50-foot objects?

Dean: How about a vertical loop supported by your tree?

That's when the sweatsock-filled-with-nickels-of-inspiration struck me upside the head. How about a loop not only supported by the tree, *but in the tree?*

The Stealthy Delta

A delta loop gets its classy moniker from the Greek alphabet, namely the letter *delta*, or Δ. My Stealthy Delta is a vertical wire triangle fed directly in the middle of its base (see Figure 1). For multiband HF operation the idea is to make the triangle as big as possible. It also helps to keep the base of the triangle about 7 feet or so off the ground.

For my application each side of the triangle is 40 feet in length. Remember that the wire is continuous; that's why they call it a loop. Using our wood privacy fence to hide the bottom wire, I strung the loop out 20 feet to an insulator, up into the tree (to an insulator suspended by a Nylon rope), down to another insulator on the other side of the tree and then finally back to where I began. Was it a perfect triangle? No. Was it good enough for Amateur Radio and rock n' roll? You bet.

And now that it was strung, how would I feed the Stealthy Delta? I would need an antenna tuner for multiband operation—that much was clear. With the tuner indoors I could use 450-Ω ladder line between the tuner and the feed point of the antenna. In my case, however, the ladder line would have to take a torturous route to reach the Stealthy Delta. It would have to careen through the air and directly over my wife's sacred hedges and rose bushes. That was unacceptable (to her, anyway). The alternative was to use a substantial length of buried coax, but coaxial cable is much too lossy in the face of the high SWRs that would exist between the antenna and the tuner.

If the mountain will not come to Mohamet, Mohamet must go to the mountain. Or putting it in a ham context, if the antenna will not come to the tuner without unacceptable feed line loss, the tuner must go to the antenna. Borrowing an idea from my "One Stealthy Wire" article, I invested in a new SG-237 remote automatic antenna tuner from SGC Inc (**www.sgcworld.com**). I installed the tuner at the feed point, hiding it behind the tree trunk, and ran direct-bury coax and a power cable all the way back to the station. I buried most of the wires, except for a short run up the side of the house and into the guest bedroom window.

How Does it Work?

The SG-237 is RF activated. You transmit and it finds a low SWR within a few seconds. That low SWR is achieved at the antenna. With the good-quality coax I used between the tuner and my radio, feed line loss was kept to a minimum (a little over 1 dB on 6 meters and much less on lower bands). With my Stealthy Delta the SGC tuner can find an acceptable match with an SWR less than 2:1 on any amateur frequency from 80 through 6 meters. If I had erected a somewhat larger loop, I probably could have operated the antenna on 160 meters as well.

The direct-bury coax makes a discreet jaunt into the bedroom window.

In terms of performance, the Stealthy Delta is definitely superior to my single stealthy wire. Even on 80 meters, where it is way too short, the loop surprised me. During a recent RTTY contest I made several contacts into Europe on 80 meters, which I've never done before on RTTY from home. On 40 through 10 meters I consistently receive strong signal reports. I worked the XR0X and TI9M DXpeditions on RTTY after just a few calls and even managed to get through the pileup to work the PW0T group on 15-meter SSTV. Not bad for a wire triangle.

And best of all, the Stealthy Delta is very stealthy indeed. The tree camouflages most of the antenna. The photos that accompany this article were shot in March when the tree was bare and yet the antenna is very difficult to see. Just imagine how invisible it is when the tree is in bloom.

Will I stick with the Stealthy Delta? Certainly...for now. I can't beat the performance and convenience, but I'm sure I'll eventually think of something that will. Some day my "loop period" will give way to some other source of annoyance for my wife and child…

"I swear, honey, I will never erect another diabolical delta…*I'm doin' rhombics now!"*

You can contact the author at ARRL Headquarters, 225 Main St, Newington, CT 06111; **sford@arrl.org**.

By Paolo Cortese, I2UIY/NH7DX

A DXpedition to Niger

"There was a knock at the door," is the way many adventure stories begin, and I2UIY's does, too. Follow along with Paolo, Silvano, Marcello and Murphy to the tropical country of Niger on their first (but not last) DXpedition.

I don't know about your country, but in Italy the first day of January is not only a holiday but a day when you are trying to recover from the monster New Year dinner and—at the same time—getting ready for the first monster lunch of the new year with your family. So, I was napping in my favorite armchair when Silvano, I2YSB, knocked at my door. It is quite unusual having visitors on January 1—this made me very curious.

To make short a long story, Silvano had been bothering the Niger Ambassador in Rome asking for permission to operate for three months. He called this fellow three times a week for three months and it worked because the Ambassador, probably really tired of talking with Silvano, was able to get a fax from the Niger Foreign Office securing permission. It was not a license, but close enough to go ahead!

The Project

Silvano is a real DXer, retired from the Air Force, and he still spends nights on the air looking for something exotic. He "has them all" on SSB and CW (except P5) but never submitted his cards because he was afraid they would be lost during shipping! Now he's exploring new frontiers like RTTY, PSK31 and 50 MHz.

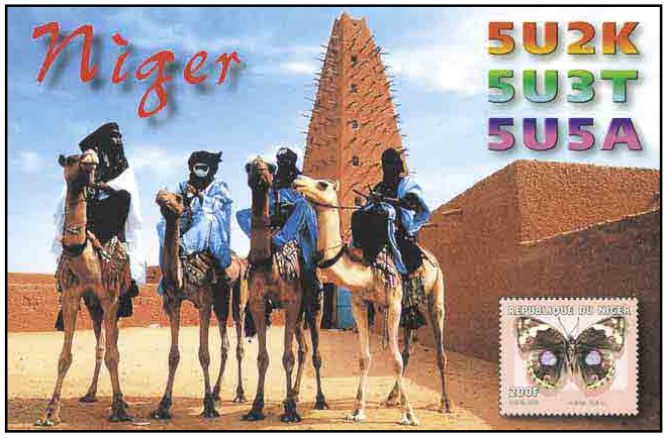
While we were discussing the project, Marcello, IK2DIA, arrived. He had never been outside of Italy or on an airplane in his 59 years. We involved him in our discussion and, after we demolished all his excuses, he agreed to join us. Marcello is retired from the electric company and likes running US and JAs on the high bands.

I was the most expert of the three since I already been in a couple of DX locations like Vatican City (HV), 1A0KM, the Republic of San Marino (T7) and a few others. We had never organized a DXpedition on our own, however, so we were worried not knowing what could wait for us in Niger. When you're at home listening to someone DXpeditioning, you seem to know everything… "If I were in his shoes, I would do this and that… They should have brought better antennas… Why don't they have more power…" and other pleasantries. Criticism is a sort of national sport for "armchair radio amateurs," most of whom don't even know how to start making a list of what is needed for a DXpedition.

But sometimes you can be lucky and so it happened. As some of you might know, I am busy sorting cards for the Italian QSL Bureau full time and just two days after our decision to go, while sorting USA QSLs I found a card from 5U7DG. We thought there were no local operators in Niger but here was one and—look!—his email address was on the card. The email addresses you find on QSL cards seldom work because most of them are no longer in use, but trying is reasonable. The same night I emailed 5U7DG asking if he could help and the next day I received his positive answer: he was available to make our life easier.

There is only one flight a week from Paris to the capital, Niamey, so you can imagine that it is not easy finding some seats without an early reservation. The first available flight was on February 26 so our plans were made: we would be in Niger from February 26 until March 13.

While everybody talks about monster DXpeditions that set new records by raising monoband antennas in remote corners of the world, we decided to mount an old fashioned DX adventure using very basic tools. We relied upon simple antennas, relatively low power and our commitment to hit the airwaves as much as possible to give everybody a chance to work this rare country.



Our 5U2K, 5U3T, 5U5A QSL card.


Between the trees you can see our 2-element Yagi with the Italian flag and the flag of Inter-Football Club, our favorite soccer team.

The call sign 5U5A was aired from 5U7DG's house, including the ARRL DX SSB Contest.

At the SIM Guest House we set up two stations but there were big difficulties keeping both of them on the air simultaneously.

For these reasons we did not plan to bring a lot of stuff. Our luggage consisted of a ski bag with all antennas, a suitcase with all the hardware, feed lines and radials, and a second suitcase with all the clothes and personal belongings of the three of us. Transceivers, linear amplifier, computers and other electronic gear were stored in hand baggage. We were only 7 kg over the allowed checked baggage limit so we were quite sure we would have no problems at the check-in.

Murphy Joins the Expedition

We only bought three tickets, but there were four travellers: Murphy spent two weeks with us and did not even split the costs! At 3 AM with the temperature below freezing, I picked up Marcello, drove to Silvano's place, put all the bags on the street, locked my car in Silvano's garage, and put the keys in his mailbox that cannot be opened from outside. We then waited for the taxi to the airport. The taxi driver simply forgot to get up so we spent almost an hour on the street with very light clothes—we were heading to Niger!

When finally we got the taxi driver out of the bed, we set the new unofficial world speed record to the airport where Air France was waiting for us. They paid no attention to our checked luggage, but instead concentrated on our hand baggage. So we had to pay over $1000 and check two-thirds of the hand baggage. Air France immediately became our favorite carrier especially when they kept us four extra hours in Paris because our aircraft had a technical problem.

Daniel and Jim

Seeing two smiling guys just inside the airport building holding a recent copy of *QST* was one of the relaxing moments of our trip. They were Daniel, 5U7DG, and Jim, 5U7JK, who made it easy passing the Customs. Jim Knowlton (also KC0IFR) was born in Nigeria—his parents moved to Niger when he was only seven weeks old. He learned the local dialect first and then English. He has an African name too, Yacouba, and has lived in Niger for over 35 years. Jim was the real engine of our activity. He was even able to get a crew of Niger TV to visit us for the evening news. The story ran four times during the Tabaski holiday so everyone saw us.

Both Daniel and Jim are missionaries for SIM, the Société Internationale Missionnaire (**www.sim.org**)—an international mission organization in more than 43 countries on five continents. Currently there are about 130 SIM missionaries in Niger, which also runs the largest hospital in the country. Daniel Germaine, AE4RP, is a pilot who flies a small 6-seat aircraft to move people and things for SIM in Niger and nearby countries.

Here We Are!

Since we were asked which call signs we wanted, we asked for something that had never been on the air before just to make the game more interesting. So we applied for 5U2K on SSB, 5U3T to use on CW and 5U5A for the ARRL DX SSB Contest in the middle of our stay.

We set up in the smaller of the two SIM guesthouses in Niamey—four rooms with complete kitchen and living room. In the garden we raised a 2-element Yagi for

The Republic of Niger

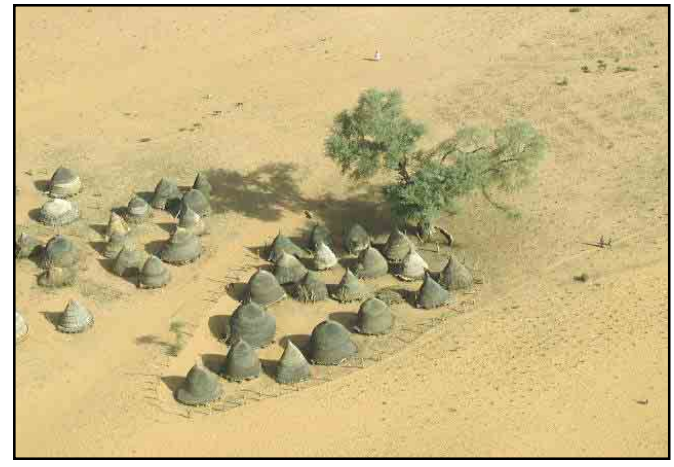
The Republic of Niger, landlocked and arid, is the largest country in West Africa, slightly smaller than the combined areas of Texas, Arizona and New Mexico. It is surrounded by Algeria, Libya, Chad, Nigeria, Benin, Burkina Faso and Mali. Annual per capita income is $270—approximately 94% of the country's budget is Foreign Aid!

Eighty percent of the country is desert—the northern borders stretch to the middle of the Sahara Desert. The remaining 20% along the southern border is dry to semi-fertile savannah (grassland). There are small-scale gardens along the banks of the Niger River in the southwest.

Although two-thirds of Niger receives less than 100 mm of rain per year, the southern border receives up to 750 mm of rain in the wet season. Due to the dryness of the air, most of this quickly evaporates, although enough is retained to enable limited agriculture supporting 95% of the population. The heat can be so intense that rain frequently evaporates before it reaches the ground! The days and nights are hot except from December to February when the nights get cooler.

WORLD FACTBOOK

This is the entire 5U crew: IK2DIA, I2YSB, 5U7DG, 5U7JK and I2UIY.



5U7DG took us flying over Niamey with his 6-seat aircraft. The land around Niamey is very desolate and the desert starts about 1 km outside the city. Little groups of huts are all around.

10/15/20 that could be switched into a 12/17/30 beam by changing the traps. We also put together a Butternut HF2V for 40/80/160, a couple of R7-type verticals, and a 3-element beam for 50 MHz. The main station was an IC-751A with an ICOM solid-state amplifier of 400 W output. The second station was an IC-735 and the third rig an IC-706 that we used on both HF and 6 meters. We had two laptop computers using *CT* software and a PK232 for RTTY with WF1B's software.

When 5U7DG and I were in touch by email, he told me that all his radio station was available for us to use. In his little shack is an IC-706 used mostly to monitor the SIM mission frequency on 10 MHz. From time to time, he is on the air but doesn't like pile-ups too much. SIM also had two Ameritron amplifiers still in the boxes—whoever bought them did not realize they would be difficult for someone who is not a radio operator to tune up and use. We connected one of them to Daniel's IC-706 and fired up on 15 SSB. The TH6 and 500 W made the game easier for us so we decided that one of us would keep that station on the air.

Having Murphy with us all the time was a pain, as you never know what was going to happen. One day the Ameritron amplifier quit working putting all of us into panic. A broken amplifier in Italy or in the US is just a broken amplifier but a broken amplifier in Niger can be a real problem. There is no service in Niamey and no RadioShack. We had no test equipment except a VOM meter. But ham radio means friendship and cooperation and we knew that Tom, W8JI, was the designer of that amplifier. Jim called him on the telephone and then we got him on the air the next morning with the help of N4ZC. It took three skeds with Tom to find that the problem was a simple diode that we were able to find in town.

Day of Celebration Amid the Desolation

We were quite surprised to find that diode in Niamey because we saw how desolate life is in Niger. Niger is one of the poorest countries in the world and you must consider that we are not talking about a country that is in ruins because of a civil war. Niger is a relatively quiet place. There is not much internal fighting simply because there is nothing to fight for—no oil, no gold, no diamonds, no silver and no water. Niger must import everything.

During our stay, the Moslem holiday of Tabaski took place. It is the greatest day of celebration in Niger. This is the one day of the year when even the poorest will have meat to eat. It is a day of great celebration and charity and everyone expects to receive a gift from anyone they meet. The streets of Niamey are lined with rams roasting in the tropical sun and everyone is going to greet family and friends wearing new clothes.

We were ready to go, posing in front of our flags wearing the shirts that a local tailor made for us and the typical Niger hats.

ARRL DX SSB Contest.

The ARRL DX SSB Contest was not the main object of our trip but we decided to take the chance as 5U5A. Unfortunately the problem with the amplifier happened on the second day of the contest so we logged 3000 contacts on the first day, plus another 1000 on the second day. The path to the US is just wonderful: even working barefoot with the TH6 I could maintain a rate of 250/hour.

DX Operations

We tried to be on as many bands/modes as possible because it was clear that the majority of our customers did not need 5U as an all-time New One but just on some bands/modes. Some were able to work us quite easily on many bands/modes like K3UL who made 19 QSOs (with no duplicates) on 9 bands. Many others are in our log on 7 or 8 bands.

We had a target of 30,000 QSOs that was quite reasonable using basic antennas and relatively low power and we made it without great difficulties. We know that we neglected 80 and 160 but our antennas were really too poor on those bands where we really heard almost nobody.

We operated for 14 days logging a total of 29,600 QSOs. Although Europe is much closer, we made 42% of the QSOs with North America, including 2155 with the West Coast.

Ready to Leave?

Believe it or not, check-in at Niamey's airport takes places nine hours before the scheduled departure! Remembering what

happened with hand baggage in Milan, we left behind some stuff to be lighter. This time Air France paid no attention to our hand baggage but concentrated on our checked bags. We had a total of 13 kg of extra weight for 3 guys and nobody but Air France would have charged us for them. We had to pay over $200 this time. But this is not all. About one hour before the scheduled arrival of the aircraft, it was announced that the flight was cancelled due to the usual technical problems. Another aircraft would arrive from France the next day so everybody had to retrieve their own luggage because the airport had only three luggage carts.

Looking Back

As I pointed out at the beginning, this was a low profile DXpedition and we know that a bigger crew with more power and more antennas could have had better results but it was our first experience. We are satisfied with what we did this time—so much so that by the time you will read this report, we should be already back on the air from Niger.

Daniel went back to Tennessee and Jim has started building his radio station. The Northern California DX Foundation (thanks!) provided him with a transceiver, he got an old tower from the airport, and we will bring him a beam so he will be active on all bands—a sure multiplier in most contests and a chance to work a new one for newcomers.

We have a PowerPoint presentation that was shown at the 2001 Visalia International DX Convention. It's 45 minutes long and is available for everybody on CD-ROM. If you want a copy, just visit **www.qsl.net/niger-2002**.

Looking Ahead

We made another trip to Niger in February 2002 with a larger crew, more power and more antennas. We paid a lot more attention to 30/40/80/160 meters with two stations on the air every night. We even put on some new prefixes, never before on the air, just for WPX chasers, too. You will find more news at **www.qsl.net/niger-2002**, including the log check for both 2001 and 2002 activities. I hope you made it into the log!

Paolo Cortese holds the call signs I2UIY and NH7DX. When contesting, he uses IQ2A. An avid contester and DXer, Paolo's awards include DXCC Honor Roll, 5BDXCC and 5BWAZ. Previously, he's operated as 1A0KM, T70A and HV4NAC. In addition, he is the author of a Contest Manual published by ARI, the IARU member-society in Italy. You can reach the author at PO Box 14, 27043 Broni (Pavia), Italy; **i2uiy@cqww.com**.

NEW BOOKS

POWER SUPPLY COOKBOOK

By Marty Brown

Published by Newnes (Butterworth-Heinemann), 225 Wildwood Ave, Woburn, MA 01801-2041; tel 781-904-2500, fax 781-904-2620; **www.newnespress.com**. *Part of the EDN series for design engineers. Second edition, 2001, 265 pages with index, paperback 5×10 inches, B&W illustrations. ISBN 0-7506-7329-X. Available from ARRL, 225 Main St, Newington, CT 06111-1494, USA. ARRL Order No. 8599, $39.99 plus shipping/handling. Order toll-free 1-888-277-5289 or QUICK ORDER online* **www.arrl.org/shop/?item=8599**.

Reviewed by Paul Danzer, N1II
ARRL Technical Advisor

◊ This is a very personal book. The author uses "I" quite often when he is talking about some of his experiences in many years of power supply design. He also uses "you" because he assumes you, the reader, are planning to design a power supply and want to take advantage of his experience.

As the name suggests, this is a cookbook. Although Chapter 1 discusses power supplies and design techniques in general, it is really an introduction to power supply requirements and terminology. Included in Chapter 1 is a table that compares cost, size/weight, RF noise, efficiency and other characteristics for several types of power supplies, including a linear regulator-based supply.

Chapter 2 continues the examination of a linear supply, with brief descriptions and circuit diagrams. But the real design information starts with Chapter 3, Pulsewidth Modulated Switching Power Supplies.

Yes, finally, is it possible to not only understand those apparently weird schematic diagrams that so commonly pop up these days—using a series inductor instead of a transformer, with unlikely looking feedback connections and unusual solid-state devices. Not only can you understand how they work, this cookbook allows you to design one yourself.

Fortunately, for those of us with little switching-mode power supply experience, two basic configurations are shown to begin the design sections. Basic schematics and waveforms, with simplified equations, introduce the *forward-mode converter* and the *boost-mode converter*. Thus, the flow chart on the following page, used to guide you to a complete design, now makes sense.

Eleven basic blocks are shown in the design flow chart, beginning with choosing a basic design topology and making black-box calculations through PC-board design. As an experienced engineer, the author notes in many places the interrelationship of many of these steps. Of considerable interest to most hams is the extensive treatment of design to minimize noise and RFI—accomplished as part of the design and layout rather than as fixes after the design is complete.

To help you pick a power supply configuration, a table in Chapter 3 lists power outputs and voltage ranges. Pick the output voltage, the total output power and the efficiency you want and the chart provides a selection of *buck, boot, buck-boost, IT forward, Flyback* or one of several other configurations. Some configurations isolate the input lines from the output, others do not. Don't know what each of these configurations mean? Don't worry about it—this is a cookbook and if you pick a configuration the author guides you through its design.

Chapter 3 is about 110 pages long—almost half the book. This is where you do your design, with refinements and further explanations in the later chapters. Since the primary reason for using a switching power supply is efficiency, if stands to reason that a later chapter would be devoted to increasing the efficiency. As you might guess, loses in a switching power supply depend heavily on the switching waveform, and techniques to raise the efficiency are described in Chapter 4. Each major loss factor related to waveform is discussed, and design suggestions made.

As a bit of a bonus, a very thorough appendix covering thermal analysis and design is included. After all, even with efficiencies of 80% or greater, dense packaging results in heat—the reliability and lifetime enemy of power supplies. Why dense packaging? Well, in addition to needing to occupy minimal space in commercial designs, another appendix—Appendix E, Noise Control and Electromagnetic Interference, points out the printed circuit wire lengths act as antennas and talks about techniques to minimize RF radiation. One key technique is to make the printed wiring as small as possible; thus we are back to dense packaging!

Appendix D, Magnetism and Magnetic Components, is directed to the commercial roll-it-yourselfer. But has a very concise and understandable discussion of magnetic components—cores, toroids and laminated structures, that could serve as a very nice reference source.

In summary: Want to know how those new, strange looking switching power supplies work? Skimming this book is certainly one very nice way to learn their functions. Want to try designing your own, with a reasonable probability of success? Just follow the cookbook!

By Joe Phillips, K8QOE

A Novice Contester Gets His

Nothing was expected of the rookie DXer, but somehow he managed to do even less.

A scrawny, fragile-looking book author named George Plimpton wrote several best sellers in the '60s about actually playing professional sports against monster professional ballplayers. One of these was the aptly named *Out Of My League*.

After seven days of being a first timer at Major League contesting and being a member of the "New York Yankees of DXpeditions," I now know exactly how Mr Plimpton felt. Four decades of Amateur Radio did not prepare me for this.

Tough Love

In Jamaica's Montego Bay for the October CQ World Wide SSB Contest, my fragile rookie efforts at contesting were hardened by 6Y6L (our contest call) team leader Harry Flasher, AC8G, of Dayton who tried tough love teaching methods in vain. During a practice QSO, a German ham commented on my failed attempt to hold a 10 meter frequency in a pile up: "You're too soft to make a good contester," he told me with the world listening. If Heinz hadn't been 4500 miles away, Harry would have kissed him.

Yes, I found contesting a special challenge, but let's first set the scene. Start with a four bedroom Caribbean villa, on a hill overlooking Montego Bay. This could be any vacation heaven except for the three triband beams, two verticals and two dipoles visible against the hillside flowers and Atlantic Ocean backdrop. Not to mention the radials for the 40 meter vertical that were lying underwater across the length of the outdoor swimming pool (which greatly limited that activity).

Ham radio or not, this was the art of gracious living. The villa came complete with a cook, two housekeepers and a chauffeur for the 11-passenger Toyota van. Still, the living room was the ultimate ham shack with four transceivers, two with 500-W amps, and seven feed lines going in all directions. This is Major League contesting.

The Yankees contesting team, from the Dayton, Ohio area included (1) Harry, a veteran DXpedition team leader who was organizing his umpteenth Caribbean contest location, (2) Ron Hesselbrock, WA8LOW, whose DX credits include three trips to rare North Korea; (3) Ron Moorefield, W8ILC, a CW specialist whose speed isn't compromised when he uses a J-38 straight key; plus (4 and 5) Hillar, N6HR, and Elsie, N7YX, Raamat, a Washington State husband and wife team. Hillar and Elsie, as we'll see later,

ELSIE RAAMAT, N7YX

The 6Y6L team sets up a tribander with rope, which will later rotate it by hand.

JOE PHILLIPS, K8QOE

The tribander against the Jamaican sky.

operated the most active transceiver of the four during the 48 hour World Wide SSB contest, mainly on 10 meters.

The Caribbean is a favorite location for big-time operating. Many well-known stations hold large advantages because they operate from permanent fixed locations with larger beams, on-location 70-foot towers and highest legal power. But the Dayton group is always competitive, even as our Yankees move around and set up in vacation villas, constructing the station in a matter of a couple of days from a variety of West Indies locations. While it will be several months before official results are in, the 6Y6L team feel they may be in the top 20 of more than 2000 entries worldwide. The most notable aspect of 6Y6L's final reported score is that 5957 of their 16,479 QSO points plus multipliers came from a single band—10 meters. That's 36 percent. Yes, the Raamat husband-wife team were truly outstanding on 10.

But contesting aside, for me the most beneficial aspect was that I got to return to the roots of ham radio—the hobby I first entered four decades ago. Antennas had to be pieced together from scratch, which was a special joy using sketchy instructions or matching the parts against a fuzzy photo of the completed antenna. Feed lines had to have new connectors, amplifiers had to be interfaced, and I quickly learned that there was a real purpose for the SWR meter on the transceivers.

While I failed to make any significant progress as a DXer, the week's events included falling from a chair, a fire, an electrical blackout, meeting 10% of all Jamaican hams and a special QSO with a North Carolina school youth ham station.

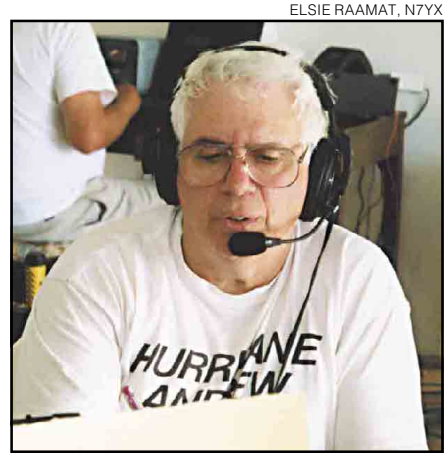
The Three Ogres

But let's talk about what I learned about DXing and contesting. When you enter the world of serious contesting, you enter the venue of the Three Contest Ogres: The Scoreboard, Multipliers and the Pileup.

The Multiplier Ogre is straightforward—seek first that which generates points. As you search the band, not just any contact will do. Each contest has its specialty QSOs or rare countries that are worth more (thus a multiplier), similar to CW contacts during Field Day. Knowing which contacts will yield the most points pays great dividends.

Which brings us to the *Scoreboard Ogre*. Modern computer logging programs now contain clocks on the screen that resemble those permanent scoreboards on your TV screen while you watch your favorite football game. These displays are a running count of, perhaps, your contacts per hour based on your QSO speed that minute. There is a multiplier per hour listing on the screen as well. The most desirable number, which my cohorts kept pounding into my head, was 200 QSOs per hour. Do the math. That's more than three a minute, every minute, for every hour you operate. If you like rag chewing, you'd be better off staying home. Want a real appreciation of operating skill? Watch Ron, W8ILC, maintain that 200 per hour speed with a J-38 straight key for two hours at a time. Even when that time is 3 AM!

ELSIE RAAMAT, N7YX



The author failing again.

And then there is the *Pileup Ogre*. A pileup is simply the numerous stations on the same frequency trying to work all the others at the same hot band location. Harry explained that packet networks across the planet inform contesters where to locate certain multipliers. As the word spread, these frequencies would become the places everyone tried to control. My greatest failure was an inability to control any frequency in a pileup. Gentlemanly aspects of Amateur Radio do not apply here. The tough survive and the weak lose the frequency. Or as Harry exhorted again and again: "Keep calling CQ; no dead air!"

I would have never thought of this, but our station call letters, 6Y6L, were prominently displayed near each rig. Operating at that speed and continual repetition made it easy to forget your call if the letters weren't posted. And when operating in the contest, was I slow? Well, when I would relieve Harry on 20 meters, it was as if Mario Andretti had gotten out of his race car and I had climbed in.

How We Got to Meet 10% of all 6Ys

I also was reminded of the bonds that bind ham radio operators of any country. Even before our arrival, the Dayton group had made contact with the local Montego Bay Radio Club. President Rupert Walford, 6Y5RW, and Secretary Norman Smith, 6Y5NS, greeted us the first night. Two nights later, the entire Jamaican club (11 members and three students) toured our contest location. This represented 10% of all the hams in Jamaica, and attendance was perfect. When do you remember having 100% attendance at any ham radio function in the US?

Another example of Amateur Radio's bonds: Two days before the contest started, the entire island experienced a total electrical blackout. It only lasted four hours but to guard against that happening during the contest, Norm, 6Y5NS, found a solution. Eight hours before the contest started, he had a 5 kW gasoline-powered generator delivered from the grain processing plant where he is mill manager. While the generator wasn't needed, the gesture was in the highest traditions of this hobby.

And this DXpedition even had its own Amateur Radio Youth Day. After the contest ended and while we were tearing down equipment, Harry continued to operate 10 meters on Monday and started a QSO with some ham radio students at Greensboro (North Carolina) Day School. Students Jordan, Caroline and Pat took turns at the mike talking to Jamaica while their teacher, Carl Fenske, KC4WGA, served as control operator for N4GDS.

It's a Tie

The competition for the most humorous events of the week comes down to a tie between (1) the time I got so excited trying to hold a pileup on 20 meters that I broke my plastic chair, which caused me to fall on my back, and (2) the fire. At breakfast one morning, Ron, WA8LOW, smelled resistors burning. Six people ran into each other and the furniture (like a second-grade fire drill) trying to touch each rig and amp to find which one was on fire. That's when we learned the odor of our cook's frying pan handle burning in the kitchen had the same aroma as burning electrical components.

In the middle of a 15-meter pileup and failing once again to gain control of the frequency, I suddenly remembered a time I had mistakenly walked into a public women's restroom. It was the only time I had felt more out of place.

Joe Phillips, first licensed as KN9SYL in 1959, has held the call K8QOE for 42 years. He taught high school English for 30 years and was a reporter for three metropolitan newspapers for eight. Most of his ham radio activities until this experience, have related to public service and newsletter editing. Joe has been the ARRL Ohio Section Manager since October 1998. You can contact him at 2800 Jupiter Dr, Fairfield, OH 45014-5022; **k8qoe@arrl.org**.

By John Reisenauer Jr, KL7JR

DXing with Polar Bears

The author's self-described "best trip to date" involved a rare island, a rare county, 10-10, contesting, Northern Lights and polar bears. For a dedicated Arctic ham-traveler, it doesn't get any better than that.

STEVEN KAZLOWSKI (WWW.LEFTEYEPRO.COM)

Although polar bears may appear friendly, they see everything else as food and can easily kill a person with one swipe of their paw!

An irresistible force continues to beckon me to the Arctic, where my pride in being an American and an Amateur Radio operator is somehow amplified. My mind was on operating HF from the Arctic Ocean as I gazed out the bush plane window to the flat expanse of tundra a few thousand feet below. I'd been planning this trip for a long time. Small frozen streams and lakes zigzagged everywhere, adding brilliant contrast to the treeless landscape of Alaska's North Slope. Captain Jim broke the Arctic silence…. "Kaktovik Tower, this is Frontier 1-3-9er with one passenger on board. Request permission to land, over." The mystique and overpowering sense of belonging I felt was intense. Minutes later the small plane set down on the frozen tundra.

Warming up—the Gear, that Is!

Five minutes after checking in to my room, I started to unpack the radio gear I had shipped up earlier. A converted man camp, relic of Prudhoe Bay construction days, Waldo Arms Hotel would now be my home for the next week. The Northern Lights were out in all their splendor as I assembled my Solarcon A99 vertical antenna (10 through 17 meters) in the dining hall. Once the mast and coax were connected I merely carried the assembly outside and climbed a snowdrift to the roof. The swirl of the Northern Lights flashing across the dark sky made it difficult to concentrate on doing antenna work. The combination of moonlight and twilight made for a rich blue and pastel display. Hoarfrost clung to everything in sight on this 23 below zero (F) afternoon. My rig was a Kenwood TS-50 with matching AT-50 auto-tuner. Both units are compact and pack well. By 0400Z December 13, I had heard only weak signals on 15 meters. At 0500Z I worked JA1CG and JK1BMF who were now loud. KL7JR was spotted on the Japan Packet Cluster. JAs rolled in for 20 minutes before the band dropped out. I turned in early, exhausted but pleased.

After a hearty stick-to-my-ribs breakfast of reindeer sausage and sourdough pancakes, I headed for the radio room.

STEVEN KAZLOWSKI (WWW.LEFTEYEPRO.COM)

Northern Lights and sunset on Barter Island, Alaska.

First in the log on 15 meters was DL5ME, AA5AT and EA8BYR. I moved to 10 meters and it didn't take long for a pileup to start after I announced Barter Island was AK-044S for the US Island awards program and NA-050 for Islands on the Air! VE2NW, VE1VE, SM0FWW, UA9YE, ZL1ARY and VP2EY had very strong signals and reported the same for me. In the deepening twilight and with excellent propagation, I was enjoying a wonderful time with Amateur Radio under the Northern Lights. By 0200Z I had made about 400 QSOs on 10, 15 and 17 meters with Japan, Germany, Spain, Norway, Italy, Russia, New Zealand, Cuba, all over Canada and the USA. At times on 10 meters it was almost impossible to copy any signals, even operating split, because everyone was 5×9 plus 20! I was overwhelmed to say the least. Two or three times throughout the day sled dogs barked, announcing the presence of polar bears in the village. The tough northern dogs not only pull sleds but double as "white bear" alarms here at the top of the world.

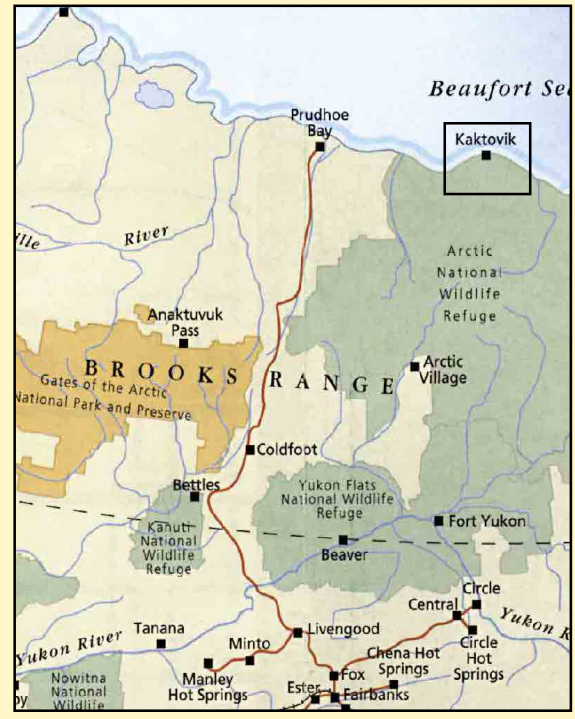
Casual Operating

On day 2 it was a balmy 8 below zero (F) and at 1700Z WJ8Y spotted me on packet. He said, "I'm going to put you to work." That he did! Later W1VJ and N3EEI spots kept me go-

Just where are We?

The North Slope of Alaska stretches above the Arctic Circle at latitude 66.3, between the Brooks Range to the south and the Arctic Ocean to the north. Roughly 500 miles from the nearest traffic light, or more precisely, 120 miles east of Prudhoe Bay, Kaktovik on Barter Island is about as remote as it gets.

Barter Island was an important stop for trading (hence the name) by the commercial whalers during the 1890s and early 1900s. In 1923 a permanent settlement came to be when Tom Gordon established a fur trading post. During the years that followed, residents of the region were semi-nomadic, moving from place to place depending on the availability of fish, fur, game and marine mammals. In 1947, the US Air Force installed the DEW (Distant Early Warning—for detection of enemy aircraft or missiles along the northern rim of Alaska) line station creating jobs for the indigenous people. At one time, there were 20 such stations spaced about 35 miles apart across Alaska's North Slope. By 1968 Kaktovik was becoming popular with the discovery of oil at nearby Prudhoe Bay. 1997 saw the end of the DEW line on this tiny island. Amenities here include two hotels, a school, trading post, city hall/community center, fire department, post office, fuel depot, medical clinic, two cafés, a grocery store and even a Bed and Breakfast. A new diesel generator supplies electricity for the island and a cable TV network via satellite is available. About 100 small homes occupy the island, some with running water and sewer systems. Kaktovik is home to around 250 residents whose families have lived in the region for centuries.



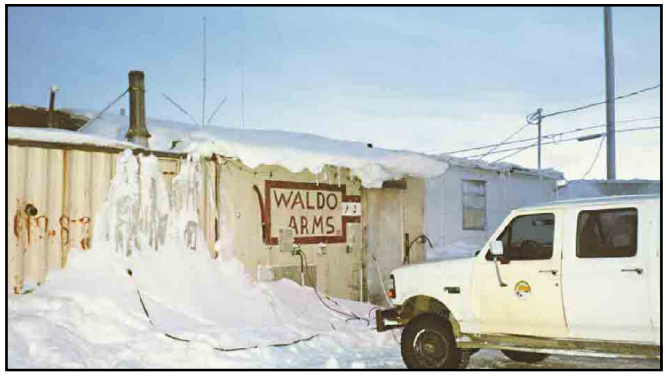
ing. Sweden, Australia, Argentina, Chile and Mexico were now in my log. Packs of dogs howled loudly. I looked out my window to catch a fleeting glimpse of something "big and white." "Was that an Eskimo in a traditional parka, or a polar bear," I thought while waste-deep in a pileup. Later I learned two polar bears had been scared out of a dumpster by a villager with firecrackers! Polar bears are most often found near arctic coastlines and the southern edge of sea ice. Sightings are common in the oil fields of Prudhoe Bay and North Slope communities. Polar bears are the largest predators in the world. They top the food chain in the Arctic, where they dine primarily on seals. I took a break from radioing to ride with Waldo Audi, owner of this Amateur Radio-friendly establishment, to the bone yard. The bone yard is where whale bones are discarded after each annual hunt. "White bears" often congregate there. In the twilight of a crisp 27 below zero afternoon, we saw eight Arctic fox dining on a bowhead whale carcass that had washed ashore last summer. The fox bounced up and down in our spotlight like rats on a garbage heap. Unlike myself, they were well adapted to the fierce Arctic Ocean winds. DX worked today included JK2JEP, P40Y, XE2LV, SM0AJU, KH7RS, LA3WAA and VK3UY.

Besides the island chasers and contesters, I was amazed by the number of county hunters, 10-10ers and the WAS gang (looking for Alaska on 30, 17 and 12 meters) who called me. Several hams said they needed North Slope Borough (aka 2nd Judicial District) or Alaska on 17 meters "big time"! Strange as it seems, this county is the largest in the US and perhaps the most sought after by hams. I got Waldo (aka Walt) to squeeze the mike on 15 meters for a taste of ham radio. Walt, a bush pilot, has lived here for 37 years and worked on the DEW line before constructing his lodge. We worked K4XH, W6FAH, N5XG, N7JSM, W1NG and others before all bands dropped out.

***In the dim Arctic daylight*: The operating shack window (back of hotel) and A99 antenna on roof with dog sleds in front.**

In the Inupiat Aboriginal calendar, December is called "moon with no sun." Moonlight and pitch darkness entombs the Arctic much of the winter. Getting used to the lack of daylight is about as difficult as getting used to "tundra time." Tundra time is that clock inside you telling you when to eat, sleep and work. Everything else is secondary. I soon fell into a rhythm. I'd get on the radio around 1400Z when 15 and 17 meters opened, then work 10 meters until it closed around 0400Z when I'd go back to 12, 15 or 17 meters to work anyone I could.

Day three was slow, as signals were weak and heavy noise was present. I checked into the OMISS (17 meters) and Family Hour (15 meters) nets to work WA2QOM, K9VY, IK5ACO, KB2HJ, GU3EJL, HK4CYR, F5NOD and a few others. I was happy to slow the pace and get whatever contacts I could. Daylight, if you want to call it that, is between 11:30 AM and 1:30 PM "up here." It's 39 below zero as I spin the dial for contacts. The most commonly asked questions, besides "What's the temperature now?" or "Where are you from



The main entrance of the Waldo Arms Hotel, an Amateur Radio-friendly establishment. The A99 antenna is mounted on the roof.

A fuel oil truck just leaving Christmas-decorated home. In remote Arctic villages, the fuel oil man is your best friend!

Fairbanks?" were "Seen any polar bears?" "Do you work for an oil company?" or "Are the Northern Lights out?" The Northern Lights—the aurora borealis—are always present in the far North, even when we can't see them due to daylight or cloud cover. After about 200 contacts today, I decided to slow down and ragchew with an old friend when I heard him in the pileup. Geno, AL7GQ in Colorado, was 59 on 10 meters, then we switched to 15, then 17 and finally 12 meters for back-to-back QSOs with 57 reports both ways. This was a record for us! We were both using A99 verticals.

Sometimes the bands are exceptional up here. Others worked on 17 meters were N2BI, KF7UX, N3TSV, KD5PPS, several W6s and *QST* Publisher K1RO. One ham commented, "WARC bands from the Arctic Ocean—imagine that." Hours later in the dining hall I feasted on a caribou steak dinner—I sure was eating well up here!

Let's Contest—The Big Chill

It's one hour before the ARRL 10 Meter Contest starts and 28 MHz is quiet but you just know a thousand contesters are lurking in the shadows! The mercury dropped past 35 below zero and I'm glad I'm in for the night! Frigid Arctic winds stirred, sandblasting everything on this frozen ice sheet of land. It was futile calling CQ with my peanut whistle station, so I switched to "hunt and pounce" for contacts. Ten meters was slam-full of big signal stations! When 10 faded I was on 17 working KQ6F, K7PE, JA7FVA and many others.

The day ended with a nice hot shower and a delicious baked Alaskan halibut dinner complete with all the trimmings. Many villagers greeted me with, "So, you're the ham operator" or "How's the contest going?" Apparently I was the talk of the town—and not the wandering polar bears! Early the next morning I enjoyed very good band conditions. I was surprised to work short skip in to Fairbanks (KL7RA and KL7FAP were 55) and later to Anchorage (KL7FH and AL7KC were 59). The temperature had been holding right at 29 below zero most of the day.

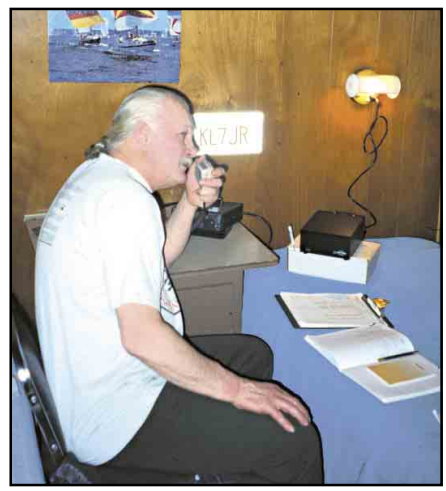
The last day of the contest saw terrible band conditions up here—the interference, noise and fading was extreme. Ten meters opened late and closed early. Arctic flutter was present on some Florida and Georgia station signals as well as mine. Strange conditions in the Arctic indeed! Twenty hours operating and 275 Qs was the best I could get in here for the contest. Some contest DX worked included JH1IED, LW9EOC, HL3AMO, EX2M, ZL1ANJ, UA9YAB, VK4WPX, LT1F, LR6D, DU1UGZ and PJ2T. Fifteen and 17 meters later produced some contacts but conditions were also rough. All in all, I made just over 1250 QSOs with about 40 countries, and 85% were on 10 meters.

Time to Head South

It was great to be this far north again. I had relived many fond memories of my working and radioing from Prudhoe Bay a decade ago. A short 30-minute flight back to Deadhorse Airport (Prudhoe Bay), then by jet back to Anchorage allowed me some time to reminisce about the fun I'd just experienced. Special thanks go to Waldo and Merylin of Waldo Arms Hotel for the warm hospitality shown me. Your cooking is the best in the Arctic! I've experienced Arctic Alaska once again, but this time I left a part of me "up here."

"Barter Island Tower, this is Cape Smythe 2-1-4 taking off with 2 on board for Prudhoe Bay….have a nice day, over."

Photos by the author.



Walt having a great time on 15 meters.

John Reisenauer, KL7JR, was first licensed in 1979 as KA7BKI. He grew up in North Dakota and was a SWL for many years. John does electrical consulting work nationwide and has worked for industry giants such as Boeing and General Electric. Amateur Radio complements his other interests such as camping, fishing, travel, photography and writing. Building wire antennas, island activating and contesting from the North are his favorite ham things to do. He called Alaska home for many years and was quite active in SCARC (Anchorage), including serving as president in 1994. John is the founder and past program director for the US Islands (USI) awards program (KL7USI) and is currently activities manager for the North Country DX Association (K7ICE). His love for the North Country, especially Alaska and the Yukon, is evident by his travels and literary efforts. Many of John's northern ham adventures have been published in QST, 73 and TCA magazines over the past decade. His son John III, KC7FVA, and YL, Claire, WL7MY, often accompany him on trips. He and Claire reside on 10 acres (can you say antenna farm!) near Benton City, Washington. You can reach John at PO Box 4001, West Richland, WA 99353; **kl7jr@owt.com**.

By J. D. Harper, K6KSR

Somewhere There's a Good Home for a Boat Anchor

Do you claim it's your allergies when a dusty rig makes your eyes water and your nose run? Do the pupils of your eyes form little pie-shaped wedges when you're excited? You may just be a Glowbug Geezer!

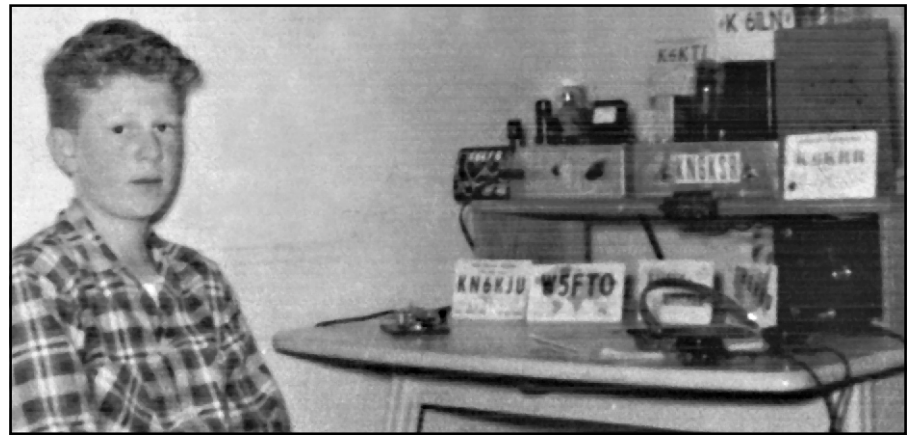
If, as they say, confession is good for the soul, then I should be downright sanctified by the time I'm through 'fessin' up. That's what I'm about to do, right here and now. Own up to it. Unload. Tell it like it is. You see, I'm an addict—have had the habit for nearly 50 years. It's a wonder I ain't dead from the sheer weight of it all.

Until recently I've been afraid to say anything—mostly because of what I imagined would happen once the word got out.

"There goes the old Glowbug Geezer!" they would shout as I passed by.

"Hey Geezie," another would holler, "you been sniffin' dust off them old finals again?"

Still another would taunt with, "Yo, Geezo—better not try to move that big ol' radio by yourself 'less you get a real bad hernia!"



The author operated KN6KSR in 1955, the same year he was stricken with "Glowbug Fever." The 35-watt homebrew transmitter and BC-454 war surplus receiver kept the bedroom corner shack warm during all-night DX-chasing sessions—on non-school nights, of course.

The Beginning

As part of my catharsis, I'm going to tell you the exact day I got hooked some 46 years ago. It was summer, 1955, and I'd gotten my ham ticket a few weeks before school let out for summer vacation. I'd spent most of the school year scrounging parts and then assembling a 40-pound, 3-tube transmitter that ran 35 watts input. At full power the plate in the 807 final glowed like a miniature beacon every time the hand key made contact.

Anyway, what with school being out, we could stay up late any night of the week. It seemed like a perfect time for a go at some wee-hours DX with Walter, my old pal. Walter got his ticket a week after me and had only been on the air once at the school's club station. He'd just finished converting an ARC-5 Navy T-19 surplus transmitter to 80-meter CW. It would be the trial run for his rig that night. We set up our station where my long wire antenna terminated in the dimly lit corner of the bedroom I shared with my kid brother.

I was sitting right beside him when it happened. Here he was, sweat forming rivulets above his upper lip and eyebrows, the headphones clamped tightly over his ears, his right hand hammering away on the old J-38 key, while white spittle foamed at the corners of his mouth. It was sudden... and loud. Walter was taking that first euphoric step into boat anchor nirvana.

"I got Arizona!" he shouted, causing my kid brother to bolt upright in his bed across the room and holler, "I didn't do it!"

"I got Arizona!" Walter yelled again, looking at me with eyes that had little pie-shaped wedges that kept opening and closing.

"What'd he give you?" I asked, watching Walter begin chewing on the headphone cord.

"Fow sess nam," said Walter, without removing the cord from between his teeth.

"Bitchin' report for DX!" I said. Never mind that we were in a town just south of Los Angeles. "Hey, you wanna hang out and try for maybe Nevada or Oregon?" The little pie shaped wedges slammed open 180 degrees. "Afsholutley!" he hollered.

That exclamation sent my kid brother running off to my parent's room. "I'm tellin' on you!" he said, almost sobbing. He came back a couple minutes later and was about to say something bratty when a booming baritone floated in from my Dad's room down the hall. "Boys, this is the Lord speaking. It's time to hit the sack. Unplug that stuff. Radio Free California is now off the air." To rub it in he began humming the national anthem. "Wibish afshi," garbled Walter, unrolling his sleeping bag.

It was along about first light that same morning that I realized I'd been hooked, too. I can remember vaguely dreaming about my 6AG7/807 rig. Walter tells me I was just sitting up in my sleeping bag, mumbling. "You were saying 'I'll never leave you,'" he said, in between enthus-

ARS K6KSR today. Except for the Kenwood 2-meter rig and Astron power supply, all gear is at least 20 years old, including the "like-new" Collins 75-S1 receiver (bottom shelf), which the author found at a neighborhood garage sale for $20.

ing over the potential QSL card from Arizona and adjusting the headphones he still wore in his sleeping bag. "You just kept saying it over and over like you was chanting or something." He shrugged and began chewing on his headphone cord again. "Aairulzona," he muttered through his cord-chew. "Kenyoo beereefit!"

But Why, John?

By now your big question has to be, "Why would this dweeb wanna fool around with 400-pound radios that smell of burning dust, make the room too hot, and take a plumbing contractor to tune 'em up proper when he could do everything faster and easier with one of the solid state rigs?"

I don't think I can give a definitive answer to that one. Maybe the answer is that faster and easier doesn't always mean better. Maybe it's 'cause we cut our teeth on *Drive*, *Tune* and *Load* controls. Just maybe it's 'cause we can maintain near-total control over our signal's development — from the time it's introduced into the circuit, as it proceeds along its merry way through amp and oscillators and buffers and drivers to the 6146B finals, out the back door and up the feedline to Mother Ionosphere. Geezers will tell you it's because real ham radios should be more than a single-finger exercise.

The last thing a Geezer wants to do is to get rid of equipment. That's a no-no—whether you sell it, trade it or donate it. The whole objective is to get more old gear. It's the key to a great set of abs and enhanced mental health. Just ask Herbie over in Texarkana. Uhhh, come to think of it, better ask his XYL, since Herbie got all glassy-eyed a couple weeks after he traded his old Swan 500C for a mountain bike. Not completely centered in his own mind, he took to riding around the big campground just south of town, asking perfect strangers if they'd seen his Swan. "He's just like a little boy who trades his favorite Buck knife for a glass eye," said Mary Ellen, Herbie's XYL. "He's got a heap of 'trader's remorse' that's all," she explained to the Park Rangers.

I phoned Walter. "Hey, Walt—you think maybe we're just a little crazy for hangin' on to all these old boat anchors for nearly half a century? I mean are we dinosaurs or what!"

"You know, I have no feeling in my left leg now." Walter complained. "And yesterday I just know I went blind in one eye for at least five minutes."

"Boat Anchors, Walter." His voice went up an octave. "Hey, is it swap meet this Saturday already?"

"Yeah," I said, "I think it is. You want me to pick you up?"

"For sure, ol' buddy. There's an old junker out there with my name on it!"

"Uh-huh. You know, Walt," I said, quickly scanning my shack to see if there was room for just one more radio that needed a home, "I think I better bring the refrigerator dolly... just in case."

First licensed in 1955 as Novice station KN6KSR, John Harper cut his ham teeth on home-brewed rigs and military conversion sets. A dedicated Boat Anchor fan and QRP enthusiast, he still builds much of his own gear. John is a former commercial photographer and copywriter who now makes his home in Frisco, Texas. His articles and photos continue to appear in a wide variety of national periodicals and trade books. You can contact him at 8260 Christie Dr, Frisco, TX 75034, e-mail **k6ksr@earthlink.net**.

NEW PRODUCTS

MULTIBAND ANTENNAS FOR THE FT-817

◊ Designed for the Yaesu FT-817 (or similar) mini QRP transceivers, MFJ's new Walkabout 10-section telescoping whip antenna puts out a portable signal on 80 through 6 meters and plugs into almost any BNC or SO-239 antenna connector.

The Model 1899T whip antenna is 52 inches fully extended, 7 inches when collapsed and unscrews easily from its 12-inch base loading coil. To change bands on the 25-W (max) antenna, simply plug the "wander lead" into the appropriate socket on the loading coil and fine tune the antenna to resonance by lengthening or shortening the whip. Single band versions are available from 80 through 6 meters.

Price: $129.95 (Model 1899T multiband); $49.95 (single band, 80 or 40 meters); $39.95 (single band, 30 through 10 meters); $29.95 (6 meters). 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**.

PM COMPONENTS TO DISTRIBUTE SVETLANA VACUUM TUBES

◊ England's PM Components Ltd has been appointed primary worldwide distributor for Svetlana glass and ceramic vacuum tubes and has formed PM of America to handle Svetlana product distribution in North America. For more information, contact PM of America at 1687 Shelby Oaks Dr, Ste 8, Memphis, TN 38134; **www.svetlanausa.com**.

LOW-RESISTANCE TRENCH POWER MOSFETS FROM IXYS

◊ Power semiconductor specialist IXYS has introduced a new series of Trench Power MOSFETs for low-voltage/high-current applications. The IXUC100N055, IXUC200N055 and IXUC160N075 have current ratings of 100 A, 200 A and 160 A, respectively. All are housed in a new "holeless" package that conforms to a TO-220 outline, but with an electrically isolated mounting tab (dubbed ISOPLUS220 by the manufacturer). With on-state resistances of between 4 and 7.7 mΩ, the new Power MOSFETs are said to offer high current handling, excellent on-state conduction and minimal switching losses.

Prices: $3.50 to $6.40 in quantities of 1000. For more information, contact IXYS at 3540 Bassett St, Santa Clara, CA 95054, tel 408-982-0700, fax 408-496-0670; **www.ixys.net**

Previous • Next New Products

By Dave Patton, NT1N

The Evolution of the World Radiosport Team Championships

Amateurs will converge on Finland this summer to determine who is the "best of the best."

Not all sports have a clear-cut method for determining the absolute best of the best. Some sports come close, but others such as college football, simply do not have the time or resources to determine the best of the best. Various polls of experts can be used to make an educated guess at the best—often seemingly done with political overtones and favoritism being evident.

How about the case with Amateur Radio contesting—can the best of the best be determined? Probably not with the vast array of our present contests and all the inherent variables that go together to produce a final score. However, the World Radiosport Team Championship events—simply known as *WRTC*—have come close.

Jun Hasegawa, president of Yaesu, Dennis Motschenbacher, K7BV, who recently joined the ARRL Headquarters staff as Sales and Marketing Manager, and Martti Laine, OH2BH, stand near Yaesu's display of rotators at the Tokyo Ham Fair in 2001. Mr. Hasegawa and Yaesu have been very generous in their support of DXpeditions and operating events such as WRTC 2002, where competitors will use 50 donated rotators.

WRTC History

WRTC was originally conceived as an international competition to take place in conjunction with the 1990 Goodwill Games in Seattle. Danny Eskenazi, K7SS, spearheaded that first competition to a very successful conclusion. Two-man teams of operators chosen to represent their countries flocked to Seattle to compete in a 10-hour contest using similar stations (see John Crovelli's article in October 1990 *QST;* this and other articles about WRTC can be found at **www.ncjweb.com/wrtc.html**). The results were so good that the international contesting community's attention was locked in. Clearly there would have to be more of these international events.

The Washington organizers had shown that volunteerism could work and dozens of people came forward to donate time, money, lodging, and competitor's stations. Software developers (principally Tree Tyree, N6TR) took heart in the principles of this type of competition and attracted world-class talent such as that of Glenn Rattmann, K6NA, Dick Norton, N6AA, Martti Laine, OH2BH and others, to participate not as operators (even though they could easily have been involved as team leaders and operators), but as judges and log checkers. The 1990 winners, John Dorr, K1AR and Doug Grant, K1DG could certainly take heart in knowing that they won with a "clean log."

The Northern California Contest Club took up the challenge of organizing the next WRTC in 1996—and what a job they did. There were so many people involved that it's impossible to list them all in the space provided here, but much has been written about that event in the *National Contest Journal*. The WRTC '96 was expanded to include 52 two-man teams representing both regional and national contest clubs as well as their countries. The contest period was lengthened to 20 hours and operated within the IARU HF Championship in July. Operating locations were spread throughout the San Francisco Bay area using the stations of volunteers—one of the most incredible examples of volunteerism contesting has ever seen.

WRTC '96 organizers were able to successfully involve noncontesters like never before. Every attempt was made to provide equal antenna systems for the competitors with the organizers going so far as to have a "40-meter dipole building and erection weekend" at stations without those antennas. "Bigger" stations were modified to be "littler" in some instances. Noise problems were tracked down and cured. Transportation problems were overcome. And best of all, tens of thousands of dollars worth of donations flowed into WRTC coffers. Corporate underwriting was obtained from many Amateur equipment companies and associations, and even from non-amateur companies such as Shell Oil, WJET-TV, and Give Pizza A Chance! The effort was

WRTC 2002 Competitors

EUROPE

Austria
OE2VEL, Wolfgang Klier
OE9MON, Carl Maurer

Belgium
ON4WW, Mark Demeuleneere
ON6TT, Peter Casier

Croatia
9A9A, Zdravko Balen
9A3GW, Robert Orehoci

Czech Republic
OK2FD, Karel Karmasin
OK2ZU, Vojta Zeman

German Teams
DJ6QT, Walter Skudlarek
DJ2YA, Ulrich Weiss

DK3GI, Roland Mensch
DL1IAO, Stefan von Baltz

DL2CC, Frank Grossmann
DJ7AA, Wilfried Gottschald

France
F6FGZ, Gerard Parat
F5NLY, Laurent Blin

Finnish Teams
OH1MDR, Timo Pohjola
OH1MM, Pasi Alanko

OH6EI, Tomi Ylinen
OH2XX, Kari Lehtimäki

Hungary
HA1AG, Zoli Pitman
HA3OV, Antal "Anti" Hudanik

Italy
IK2QEI, Stefano Brioschi
I4JMY, Maurizio Panicara

Lithuania
LY1DS, Dainius Savicius
LY2TA, Andrius Ignotas

Polish Teams
SP3RBR, Bogdan Chorazyk
SP8NR, Andrzej Jarzabkowski

SP7GIQ, Krzystof Sobon
SP2FAX, Kazimierz Drzewiecki

Russian (European) Teams
RW1AC, Vlad Aksenov
RW3QC, Jack Danielyan

UA2FZ, Igor Avdeev
RW4WR, Alex Orlov

RA3AUU, Igor Booklan
RV1AW, Andrei Karpov

Slovenian Teams
S53R, Robert Kasca
S57AW, Robert Bajuk

S50A, Tine Brajnik
S59AA, Franc Bogataj

Spain
EA3NY, Eduardo Stark
EA3KU, Fernando Martinez

Sweden
SM5IMO, Dan Hultgren
SM3SGP, Gunnar Widell

Ukraine
UT4UZ, Yuri "Jerry" Onipko
UT3UA, Sergey Vasilenko

United Kingdom
G4PIQ, Andy Cook
G4BWP, Fred Handscombe

Yugoslavia
YU7BW, Robert Homolja
YU1ZZ, Milovanovic Milan

ASIA

Russian (Asiatic) Teams
RZ9UA, Mikhail Klokov
UA9MA, Gennadij Kolmakov

UA9BA, Vladimir Umanets
RN9AO, Nickolai Perminov

Cyprus
5B4ADA, Ivo Pezer
5B4WN, Marios Nicolaou

Japan
JM1CAX, Koji Tahara
JE1JKL, Satoshi Nakamura

Kazakhstan
UN9LW, Vladimir Vinichenko
UN7LAN, Alex Sytov

NORTH AMERICA

Canadian Teams
VE3EJ, John Sluymer
VE7ZO, Jim Roberts

VE7SV, Dale Green
VE7AHA, Andrew Ponzini

USA Teams
N5RZ, Ralph Bowen
K2UA, James W. "Rus" Healy

N6RT, Doug Brandon
N2NT, Andy Blank

N6MJ, Daniel M. Craig
N2NL, David W. Mueller

K1AR, John Dorr
K1DG, Doug Grant

W4AN, Bill Fisher
K4BAI, John Laney

N5KO, Trey Garlough
N1YC, James Brooks

N2IC/0, Steven London
K6LL, David Hachadorian

NT1N, Dave Patton
AG9A, Mark Obermann

KQ2M, Robert Shohet
W7WA, Daniel Handa

K5ZD, Randy Thompson
K1KI, Tom Frenaye

N5TJ, Jeff Steinman
K1TO, Dan Street

K3LR, Timothy J. Duffy
N9RV, Patrick M. Barkey

N6KT, Rich Smith
K6NA, Glenn Rattmann

N6TJ, James Neiger
N6AA, Richard Norton

AFRICA

South Africa
ZS6EZ, Chris Burger
ZS4TX, Bernie van der Walt

SOUTH AMERICA

Argentina
LU7DW, Claudio Gabriel Fernandez
LU5DX, Martin Monsalvo

Brazil
PP5JR, Sergio Lima de Almeida
PY1KN, Marcelo Gomes da Silva

absolutely extraordinary.

An addition to the 1996 event was the placement of judges at each station. The judges, led by Lew Gordon, K4VX, set a new standard in contesting by volunteering their services to come to San Francisco and listen to what was going on for those 20 hours, as well as perform log-checking duties and to be in charge of recording the entire contest for future log checking decisions. An unexpected phenomenon that arose from WRTC '96 was that the judges became part of the teams they were adjudicating! While they didn't actually operate or assist toward the total score, the judges were cheerleaders and virtual participants—a great experience that went beyond the drudgery that first appeared to be the case. Virtually the same group of experts led by N6AA made sure the logs were fairly and cleanly evaluated—furthering another standard that will continue in the future. Many people who were not involved in the event came to the Bay Area just to witness the fun and be a part of the action. All were truly welcome as has become the hallmark of the WRTC and its future—which headed to Slovenia in 2000.

The winners of WRTC 1996, Jeff Steinman, KR0Y (now N5TJ) and Dan Street, K1TO, defended their win in Slovenia, just as K1AR and K1DG had the opportunity to do in '96. Again, as in both previous WRTCs, the actual contest was a battle that was as fairly conceived as possible. Hosted by the Slovenia Contest Club, and seemingly the entire country of Slovenia, and led by Tine Brajnik, S50A, WRTC 2000 hosted 53 teams on hilltop locations with identical antennas. The competition also included simulated CW and phone pile-up competitions!

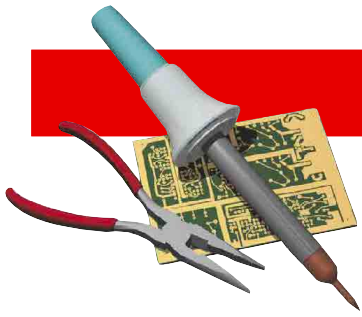
The special events surrounding the competition were truly "Olympic class" and included the competitors entering the ceremony by carrying placards to identify their home countries. There were dancers and musicians, and many special gatherings and speeches throughout the country (see "WRTC-2000: A Test of Teamwork in 'The Green Piece of Europe'", October 2000 *QST*). The Slovenian Army helped transport participants to and from the airport and even flew Chief Judge David Sumner, K1ZZ and other organizers on station inspections! When it was all over, Jeff and Dan once again emerged victorious and will defend their back-to-back titles in Finland in 2002.

Finland 2002

As with previous WRTCs there were follow-up discussions concerning future event locations. Finding a willing and capable organization to host a WRTC is difficult, but Contest Club Finland (CCF) and the Finnish Amateur Radio League (SRAL) stepped forward. The reason for holding the next WRTC in 2002 rather than in 2004 is to take advantage of still-elevated sunspot numbers which will likely make propagation much better than it will be in 2004. And at 62° north latitude, contesting will be a new experience for most of the 100 competitors making up 50 teams from around the world (see the "WRTC 2000 Competitors" sidebar).

Prior to committing themselves to the event, organizers were able to secure half of their budget ($200,000) from local sources. Nokia Corporation became a local title sponsor while Vaisala, Elektobit, SGS and Texas Instruments contributed further to the initial success. See the WRTC 2002 Web site at **www.wrtc2002.org** for additional information on how you can help fund this great event.

You don't have to fly to Finland to enjoy the excitement of WRTC 2002. Just be ready July 13-14 and participate in the IARU HF World Championship. It's *the* #1 summer contest. The WRTC stations will be using special Finnish call signs and they will be most eager to work *you!* Thanks to Martti Laine, OH2BH, for his help with this article. QST



QST WORKBENCH

PROJECTS AND INFORMATION FOR THE ACTIVE AMATEUR

The Doctor is IN

Q Bob Appel, KE3VP, of New Berlinville, Pennsylvania writes: In old equipment and the old FCC regulations, power was expressed in input power to the finals (plate current times plate voltage). If the input power to the finals is 50 W, with a 1:1 impedance match to the antenna, what is the output power to the antenna? I'm guessing, half is dropped across the finals and half across the antenna (load) giving a maximum of 25 W to the antenna. If not, can you explain?

A Prior to 1983, the FCC power rules for the Amateur Radio service were based on dc input power to the final RF stage in the transmitter. In these rules, the power of an amateur transmitter was limited to 1000 W dc input to that final stage. To make this measurement, it was necessary to measure and monitor the dc voltage and current being supplied to the final RF stage. Many rigs of that day had built-in voltage and current metering.

The FCC changed its power rules in 1983. Modern ICs had made peak detection of voice signals quite inexpensive. The present rule permits 1500 W peak envelope power (PEP) RF output from transmitters used in the US Amateur Radio Service. Verifying compliance is as easy as connecting a peak-reading wattmeter to the output of the transmitter. Today, most rigs have some kind of built-in RF output measurement capability. In some rigs, possibly for cost containment, the meter is merely hooked up to the output of an RF detector, without any peak detecting or averaging circuitry. Normally, these radios are sufficiently low powered that the FCC does not require accurate power measuring.

In most cases, the final RF output stages in typical amateur transceivers use some variant of Class AB amplification, which provides around 50 to 60% efficiency under ideal conditions. In other words, the RF output from the amplifier is between 50 to 60% of the amount of dc power provided to amplifier from the power supply. Some FM or CW-only rigs use more efficient Class C amplifiers, which provide up to 70% efficiency under ideal conditions. Some special amplification techniques, such as Class E amplification, can achieve nearly 90% efficiency.

Power that isn't converted to RF energy appears as heat in the tubes or transistors and associated circuitry. As such, heat sinks, convection cooling, forced-air cooling and other methods of dissipating the heat must be employed to avoid premature failure of the amplifier. In reality, the ideal 1:1 impedance match is rarely achieved, resulting in decreased efficiency in the final amplifier stage.

The equations for calculating the loss in a feed line and antenna tuner are rather involved. The *TLW* program supplied with *The ARRL Antenna Book* will do these calculations.

Some articles that have featured high-efficiency final amplifier designs are:

Jan 2001 *QEX* "Class-E RF Power Amplifiers," p 9.

Jan 1998 *QST*, "Signal Envelope Elimination and Restoration in Class-E High Efficiency Linear RF Power Amplifiers" (Technical Correspondence), p 80.

May 1997 *QST*, "High-Efficiency Class-E Power Amplifiers—Part 1," p 39.

Jun 1997 *QST*, "High-Efficiency Class-E Power Amplifiers—Part 2," p 39.

Q John Mientus, KG4GRZ, of Charlotte, North Carolina writes: I have a dual band (2 meter/70 cm) base station antenna in my attic. I also have a base rig with separate VHF and UHF antenna connectors. Will a duplexer/diplexer allow me to transmit on 2 meters and simultaneously receive on 440 or vice/versa? My rig is capable of this. A brief explanation of how the duplexer accomplishes this would also help.

A Yes—a diplexer would allow simultaneous operation on two bands. A diplexer is a pair of filters. One routes 2-meter energy between the 2-meter port and the antenna, but not the 70-cm port. The other routes the 70-cm energy between the antenna and 70-cm port but not the 2-meter port.

A duplexer is also composed of filters, but it normally operates on a single band, such as 2 meters. Duplexers are commonly used with repeaters, since they allow a transmitter and receiver to share a single antenna simultaneously.

Q Walt Martin, KB5HOV, of Dallas, Texas writes: Older communications receivers (tube type) had front panel antenna trimmers. What function did these trimmers serve and why don't we have them on current model (solid state) receivers? Yes, I know we manipulated them while listening for a peak in white noise, but was the trimmer matching impedance between the feed line and the receiver input or was it a frequency matching function?

A Those little trimmers were intended to function as very crude antenna tuners. They essentially tuned the antenna system to be resonant, forming a series resonant circuit with the antenna. This created a low impedance point at the receiver input, ensuring the best transfer of received-signal power from the antenna to the receiver, whose input impedance was typically low.

The trimmers are no longer useful, as tuning them for maximum noise would degrade sensitivity. Modern receivers often have impedances that are significantly mismatched from 50 ohms. Power matching with a tuner typically results in degraded signal to noise ratio, despite the higher noise level coming out of the receiver. Chapter 6 of *Introduction to RF Design* by Wes Hayward explains how increased sensitivity can be obtained by mismatching the receiver to 50 ohms. Most hams prefer increased sensitivity to low receiver input SWR. Tuning a matching network for best signal to noise ratio on SSB or CW signals is difficult.

Q Lamont Matin, N3ROR, of Baltimore, Maryland writes: Is it practical to use a tuner with a bug catcher type antenna to receive some gain in 10 meter mobile operation? That is, using a 40 meter coil (bug catcher type) tuned via mobile tuner?

A It is possible, but not efficient—you will receive no additional gain; in fact, possibly quite the reverse. On 10

meters, the tuner will see the 40-meter mobile system as a lossy antenna that is electrically longer than a quarter-wave antenna (sort of like a random wire). If the tuner is not placed at the base of the antenna, the SWR on the feed line between the tuner and the antenna will be very high, adding to the losses. What you suggest might work for convenience sake if you can get the SWR down to a reasonable level—2:1, but I would not use this as a permanent antenna.

Q Marvin Sackett, WA4WAY, of Largo, Florida writes: I have four tubes in my storage. All are 6146s finals. Two are RCA 6146A and two are Sylvania 6146W. Can you explain what the letter after the number means?

A The lineage of the 6146 (see Figure 1) is as follows:

6146—The original design with a plate dissipation of 25 W.

6146W—A ruggedized version of the 6146.

6146A—The first generation of improved 6146 design, also with a plate dissipation of 25 W.

6146B—A significantly improved tube design that offers 35 W of plate dissipation as well as an improved heater design that allowed much cooler operation. The 6146B was designed specifically for SSB service, and was used as a workhorse in many CW and SSB rigs.

Figure 1—The venerable 6146 tube.

In other words, the 6146W is not a replacement for the much more capable 6146B. If you must use a 6146, 6146A or 6146W, adjust your rig's final amplifier section so that the maximum plate dissipation rating isn't exceeded. A great Web site for detailed tube descriptions is www.tube.be.

Q Brian Lakner, AB0SD, of Exline, Iowa writes: I have a really good question for you. Once in a while I notice that the 2 meter band has much less noise on it than is normal. I turn the preamp on, and still do not hear a difference. The effect is across the entire SSB subband. It is as if there is an AM carrier, as I spoke with another ham during this phenomenon and could barely hear him. Is this a weather affect, as a large front is passing through, or is it something else?

A It sounds like there is a very powerful signal near the 2-meter amateur band that is desensing your receiver. This often occurs with RF preamplifiers—a powerful near-band signal saturates the preamplifier, leaving less gain for the signals you want to hear.

Q Jack Ward, K9ZQJ, of writes: The cheapest "dime store" watch would keep better time than the clock in any computer I have ever owned. I just purchased another computer, better-than-ever model, but it too gains about 3 minutes a month. Is there any way to adjust the computer clock so it will keep accurate time?

A There probably never will be an accurate on-board computer clock and there is no "faster" or "slower" adjustment. But there is a painless way to correct the time as often as you wish. There is a free program called *NistTime* available at: www.freedownloadscenter.com/Business/Time_and_Clock_Tools/NistTime.html.

NistTime sets your system time to the atomic clock in Boulder, Colorado via the Internet. No setup is required and it uses your registry settings for time zone information. It runs in the background and takes only a few seconds to complete its task and works well using the *Windows* scheduler. In *Windows 98*, the scheduler's icon (a little calendar and clock) is at the right of the task bar near the clock—setting the scheduler is simple and very intuitive.

If you use a cable modem or DSL and are therefore connected at all times, and you leave your computer on, you can set your scheduler to update the clock nightly while you sleep. If you turn your computer off when not in use, you can simply put *NistTime* in your StartUp folder so it will update when you turn on your computer.

If you use a dial-up modem, you can place the icon on your desktop and when you connect, just give the icon a click and it's done, in the background, without distracting you from your task.

I have been using *NistTime* under all the above conditions for several years and it really works!

Q Mark Horowitz, WA2YMX, of Plantation, Florida writes: I was wondering if you could help me identify a 3-element Yagi. I picked it up from a widow of a ham. It's probably over 15 years old. The dimensions are: Boom—18 ft. Elements—23 feet 9 inches, 25 feet 1½ inches, and 25 feet 2½ inches. I'm fairly sure it's a tri-bander for 10-15-20 meters. Each element has one trap on each end.

A Sorry, but it is virtually impossible to identify an antenna from such a description—unless you by chance happen to talk to someone who owns the same antenna, and even then it's not a sure thing. Antennas obey the laws of physics and two antennas from two different manufacturers could well have identical dimensions (the differences being in the subtleties in the manufacture of the traps or the hardware).

In addition, such detailed dimensions are not usually given in ads (if you could somehow remember all the ads you've seen) and you would have to search through the instruction sheets of all beam antennas to find a match (if you had access to such a collection).

A special case is when the antenna is intact on a tower and the coaxial feed is still functional. Assuming the ham gear in no longer connected to the antenna (the easiest way to determine which bands the antenna supports), you can use a dip meter to determine the resonant frequencies of the antenna. If you know ahead of time that there is an antenna for sale, borrow a dip meter, such as the Alfa Electronics DM-4061A or an MFJ SWR Analyzer. The MFJ unit is much easier to use than a dip meter; simply plug in the coax and find the SWR of the antenna on any frequency in the 10-160 meter range.

In the end, we do not recommend purchasing an "unknown" antenna at hamfests or estate sales without the original instruction sheet. What you may well have here is a good source of aluminum and possibly traps (if you can backward engineer them) with which to design and build another antenna.

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/.

Timewave Technology PK-232/PSK Upgrade

Timewave Technology has created a soundcard interface board for the old, reliable PK-232 multimode controller. When it is teamed with *PKTERM* software from Creative Software Services you can be on the air with PSK31 in no time, not to mention the other sound card digital modes.

Installation

The first step is selecting the proper upgrade board. AEA produced several versions of the PK-232, and Timewave is producing another one now. The upgrade kit you need will depend upon the PK-232 you own. I own what is called the "Middle Version" PK-232MBX, so this review is specifically about the model A.06217 PSK upgrade kit. To determine which upgrade kit you need, check the Timewave Web site at **www.timewave.com**. There are three available and they all function the same way. The difference is in how the upgrade board installs in the PK-232. The upgrade uses the external modem port on the PK-232 for connection to the sound card. You will not be able to use the sound card connection and an external modem at the same time.

My installation went smoothly. The wires were the right lengths and all of the holes matched up well. The upgrade board fit neatly within the PK-232.

Testing

The upgrade package comes with a program called *ModemSwitch*. This program allows you to switch your PK-232 between sound card modes and traditional modes. It also provides a manual transmit button for sound card modes that do not yet support PTT directly through the PK-232 upgrade. *ModemSwitch* provides a dumb terminal that can be used to send commands to the PK-232. When you switch to "TNC" you will need to close *ModemSwitch* before opening your TNC software or your computer will become confused about which program is controlling the COM port. It can be left running (and even provide PTT) when in sound card mode. Be sure to download the latest version of the free *ModemSwitch* software from the Timewave Web site. *ModemSwitch* requires the TNC to be in "Terminal Mode" to communicate. In *PKTERM* you can set the PK-232 to "Return to Terminal Mode on Exit." This setting is under the Mode selection in the VHF packet window.

I fired up the *ModemSwitch* software and switched the PK-232 to "Soundcard" and fired-up *AO-40RCV*, the sound card software by AE4JY that allows hams to decode the PSK telemetry beacon from the OSCAR 40 satellite (**www.qsl.net/ae4jy/ao40rcv.htm**). *AO-40RCV* said I needed to reduce the input audio. I moved a jumper on the upgrade board from JH3 to JH4 (Section 2 of the instructions) and it worked beautifully. Some of the noise that always used to be present on the waterfall display with my direct soundcard connection was gone.

Using *ModemSwitch* I switched the PK-232 back to "TNC." Much to my chagrin none of the old modes worked. Everything looked like it was working including the tuning indicator, but no text appeared on my screen. I uninstalled the upgrade and everything worked just fine again. I reinstalled the upgrade and e-mailed Timewave with my symptoms several times over a couple of weeks, but didn't receive a reply. One quick phone call saved the day. They answered the phone on the first ring and in less than a minute the technician talked me through the problem. It turned out that the header connector uses pins that slice through the insulation of the wires to make contact. A gentle push without spreading the connection resulted in good contact. All of the original modes were back.

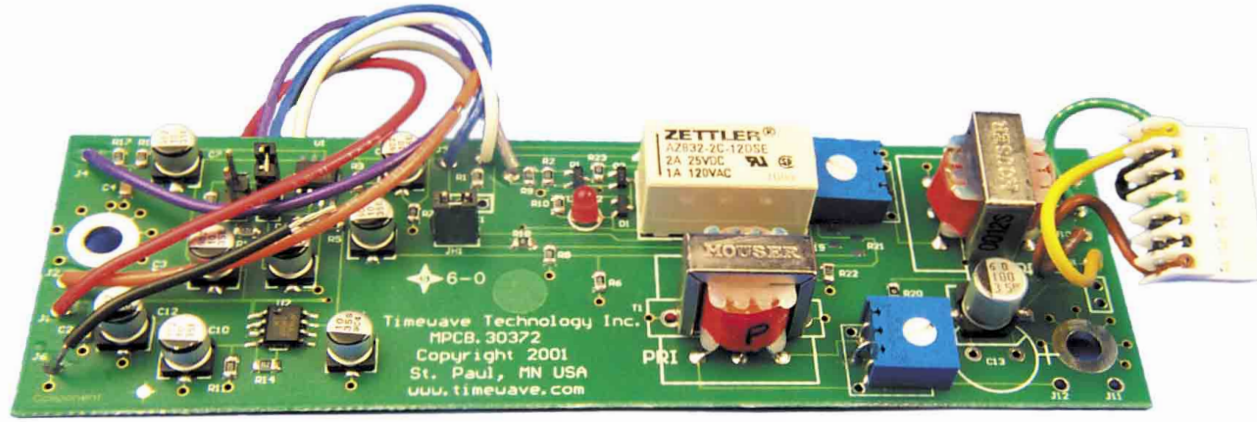
PKTERM

I completed the final tests of my modified PK-232 with the latest version of *PKTERM*, available from Creative Software Services. This versatile software package has several new features in addition to your old favorites. A demo version and upgrades for registered owners are available from **www.cssincorp.com/pkterm/**. *PKTERM* for *Windows* is *the* program for running the PK-232. I think the most impressive new feature is PSK31 operation. It is fully integrated; just click on PSK on the tool bar and the PK-232 switches automatically to sound card mode. The familiar PSK display comes up and you are working PSK31.

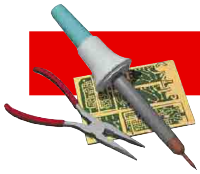
Conclusion

Timewave's PK-232/PSK upgrade makes an ever-increasing library of digital mode software available to the PK-232 user. As time goes on, more authors will be taking advantage of the keying and other functions available for sound card software using the PK-232/PSK connection. The PSK upgrade is a great way to get even more out of your PK-232.

Manufacturer: Timewave Technology, 501 W Lawson Ave, St Paul, MN 55117; tel 651-489-5080; **www.timewave.com**; *$69.95.*



Gary "Joe" Mayfield, KA0YOS ♦ 1909 5th St NE, Watertown, SD 57201 ♦ ka0yos@amsat.org



By Mark Bradley, K6TAF

What Can You Do with a Dip Meter?

Quite a bit! The dipper is one piece of test equipment that can replace a whole shelf of expensive gear—if you know how to use it.

As radio amateurs we are often interested in resonance. What is the resonant frequency of that antenna I just put up? Is that trap resonant at the frequency I think it is? That crystal, the one with the strange markings, is it good for anything? Do I have an inductor in the junk box that will work in the next project? How do I find the value of those mica capacitors with the cryptic markings? Is that chunk of coax really a ¼ wavelength at the frequency I hope it is?

These are all questions that can be answered by using a dip meter or "dipper" to measure resonance—just one of the instrument's many uses. A dipper makes a very sensitive absorption wave meter for measuring a signal frequency. Since a dipper is an oscillator, I have used it as a signal source to troubleshoot receivers, as well.

All this versatility comes at a price; a dip meter is not a precision instrument. There are techniques to reduce errors to acceptable levels, which will be discussed later. In case you haven't guessed by now I am a big fan of dip meters—mine has allowed me to make many tests that would normally require an extensive array of laboratory equipment.

What is a Dip Meter?

A dip meter is nothing more than an oscillator with the frequency-determining coil exposed, so that it may be coupled to other electrical circuits. A frequency control is included so the oscillator's approximate frequency is known and can be adjusted. A meter indicates the level of oscillation. Most dip meters come with a set of plug-in coils for wide frequency coverage in several ranges. Older vacuum tube units, in which the meter monitored the grid current of the tube to indicate the level of oscillation, were called grid dip meters. With the availability of high frequency transistors, dip meters went high-tech and battery operation became practical.

The typical dip meter is contained in a small case, with provisions for external plug-in coils. A dial to control the oscillator frequency will be conveniently located on the unit. The meter is located for easy reading while the frequency is being adjusted. Most dippers will also have a control to adjust the level of oscillator activity. This control allows the operator to keep the meter indication at a convenient level over a wide frequency range. If it is a solid-state unit, a battery is included in the case, while vacuum tube units will have an ac power supply that may be self-contained or separate.

Sometimes there is a switch to kill the oscillator to facilitate its use as an absorption wave meter. On others it is possible to turn the activity control down far enough to stop the oscillator. On the front panel there may be an audio output to listen to the modulation of a carrier. Figure 1 shows some common types of dip meters.

Figure 1—Several common types of dip meters are shown with their plug-in coils that determine the oscillator's frequency.

Using the Dipper

When the coil of the dipper is placed near the resonant circuit under test, some of the energy from the oscillating dipper is coupled to the circuit. This coupling reaches a maximum when the frequency of the dipper and the resonant frequency of the circuit are the same. This coupled energy is supplied by the dipper's oscillator, which causes the amplitude of the oscillation to drop. Since the meter indicates oscillation level, a pronounced dip in the meter will be seen as the dipper is tuned through the resonant frequency of the circuit. The oscillator frequency at the minimum or bottom of the dip is the frequency of resonance of the circuit under test. The nice thing is that the circuit being tested does not have to be powered up to measure its resonant frequency.

Placing the axis of the dipper's coil adjacent and parallel to the axis of the coil in the circuit under test results in inductive coupling (Figure 2). This method gives the deepest and most easily found dip on the meter. The dipper's oscillator frequency is "pulled" by the additional load of the resonant circuit—this is one of the major sources of error in making dip meter measurements. Reading the dipper frequency with loose coupling

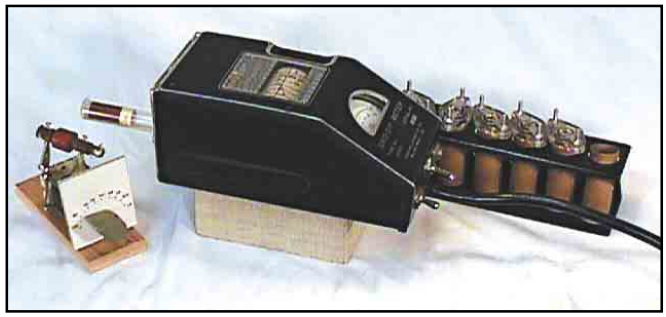


Figure 2—The dip meter's plug-in coil is aligned for inductive coupling with its axis parallel to the inductor of the resonant circuit.

Figure 3—A coaxial cable "link" with a coil at each end is used to extend the reach of the dip meter's plug-in coil.

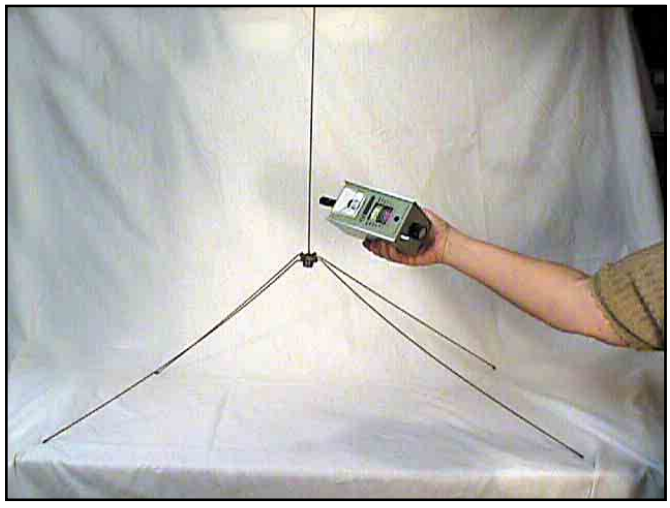


Figure 4—A dip meter may also be coupled to an antenna to determine its resonant frequency.

Figure 5—Tune the dip meter's frequency until the unit's meter reaches a minimum—or "dips." The plug-in coil is attached to the capacitor with slide-on alligator clips.

will reduce this error to acceptable levels. After the dip is found I decrease the coupling (move the two coils apart) and recheck the frequency of the dip.

A variation of inductive coupling is link coupling. This allows the dipper to be coupled to circuits in some very cramped places. The link I use is a 2-foot length of coax with a two-turn coil on each end (Figure 3). As the frequency of interest increases, links with fewer coil turns on each end should be used. Two turns can be used up to 70 MHz. Couple one link to the dipper and the other link to the circuit under test.

Capacitive coupling, in which the axis of the coil is perpendicular to the item under test, is useful when there is no inductor present or it is difficult to get to, such as with an antenna (Figure 4). Using capacitive coupling usually produces a shallow dip that is more difficult to see as the dipper is tuned.

Finding the Resonant Frequency of an LC Circuit

Coupling the dipper's coil to the circuit under test, inductive coupling will produce an easily found dip as you tune the dipper through its frequency range (Figure 5). When you find a dip, move the coils apart to reduce coupling. If the depth of the dip does not decrease, you may find the dip is internal to the dipper. I usually move the coils apart so the dip is no more that 20% to 30% of the maximum meter reading. Loosening the coupling to this point prevents the circuit under test from pulling the dipper's oscillator too badly, and the resonant frequency may then be read off the dipper's dial with a fair degree of confidence.

Can't find a dip? The LC circuit could be outside the range of your dipper. It is helpful to have an idea where to expect resonance and to tune slowly. Occasionally I have found the coil under test to be open, or the resonating capacitor to be faulty, when I could not find a dip. A good way to gain some confidence in using your dipper is to make a parallel resonant circuit from a coil and capacitor. Support the circuit on a nonconductive surface. Practice coupling to the coil of the resonant circuit in every manner you can think of and note the characteristics of the dip.

Finding the Value of an Unknown Inductor

Connecting a suitable capacitor of known value in parallel with the unknown inductor creates a resonant circuit. Using the dipper you can now find the resulting resonant frequency. I keep fixed-value 5, 20, 100 and 200 pF mica capacitors with my dipper just for making resonant circuits. I also have a calibrated 100 pF variable capacitor for doing quick checks on inductors.

Once resonance has been found, the value of the inductor can be found from the following equation:

$$L = \frac{1}{4\pi^2 f^2 C} \qquad \text{(Eq 1)}$$

where

$\pi \approx 3.1416$
f is in MHz
C is in μF, and
L will be calculated in μH

Since I dislike doing the math, I have acquired two circular slide rules that will solve resonance problems. Some textbooks have resonance nomographs that can be used. [Chapter 6 *of The 2002 ARRL Handbook* contains a reactance chart that can be used for this purpose.—Ed.]

If you check the same inductor at different frequencies, you will get slightly different values due to the distributed capacitance of the inductor. If the inductor has a metal core, this will also cause inductance to vary with frequency. It is best to check inductors near the frequency of intended use.

Finding the Value of an Unknown Capacitor

As with the unknown inductor, form a resonant circuit with the unknown capacitor using an inductor of known value. A good source of inductors is the plug-in coils that came with the dipper. As described in the preceding section you can find the inductance of the coils and use them as your inductance standards. To avoid soldering the plug-in coils to capacitors, I found that Mueller makes some alligator clips that slip over the pins of my dipper coils just fine (Figure 5).

Once you find the resonant frequency of the circuit formed with unknown capacitor and known inductor, calculate the value of the capacitor as follows:

$$C = \frac{1}{4\pi^2 f^2 L} \qquad \text{(Eq 2)}$$

where

$4\pi^2 \approx 39.48$

f is in MHz

L is in µH, and

C is calculated in µF

The frequency range of the dipper and the values of the known inductors limit the range of capacitance values that dippers can measure. The largest value of capacitance that can be measured is usually about 1 nF (1000 pF).

Finding Q of an Inductor

The Q (or Quality Factor) of an inductor is a figure of merit for an inductor. For example, Q is an indication of how sharply a resonant circuit formed with this inductor will tune. There is a good explanation of Q in chapter 6 of *The 2002 ARRL Handbook*. Form a resonant circuit with the inductor to be tested and a mica capacitor. Since the Q of a mica capacitor will be in excess of 1200, the resultant Q of the resonant circuit will be almost totally dependent on the Q of the inductor.

An estimate of Q may be obtained in the following manner. After noting the frequency F and the depth of the dip at resonance, tune the dipper higher in frequency until the dip has been reduced by 30%—this is frequency F_1. Now tune lower back through the dip to where the dip has again been reduced by 30%. This frequency is F_2. Calculate Q using the following equation:

$$Q = \frac{F}{F_1 - F_2} \qquad \text{(Eq 3)}$$

To make a precise measurement of the frequencies involved, I track the frequency of the dipper with a calibrated receiver as discussed in the section on measuring crystals. Obviously the results are highly operator-dependent but are good enough to tell the difference between a coil with a Q of 20 and one of 50.

Measuring Quarter- or Half-Wavelength Transmission Lines

The physical length of ¼ wavelength of a coaxial cable may be calculated using the following equation:

$$\frac{1}{4} L = \frac{246}{f} VF \qquad \text{(Eq 4)}$$

where

VF is the velocity factor of the coaxial cable (assumed to be 0.66).

f is in MHz, and

length is in feet

To prepare a ¼-wavelength section of cable, calculate the length of cable using Equation 4 (including the length of any connectors or adaptors), add a few percent and cut. Short one end with a loop and leave the other end open circuited. Couple the dip meter to the loop and look for the lowest frequency dip. This is the frequency at which the cable is approximately ¼ wavelength long.

It is slightly short, due to the detuning effect of the loop. Making the loop smaller will minimize the effect. Page 27-8 of *The ARRL Antenna Book* describes a more accurate method that replaces the loop with a series tuned circuit that resonates at the desired frequency. If you need a half wavelength section, you can use the ¼-wavelength technique at half the desired frequency.

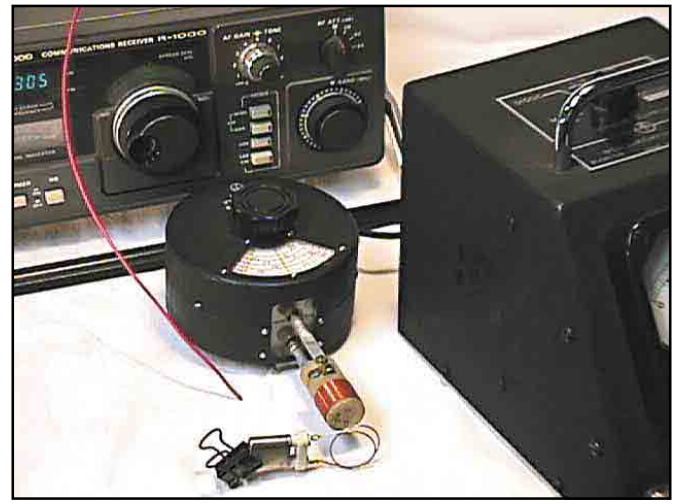


Figure 6—A calibrated receiver is used to monitor the dip meter's exact frequency while a crystal is "dipped."

Measuring Crystals

A crystal's resonant frequency can be found by inductively coupling it to the dipper. I keep several different types of crystal sockets around with two turn loops soldered to them. It's then a simple matter to couple crystals to the dipper. The Q of a crystal is very high, so the dipper must be tuned slowly and watchfully. Because of the high Q, the dipper's frequency may be pulled significantly. For this reason I listen to the dipper on a receiver during the tests (Figure 6). A foot or two of wire lying in the area of the dipper and hooked to the antenna terminal of the receiver is enough coupling. Be sure the BFO of the receiver is on. The crystal frequency found by this method will not be exact but will usually be within 0.2%. The crystal's frequency can be specified only to operate in a circuit with a specified capacitance.

Sometimes a dip will be found at a frequency that doesn't make sense. You may be checking an overtone crystal. Check other harmonically related frequencies for a dip. Even crystals not intended for overtone operation will usually show some activity near their odd overtones.

As a Tuned Detector

Most dippers may be used as detectors by turning the oscillator completely off or by turning the activity control down to the point that oscillation just stops. In the first case the dipper will act as a diode detector and in the second case as a regenerative detector. The approach you use will be dependent on the features of dipper.

Many times I have found that a superheterodyne receiver was not functioning because the local oscillator was dead or off frequency. If you are suspicious of an oscillator, dig out the dipper. Couple the coil of the dipper to the oscillator coil. With the dipper in the detector mode, tune the dipper and look for an upward deflection of the dipper's meter as the frequency of the oscillator is found. If there is no upward deflection, the oscillator may not be doing its thing.

For those of us with vacuum tube power amplifiers, the dipper acting as a detector is an excellent indicator of parasitic oscillations that require neutralization. Follow the manufacturer's instructions and be aware that tube amplifiers use lethal high voltages.

Many times we would like to check the operation of a transmitter that has an integral antenna. Radio control models and garage door openers are some examples. A dipper acting as a detector can serve as a field strength meter to check the frequency and level. If your dipper has an audio output, you can confirm the carrier is being modulated, as well.

As a Signal Source

Since a dipper is a tunable oscillator, it can be used as a signal source to align or troubleshoot a receiver. It will never replace the RF generator but when nothing else is available, it will do. To adjust the signal level, vary the activity control and the coupling to the dipper coil.

Measuring Impedance

Heathkit, Millen and Eldico made impedance bridges designed to be driven by a dipper. Since these bridges have no means of compensating for reactance, measurements are best made at the frequency of resonance. The range of these bridges is around 10 to 400 ohms.

Sources of Dippers

Eico, Heathkit, Millen and Measurements Corporation models show up at ham flea markets fairly often. Even some military surplus units are sometimes seen. Pricing seems to be from $3 to $50 depending on the condition and desirability of the particular model involved. If you are looking for a small useful project, why not build a dipper? *The 2002 ARRL Handbook* has construction information in chapter 26. Coil forms are available from Antique Electronic Supply.[1]

Summary

I hope the information presented here will create some interest in dippers in general and will stimulate the discovery of other applications. For those of us who must pursue our amateur radio activities on a tight budget, the dipper represents great value for the dollar. The dipper is not inherently extremely accurate but with good technique and attention to detail, errors can be reduced to acceptable levels.

All photos by the author.

Mark Bradley, K6TAF, of San Carlos, California, was first licensed in 1955. After college, he spent 19 years working for Ampex Corporation, developing various video tape recorders, instant replay machines and television cameras. He joined a start-up company, Acuson, in 1983 and spent the next 18 years working on various aspects of medical ultrasound imaging. On retirement last June he began home-brewing Amateur Radio projects.

[1]Antique Electronic Supply, 6221 S Maple Ave, Tempe, AZ 85283, tel 480-820-5411, fax 800-706-6789 (US and Canada) or 480-820-4643; **www.tubesandmore.com/**; **info@tubesandmore.com**.

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◊ TDL's Model 401 high-performance mike preamp is designed to drive a PC sound card line input, but is useful in a variety of applications that require moderate to high gain and very low noise. The preamp uses a computer-optimized differential input stage and has built-in 9-V rechargeable batteries (and a cast aluminum case) to eliminate any possible interaction with the ac mains.

Other features include 20 to 60 dB gain, a dynamic range of 70 to 100 dB, selectable A, B or C weighting/response curves, three input connectors, a trickle charger for the internal batteries and more.

Price: $183. For more information or to download the Model 401's user manual in PDF format, contact TDL Technology, 5260 Cochise Tr, Las Cruces, NM 88012, tel 505-382-3173, fax 505-382-8810, **www.zianet.com/tdl**.

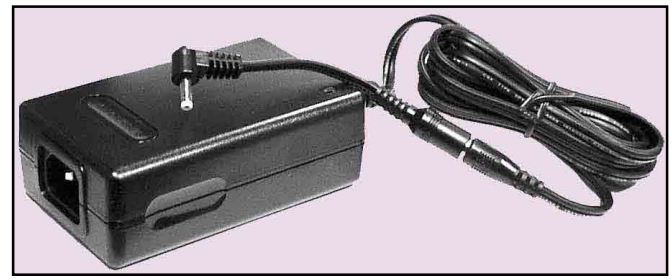
MINIATURE SWITCHING POWER SUPPLY FOR FT-817 AND OTHER QRP RIGS

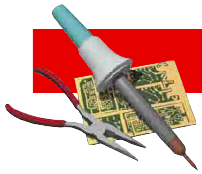
◊ Need a teeny, hash-free switching supply for your FT-817 (or other) QRP radio? Check out MFJ's new Model 4103. Measuring less than 4 × 3 × 2 inches and weighing in at just 10 ounces, the tiny switching supply provides up to 40 W of hash-free dc power (13.8 V dc at 2.9 A max).

On the input side, the supply requires 100 to 240 V ac at 47 to 63 Hz, making the '4103 usable nearly worldwide. Other features/specs include excellent line and load regulation, minimal ripple and noise and an MTBF of 100,000 hours.

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**.

Previous • Next New Products





By H. Ward Silver, NOAX

Test Your Knowledge!

Tests Test

This month we present a test about…tests! How much do you know (or remember) about the ham exam and the processes involved? We have ways to make you talk!

1) How many VEs must be present to administer an exam?
a) None; exams aren't administered in Canada
b) 1
c) 2
d) 3

2) What is the typical passing percentage for amateur exams?
a) 40-50%
b) 66-75%
c) better than 80%
d) about 50-50 from what I've seen

3) Which of the following is an acceptable method to use to pass the Morse code exam?
a) 25 consecutive characters copied
b) begging and pleading for mercy
c) a written essay describing the text sent during the exam
d) possession of a Boy Scout Radio merit badge

4) What is the document the test administrator provides that shows you've passed your exam?
a) FCC Form 605
b) OET Bulletin 65
c) CSCE
d) an ARRL Radiogram to your mom

5) Which of the following are needed to access data from the new FCC Universal Licensing System (ULS)?
a) UTC
b) PVC
c) computer or telephone
d) QSL

6) After passing your General exam, what do you append to your call sign when calling CQ on 20-meter phone?
a) "stroke KT"
b) "stroke AG"
c) "upgrade"
d) "Yippee!"

7) What is heard during a Morse code exam just before the message text?
a) drops of sweat falling to the table
b) "QST"
c) the letter "V" repeated several times
d) a bibliography of Samuel FB Morse

8) The set of questions from which exams are constructed is called the…
a) test booklet
b) instrument of torture
c) test generator
d) question pool

9) You must be _____ to administer an amateur exam session.
a) 21 years of age
b) an accredited Volunteer Examiner
c) this tall
d) an Extra class licensee

10) Which reference contains the current rules and regulations for the Amateur Service?
a) FCC Wireless Telecommunications Bureau Operations Policy Manual
b) Article 73 of the International Radio Regulations
c) Riley Hollingsworth's Little Black Book
d) Part 97 of the FCC Regulations

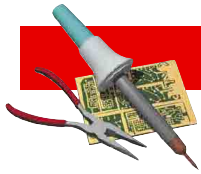
Bonus—At the test session 90% of the more than two dozen candidates passed their Technician and went on to the Morse code element. 66% of those passed and went on to the General. 66% of those passed the General and went on to take the Extra but 25% failed. If the test room could only hold 35 people (not including the examiners), how many total candidates were there?

Total Your Score!
Give yourself one point for each correct answer.

7-10	Top of the class
4-6	Better check your memory banks
1-3	Back to class

22916 107th Ave SW
Vashon, WA 98070

Answers
1) d
2) b
3) a
4) c
5) c
6) b—although d is frequently added
7) c
8) d
9) b
10) d
Bonus—M is the number of test takers. $M \times 9/10 \times 2/3 \times 2/3 \times 1/4 = M/10$ is the number of test takers who failed the Extra, which must be a natural number. Thus, M is 10, 20, 30, and so on. 30 is the only possible number between 24 and 35.—*tnx W1VT*



HINTS & KINKS

COILING WIRE OR ROPE WITHOUT KINKS

◊ I just finished reading a *Hints & Kinks* article by KB6FPW, about coiling and storing coax (*QST*, Aug 1992, p 60). The article contains many good tips, but states that coils of coax must be rolled and unrolled by turning them like a wheel to prevent kinks and tangles. Turning a coil of cable like a wheel to roll it up (without a reel) is a slow and rather inaccurate process and is unnecessary.

For years, it has amazed me that most people simply do not know how to handle cable without rolling it onto a form or rolling (and unrolling) by hand and putting twists into the cable.

Many years ago, as an industrial electrician, I rolled and unrolled thousands of feet of wire and cable. I noticed that my coworkers simply accepted frustrating twists and kinks as an inevitable part of rolling and unrolling cable. After a while, it dawned on me that the concept of phase cancellation (actually, *twist* cancellation) could easily be applied to everything that must be coiled: wire, cable, rope, hose, etc.

There are several easy and fast methods for rolling and unrolling that do not require a reel, do not require the roll to be turned like a wheel, do not impart twists to the material being rolled, and best of all, you eliminate tangles and kinks forever. "Impossible!" you say?

The basic idea is to develop the habit of always employing twist-cancellation techniques. As you read this article, practice with an extension cord. This will help you visualize and remember the techniques. A cord (or hose) with a stripe on it will make learning even easier.

Make rolls as large as possible. This is usually one full armspan (about 6 feet), which will make a roll about 2 feet in diameter. Why? A large roll means fewer turns and less handling.

Basic Twist-Cancellation Technique

I call this method *left-five, right-five*. With it, I recently unrolled 300 feet of 1-inch black plastic irrigation pipe in less than five minutes without one twist, kink or tangle.

To unroll any roll you can carry, proceed as follows: Hold the roll in one hand and hold the current turn with the thumb and forefinger of the other hand. As you unroll, walking, circle the unrolling hand around the outside of the roll, Separating the turn from the roll before dropping the turn. Hold the roll loosely, allowing crossed turns to uncross and free the current turn.

Count five turns, then transfer the roll to the other hand and take five turns off the other side. *Do not* turn the roll around when you pass it from hand to hand (see Figure1). Continue passing the roll back and forth, taking five turns off each side, until finished. Now stretch or simply drag the cable a bit. *Voila!* All those left-five and right-five twists will instantly cancel each other.

To coil a length, reach out a full arm span and bring in five turns. Twist the cable between the thumb and forefinger, once per turn, so the turn lays flat against the other turns. Now transfer the roll to the other hand and bring five turns onto the opposite side of the roll. Notice that the twisted turns are canceling, instead of flailing the tail of the cable into a wild Lissajous figure! The end of the cable doesn't need to spin around.

If you simply cannot roll or unroll with the "wrong" hand, employ this variation: Instead of passing the roll from hand to hand, keep it in the same hand but flip in on a vertical axis. (see Figure 2). Hold the roll one way and wind five turns forward, then flip it and wind five turns backward on its opposite side. Make sure you flip it back and forth, not the same way each time. Unroll in the reverse manner.

If the roll is too large or heavy to handle, simply lay it on the ground, pull in five turns, then flip it over and pull five turns into the opposite side. I have rolled industrial multiconductor cables *800 feet long* in this manner, by myself.

Adjust the number of turns you pull in depending on the stiffness of the material being rolled. If a material is highly prone to kinks, take only one turn (not five) off each side of the roll at a time. Secure one end of the roll and keep a little

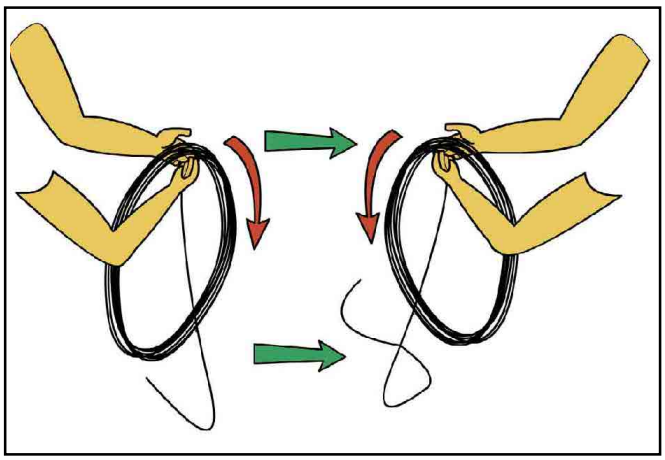


Figure 1—Ambidextrous hams can eliminate twists when coiling wire by periodically passing the coil back and forth between left and right hands. Don't rotate the coil when changing hands. See text.

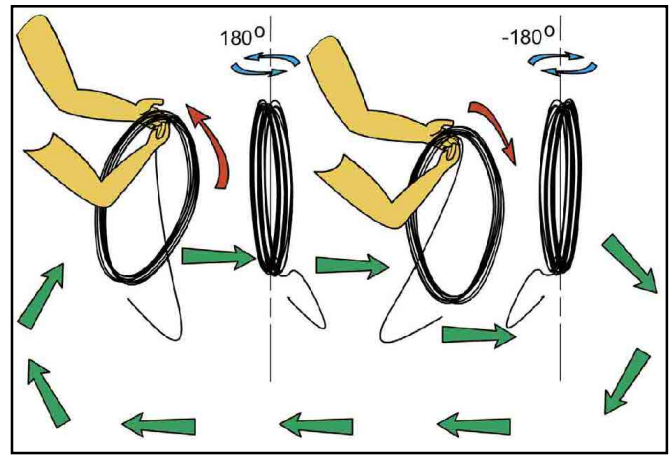


Figure 2—If you want to keep the coil in one hand, periodically flip it back and forth. (Wind five turns, rotate it 180°, wind five turns, rotate it the opposite direction –180° and repeat). See text.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

tension on it as you walk and pay it out, alternating turns from each side. Flimsy light-duty cords may go 10 turns each way, while RG-8 or #2 AWG may tolerate no more than one or two turns each way. The only requirement is to maintain left-right turn equality.

Other Methods

Another method, which I always use for garden hoses, is called *figure-eight rolling*. Each half of the "8" cancels the other half.

For hoses or large cable, make the figure-of-eight roll on the ground. If you need precision, drive a couple of wood stakes. For antenna wire or small cords (say, 100 feet of THHN or a 50-foot extension cord), you can roll a figure-eight roll around your palm and elbow. The middle of the 8 crosses the forearm. You can convert the 8 into a regular roll simply by flipping one half over onto the other half. Wrap a band of tape around each end of the 8 to prevent mixing of the upper and lower loops so you can later "unflip" it back into an 8 for "twist-synchronous" unrolling.

To unroll, simply walk and pay it out. There is no need to alternate between sides, since the eight shape builds twist-cancellation into every turn. Be very careful, however, to maintain control of the 8 at all times to prevent a turn from pulling between other turns.

When paying out a large figure-of-eight roll that is on the ground (such as a garden hose, or say, 200 feet of RG-213), do not just walk off with the free end and expect the 8 to pay out properly. Turns will surely pull underneath other turns before you're done. Have a helper stand over the 8 and pay out from the top, as you walk out the tail.

Preventing Tangles

Most tangles occur because loops pass through other loops. It is important to unroll by passing the hand around the outside of the roll in a circular motion, separating a turn from the rest of the roll. Loops that crossed others must uncross as you go.

Other tangles occur because a line end passes through one or more loops. Control the ends by taping them to the first and last turns before storing the cable. If you don't want sticky tape "goo" on your cables, use bread-bag ties, pipe cleaners or cable ties. Don't use tie wire; it can gradually cut the insulation.

To "relax" a stiff antenna wire so it will not recoil itself, stretch it slightly. Tie one end to something solid. Wearing gloves, slick the wire out from the tied end to the free end several times to remove twists. Tie the free end to a suitable handle, like a piece of galvanized water pipe or a hammer handle. Place one foot well behind you, and "bounce" your upper body weight against the wire in tension. Start gently, then increase the effort until you feel the wire "give" a little. That's enough—once the wire gives, it will relax and lay flat. Steel and steel-core wire may require a fence-puller or come-along for sufficient pulling force.

Store patch cords and miscellaneous wires in a box without tangling: Simply place each one in a plastic bag. Freezer bags are stronger than others, last longer, and are well worth the extra price. The one-gallon size will easily hold an 80-meter dipole. The two-gallon size will accommodate 100 feet of RG-58 or 8X.

N1FB stated in a related article that hose and cord reels are handy, and I agree. However, I advise against rolling large coaxial cable onto extension-cord holders. Their small diameters may be less than allowed by the cable's minimum bending radius. Bends that are too sharp may cause the center conductor to "cold flow" in the dielectric, particularly in long-term, possibly hot, storage.

Armed with knowledge of twist cancellation techniques, you can forever eliminate the frustration of kinked and tangled wires, cords, cables, ropes and hoses. Enjoy!—*Harold Melton, KD5IRR, 1822 County Rd 3618, Murchison, TX 75778;* **hmelton@tvec.net**

MODIFYING THE YAESU FT-1000/1000D FOR DIGITAL MODE USB/LSB OPERATION

◊ For a while now I have wanted to operate USB and LSB for computer-generated RTTY, PSK31, MFSK and such, without using the microphone connector on my FT-1000. As supplied by the factory, it can operate in either USB or LSB in the RTTY mode but only using the internal tone generator. In the PKT mode, back-panel external audio is used, but only LSB and FM can be selected. That leaves the voice modes for what I want, but I would have to swap microphone connectors or use an interface box to switch between voice and digital modes. This is not an elegant solution, and I want to continue to use the back panel interface to my PC and leave the microphone where it is.

I solved this by doing a simple, reversible, modification to the P36 connector to the audio board that does not involve circuit-board removal or modification. Now when in the RTTY mode, audio presented to the PKT back panel connection is used for transmitting in either LSB or USB. In addition, the VOX operates with the external audio, eliminating the need for a separate PTT signal from the PC. This is a real plus if you use a laptop with a single serial port that is dedicated to another function.

To make this modification, turn the FT-1000 over and remove the bottom panel. On the audio board (located at the rear of the rig), find 8-pin connector J3019 and carefully remove the corresponding plug, P36, from the connector. Then *carefully* (read on) remove female pins 6 and 7 of the plug and move pin 6 to the slot pin 7 previously occupied. (Pin 1 of P36/J3019 is closest to the 7-pin connector J3014.) It's best to remove the terminals using the appropriate extractor tool. It can be done with careful use of a jeweler's screwdriver, but it's more tedious and risky to you, the terminals and the fragile wires!

This modification enables the audio transmission path for the PKT rear-panel input when in the RTTY mode and disables the RTTY audio transmission path, including the built-in RTTY tone generator. Reconnect the plug to the connector and isolate the pin-7 wire and terminal to keep it from touching anything. Alternatively, the pin-7 and pin-6 terminals of plug P36 can be interchanged, but when in the PKT mode, the RTTY tone generator will be enabled during transmit, which may not be desirable. After reassembling the rig, connect your PC to the PKT jack as described in the Yaesu manual (using the PTT connection is optional, since you can now use VOX). Now, to operate using the PC, set the rig for RTTY and either USB or LSB can be selected by repeatedly pressing the RTTY mode button.—*Scott McLellan, W3WT, 40 White Oak Ct, Kempton, PA 19529;* **smclellan@agere.com**

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

QST invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters (see page 10), or via e-mail to **h&k@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments. QST

ICOM IC-746PRO HF/VHF Transceiver

Reviewed by Rick Lindquist, N1RL
ARRL Senior News Editor

It appears that ICOM is not yielding any momentum in the all-DSP transceiver quarter. Quick on the heels of the all-DSP IC-756PROII (see "Product Review," *QST*, Feb 2002) comes what might be called the economy model, the IC-746PRO, also a DSP-filters-only transceiver. By and large, we hailed the original IC-746 (see "Product Review," *QST*, Sep 1998) as a transceiver that had plenty to offer serious and casual operators alike. When my brother was looking to break out of the vacuum-tube era, he picked up a '746 and has been extremely happy with his choice.

But for optimum performance the original IC-746 required optional (and pricey) crystal filters. With the IC-746PRO, you at least can save the trouble, and the expense, of filtering up the radio. In addition, you'll end up with a lot more flexibility and features formerly available only on the more expensive '756PRO and 'PROII models—and even some not available at all till now.

Even with them sitting side-by-side, it takes a keen eye to distinguish the original '746 from its 'PRO update. The outward changes are pretty subtle, only revealed by close inspection. Inside the box, however, ICOM has grafted DSP filtering onto the already-capable IC-746 framework. The results are gratifying. Not only did ICOM end up making a good box better, they added a few unique features to boot. Let's zoom in on the new IC-746PRO and see how ICOM has again raised the bar for the competition.

A Poor Man's IC-756PROII?

The original IC-746 represented the next logical step after their innovative and extremely popular IC-706 compact/mobile transceiver series. For the '746, ICOM bundled HF plus 6 and 2 meters in a desktop package with a big display screen and lots of creature comforts. It recalled ICOM's top-end IC-781 and closely resembled the much more recent IC-756. With its full reliance on DSP, the new IC-746PRO seems now to owe more to the IC-756PRO and 'PROII, however. Indeed, ICOM's ads have been touting the fact that the '746PRO shares "the same powerplant as the '756PROII," and—particularly for the budget-conscious—this makes the choice between the '746PRO and the '756PROII all the more difficult.

No, there's no delicious color screen or throwback (nostalgic?) analog meter, but the IC-746PRO offers performance (see Table 1) that's comparable with that of its pricier sibling, and includes all-mode 2-meter capability that even the IC-756PROII neglected to add. The IC-746PRO features essentially all of the same bells and whistles found on the original model plus most of those that the '756PROII offers. There are a few new wrinkles too, and ICOM fixed at least a couple of things we'd faulted on the original model.

What's New?

Outwardly, a couple of labels have been changed on the front panel. Where the '746 had an APF/ANF (automatic peak filter/automatic notch filter) button label, the '746PRO now bears an A/NOTCH label. The APF is history—but with the new DSP system, you won't miss it. Additionally, the SPEECH button on the '746 now is a CALL button (to let the operator quickly access a favorite frequency); the old LOCK button—now labeled LOCK/SPCH—serves a dual function. The discerning eye will notice some cosmetic changes too. The MENU button, once black, now is gray; the four buttons adjacent to it, once gray, now are black (yes, we had the same reaction). Keypad button labels are more prominent. The XFC key is now a fashionable teal shade. The bold, easy-to-read monochrome LCD display remains.

The '746PRO incorporates several niceties we soon won't be able to live without. These include enhanced transmit-audio tailoring, a receive audio "equalizer" (of sorts), an adjustable noise blanker, an SWR plotter and "sharp" and "soft" filter shaping—something we first saw on the '756PROII—plus excellent DSP noise reduction and auto and manual IF-level DSP notches.

A lot of the '746 basics remain unchanged, however. If you're coming in late or aren't that familiar with the original '746, we'd *strongly* advise you to check out the earlier reviews of the '746, the '756PRO and the '756PROII (all product reviews are available to members via the ARRL Web site, **www.arrl.org**). Much of the discussion of DSP in our '756PROII review applies equally to this transceiver.

Bottom Line

ICOM has bestowed the digital magic already applied to its IC-756PROII to this updated economy model—which continues to offer all-mode HF, 6 and 2-meter capability. The IC-746PRO also incorporates some novel features not yet available elsewhere.

Selectivity!

The introduction of the ICOM "PRO"

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

series of transceivers finally may have nudged Amateur Radio across the great digital filter divide—at least on a grand scale. Our equipment appears to be advancing into an era where DSP not only stands ready to subsume IF filtering roles once considered the sole domain of analog crystal and mechanical filters but perform multiple other signal-enhancing tasks only dreamed of a few years ago. This shift to DSP filters is what distinguishes the IC-746PRO from its predecessor. The radio's 32-bit floating point IF digital signal processing coupled with a 24-bit analog-to-digital/digital-to-analog converter yields the digital equivalent of dozens of filter selections at the push of a button or the twist of a knob.

What does this mean in practical terms? *Selectivity, selectivity, selectivity*! To get an idea of how far we've come in the past 70 years or so, an ad in a late 1920s call sign book we've got at ARRL Headquarters trumpets the attainment of "10 kc selectivity." Imagine!

On the original '746, your ability to enhance selectivity was limited to the number of optional crystal filters you could afford and/or fit in the radio—two optional in the 9-MHz IF and one optional in the 455-kHz IF. Each filter can cost as much as $150. With three optional filters installed, and assuming my math is correct, this works out to a maximum of six filter choices—if you count "no optional filter" in either IF as one of the choices. And accessing all of the various permutations and combinations will send you back to the menu. The only DSP selectivity enhancements available were the notch filter and automatic peak filter.

The IC-746PRO's DSP engine changes everything. It makes available the equivalent of up to 51 standard-bandwidth filters, each in soft or sharp flavors (hence a marketing-oriented individual might want to claim "102" filter choices). With the IC-746PRO, you can dial up SSB and CW bandwidths ranging from 3.6 kHz down to a razor-thin 50 Hz, selectable via the front-panel system of menus and function buttons, and you'll never have to spring for or install another optional filter again. Such a deal!

The "soft" filter shape—which we first encountered with the '756PROII—rounds the sharp shoulders of the digital filter and imputes mellower sounding audio on SSB; on CW you won't notice much difference except slightly less ringing at narrow filter bandwidths. One slight advantage of the "soft" filters is that they seem to offer better SSB readability at narrower bandwidths—right down to about 1.2 kHz! And up until now you've probably considered 1.8 kHz a "narrow" SSB filter! (Remember that vaunted "10 kc" bandwidth?)

You can customize three quick filter choices for SSB and for CW, each selectable from the front-panel FILTER button. For example, you'd probably want wide, medium and narrow filters for each mode—say 2.8, 2.4 and 1.8 kHz on SSB and maybe 800, 500 and 250 Hz for CW. But you don't *have to* go that route. If you'd rather have a choice of narrow, very narrow and extremely narrow, you can do that. It's *your* call, because there are plenty of filter choices to go around.

Even after you've set up your basic filter selections it's super simple to change bandwidths on the fly or to further customize for current conditions using the DSP TWIN PBT (twin passband tuning) controls. These let you narrow the IF passband from either side and/or shift its position, so once you have selected one of your "standard" filters, you can tweak further using the TWIN PBT. Push the PBTC button to promptly clear any twin PBT settings.

For AM and FM, there are three fixed filter bandwidth selections—3, 6 and 9 kHz on AM (the IF shift remains available) and 7, 10 and 15 kHz on FM (no IF shift available).

For RTTY reception, the choices are 250, 300, 350, 500 or 1 kHz, plus there's a twin-peak filter (TPF) you can kick into play for additional QRM-fighting capability on that mode. The IF shift function continues to work in that mode as well.

Side by Side by Side

Of course, we had to see how the IC-746PRO stacks up with the original model as well as how it compares to the IC-756PROII, with which it shares much in common. This was an interesting exercise. It was confusing too, because not all of the PRO models share the same features.

The original '746 incorporated limited DSP features such as noise reduction and notching, but these operated on the audio-frequency level, not at the IF. We've already discussed what this means in terms of filter flexibility. The souped-up DSP engine in the '746PRO also makes possible many of the other features or enhancements the original model does not have:

- IF manual and automatic notch filters, just as on the '756PRO and 'PROII. These were AF-level DSP on the '746.
- A variable noise blanker level. Its lack in the '746 was something we'd "lamented" in our review. Now, you can insert only as much blanking as you need, minimizing the signal-degrading side effects. This was a feature that first appeared in the 'PROII.
- Three AGC settings—fast, mid, slow—plus the ability to choose from 13 time-constant settings for each AGC level in SSB, CW, RTTY or AM modes! (FM has a fixed time constant.) You can turn off the AGC if you wish. This is yet another feature "inherited" from the '756PRO and 'PROII. The original '746 offered only fast and slow AGC settings with fixed time constants—or off.
- The ability to select a transmit passband filter. You can pick wide (2.8 kHz), mid (2.4 kHz) and narrow (2.2 kHz) transmit passbands depending on your operating style, say wide or mid for casual operation and narrow for cutting through the contest or DX pileups. The original '746 did not offer an equivalent feature.
- Adjustable transmit audio treble and bass response. This is something we enjoyed on the '756PRO and 'PROII models, but only in a limited fashion on the original '746. ICOM variously calls this a "microphone equalizer" (a bit of overstatement) or a "microphone tone control" (more accurate). In essence, the TCN menu item lets you adjust bass and treble response of your transmit audio over a range of +5 dB to –5 dB on each scale (default is 0 dB). This lets you customize the transmit audio to suit just about any voice. The original '746 had a more rudimentary transmit tone control.
- The TCN menu item also reveals a receive tone control that operates in a similar fashion to the transmit audio adjustment. The '746 offered no equivalent feature.
- A voice squelch (VSC) and conventional squelch are standard on the IC-746PRO, and VSC is a feature that's new with this model. More later on this very cool enhancement.
- The CW memory keyer on the IC-746PRO now is controllable via both the front panel (as in the earlier model and the IC-756PRO and 'PROII) as well as via an external accessory. The down side is that you'll have to construct the accessory interface yourself. The up side is that with the external control interface, you can control the memory keyer while keeping other menus up on the screen instead of the memory keyer interface. CW memories hold up to 50 characters, and the '746 memory keyer remains so easy to program that even those with no knowledge of Morse code can do it. It's also fun to use and handles such things as incremental serial numbers and so-

Table 1
ICOM IC-746PRO, serial number 01484

Manufacturer's Claimed Specifications

Frequency coverage: Receive, 0.03-60; 108-174 MHz; transmit, 1.8-2, 3.5-4, 7-7.3, 10.1-10.15, 14-14.35,18.068-18.168, 21-21.45, 24.89-24.99, 28-29.7, 50-54, 144-148 MHz.

Power requirement: Receive, 3.0 A; transmit, 23 A (maximum).

Modes of operation: SSB, CW, AM, FM, AFSK.

Measured in the ARRL Lab

Receive and transmit, as specified[1].

Receive, 1.9 A; transmit, 20 A. Tested at 13.8 V.

As specified.

Receiver

SSB/CW sensitivity, bandwidth not specified, 10 dB S/N: 1.8-30 MHz, <0.16 µV; 50-54 MHz, <0.13 µV; 144-148 MHz, <0.11 µV.

AM sensitivity, 10 dB S/N: 0.5-1.8 MHz, <13 µV; 1.8-30 MHz, <2 µV; 50-54, 144-148 MHz, <1 µV.

FM sensitivity, 12 dB SINAD: 28-30 MHz, <0.5 µV; 50-54 MHz, <0.32 µV, 144-148 MHz, <0.18 µV.

Blocking dynamic range: Not specified.

Two-tone, third-order IMD dynamic range: Not specified.

Third-order intercept: Not specified.

Receiver Dynamic Testing

Noise floor (MDS), 500 Hz filter:

	Preamp off	*Preamp one*	*Preamp two*
1.0 MHz	–122 dBm	NA	NA
3.5 MHz	–132 dBm	–140 dBm	–142 dBm
14 MHz	–132 dBm	–140 dBm	–142 dBm
50 MHz	–128 dBm	–138 dBm	–141 dBm
144 MHz	–133 dBm	–142 dBm	NA

10 dB (S+N)/N, 1-kHz tone, 30% modulation:

	Preamp off	*Preamp one*	*Preamp two*
1.0 MHz	5.9 µV	NA	NA
3.9 MHz	1.6 µV	0.62 µV	0.51 µV
53 MHz	2.1 µV	0.93 µV	0.6 µV
146 MHz	1.3 µV	0.53 µV	NA

For 12 dB SINAD:

	Preamp off	*Preamp one*	*Preamp two*
29 MHz	0.56 µV	0.25 µV	0.22 µV
52 MHz	0.86 µV	0.34 µV	0.21 µV
146 MHz	0.49 µV	0.18 µV	NA

Blocking dynamic range, 500-Hz filter:

Spacing	*20 kHz Preamp off/one/two*	*5 kHz Preamp off/one/two*
3.5 MHz	124/121/117 dB	100/96/93 dB
14 MHz	125/123/118 dB	100/98/93 dB
50 MHz	127/124/121 dB	101/99/96 dB
144 MHz	114*/112*/NA	100/88/NA

Two-tone, third-order IMD dynamic range, 500-Hz filter:

Spacing	*20 kHz Preamp off/one/two*	*5 kHz Preamp off/one/two*
3.5 MHz	97/95/91 dB	76/73/71 dB
14 MHz	97/96/92 dB	75/74/71 dB
50 MHz	98*/96*/92 dB	77/75/73 dB
144 MHz	84/89/NA	75/62/NA

Spacing	*20 kHz Preamp off/one/two*	*5 kHz Preamp off/one/two*
3.5 MHz	+13.7/+2.6/–5.5 dBm	–17.6/–28.7/–33.7 dBm
14 MHz	+13.5/+3.7/–4.0 dBm	–19.5/–29.3/–35.5 dBm
50 MHz	+18.9/+6.1/–3.1 dBm	–12.6/–25.5/–31.6 dBm
144 MHz	–6.9/–8.6/NA	–20.4/–49.1/NA

called "cut" numbers for contest exchanges.

- The IC-746PRO now synchronizes SSB and CW tuning, so you can toggle between modes on a given frequency without having to retune. This isn't something you'll use a lot, but it's very welcome when you do need it.
- Like the '756PRO and 'PROII, the '746PRO now offers a "data mode" for SSB and includes a 1/4 fine-tuning function in data modes. The SSB data mode setting disconnects the audio input via the microphone connector, turns off the speech compressor and resets the transmit bandwidth, treble and bass controls to their default settings. The '746PRO also incorporates the built-in RTTY decoding feature we enjoyed in the IC-756PRO and 'PROII.
- Something new to the PRO series is the swept SWR graph feature introduced with the '746PRO. We'll have more to say about this terrific feature later.
- Setting the speech compressor level in the original '746 required reaching around to the back panel to adjust a little knob. In the 'PRO version, this is a front-panel accessible menu item.

Totally Excellent

The IC-746PRO is as much (maybe even more) fun to use than the original. There's the excellent (but, in this case, monochromatic) LCD display, of course—just as in the original '746. Important features are all accessible

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Second-order intercept: Not specified.	Preamp off/one/two, +72/+70/+54 dBm.
FM adjacent channel rejection: Not specified.	20-kHz channel spacing, both preamps on: 29 MHz, 77 dB; 52 MHz, 77 dB; 146 MHz, 73 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20-kHz channel spacing, both preamps on: 29 MHz, 77 dB*; 52 MHz, 77 dB*; 146 MHz, 73 dB*. 10-MHz channel spacing: 52 MHz, 113 dB; 146 MHz, 97 dB.
S-meter sensitivity: Not specified.	S9 signal at 14.2 MHz: preamp off, 82 μV; preamp one, 28 μV; preamp two, 12 μV; 50 MHz, preamp off, 126 μV; preamp one, 30 μV; preamp two, 15 μV; 144 MHz, preamp off, 58 μV; preamp on, 6.4 μV.
Squelch sensitivity: SSB, CW, RTTY, <5.6 μV; FM, <1 μV.	At threshold, preamp on: SSB, 6.2 μV; FM, 29 MHz, 0.07 μV; 52 MHz, 0.11 μV; 146 MHz, 0.09 μV.
Receiver audio output: 2 W into 8 Ω at 10% THD.	2.3 W at 10% THD into 8 Ω.
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW (500-Hz filter): 329-917 Hz (588 Hz)[2]; USB: 60-2918 Hz (2858 Hz); LSB: 60-2929 Hz (2869 Hz); AM: 76-3058 Hz (2982 Hz).
Spurious and image rejection: HF and 50 MHz, (except IF rejection on 50 MHz), 70 dB; 144 MHz, 60 dB.	First IF rejection, 14 MHz, 123 dB; 50 MHz, 121 dB; 144 MHz, 86 dB; image rejection, 14 MHz, 124 dB; 50 MHz, 118 dB; 144 MHz, 121 dB.
Transmitter	**Transmitter Dynamic Testing**
Power output: SSB, CW, FM, 100 W (high), 5 W (low); AM, 40 W (high), 5 W (low).	HF: CW, SSB, FM, typically 110 W high, 2 W low; AM, typically 39 W high, 1 W low; 50 MHz: CW, SSB, FM, typically 103 W high, 2 W low; AM, typically 39 W high, 1 W low; 144 MHz: CW, SSB, FM, typically 98 W high, 2 W low; AM, typically 39 W high, 1 W low.
Spurious-signal and harmonic suppression: ≥50 dB on HF, ≥60 dB on 50 and 144 MHz.	HF, 58 dB; 50 MHz, 65 dB; 144 MHz, 67 dB. Meets FCC requirements for spectral purity.
SSB carrier suppression: ≥40 dB.	As specified. >60 dB.
Undesired sideband suppression: ≥55 dB.	As specified. >67 dB.
Third-order intermodulation distortion (IMD) products: Not specified.	See Figures 1 and 2.
CW keyer speed range: Not specified.	6 to 40 WPM.
CW keying characteristics: Not specified.	See Figure 3.
Transmit-receive turn-around time (PTT release to 50% audio output): Not specified.	S9 signal, 18 ms.
Receive-transmit turn-around time (tx delay): Not specified.	SSB, 34 ms; FM, 12 ms. Unit is suitable for use on AMTOR.
Composite transmitted noise: Not specified.	See Figures 4 and 5.

Size (HWD): 4.7×13.3×12.5 inches; weight, 19.8 pounds.

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]Sensitivity degrades below 250 kHz.
[2]Varies with PBT and Pitch control settings.

via the menus now, and a few new features debut with this model.

Rating the Tuning

Let's face it. The main tuning knob is the control on any given transceiver that gets most of the action. That's probably why it's the always the *big* knob—the *knobbo de tutti knobbi*, the knob of all knobs. So, how the tuning feels, how it plays along with your operating habits, is pretty important. The IC-746PRO has retained the nice rubber-grip knob with a screwdriver-adjustable drag. It's got a spinner dimple too—if you're into that kind of thing.

Tuning rate is an important facet, and the IC-746PRO has taken advantage of advances in this regard implemented on earlier units, including the '706. On SSB, the tuning rate works out to 6 kHz per dial revolution. That doesn't sound speedy, but there are situations where you might want to slow it down even further. At first glance, there doesn't appear to be any way to do that. But wait! The IC-746PRO lets you read out the frequency to 1-Hz resolution! When that's enabled, the SSB tuning rate drops down to a leisurely 600 Hz per revolution.

On CW or RTTY, you want things even slower than that. The default rate is the same as for SSB, 6 kHz per spin of the dial. The 1/4 function—introduced on the IC-706MkII—drops the CW/RTTY tuning rate down to 1.5 kHz per revolution and—with the 1-Hz digit enabled—to a downright lazy 150 Hz per spin.

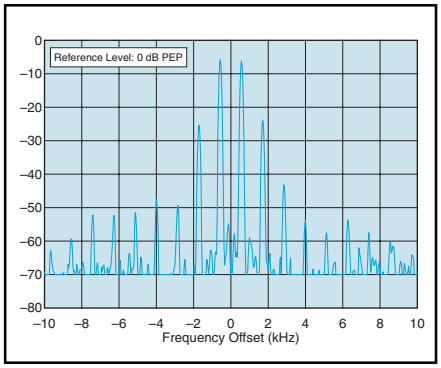


Figure 1—Worst-case spectral display of the IC-746PRO transmitter during two-tone intermodulation distortion (IMD) testing on HF. The worst-case third-order product is approximately 25 dB below PEP output, and the worst-case fifth-order product is approximately 44 dB down. The transmitter was being operated at 100 W output at 28.35 MHz.

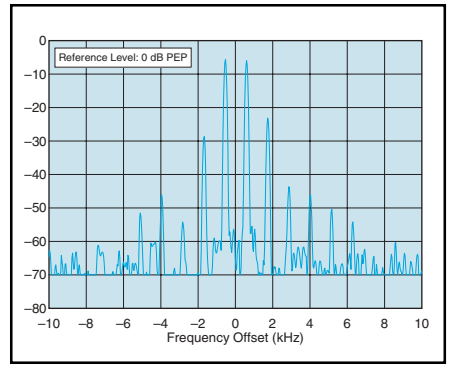


Figure 2—Worst-case spectral display of the IC-746PRO transmitter during two-tone intermodulation distortion (IMD) testing on VHF. The worst-case third-order product is approximately 24 dB below PEP output, and the fifth-order product is approximately 44 dB down. The transmitter was being operated at 100 W output at 144.2 MHz.

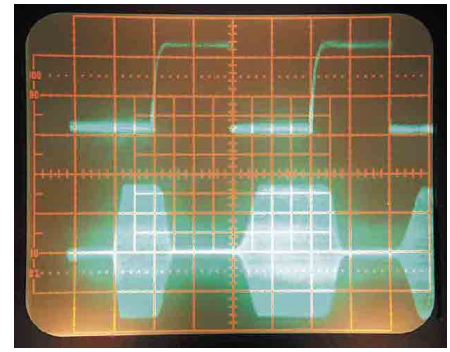


Figure 3—CW keying waveform for the IC-746PRO showing the first two dits in semi-break-in mode. The equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver was being operated at 100 W output at 14.2 MHz. Note that the first dit is shortened.

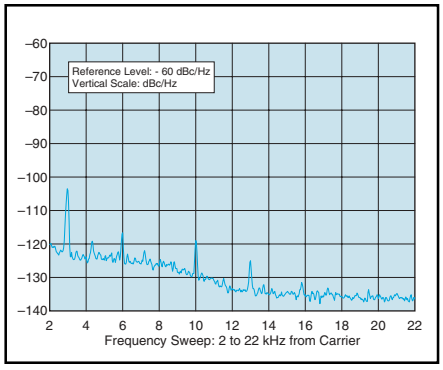


Figure 4—Worst-case tested spectral display of the IC-746PRO transmitter output during composite-noise testing on HF. Power output is 100 W at 3.52 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

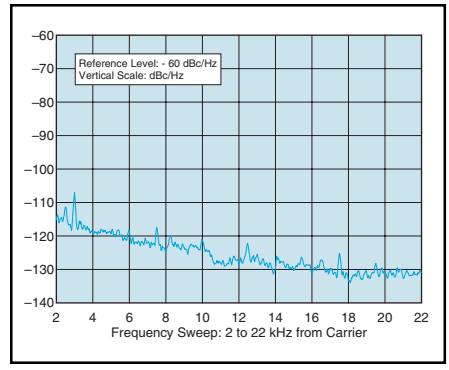


Figure 5—Worst-case tested spectral display of the IC-746PRO transmitter output during composite-noise testing on VHF. Power output is 100 W at 144.02 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

Split Operation

DXers will appreciate how easy the IC-746PRO makes it to operate "split." The split-frequency system is excellent, and you'll never be in doubt about your transmit frequency, because it's right there on the display. There's a lot of flexibility here, too.

If you prefer, the *Quick Split* set menu function lets you program a "standard" split (such as the typical "up 2" for working DX). The only stumbling block here is that the radio expects you to enter a desired split in megahertz (eg, 0.0020 for 2 kHz), not in kilohertz. Unless you're paying close attention to the decimal place, you could wind up way off your intended mark. Pressing and holding the SPLIT button for a second puts your standard split into play. If the DX pulls a fast one and starts listening up, say 4 kHz, you can equalize the VFOs (press and hold the A/B button for a second), hit F-INP, quickly punch in the correct split (up or down) on the keypad, press the SPLIT button, and you're set (this can be done about as rapidly as it takes to read the description off the page).

If you like the old-fashioned method and want to find a good transmit frequency among the madding crowd, equalize the two VFOs on the DX frequency, swap to the other VFO, seek a clear spot, swap VFOs again and hit SPLIT. Then, to check (and/or change) transmit frequency again, simply swap VFOs.

Pressing the XFC button also lets you momentarily check or adjust your transmit frequency. In that case, the transmit frequency display reads out the amount and direction of the split—thus eliminating the need for messy on-the-fly mathematical computations. The XFC button is conveniently located at around the 11 o'clock position of the main tuning knob; if you're dexterous enough, you can push it and adjust the knob with the same hand. If you're clumsy, just engage the split lock and dial lock functions and push the LOCK/SPCH button. Then, accidentally releasing the XFC button while still turning the tuning knob won't change your receive frequency, but you'll still be able to change your transmit frequency.

Scanning Features

The IC-746PRO has some terrific scanning features, which include programmed and memory (all or selected) scans and something called a ΔF scan—my particular favorite. Press the ΔF button on the menu and you can pick an SPN (span) of 5, 10, 20, 50, 100 or 500 kHz or 1 MHz to scan (from the center frequency). This is handy for a quick look at a piece of spectrum you might want to tune across. There are two scan speeds—high and low. Push the FIN button, and scanning temporarily drops to 10 Hz steps. You can scan for CTCSS and DTCS codes too.

The clever *voice squelch control* (VSC) feature is not just an extremely useful adjunct to scanning, it's a superb standalone feature that works on all voice modes. When VSC is enabled, the radio checks all signals for "voice components" before it breaks squelch (the VSC squelch is separate from the manually adjustable carrier-operated squelch). Anyone who's grown tired of hearing a scanner stop on unmodulated signals emanating from leaky cable systems, repeater kerchunkers and the like can see how desirable VSC could be.

VSC also works on SSB! Enable VSC and tune across a phone band and you won't hear any of the "white noise" or tuner-uppers (or is it "tuners upper"?) between busy frequencies—just actual

signals with voices. It will work even on relatively weak signals, but you might find it annoying when the VSC squelch cuts in and out on a marginal signal.

Graphing Your SWR

Using the built-in LCD SWR "meter," you can read your antenna system's SWR directly. "Yeah, so what?" you say. I can do that with my current radio. Okay, the IC-746PRO also lets you *plot* your SWR. How cool is *that*? You can plot between 3 and 13 points (odd numbers) in 10, 50, 100 or 500-kHz steps. Push the F1 button to start and then repeatedly press PTT or TRANSMIT as many times as necessary to fill the graph with little vertical bars.

You use the main tuning dial to move a little caret beneath each plot point to determine which frequency the bar represents. The horizontal scale, while not calibrated, represents points between an SWR of 1:1 and 4:1, so you can get a visual idea of where your antenna system is resonant and/or how much bandwidth you've got to play with.

This is a very nice feature, but be sure to check for activity at the test point frequencies before you make your measurements, and ID on each of these frequencies when the test is completed.

Decoding RTTY

Unless you're like the John Travolta character in the movie *Phenomenon*, you'll need some kind of TNC or sound card software to decode RTTY. One of the great features ICOM added when it introduced the IC-756PRO was a built-in RTTY decoder. We lauded this inclusion but lamented that ICOM did not also include the ability to plug in a keyboard and transmit RTTY as well. The IC-746PRO also includes this feature, but—sorry—still no transmit. Nevertheless, it's great for checking on what's there without having to boot up a computer—or if you're just doing some monitoring in or out of the amateur bands. You can see up to three lines of text, freeze the text at the push of a button, pick from 1275, 1615 and 2125-Hz mark and 170, 200 or 425-Hz shift settings, and read normal or reverse signals—all without having supernatural powers.

The Numbers Never Lie

Given the lineage of the IC-746PRO, you'd probably figure that the performance numbers (see Table 1) would be pretty much the same across the line. And you would be right. Let's take the nickel tour of how some of the more critical '746PRO numbers line up with those of the original '746 and the IC-756PROII.

All three of these models are plenty "hot" in the front end. Sensitivity (noise floor) numbers were essentially the same across the board—in the vicinity of –131 dBm on 20 meters with the preamp off. We registered mild surprise when we compared blocking dynamic range numbers, which represent the receiver's ability to distinguish between the weakest and strongest signals. Again looking at 20-meter numbers, we measured 125 dB (preamp off, 20-kHz spacing) on the IC-746PRO and 122 dB on the original '746—pretty much a dead heat. Our IC-756PROII came in at 118 dB at 20-kHz spacing, however.

We've recently begun also measuring the "close-in" dynamic range, using 5 kHz as the standard spacing. Here, the IC-746PRO came in at 100 dB, the same number posted by the IC-756PROII.

Getting down to the two-tone, third-order IMD dynamic range numbers, we found little difference among the three units on 20 meters at the 20-kHz spacing (preamp off)—it ranged from 97 dB on the two 'PRO models and 99 dB on our original '746. The close-in numbers for the two 'PROs were essentially identical too (we consider a 2 or 3 dB difference to be within sample-to-sample variation or measurement error).

We were pleased to learn that the two-tone, third-order IMD dynamic range numbers for the '746PRO compared quite favorably with a competitor's well-known transceiver that's become the gold standard for many DXers and contesters. When we'd reviewed the "gold standard" unit a few years ago, we came up with 97 dB on 20 meters (at 20-kHz spacing). That same radio measured an impressive 142 dB of blocking dynamic range, and the sensitivity (noise floor) was –128 dBm. A later, and related, model turned in a blocking number of 129 dB and a two-tone, third-order dynamic range figure of 101 dB.

We encountered another pleasant surprise when we looked at the '746PRO's first IF rejection numbers for 20 meters. It measured 123 dB, while the original '746 came in at 100 dB and the 'PROII at 94 dB. The IC-746PRO also topped the line in terms of image rejection at 124 dB. The comparable number in the original model was 120 dB; it was 110 dB in the 'PROII. The IC-746PRO also seems to do a slightly better job than its predecessor in terms of SSB carrier suppression.

Unfortunately, one number we'd like to have seen change greatly in the IC-746PRO did not—two-tone, third-order transmit IMD. This number indicates whether the unit will generate undesirable intermodulation products that can lead to splatter. On the worst-case band—10 meters in both cases—third-order products were down by about 23 dB in the original '746 and about 25 dB in the 'PRO. In contrast, the IC-756PROII's worst-case third-order products were down 30 dB—not terrific but getting there. The third-order numbers were about the same on the worst-case VHF band, 2 meters.

On the positive side of the ledger, the IC-746PRO did a better job than the original model in suppressing fifth-order products on the worst-case bands—by about 7 dB on 10 and about 9 dB on 2 meters. (Fifth-order products were down about 40 dB in the '756PROII on its worst-case band HF band, 10 meters; that unit does not have 2 meters.)

Transmitted phase noise on the worst-case band—80 meters on the IC-746PRO and 20 meters on the IC-746—was slightly worse in the 'PRO model, which also exhibited a few prominent spikes.

All This and VHF Too!

If you're trying to decide whether to purchase the IC-746PRO or the IC-756PROII, one of the most important factors—maybe the only factor for a lot of ops—is the inclusion of both the 6 *and* 2-meter bands on the IC-746PRO. The antenna tuner even works on 6 meters, and the '746PRO registers some decent performance numbers on that band, too, with 98 dB of two-tone, third-order dynamic range (77 dB close-in). No slacker there!

Two-meter performance numbers are not quite as impressive as those on 6, but the '746PRO still offers plenty of sensitivity and better FM sensitivity (about 0.5 μV) than on either 10 or 6 meters. The preamps offer additional sensitivity without overly compromising the dynamic range on VHF too.

For repeater work, you can set separate "standard" splits for 10, 6 and 2 meters, and it can be set up to track the US band plan standard in terms of whether the split is plus or minus. There's a tone encoder, and the radio will even encode, decode and display monitored CTCSS or—new with the 'PRO model—DTCS tones. Fifty CTCSS and 104 DTCS tones are supported.

The 100 memories store offset, CTCSS/DTCS tone and other parameters. The IC-746PRO also lets you apply names of up to nine alphanumeric characters (numerals, upper and lower-case letters and punctuation) to memories, and it's very simple to do.

The front-panel's new CALL button retrieves a preferred "call" channel. We say "channel" because once you push the button to go there, the IC-746PRO does not let you use the tuning dial, band keys or keypad to change frequency (you *can* use these controls if you select the "call" channel via the MEM-CH knob). For this reason, most users probably will program in a favorite VHF simplex or repeater

channel, although it could be used for an HF net frequency as well.

The IC-746PRO is 9600-baud packet ready.

Grumblings

Maybe it's a carryover from my radio broadcasting days, but I like to hear my voice in the headphones when I operate SSB. The IC-746PRO includes a monitor that's enabled by a little pushbutton on the front panel apron. Pushing and holding the MONITOR button for a second lets you set the level, but even at 100% it's not loud enough. To really hear it well, you have to also crank up the AF GAIN control to a point where received audio is likely to be uncomfortably loud. Then again, I didn't much like the monitor in the IC-756PROII either.

Those little "stem controls" on the lower front-panel apron leave something to be desired. Unless you're directly face-to-face with the radio, you can't read the labels (they're partially blocked by the stems). Fortunately, the only control you're likely to need routinely (KEY SPEED) is on the right-hand end of the row; the others will be set-and-forget items for most operators.

It's still way to easy to confuse the F1-F5 buttons with the MENU, mode and FILTER buttons located immediately beneath them, but we also can understand ICOM's reluctance to redesign the front panel during this update. The IC-756PROII suffers from the same shortcoming. At the very least, ICOM might want to consider sharply contrasting shades and labeling for these sets of buttons. They all look far too much alike. Operator beware!

We'd griped about the fact that in the full-break-in (QSK) mode, keying was a bit "choppy" on the original '746 when sending at higher speeds—in excess of 30 WPM or so—and this is still the case with the 'PRO. This does not occur in semi-break-in (VOX) mode, however, where no relay is involved. This particular shortcoming recalls the less-than-ideal QSK keying of the IC-706 series.

If you're planning to switch a linear amplifier other than ICOM's IC-PW1 with the IC-746PRO, be advised that the "send" relay contacts can handle 16 V/500 mA maximums. Some amplifiers require huskier switching capabilities. ICOM can provide a schematic for an external transistor switching circuit for those situations.

There's only one level of receiver RF attenuation—20 dB. For most operators with relatively modest antenna systems, this will not prove to be a disadvantage. But the single stage of attenuation might prove to be either too much or—in the case of the station with the better-than-average antenna system—not enough. Just for the record, the IC-756PROII offers a three-step attenuator—6, 12 and 18 dB.

DXers and contesters often want to be able to connect separate receive antennas—such as low-band Beverages—to their transceivers. Unfortunately, you're out of luck with the new '746PRO. It does not offer this capability.

Competent Compromise

Just where does the IC-746PRO fit in the greater scheme of things? This new-and-improved model has even more to offer than the original in terms of features and performance, so it's also more difficult to pigeonhole. It would be a giant step forward for the casual operator who's running say, an older mid-level transceiver or maybe an IC-706 (and the IC-746PRO will seem familiar to the '706 crowd) and has been looking for something to handle a bit more demanding operating regimen. It's a great standby or second radio for the seasoned contester or DXer (and it puts all-mode VHF in the shack). For the value-conscious operator who has limited space and/or wants an all-in-one box, look no further. Only extremely discriminating or particular operators—who usually have more money to spend anyway—likely would be happier consuming higher on the food chain.

Manufacturer: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004; 425-454-8155, fax 425-454-1509; **amateur@icomamerica.com**; **www.icomamerica.com**. Manufacturer's suggested list price: $2265. Typical current street price: $1900. Manufacturer's suggested list prices for selected optional accessories: UT-102 voice synthesizer unit (announces frequency, mode and S-meter reading): $74; CT-17 CI-V level converter (for computer control): $169. QST

NEW PRODUCTS

DIGITAL-MODE SOUND CARD INTERFACE FROM MFJ

◊ Designed to meet the needs of the ever-increasing ranks of digital-mode operators, MFJ's new MFJ-1275 sound card audio interface handles audio I/O and PTT switching tasks between your rig and computer sound card. Required software, cables and a power plug are included. The '1275 provides fully automatic operation with audio-derived and PTT T/R switching, is said to eliminate hum- and RFI-inducing ground loops and works with all transceivers that use round eight-pin or modular mike connectors.

Using the supplied software, users can operate PSK31, packet, APRS, AMTOR, RTTY, SSTV and CW (meteor-scatter and others). When the interface is switched off, normal transceiver operation is maintained. When digital operation is selected, all connections are made between your rig and your computer, and isolation transformers protect against ground loops, noise and distortion.

Other features include PTT override, serial port or VOX T/R switching, level controls for TX and RX audio, stereo and mono inputs, off-air recording capability, a monitor switch and more. Internal jumpers allow the '1275 to be used with a wide variety of mikes and radios with no soldering required. The interface requires 12 V dc. The MFJ-1275 is for rigs that use eight-pin round mike connectors, and The MFJ-1275M is for rigs that require RJ-45 "LAN cable" plugs.

Prices: $89.95 (MFJ-1275/1275M, including all necessary cables and a power plug); $14.95 (MFJ-1312B ac adapter). For more information, contact your favorite Amateur Radio products dealer or contact MFJ, 300 Industrial Park Rd, Starkville, MS 39759; tel 800-647-1800, fax 662-323-6551; **mfj@mfjenterprises.com**; **www.mfjenterprises.com**.

Previous • Next New Products

FEEDBACK

◊ In "9-11-01: A Dedication to Public Service" (Apr 2002, p 28), the narrative attributed to Ryan Jairam, AB2MH, was actually submitted by AB2MH but was written by Mike Bartmon, KF2EO.

◊ Concerning the letter from Jim Piper, KD6YKL (Mar 2002, p 24), the kind words are much appreciated, but please correct the record. I did not work for FEMA. I did work for the New York City Red Cross, for Jay Ferron, N4GAA, for whom I was the Red Cross Radio Night Shift Supervisor 9/12 to 9/20, 2001. I agree wholeheartedly with Jim's plea for old hands as well as new hams to get involved with ARES.—*Bart Lee, KV6LEE*

◊ Re my article ("A Quality Sound Card Interface for ICOM Rigs," Mar 2002, p 31) the muting of the front panel mike connector is a feature of the IC756PRO rather than the interface itself. Most (probably all) of the older ICOM rigs will *not* mute the front panel mike connector while running digital modes even though they use the ACC(1) connector and are otherwise compatible with the interface.—*Bob Lewis, AA4PB* QST

ARRL Asks FCC to Eliminate, "Refarm" Novice CW Bands

The ARRL has asked the FCC to eliminate the 80, 40 and 15-meter Novice/Technician Plus CW subbands and reuse that spectrum in part to expand the phone allocations on 80 and 40 meters. In a *Petition for Rule Making* filed March 22, the League requested that the FCC revise its Amateur Service rules in accordance with the modified Novice band "refarming" scheme the ARRL Board of Directors okayed in January (see "The 2002 Annual Meeting of the Board of Directors," *QST* Mar 2002, p 59). As of press time, the *Petition*, which includes some additional, lower-profile requests, had not been put on public notice for comment.

"ARRL suggests that it is urgent that the Commission consider revisions to operating privileges in the Amateur Service," the League told the FCC. "The opportunity to eliminate the Novice and Technician-Plus telegraphy subbands and the reapportionment of those inefficiently deployed segments will allow alleviation of significant, sometimes critical, overcrowding in the popular amateur HF allocations."

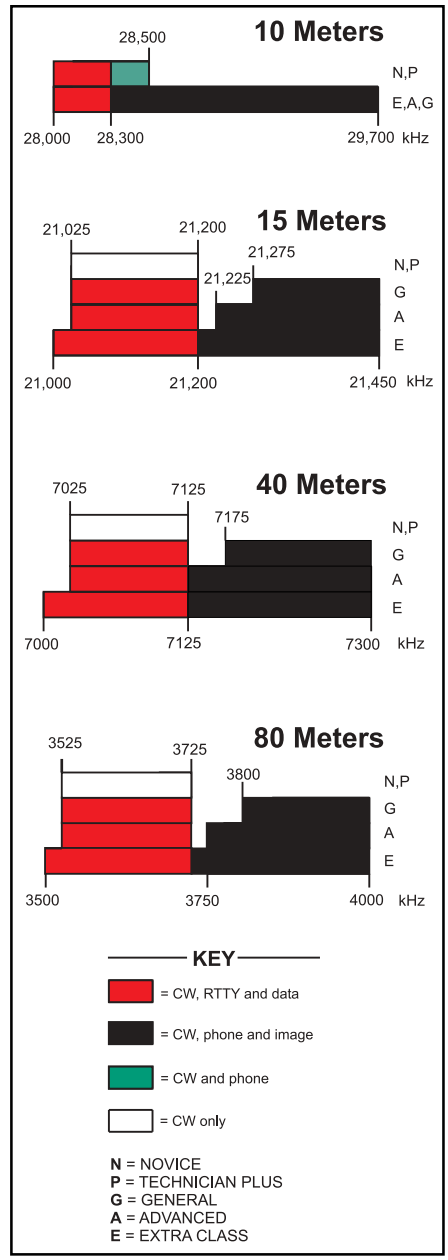
The ARRL cited "substantial advancements in the use of digital techniques" in the HF bands—such as PSK31—to bolster its assertion that a refarming plan for the underutilized Novice HF subbands "cannot wait longer and must proceed now." The Novice refarming plan adopted by the ARRL Board was based on the recommendations of the ARRL Novice Spectrum Study Committee following a survey of the amateur community last year.

If the FCC approves the plan, no operator class would lose privileges, and most would gain. Current Novice and Technician Plus (ie, Technician with Element 1 credit) licensees would be permitted to operate on the 80, 40, 15 and 10-meter General-class CW allocations at up to 200 W output. For General and higher class operators, the ARRL wants the FCC to implement changes affecting the 80, 40 and 15-meter "phone" bands.

On 80 meters, phone privileges would begin at 3725 kHz for Extra, at 3750 kHz for Advanced and at 3800 kHz for General—an additional 25 kHz for Extra and Advanced and another 50 kHz for General.

On 40 meters, phone privileges would begin at 7125 kHz for Advanced and Extra and at 7175 kHz for General—another 25 kHz for Extra and Advanced and another 50 kHz for General.

On 15 meters, phone privileges would begin at 21,200 kHz for Extra, at 21,225 kHz for Advanced and at 21,275 kHz for General—no change for Extra and Advanced but another 25 kHz for General.



On 10 meters, the ARRL has recommended no changes other than to accommodate CW, RTTY and data by Novice and Tech Plus licensees over the 28.0 to 28.3 MHz segment.

The ARRL suggested that while its survey data support the options proposed "and in fact could support even greater expansion of the telephony subbands" on 80 and 15 meters, its proposal strikes the right balance. The League urged the FCC to carefully weigh the desire for more phone spectrum in the affected bands against "the important goal" of encouraging further development of narrowband data modes in the CW segments.

The ARRL's "omnibus" petition also asks the FCC to permit amateurs to use spread spectrum on the 222-225 MHz band; expand the pool of special event call signs beyond the 1×1 format to include identifiers for US territories and possessions that do not provide for mailing addresses; clarify its rules to indicate that modulated CW (MCW) is permitted for repeater station identification; and to incorporate into its rules a 1990 FCC waiver authorizing amateurs in certain areas of Colorado and Wyoming to operate on certain segments of the 33-cm band.

The ARRL proposed that the FCC consolidate its omnibus petition with other pending Amateur Radio-related petitions now before the FCC (see "FCC Gathers Comments on Amateur Radio-Related Petitions," *QST* Mar 2002, p 67) and that the FCC "address these together in a biennial review-type proceeding."

ARRL pointed out that, at a time of heightened concern for homeland security, the Amateur Service continues to be at the disposal of the American people. "The ubiquitous communications systems installed and maintained by radio amateurs are always functional, and amateur operators consistently and reliably volunteer in emergencies and disaster relief," the League noted in its concluding remarks. "ARRL would like the Commission to know that the Amateur Service is ready, willing and able to assist as necessary in its normal capacity."

A copy of the ARRL's complete *Petition for Rulemaking* is available on the ARRL Web site, **www.arrl.org/announce/regulatory/refarm/**.

Rick Lindquist, N1RL ♦ Senior News Editor

FCC News

FCC REDESIGNS AMATEUR SERVICE WEB SITE

The FCC has redesigned its Amateur Radio Service Web site and changed the URL. The updated site is at **wireless.fcc.gov/services/amateur/**. The new layout makes it easier to find information on topics most requested by amateurs, including licensing, amateur exams, filing an application, changing an address or using the Universal Licensing System (ULS). The refurbished site also provides links to recent Amateur Radio-related news from the FCC.

"The new design is a part of the Wireless Telecommunications Bureau's continuing effort to meet the needs of the Amateur Radio Service operators as identified in focus groups, letters, phone calls, and e-mails," the FCC said in a news release.

The new design clusters FCC public notices, news releases, and other official documents affecting Amateur Radio operators on the right side of the page. On the left side of the page, the new navigation scheme displays information on the Amateur Radio Service, the sequential call sign system, licensing and vanity call signs as well as amateur-related communications policies such as reciprocal agreements. The site also offers links to information on the limited federal preemption known as PRB-1, the Part 97 Amateur Service rules and the Wireless Tele-communications Bureau and ULS sites.

The site, launched on February 20, includes a search engine for the entire FCC Web site, **www.fcc.gov**.—*FCC*

Amateur Enforcement

♦ **FCC completes Georgia ARRL VEC exam session audit:** The FCC has wrapped up an investigation into apparent irregularities at five ARRL VEC-sponsored Amateur Radio examination sessions in Georgia during 2000 and 2001. As a result of the probe, FCC Special Counsel Riley Hollingsworth said that several examinees would be called back for Element 1 (Morse code) retesting. In addition, the ARRL VEC has discontinued volunteer examiner accreditation for all but two of the VEs involved. According to standard procedure, all VEs who might have been involved were suspended after the FCC investigation began last year.

"We have reviewed the examination documents and all relevant information, including that provided by the volunteer examiners and applicants," Hollingsworth said in a February 12 letter to ARRL VEC Manager Bart Jahnke, W9JJ. Jahnke called the apparent irregularities to the FCC's attention last June. The issues involved both exam sessions and instructional classes.

Initially focusing on the May 19, 2001, examination session in Statesboro, the FCC audit was expanded to cover the activities of the same group of VEs at Georgia test sessions in Claxton on February 19 and April 15, 2000, and in Statesboro on May 27, 2000, and February 17, 2001.

In a letter last summer to ARRL VEC, Hollingsworth said test session documents and other information indicated "alarming discrepancies in testing procedures." He said information before the FCC suggested that volunteer examiners at the May 19 Statesboro session used identical exam question sets and Morse text at several recent exam sessions in apparent contradiction of Amateur Service rules that prohibit administration of a "compromised examination." Hollingsworth also said it appeared that test candidates "had been shown or had access to" the Morse code answer key and that some VEs had taught classes using the same test editions later given at actual examination sessions.

Hollingsworth said that as a result of the FCC probe, eight examinees who obtained licenses as a result of the tests would be called in for Element 1 (Morse code) re-examination, if they have not already re-tested.

The ARRL VEC has withdrawn accreditation for volunteer examiners responsible for the testing sessions at which alleged irregularities occurred as well as those of VEs present at a February 10, 2001, instructional class. The examiners are Ellie Waters, W4CJB; Cheryl L. Waters, W4CLW; Joanne D. Sharpe, KF4WFN; John W. Sharpe, WA4BE; Joseph A. Horne, N4ZAJ; George B. Grant, KF4WPU; Robert T. Jernigan, W4RTJ; Kathy L. Lanier, KD4MVY; Charles M. Aulick, KF4MLT; and Lawrence A. Lewis, K4RRR.

The ARRL VEC reinstated two VEs suspended during the audit—Charles F. Roberts, AI4A, and Marshall R. Thigpen Jr, W4IS.

NEW MEXICO, WEST VIRGINIA ADOPT ANTENNA LEGISLATION

New Mexico and West Virginia have become the 14th and 15th states to adopt Amateur Radio antenna bills based on the limited federal preemption known as PRB-1.

In New Mexico, Gov Gary Johnson signed House Bill 314 on March 5 after it easily passed both houses of the legislature in February with just two opposing votes during a short session that typically only deals with appropriations bills.

West Virginia Gov Bob Wise signed House Bill 4335 into law March 7. Acting with uncharacteristic speed, the West Virginia Legislature okayed the measure less than 30 days after it was introduced earlier this year. West Virginia ARRL Section Manager Hal Turley, KC8FS, said Gov Wise—whose late father was WA8AYP, also proclaimed March 7 as "Amateur Radio Operators Appreciation Day."

PETE MYERS, WZ5PM

New Mexico Section Manager Joe Knight, W5PDY (left,) awards a certificate of achievement to ARRL member Mike Stuart, AC5ZO, the prime mover behind New Mexico's amateur antenna bill. The New Mexico PRB-1 Group also presented Stuart with a 1943 model Vibroplex Blue Racer bug.

DAVE ELLIS, WA8WV

West Virginia Gov Bob Wise signs the Amateur Radio antenna bill, HB 4335. With him is House of Delegates Member Sharon Spencer, KC8KVF, who sponsored the bill and serves as West Virginia's ARRL Affiliated Club Coordinator.

New Mexico's bill—the "Emergency Communication Preservation Act"—was sponsored by Rep Mimi Stewart and Sen Ramsay Gorham. It stipulates that municipal or county ordinances regulating Amateur Radio antennas "shall not obstruct or preclude amateur radio service communications" and "shall reasonably accommodate amateur radio service communications."

The bill further provides that antenna structures "may be erected at heights and dimensions sufficient to accommodate amateur radio service communications," but it does not include a minimum regulatory height schedule. It also exempts Amateur Radio "antenna towers" constructed prior to the effective date from subsequent zoning regulation changes.

As with most PRB-1 bills, municipalities or counties in New Mexico will still be able to require Amateur Radio antennas or support structures to meet screening, setback and placement, construction and health and safety standards. Such regulation "must be the minimum practicable regulation to accomplish the local municipality's or county's purpose," however.

New Mexico ARRL Section Manager Joe Knight, W5PDY, gave Mike Stuart, AC5ZO, much of the credit for getting the New Mexico bill through the legislature. Stuart said that while all involved had hoped to have a more powerful amateur antenna bill, "the practical and political realities dictated otherwise."

The West Virginia measure also incorporates language very similar to that of PRB-1 into articles of the Code of West Virginia. Under the bill, any county or municipal ordinance or order concerning the regulation or placement of Amateur Radio antennas would have to comply with all FCC regulations, rulings and orders; reasonably accommodate" Amateur Radio communications; and represent "the minimum practicable regulation."

West Virginia's bill would not prevent a county commission or municipality from taking action to protect or preserve historic buildings, structures, sites and districts established by federal, state or local law.

Turley credited "the tireless efforts" of Kanawha County House of Delegates member Sharon Spencer, KC8KVF—an ARRL member from Charleston—for helping to get the bill through the legislature as well as for her "dedication and commitment" to Amateur Radio. He said that amateurs from all corners of The Mountain State actively participated in promoting the bill's passage and by contacting their elected representatives. "And I am certain there are many legislators in our state who now know a lot more about Amateur Radio than they did a month ago," he added.

An Amateur Radio antenna bill awaits the governor's signature in Wisconsin, a PRB-1 bill recently was introduced in Tennessee and similar measures have been proposed for introduction in other states.

ARRL FIELD & EDUCATIONAL SERVICES ANNOUNCES CHANGES

ARRL Field & Educational Services Manager Rosalie White, K1STO, has announced the creation of two teams to help streamline the department's varied support activities. White named Steve Ewald, WV1X, to lead the new Field Organization/Public Service Team, and Mary Lau, N1VH, to lead the new Field & Educational Support Team. White said the new teams permit F&ES staff members with common goals to more easily share their expertise, ideas, and resources and better serve League members.

Ewald's Field Organization/Public Service Team supports the activities of field volunteers, who further ARRL objectives at the local and section level. As a result, Ewald has become the primary

Vanity Processing May Be Back on Track

In the wake of a months-long disruption, vanity call sign processing appeared to be back on track by mid-March, despite a problem that halted the system for several days just as it appeared that routine operation would resume.

At the core of the initial interruption were some two weeks' worth of October paper vanity applications sent last fall from Gettysburg to Washington, DC, for anthrax decontamination and which were delayed for months on the return trip. Since FCC policy now puts equal processing priority on paper and electronic vanity applications, the vanity system ground to a halt October 30 when the October paper applications went missing.

In an effort to restart the system, Private Wireless Division Licensing and Technical Analysis Branch personnel at Gettysburg began using information gleaned from payment receipts to contact most of the known paper filers via e-mail or telephone to have them resubmit copies of their vanity applications. As the FCC—with help from ARRL—was able to compile all applications for a given receipt date, a few vanity call signs trickled out of Gettysburg during January and February. But a backlog estimated at 2000 applications and growing remained on hold.

After indicating it would run daily batches to catch up, the FCC suddenly, and mysteriously, shut the system down again without any immediate explanation.

At one point, a lone missing paper vanity call sign application filed last October held up the resumption of routine vanity processing. The FCC was determined to continue the hiatus on vanity processing until the remaining applicant was given an opportunity to resubmit an application and, thus, retain a place in the processing queue. Efforts to contact the elusive applicant to have the individual resubmit a vanity application proved challenging, but the single missing application eventually was resubmitted, and the vanity logjam was broken.

Or was it? After indicating it would run daily batches to catch up and processing nearly 600 vanity applications March 6, 7 and 8, the FCC suddenly, and mysteriously, shut the system down again without any immediate explanation. The shutdown renewed fears of another vanity drought and sparked a flurry of rumors, unfounded speculation and inquiries to the FCC. Other Amateur Service applications have continued to be processed normally.

Licensing and Technical Analysis Branch personnel spent almost a week sorting out the vanity application processing anomaly that led them to put vanity processing on hold again. A staff member explained that the problem involved the improper dismissal of a vanity application—a glitch apparently related to the processing software. The decision was made to pull the plug on further vanity processing and fix the problem rather than risk having to call back grants later, she explained. On March 15, the FCC ran some three dozen new vanity call sign grants followed by another 221 the following week. A spokesperson indicated that the Commission was cautiously optimistic about restarting routine vanity processing. "If it continues to work properly, we will process daily," she said.

The FCC announced in March that it was finally starting to receive the two weeks' worth of missing October paper vanity applications that had caused the vanity holdup in the first place.

contact person at ARRL Headquarters for Section Managers. He continues as the League's expert on emergency communications, public service and the field organization. "Public service is one of the most important aspects of Amateur Radio and one of the main reasons why we enjoy the many frequencies we've been allocated," White said. Ewald's team includes Leona Adams and Linda Mullally, KB1HSV.

ARL

Steve Ewald, WV1X

ARL

Mary Lau, N1VH

Lau's Field & Educational Support Team works with field volunteers active in the education and recruiting of new hams, as well as provide support for ARRL-affiliated clubs and ARRL-sanctioned conventions and hamfests. F&ES also sponsors annual events, such as Jamboree On The Air, Kid's Day and School Club Roundup, as well as the ARRL's annual educator and technical awards. Lau's team includes Jean Wolfgang, WB3IOS, Gail Iannone, and Margie Bourgoin, KB1DCO.

White stressed that Amateur Radio education in arenas other than schools will continue to be a major focus, equal in importance to the support given to clubs, hamfests and conventions.

A Tennessee native, Ewald began his ARRL career in 1982. He currently edits the "Section News" and "Public Service" columns in *QST*, and is a frequent contributor to various ARRL publications. He was licensed in 1972.

Lau has been at ARRL Headquarters since 1986. She also serves as secretary of the ARRL Foundation and edits "At the Foundation" for *QST*. She has been licensed since 1985.

In Brief

• **W6DPD appointed San Joaquin Valley SM:** ARRL Field and Educational Services Manager Rosalie White, K1STO, has appointed Charles P. "Chuck" McConnell, W6DPD, of Fresno, California, to replace Don Costello, W7WN, as ARRL San Joaquin Valley Section Manager. Costello is stepping down for personal reasons. McConnell will take office April 1. W6DPD served as SJV Section Communications Manager/Section Manager from 1976 to 1989, as Pacific Division Vice Director in 1989 and 1990 and as Pacific Division Director until 1993—following the election of Rod Stafford, KB6ZV (now W6ROD), as ARRL Vice President. He continues to serve as a Pacific Division Assistant Director. Costello has served as SJV SM from January 1997.

• **Body of amateur lost in World Trade Center collapse located:** The body of Robert D. "Bob" Cirri Sr, KA2OTD, was among several found February 9 in the ruins of the World Trade Center. The remains of Cirri, 39—a Port Authority Police Department lieutenant—and five other PAPD members were located in what had been the lobby of One World Trade Center—the second tower to collapse September 11. Nearby, recovery crews also found the body of a woman strapped into a rescue chair. An ARRL member, Cirri, of Nutley New Jersey, had served as ARES District Emergency Coordinator for Hudson County. "The thoughts of the Cirri Memorial Radio Club are with his family," said club president Rich Krajewski, WB2CRD. The club, headquartered in Jersey City, was renamed last year to honor Cirri's sacrifice. Cirri had helped to organize the club.

• **Vote on *QST* Cover Plaque Award:** The winner of the *QST* Cover Plaque Award for January was Dick Stroud, W9SR, for his article "Six Meters from Your Easy Chair." The winner of the *QST* Cover Plaque Award for February was Brian Wood, W0DZ, for his article "The Return of the Slide Rule Dial." Congratulations, Dick and Brian! 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.

• **YHOTY nominations are open:** Nominations are open for the *Amateur Radio Newsline* Young Ham of the Year Award for 2002. Created in 1986, the award recognizes one young radio amateur under the age of 18 in the continental US for his or her contributions to society through Amateur Radio. Nominating forms and additional information are available at the *Amateur Radio Newsline* Web site, **www.arnewsline.org**. All nominations and materials required by the official rules must be received by *Amateur Radio Newsline* before May 30, 2002.

SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Connecticut, Idaho, Minnesota, North Dakota, Ohio, Oklahoma, Southern Florida, Western New York, Puerto Rico and Virgin Islands sections. You are hereby solicited for nominating petitions pursuant to an election for Section Manager (SM). Incumbents are listed on page 12 of this issue.

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

(Place and Date)

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

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

(Signature___ Call Sign___ City___ ZIP__)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on June 7, 2002. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before July 1, 2002, to full members of record as of June 7, 2002, which is the closing date for nominations. Returns will be counted August 20, 2002. Section Managers elected as a result of the above procedure will take office October 1, 2002.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning October 1, 2002. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the October 2002 *QST*. A Section Manager elected through the resolicitation will serve a term of 18 months. Vacancies in any Section Manager's office between elections are filled by the Field & Educational Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Rosalie White, K1STO, Field & Educational Services Manager*

Since no petitions were received for the South Dakota Section Manager elections by the deadline of December 7, 2001, nominating petitions are herein resolicited. See above for details on how to nominate. QST

Hardrock 100 Mountain Run

By Greg Hine, WT0M
Communications Co-Coordinator
Hardrock 100 Mountain Run

"Pole Creek, WT0M, this is headquarters, W0MOM calling. Do you have any additional information on our missing runner?"

I was working as a communicator for the Hardrock Hundred Mile Mountain Run at the Pole Creek aid station. The Pole Creek aid station was situated north of the headwaters of Rio Grand River, high in the San Juan Mountains of southwestern Colorado. We had a runner missing somewhere in the backcountry between Camp Sherman aid station and Pole Creek. This section of the trail is nine miles of somewhat rugged, roadless, backcountry.

"Negative, headquarters. No runner in sight."

We could see east nearly a mile across the wide Pole Creek valley to the point the trail turned to disappear behind an unnamed butte. It was getting close to twilight, and the runner was not in sight. It would be dark within the hour.

Nothing out of the ordinary here. The job of the 50 or so volunteer hams is to support the safety of over 100 runners this weekend. Clipboards in hand, we take the times of the runners in and out of each aid station, and then radio the information back to headquarters in Silverton. Without Amateur Radio, the run could not be done with adequate safety for the runners.

"Okay. It's getting late. I think you should send a search party out along the trail. I'll contact Sherman and have them start sweeping the trail from their end too," Molly radioed back.

"QSL. Search party will be departing Pole Creek in a few minutes," I replied.

The Pole Creek is just one of the more than dozen aid stations for the Hardrock 100 Mountain Run. The Hardrock 100 is an endurance run connecting the four major mining towns in the San Juan Mountains: Lake City, Ouray, Telluride (now of downhill ski fame) and Silverton. The run is approximately 100 miles in length, takes place between 7,680 feet and 14,048 feet in altitude and includes an unbelievable 66,000 feet of vertical rise and fall. It can probably be considered "extreme" in every sense. The Hardrock 100 was conceived by Gordon Hardman, W0RUN, and attracts over 100 runners from many countries. Amateur Radio has been an integral part of the Hardrock 100 since it was first run in 1992.

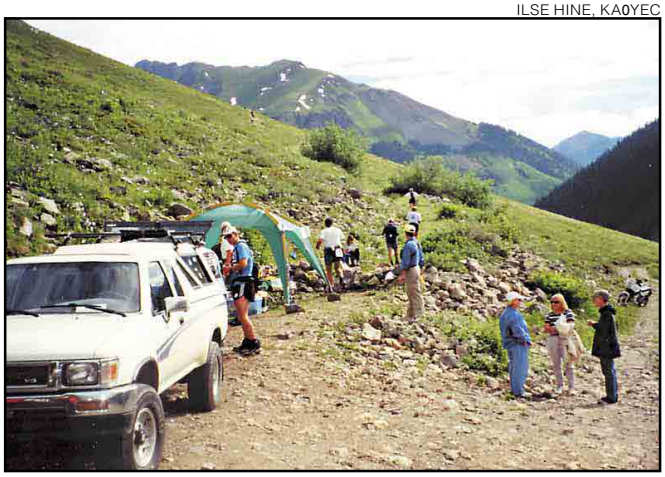
Although most of the aid stations are accessible by roads, this year I chose to head up the aid station communications at Pole Creek because of its backcountry location, its isolation, spectacular scenery and the elk. Elk in the Colorado high country are like deer on steroids. Each can be as big as a horse and are one of the many runners' hazards in the Pole Creek area. The Hardrock 100 trail is marked with thousands of reflective aluminum tags on the end of knee high thin metal rods. And the elk in the Pole Creek area like to pull up these reflective trail markers. It would be dark soon, we had an overdue runner, and the elk had been pulling up the trail markers making it even more difficult to follow the trail after dark.

Being in the backcountry, Pole Creek was one of the most minimal aid stations. For many years, volunteer horse and mule packers have brought in the outfitter's canvas tent, stove, fuel, first aid equipment, runner's snacks and even the 2-meter, three-element beam I was using to communicate back to headquarters in Silverton. Gail Vitarius, an emergency medical technician (EMT) from Durango, has headed up the "aid" part of the station for many years. Communication back to headquarters was my responsibility. To reach the Pole Creek site, I had to drive two to three hours over 12,000 foot, four-wheel-drive Stony Pass from Silverton, then ford nearly knee deep Pole Creek in my Cherokee, establish a minimum car camp and then hike the three plus miles up the broad Pole Creek valley to the site. There is no easy way in.

As far as I am concerned, the Hardrock 100 is the ultimate Amateur Radio experience: It combines some of Colorado's most beautiful high country, team work and community service in a real-life, Field Day-type exercise where accurate and timely communication can be the difference between life-and-death. It's an unbeatable combination. The perfect vacation.

The Hardrock 100 is also a challenging communication problem. Aid stations are situated as much for the comfort and

ILSE HINE, KA0YEC



The Kam Traverse drive-in aid station for the Hardrock 100.

ILSE HINE, KA0YEC

Volunteers at the backcountry Pole Creek aid station. The lightweight, portable Amateur Radio station is propped up on the rock with its ¼-wave antenna clearly visible.

Steve Ewald, WV1X ♦ Public Service Specialist

safety of the runners and their support crews as for ease of communication back to Silverton. For the first few runs, Colorado hams placed portable repeaters or sat in the four-wheel drive autos on high locations providing cross band repeating into run headquarters in Silverton. Then several years ago, KC5CHM and KB5ITS with the help from area hams placed two permanent repeaters on peaks in the run area that provide good coverage for the run. These repeaters also give good coverage year around.

The San Juan Mountains and Silverton are beautiful in the summer. The historic 1890s mining town of Silverton, nestled at 9,318 feet, is surrounded by many peaks reaching over 12,000 feet. Silverton, perhaps, is the only county seat in the USA that can be isolated by snow avalanche road closures in the winter. Yet, in the summer, Silverton comes alive as the northern terminus of the Durango and Silverton Narrow Gauge Railroad, a popular half-day tourist ride from Durango, Colorado, the center of hundreds of miles of mountain jeep trails and backpacking and hiking in the mountain wilderness.

The second weekend of July, Silverton becomes the site for the headquarters of the Hardrock 100 Mountain Run when the several hundred runners, crew members and aid station volunteers return for what feels like a reunion of friends.

The Hardrock 100 starts promptly at 6 AM on Friday morning and runs for the next 48 hours. Cut off is 6 AM Sunday morning. Approximately 50% of the starters finish the run. The sleepless nights, freezing river crossings, lightning, rains, snowfields and tireless pace can take a heavy toll on the runners.

Runners are tracked, timed actually, in and out of each aid station. Their progress is radioed back to headquarters. Runner times are plotted and when runners become overdue, searchers can be sent out.

I loaded up my backpack with my bivouac gear—food, a lightweight sleeping bag, headlamp, and (of course) my HT—and headed down the trail. I had no idea what to expect, but fortunately this time the missing runner stumbled around the unnamed butte just as I was heading out. After a short rest, he had to be lead the six plus miles out to Maggie's Gulch and automobile transportation back to Silverton.

This year, the Hardrock 100 will be held July 12-14, 2002. If you love the mountains, want to experience Colorado like never before and put your Field Day experience to use, join us in July as an Amateur Radio communicator. Contact either Molly Hardman (3994 Promontory Ct, Boulder, CO 80304, **molly@CrossLinkInc.com**) or myself (351 Sugarloaf Mtn Rd, Boulder, CO 80302, **greg.hine@hsindustries.com**) and come join the fun.

To read more about the Hardrock 100 Mountain Run get started at: **www.run100s.com/HR/**. Information about Silverton can be found at**: www.silverton.org/**, and tourism in Colorado: **www.colorado.com**.

THE WALK FOR HUNGER BOSTON

By Bob DeMattia, K1IW

I cast my eyes out the window and watch as Mother Nature kindly deposits eighteen inches of fresh snow in the front yard. It's mid February (2001), and for myself and a few others in the Crocker Public Service group, it's time to start planning for May.

What we are planning is the Amateur Radio operations for the Boston Walk for Hunger, a charity walk held annually in the Boston area. The walk is the largest one-day fundraiser in the world for feeding those who are hungry. It is professionally run by Project Bread, a Boston based nonprofit organization dedicated to providing feeding and support programs for people who cannot afford nutritious regular meals.

The walk is traditionally held on the first Sunday in May, on the heels of the Boston Marathon. Amateurs play a large part in the communications system of both events, and both events require a large radio team. To compare the Walk for Hunger with the Boston Marathon: The marathon is a 26-mile event involving 12 to 15 thousand mostly trained athletes. The Walk is nearly as long, 20 miles, and has nearly three times as many participants—between 40 and 45 thousand individuals—many of whom do not go through the kind of training that the marathon runners go through.

Amateurs support operations at each of the nine checkpoints. Items such as water, first aid supplies, energy bars, and registration paperwork must be coordinated along the route. Amateurs also support a network of vans and busses, which are used to move missing persons to meeting spots, and to assist walkers that cannot complete the entire route.

By early March, Bruce Pigott, KC1US, is working with Project Bread's staff to collect information about their procedures for this year and to assess their needs. By the second week of April, nearly all responses are in. In a meeting with Project Bread, we do a final review of the amateur pool against the charity's requirements. Balancing the available resources against what's needed, we determine where the radio operators will be positioned.

Finally, the big day arrives. At 4 AM, I pull out of my driveway and trek the 35 miles from my home to downtown Boston. After I arrive at Boston Common, where activity abounds, I pass the main tent area and enter a nondescript five story brownstone on the north side of the Common where the Net Control operations center is located. Out the windows, I can see the information tent. A 2-meter antenna is mounted to this tent and is the center of operations for the Transportation Net. Operating on the Waltham Amateur Radio Association's repeater, 146.64 MHz, this net will coordinate van and shuttle bus activity.

In the street below, the K1IW remote base is setup to receive on a UHF band and retransmit on the input to the 146.64 MHz repeater. Using this base, amateurs with dual-band HTs will be able to communicate on the Waltham repeater 15 miles away using very low power.

We established a system of two nets: The East Net control operates on the Boston Amateur Radio Club's repeater, in Boston, on 145.23. The West Net operates on the Crocker Public Service Group's 447.875 and Brookline Emergency Radio Group's 146.985 cross-linked, co-located repeaters in Brookline.

W4H is on the air, and by 7AM, all the primary net control operators have arrived, Steve Schwarm, W3EVE, Tom Costas, KA1LEP, and our Eastern Massachusetts ARRL Section Manager Phil Temples, K9HI. The team will rotate throughout the day, along with other operators that will arrive later. Also at 7 AM, down at the information tent, Tom McAlear, N1XUK, puts the Transportation Net on the air.

Activity goes in fits and starts. Opposite the radio operator side of the table sit two Project Bread staffers. The staffers answer landline and Nextel communications. The staffers and radio operators also exchange information across the table throughout the day.

The Crocker Public Service Group provides radio operators for a number of events in and around Boston. Interested in learning more about how you can get involved with public service events in the Boston area? Visit our Web site at **cpsg.amateur-radio.net**, or send e-mail to **cpsg@amateur-radio.net**. The Crocker Public Service group is named after Dave Crocker, W1TMO (SK), ARRL Eastern Massachusetts Section Manager from 1992 to 1994. Dave dedicated much of his Amateur Radio activities to public service communications.

Public Service Honor Roll Criteria

Effective May 1, 2002

This listing recognizes 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.

Correction Note: In the April *QST* Public Service column that introduced the new criteria, the following appointments were inadvertently omitted from the list on page 77: Bulletin Manager, Affiliated Club Coordinator, Technical Coordinator and NTS Member at Large.

NYSPTEN's 50th Anniversary

The New York State Phone Traffic and Emergency Net (NYSPTEN) marks its 50th anniversary in Albany on April 13, 2002. The NYSPTEN has been in continuous existence since 1952. It meets daily at 1800 (local time)—or 6 PM—on 3.925 MHz for the purpose of handling traffic and to prepare for communication emergencies. Only intractable QRM can keep it off the air, and it operated during the major power failure in New York City in 1965. If you would like to learn more about the NYSPTEN, contact its archivist, Shailer Evans, AA2Y, at **AA2Y@aol.com**. For more on the anniversary celebration, write to Arnie Koeppen, WB2AXF at **akoeppen@pol.net**, or check into the net.—*Arnie, WB2AXF*

Field Organization Reports

Compiled by Linda Mullally, KB1HSV

Public Service Honor Roll
February 2002

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

882
NM1K

396
W9RCW

387
K9JPS

294
N7CEU

291
N9VE

267
W7TVA

240
K5MC

225
KK3F

213
WX4H

207
WA9VND

205
KB2RTZ

203
N8IO

202
WBSZED

200
KG4FXG

198
W6DOB

197
K8PJ

195
N2LTC

193
KB2VRO
W5ZX

191
KA4FZI

184
K4FQU

180
WA5OUV

179
KK5GY
N2OPJ

172
W4EAT

W1GMF

170
WB2GTG
KW1U

169
K4IWW
K2BCL

168
KA2GJV
K6YR

167
K2UL

166
KA2ZNZ
W0WWR

165
AC5XK

164
K4RLD

161
WN0Y

160
N2RPI
KL5T

159
KX0N

158
W6IVV
W6QZ

157
WD9F

156
AA3SB
WB2UVB
K5UPN

150
AF4QZ

149
N2JBA

148
N7YSS
W3YVQ
K1JPG
NR2F
N7YSS
AF4NS

146
K5MXQ

145
KK1A
KC5OZT
N2AKZ
K4SCL
N2CCN
KC8CON

144
KC4ZHF
KB0DTI

143
N8BV
N2GJ
W8YS

142
KE4JHJ
N9KNJ
W9YCV
W0OYH

141
KM5VA
KC2DAA
WB2ZCM
WA2YL
W2MTA
W0LAW
WA1FNM

140
WA4QXT
W7ZIW
W5GKH

139
N9BDL
K9FHI
K2CSS
K3JL
K5NHJ
KB2KLH
K4RBR
N5OUJ

138
N0SU
N2YJZ

136
WB5NKD

135
KB0RUU
WA2YBM
NZ1D

133
N3WKE
K5IQZ

132
NC4ML
WD9FLJ

131
KA1GWE
N5JCG
W5RDM
KD1LE

130
WW8D

129
KC7ZZB
K9LGU
WA5I
KB5TCH

128
W7GB
N8OD
KC2EOT
WA0TFC

127
W1ALE
W8WWF

126
N3SW
KD4GR
WB2QIX

125
KF4KSN

124
N2BVM
N5NAV

123
K5VV
KE4UOF

122
AG9G
W7GHT
AA2SV

121
KC7SRL
KA4UIV
W7QM
WB4GGS
KB2KOJ

120
N7DRP
WD4GDB
KF5A
KA2BCE
K5DPG
KF6OIF

119
W9CBE
N9TVT
N3RB
N2WDS
WI2G

118
KI4YV
K7GXZ
W1QU
N9MN
KA2DBD
KG2D
KA8WNO

117
AD4XV

115
K1UQE
NB4K
K2PB
K4WKT

114
KO4OL
K4BEH
W2LC
W5PY

112
AC7DD

WA1QAA

111
KE0K
AG4DL
KC2ANN
WA4EIC
KB2ETO

110
W2MTO
KF4OPT
WD0GUF
N1LKJ

109
KA4LRM
W1JX
N3WK
N8DD
AB2IZ
KC6NBI

108
WD9HII

107
K2YS
WB4BIK
W4WXA
KC6SKK

106
KA2CQX

105
K8KV
WA8SSI
AB4XK
WD8DHC
N5SIG

104
KJ7SI

103
AA3GV
KA4HHE
WA2GUP
N3WAV

102
KF4WIJ
KC2HUV
KJ2N
WA2YOW
KC2HUZ
W3OKN

101
WA2CUW
KG4CHW

100
N4VVX

KB2SNP

99
N2RTF
NN2H

98
WA1JVV
N5IKN
KC8HTP
AC5Z
KA2IWK

97
KM5YL

96
WA9JWL
W3CB
WB4PAM
WB2LEZ

95
W8IM
WA5KQU
AE4MR

94
N4TAB
AA4YW
WB7VYH
WB2IJH

93
KC7SGM
W4AUN
AL7N

92
KE4PAP

91
AK6DV
KU6Z

90
W1JTH
N3ZKP
K3CSX

89
W4CC

88
KB2YJD
KE4WBI
W8IVF

85
W7DPW
N2HQL
KE2SX
AF2K
K6IUI

84
WB9OFG
WB9GIU
WA4CHQ

83
W9RSX

82
N2WGF

81
KJ5YY
WJ2F
W2CC
K4ZC

80
N8PAM
N2AVY

79
KA2ZKM
KG9B
N0ZIZ

78
W5XX
KC3Y
KA2YKN
AA4BN

77
KA1VED
KD4DZN

76
W7VSE
W2GUT
NC1X

75
W7EP
K2VX

74
K2GCE
KD4EFM
KB8NDS

73
N0JL
KB3GFC
K1TSV

72
N8NMA
N1IST

71
K2DBK
N2JRS

70
KB5WY
KE4DNO
N2VQA

The following stations qualified for PSHR points during the month of January, 2002, but were not previously recognized in this column: KC7ZZB 113, W1QU 105, W1JTH 104, WD4GDB 99, KA2ZKM 87, W1JX 86, N1JBD 83.

Section Traffic Manager Reports
February 2002

The following ARRL Section Traffic Managers reported: AK, AL, AR, AZ, CT, DE, ENY, EMA, EPA, EWA, GA, IA, ID, IL, IN, KS, KY, LA, MDC, ME, MN, MO, MS, NC, NFL, NLI, NNJ, NV, OH, OK, OR, ORG, SB, SC, SD, SDG, SFL, SNJ, STX, TN, VT, WCF, WI, WMA, WNY, WPA, WV, WWA.

Section Emergency Coordinator Reports
February 2002

The following ARRL Section Emergency Coordinators reported: AK, AR, CT, ENY, EWA, IA, IN, KS, KY, LA, MDC, MI, MN, MO, NC, NFL, NLI, NNJ, OH, SD, SFL, STX, SV, WCF, WMA.

Brass Pounders League
February 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*
W1GMF	0	696	1521	24	2241
NM1K	780	231	993	3	2007
KK3F	45	862	820	42	1769
N2LTC	0	689	703	27	1419
WX4H	0	620	788	15	1373
KF5A	0	593	602	1	1197
W0WWR	0	151	775	8	934
K9JPS	0	321	294	297	895
WB5ZED	15	440	337	19	851
W9RCW	0	316	10	287	613
WB2GTG	44	220	310	8	582
K2BCL	67	270	250	90	577
K5UPN	15	253	262	3	533
W6DOB	11	331	149	39	530
KW1U	0	295	230	2	527
N3IKN	0	258	148	120	516
KA2ZNZ	19	236	246	9	510

BPL for 100 or more originations plus deliveries: N9VE 192, K9GU 189, N7CEU 171, W7TVA 139, K5MC 122, WA5OUV 116, N8PJ 103.

And So It Goes...

(In the words of Linda Ellerbee) It seems the only constant in life is change. If you read the March "It Seems To Us..." editorial, you know that changes are coming to *QST*. Unfortunately, those changes mean this column has reached the end of its travels. It has been a great journey that has rewarded me with lots of new friends and good memories. Steve Ford and Joel Kleinman have been great to work with. Thanks, guys. Joel assures me that *QST* isn't going to neglect the interests of the mobile/portable crowd, so be sure to send him your feedback and editorial contributions. Most of all, thanks to everyone who took the time to write, offering story ideas, installation information and more. As we prepare to throw the switch for the last time, I'll leave you with some reader contributions. 73 and God Bless—*WF4N*

Keeping Your Distance

Tom Frank, KA2CDK: If you are setting up your vehicle for use as a disaster preparedness unit, get a pair of large Anderson Power Products connectors and make a permanent connection point on the vehicle, outside the engine compartment. That way the spark of the connector being connected is well away from the battery and the hydrogen gas it generates. Look at most any tow truck these days, and there'll be one on the front or side. Anderson's Web site **www.andersonpower.com/** pretty much covers all you need to know.

You might do a double take when you first see this mobile installation belonging to Julius, K4MIN. Don't worry, your bifocal prescription is just fine. "J" believes all good things come in pairs. The result? A nice, neat multi-band mobile setup.

An RFI Odyssey

Carl, WA6JOW: I experienced a great deal of RFI from the electric fuel pump in my 1998 Honda Odyssey minivan. After many attempts to find a cure, I called Palomar Engineering and talked to Jack. He knew exactly what to do. On his suggestion, I placed six of their #FSB 1/4 split ferrite beads on the fuel pump leads as close as possible to the unit (he said five, but I figured one extra wouldn't hurt). After messing around with the problem for months I am happy to say I can now hear QSOs on all bands. [See the ARRL TIS Web Page for much more on automotive RFI (**www.arrl.org/tis/info/rficar.html**).—Ed.]

TSB or not TSB

Don, KA2OMV: While researching a non-radio related car problem, I found the ALLDATA online database at **www.alldata.com**. This is a fee-based service for the download of Technical Service Bulletin documentation. *TSBs are provided by auto manufacturers to address specific electrical or mechanical issues.* I was surprised at the number of TSBs that discussed the installation of radio equipment in vehicles. There's no charge to find a specific TSB number, only to download the text. If you choose, you can obtain the number and check with a dealer to learn the specifics of the TSB that interests you.

Bolts To Go

Frank, N3ZOC: After searching my 2000 Camry for a place to mount an HF antenna, I discovered that it comes from the factory with two threaded holes on each rear underside for purposes of bolting on a trailer hitch. This would make an excellent place for bolting on a fabricated heavy duty metal bracket to support an HF antenna. The only problem I have is that I am unable to determine the bolt size and thread count per unit. I assume that it is a metric size but am at a loss as to how to find out. Any suggestions?

My machinist answer is to use a thread gauge, but the easy way is to visit a hardware or auto parts store, borrow a variety of metric bolts and try them until you find one that fits.—WF4N QST

Roger Burch, WF4N ♦ Box 100, Island, KY 42350 ♦ wf4n@arrl.org

More on the Pileups and Behavior

Last month we talked mostly about the responsibilities of the DXer and getting back to basics. This month we will hit the highlights of the responsibilities of the DX station. These are the folks who basically control the pileup, although the DXers have their own set of responsibilities. Some of these suggestions to help smooth out a pileup may seem trivial, but if not done they can really interrupt the flow and have detrimental effects. We also need to realize that many who run the pileups may not know any better. Don't confront them on the air, as this could be embarrassing and could get the operator upset at you. I would suggest you may want to send an e-mail to their pilot station or send the DX station a letter, after you get your QSL card!

Satish, 9N1AA; Bill, 9N7ZK; and Lawrence, 9N7RB, finishing up a little antenna work.

DX Station

The DX station may be a native or a visitor on vacation, a DXpedition or someone living short term in the DX country you are trying to work. Whether he knows it or not he has the most power to control the pileup. First off he decides when he will be on the air and which bands or modes he will operate. It's OK to ask about other modes or bands, but realize he makes the decision and that is final.

Split or Not?

Before the DX station gets on the air he needs to realize the pileup could get large within a few moments, thanks to the PacketCluster. He should realize at some point he might need to go split. The reason for going split is to keep the calling stations off the DX station. That way everyone can hear the instructions, without all the callers continuing on top of the DX station.

How Much of a Split?

The DX station needs to use as small of a split as possible. The smaller the split the less likely the DX station will be QRMed! On SSB you will want to be listening (up or down) 3 kHz at a minimum due to the bandwidth of a SSB signal. Anything less than 3 kHz is suicidal. If the pileup is not too large you would be best to just listen on one frequency, rather than a range. For example, the DX station may be transmitting on 14195 kHz and listening on 14200 kHz. That way everyone knows to transmit exactly on 14200 kHz and everyone should be relatively close. Under this scenario the DX station will not have to turn his receive VFO. If so it will be minimal. If operating split on one frequency is not sufficient, the DX station will need to decide if they need to listen in a range (i.e., 14200-14205 kHz) or listen by call areas or regions. Remember never ever say "listening up". This will only cause total confusion. The DXers will have no clue where to call. The DX station needs to be specific and say, often, exactly where he is listening.

Before you announce where you are listening make sure the range of frequencies you are listening to are clear. Those calling the DX station should also listen to make sure no existing QSOs are taking place where you are transmitting. This is one of the reasons the DX station sometimes gets jammed. The DX station should also avoid the SSTV frequencies around 14,230 kHz!

Call Areas or Regions

There are some instances when the DX station needs to thin out the pileup to help keep up the rate. This is typically done by call areas. The DX station needs to have a clear plan. They can either chose an amount of time to spend on each call area or chose to work a certain number of stations from a call area. You'll want to do this for each call area, unless you run out of callers from a certain area, to let those waiting think everyone is getting a fair shake. When the DX station says, "listening for fours" he should only take fours. If a three calls, the DX station should say, "W3UR I am working fours and can not work you at this time." The DX station should be firm and not let anyone break the pattern. By allowing W3UR to make a contact the DX station has now said to the rest of the pileup that it basically doesn't matter who calls me! This will then cause others to call out of turn. Say what you mean and back it up! Don't log a station that calls out of turn.

There are some instances when the DX station needs to work certain areas of the world. For example a DX station in the Caribbean will have a very short opening to Asia and signals may be very weak during that opening. When a DX station is calling for a certain area he needs to be firm in only working those stations. Don't allow callers from other areas as you have just opened Pandora's box.

Speaking Clearly

We all know in order to communicate it is important to speak clearly so the other party understands, especially when speaking to others who may not be fluent in our native tongue. The DX station should be clear in giving his call sign (even phonetically) as often as possible saying where he is listening and what area he is specifically looking for. The DX station needs to be absolutely sure the station being worked has heard his call sign. For example if the DX station hears "three united." He would say "three united you're 59." After the DX station

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

gets the complete call sign he needs to say "Whiskey Three United Radio QSL" or something similar so the station he just worked really knows it was a good QSO. By only saying something like "QSL" or "73" the station being worked has no idea if the DX station really has the correct call. Another reason for the DX station to give his call sign and split often is to keep people from talking on top of him with questions like "what is his call sign" or "where is he listening." Remember not everyone has a connection to the PacketCuster network!

Conclusion

Again I want to stress that the DX station has a lot of responsibility in maintaining control of the pileup. Martti Laine, OH2BH, is a master of running a pileup and keeping it basically under control. In his book *Where Do We Go Next?* he states the pileup is a direct reflection of the operator. He is talking about the person running the pileup, although it could also be said for those calling.

For those who plan to go on a DXpedition I highly recommend Wayne Mills', N7NG, booklet "DXpeditioning Basics," which is available for $5 from INDEXA, PO Box 607, Rock Hill, SC 29731, USA. It will probably take you less than an evening to read, but the results will be well worth it.

One last thing I would recommend is to be loud! I've learned this trick also from Martti. Run the maximum legal power and the best antenna system possible so everyone can hear your instructions and their call signs. If the pileup gets too big you can always turn on your attenuator and/or turn off your amplifier.

DX NEWS FROM AROUND THE GLOBE

DU—PHILIPPINES

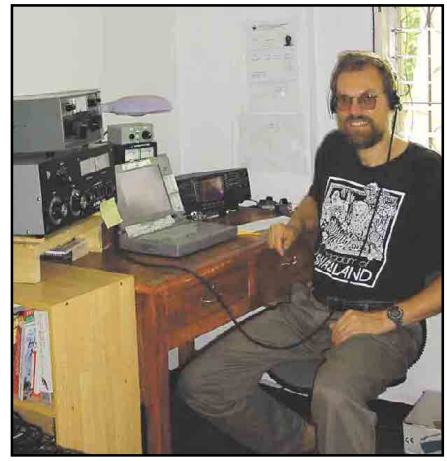
Jon, DU9/N0NM, is finally set up for the low bands with high power and an inverted L between palm trees for 160 and 80. He is also using a pennant for receive. Jon can usually be found on 1828.3 kHz at both 1100Z+ and 2100Z until his sunrise. Conditions are more difficult than his 3DA0CA 160-meter operation and hazards are many: sweltering heat, falling coconuts, high noise level, theft of radials and earthquakes. He had a strong one that interrupted a great EU opening! Look for Jon to be here for the next 5 years. QSL via W4DR.

F—FRANCE

Six French hams will put Les Minquiers Island, EU-099, on the air May 17-21, 80-10 meters, 6 and 2. Ops are F5JOT, F5LGQ, F6CKH, F8CRH, F8CUR and F8CUY. QSL to F8CUR.

KH1—HOWLAND ISLAND

Howland Island is a small coral island



Jon, N0NM (ex-3DA0CA, C91CO), is now set up and running from the Philippines as DU9/N0NM. QSL via W4DR.

measuring about 2.6 sq km (1 sq mi) and located at 00° 48′ North and 176° 38′ West. The island is an unincorporated territory, which is administered by the US Fish and Wildlife Service. The highest point on the island is 10 meters above sea level. It was first claimed by the US in 1857 and was mined for guano until 1890. In 1937 an airstrip was built in anticipation for the round-the-world flight of Amelia Earhart and Fred Noonan. The two were lost somewhere between Lae, New Guinea and Howland Island.

The DX Magazine's Most Wanted List ranks Howland Island as #11 worldwide and #4 in Europe. Hrane, YT1AD, will be heading up a team for this rare island between April 29 and May 8. A 12-man international team will start out in Fiji. Half the team will fly to Tuvalu (T2) while the other half will sail to Howland. The Tuvalu team will operate for several days before being picked up by the sailing team.

Once on Howland they will have six stations QRV simultaneously on CW, SSB, RTTY, PSK31, SSTV, Satellite and FM on 2 through 160 meters. Team members include YT1AD, YZ7AA, YU1AU, Z32AU, Z32ZM, Z31FU (ZS6MG), RZ3AA, RA3AUU, K1LZ, K6NDV, N6TQS, KW4DA and K3NA.

Total cost is expected to be $95,000 and donations are welcome. To donate, contact Wil, K6NDV, at **k6ndv@contesting.com**. Fresh from the expedition they will be in Dayton, Ohio for the Hamvention May 17.

NORTHERN EUROPE

German operators Tom, DL2RTK, and Ric, DL2VFR will operate from several islands during May:

May 20-22—Streymoy Island (EU-018), Faroe Islands—OY/homecall

May 23-24—Vestmanneyjar Island (EU-071), Iceland—TF7/homecall

May 25-30—Iceland (EU-021)—TF1/homecall

May 27-30—Grimsey Island (EU-168)—TF5/homecall

Look for them on CW and SSB on 6-160 meters. RTTY and PSK activity depends on actual demand. Other operators might join the team for a few days. Keep an eye on **www.iota-expedition.com** or **www.iota-post.com**.

P5—NORTH KOREA

I have had multiple questions about Ed, P5/4L4FN, and his accreditation toward DXCC. As of this writing he has not obtained the final authorization. Once he obtains it he will need to submit it to the DXCC Desk. Until then you would be best off doing the old standby WFWL (work it first worry later)! Keep an eye on your favorite DX bulletin for the latest.

TN—CONGO

The OM and YL team of Josep Gibert, EA3BT, and Nuria Font, EA3WL, have announced their plans to operate from the Republic of Congo (TN) during the second half of May. The Congo ranks #32 on *The DX Magazine*'s 2001 Most Wanted List, #31 in the US and #57 in Europe. In their press release the couple inform, "activity from this entity has been rather null" due to the instability and security in the country. The situation has somewhat normalized allowing the two to operate, possibly as TN3B and TN3W from May 16 to 27. Equipment includes a Yaesu FT-900, ICOM IC-706MKIIG and Ameritron AL-811. For antennas they will have beams for 6 through 20 meters and dipoles for 40 and 80 meters. The two will be QRV on 6-80 meters SSB, RTTY and some CW. As with their last two operations they will try to upload the logs on the Internet daily. The pair also plans to have pilots, in order to take input and give out information while the operation is QRV. Donations are being sought to help offset excess baggage, license, QSLs and other expenses. You can contact Josep at **ea3bt@infomail.lacaixa.es**.

Low Band Frequencies

Please spread the word on this one to all your DX friends. DXpeditions and DX stations should avoid exact 5 kHz increments on 40 meter SSB. In this part of the world very loud XE nets and ragchewers are active on those frequencies. The best frequencies for DX stations to operate on 40 meters SSB and to be heard here in the US are 7042, 7047, 7052 and 7057 kHz. On 160 meters DX stations should always avoid 1820 and 1830 kHz as there are broadcast birdies on these frequencies. US Topbanders will be able to hear you if you stay clear of these two frequencies!

ARRL Web Site

There were three very important DX related articles that were posted on *ARRLWeb* in March. The first was about the Logbook of the World project, which can be found at **www.arrl.org/news/stories/2002/03/07/100/?nc=1**. The second was on the ARRL Electronic QSL Policy, which can be read at **www.arrl.org/news/stories/2002/03/07/1/?nc=1**. The last article was done by yours truly on pileup behavior and is located at **www.arrl.org/news/stories/2002/03/01/3/?nc=1**. Please take the time and read all three as there was not enough room in this month's column to include them.

WRAP UP

That's all for this month. I'd like to thank everyone who sent in their comments about the recent pileup behavior, along with their suggestions. Keep those pictures, newsletters and stories coming. I look at them all. I look forward to seeing everyone at Dayton this month. Please stop by *The Daily DX* booth (#520) and say hello! Until next month, see you in the pileups!—*Bernie, W3UR* QST

The Problem with DX Records

Distance records on the bands at VHF and higher have been a feature of this column since May 1940, when the first DX table appeared. Recordsetting quickly became a spirited competition, with permanent recognition in *QST* as the prize. Publication of DX records no doubt also inspired operators to build better equipment and to venture into ever-higher frequencies, especially after 1945 when a host of new bands became available. Even so, it has only been since December 2001 that distance records have been claimed for every amateur band through 300 GHz.

The quest for greater distance also played an important role in amateur discovery of tropospheric ducting, sporadic E and auroral scatter prior to 1941 and an even wider array of propagation modes from the 1940s through the 1990s. Joe Reisert, W1JR, may have been among the first to recognize the significance of keeping track of distance records by propagation mode in the table of DX records he published in *ham radio* magazine during the 1980s. These records assumed that each contact was completed via a single propagation mode. This has been the understanding in this column for the past decade, as well as in many other Amateur Radio publications around the world.

Propagation Mode

Claimed distance records have generally been self-reported, often with little or no effort at further verification. This has rarely been an issue, as we assume that Amateur Radio operators are reasonably honest about all their activities. This includes claims for working new grids, states and DXCC entities, contest contacts, exchanging QSL cards and all the other routine ways that we have kept track of our accomplishments.

The propagation mode responsible for any contact is not always easy to determine, even for well-intentioned operators. Amateurs have largely relied on their operating experience to make a reasonable conclusion about what was going on, based on such things as signal quality, time of day and season, station location, conditions on adjacent bands, and the like. Nevertheless, these indicators are not definitive and can be deceiving, even when interpreted by those with wide VHF experience.

More-objective criteria can provide further checks on identifying propagation mode. The physics of radio-wave propagation and the geometry of the Earth place specific limits on the maximum distance that radio signals can travel from one point on Earth to another. Thus, it would be expected that propagation involving the E-layer (95 to 120-km altitude), such as sporadic E (E_s), meteor scatter, E-layer field-aligned irregularities (FAI), aurora and auroral-E, would normally be limited to paths no longer than about 2350 km. This is simply the maximum distance over which radio waves between two points on Earth can be refracted or scattered from an altitude of 120 km.

There are some exceptions to this general rule. Multiple-hop sporadic-E and auroral-E contacts are possible and have been well documented in the 5000 to 10,000 km range at 50 MHz. Several 144-MHz E_s contacts longer than 3000 km have been made in North America and Europe, presumably via two E-layer hops, with no indication of any limit on how many hops might ultimately be possible. In contrast, the physics of aurora, FAI and meteor scatter do not allow more than a single hop. Thus contacts greater than 2350 km that are claimed for one of these modes would be difficult to explain, largely because they would violate some basic understandings about ionospheric physics.

Similar constraints govern all the other propagation modes. Contacts made via normal tropospheric forward scatter and precipitation scatter are limited to about 800 km. Signals propagated via ionospheric forward scatter, a lower E-layer and upper D-layer phenomenon, would appear to be limited to about 2000 km. For reasons too complicated to discuss here, F-layer transequatorial field-aligned irregularities can propagate VHF signals only in the 4000 to 8000-km range under very specific circumstances.

The ultimate limit of tropospheric ducting is still unknown. Tropospheric ducts are amazingly efficient at propagating signals from 100 MHz to 5 GHz, at least, over thousands of kilometers. Extreme distances are probably limited by the geographical extent of natural ducts, which can cover a radius of 5000 km over the great oceans and probably greater, and by atmospheric absorption. There is no clear way to distinguish normal tropospheric scatter from enhanced refraction or ducting when distances are less than 800 km, so these modes are lumped together for record purposes. In practice, most record tropospheric contacts longer than a few hundred kilometers on any band are probably due to the presence of a duct.

In some cases, other characteristics of the contact, such as time of day, season, location or even the relative shortness of the contact might raise questions about the responsible propagation mode. Such an issue involving 222-MHz sporadic-E contacts, for example, was discussed in the October 2001 column. Several 222-MHz contacts attributed to E_s were much shorter than would normally be expected for this mode, which suggested perhaps something else was responsible.

Exceptional Claims

So what explains DX records that fall outside apparently natural limits? If we accept the underlying assumption that a contact did take place, then it might simply be a matter of misidentifying the propagation mode. Some modest extension of natural limits might be explained by the unusually high altitude of one or both of the stations. Tropospheric refraction may effectively extend the distance of a contact completed primarily via some other propagation mode. Such a situation is probably commonplace and raises some additional questions about how many long-distance contacts can be truly attributed to single propagation modes.

In other cases, the clear involvement of two distinct propagation modes may explain contacts that otherwise seem improbable. A hypothetical 3500-km contact completed via one sporadic-E hop and a meteor reflection, for example, would sound very much like an ordinary meteor contact, even though it may be well beyond the range that could be explained by meteor scatter alone. The

This Month

May 4	ETDXA Microwave Sprint
May 5	Eta-Aquarid meteor shower peaks
May 11-12	ETDXA 50 MHz Sprint
May 18-19	Italian EME Contest
May 19	Very good EME conditions

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operators involved may have expected to complete a contact via meteor scatter, heard what sounded precisely like meteor scatter, and thus naturally assumed they had completed via a meteor. At least in part, they did, but is this truly a meteor-scatter contact?

By their very nature, DX records are exceptional. That is one of the reasons for publishing such seemingly improbable DX records, even if there is some doubt about exactly how the contacts were accomplished. We must be willing to accept, at least for the time being, some extraordinary claims that seem to defy known explanations. It may be that unusual contacts result from causes that have never been documented and are, thus, initially misunderstood. Amateurs have stumbled upon previously unknown radio phenomena in just such a way.

Under ordinary circumstances, we might expect indefinite incremental increases in distances for every propagation category, like records for the mile run, even as some distances approach what appear to be natural limits. Large jumps in distances (with the exception of the higher microwave bands, where contacts are still relatively rare) are another matter, especially when they exceed what appear to be natural limits by a significant amount. However unusual such contacts might first appear, we would still expect that they would be replicated in time and thus subject to further scrutiny.

New Look to DX Records

Given the unusual circumstances of most exceptionally long contacts and the uncertainties that often accompany them, identifying one contact as the DX record for each band and mode is a doubtful business. There are also questions of chance and equity. Imagine an evening on 10 GHz during a great tropospheric ducting event. You have just completed a 1355-km contact for a new continental DX record and immediately call your buddy about the news. He gets on the air and completes with the same station, but he is just 1 km further away. Of course, your buddy claims the new record and closes you out altogether, even though the two accomplishments are nearly identical.

All these issues can be addressed without changing existing records or the way they will be listed in the future. Region I (that is primarily European) record keepers have for a long time published the five longest contacts by mode for each band. See **www.kirsta.com/radio/dxrec.htm**. This has the advantage of giving several contacts, whose distances may be very close, equal recognition. It also dramatically reveals any contacts that are outliers by reason of exceptional distance.

This is shown most clearly, for example, in the European 144-MHz meteor-scatter DX records. The distances listed for the top five contacts are 3101, 2356, 2354, 2353 and 2351 km. The longest contact appears to be an anomaly, while the next four are bunched right near the expected limit for meteor scatter. This method of posting claimed records reveals much more useful information than does posting a single *numero uno* contact for each band and mode. In this example, the interest goes beyond the Region I record alone. The longest claimed North American meter-scatter contact is 3154 km and the next four reported in this column are 2405, 2364, 2333 and 2314 km—very similar to the European series. This makes the two claimed 3100-plus km meteor-scatter contacts, completed on different continents and under different conditions, curious anomalies indeed.

Such multiple record keeping also gives many more operators a chance to make it into the DX listings. You may not have made a record-breaking contact, but you have completed one of the longest ever made. That achievement deserves recognition. At the same time, it adds to knowledge about what are the practical limits to each propagation mode. Multiple record keeping is more likely to inspire further efforts to make long contacts.

Beginning this month (barring any delays), The World Above 50 MHz DX Records posted on *ARRLWeb* will list as many as six of the longest contacts for each band and mode above 144 MHz. Check out the initial posting at **www.arrl.org/qst/worldabove/dxrecords.html**. This preliminary list is bound to have errors and omissions, so please e-mail your corrections, additions and comments. Obviously for space reasons, the annual list of DX records published in this column for April or May can show only the single longest contact in each category. As has been true in the past, the problem of identifying a single propagation mode for 50-MHz contacts with any confidence is so great that no attempts have been made to keep North American distance records on this band.

Postscript: DX is not Everything

It is a shame that so much attention is devoted to DX, as the longest contacts may not always be the most significant. In general, the longest sporadic-E contacts are made just as the maximum usable frequency (MUF) of a given E_s region reaches the operating frequency. As the region intensifies, the MUF rises and 50-MHz distances actually become shorter. Thus, one indirect measure of sporadic-E intensity is the *shortness* of 50-MHz contacts. Six-meter contacts as short as 500 km, or so, suggest the MUF of the responsible E_s region is in the 144-MHz range, which makes this knowledge quite a useful propagation indicator.

Thus for sporadic E, the shortest contacts are actually the most unusual and interesting. The editors of the UK Six Metre Group journal *Six News* have publicized the significance of short contacts over the past several years by running an annual "Short Skip Challenge," in which 6-meter operators report their shortest contacts. See the November 1999 issue for one such report. Typically, the shortest contacts are in the 300 to 400-km range. It takes some experience to differentiate such contacts from long-distance tropo, but experienced operators can probably tell the difference based on relative signal strength and general band conditions.

It would be most interesting to know about your short 50-MHz sporadic-E contacts during the coming season. Send in your reports. If there is enough interest, a similar short-skip feature can become a regular part of sporadic-E reporting in this column.

ON THE BANDS

Worldwide 6-meter activity slowed dramatically in February, as expected, and there were few reports of unusual activity on any other band. Thanks to the stalwarts who continued to send in reports, even as propagation waned. Dates and times are in UTC, as always.

Six-Meter DX

The last general opening between the US and Europe took place on February 11, although there were scattered contacts to Europe as late as February 15. This simply reflects the normal seasonal shift in propagation and has little to do with solar activity, which continued to remain surprisingly high. US and Canadians had more openings to the Caribbean and South America, and there were several opportunities to work into the Pacific. Europeans continued to have tremendous runs to Japan, Australia, New Zealand and Southeast Asia, as well as to Africa. Some unusually long contacts were made from all parts of the world.

Europe

Six-meter operators in the western states got some welcome opportunities to make transatlantic contacts on February 4. G0JHC worked W7XU/0 as the opening was fading on the East Coast. GU6AJE extended his reach as far westward as W5DB (DM82), and PA4PA made it to W5III (DM91). Then after 1745, EH1DDU logged N6RMJ (DM14), W7KNT (DN26) and probably other W6 and W7 stations. The next day, DL7QY hooked up with K5AM (DM62) and DL2NO worked several Californians.

Europeans focused primarily on Asia and the Pacific in February. Stations as far west-

ward as the United Kingdom participated in openings to Australia and New Zealand on at least 10 days of the month. Some of the longest contacts included ZL3TY and other New Zealanders to Italy on February 8 at around 18,000 km and OY9JD to VK4CXQ on the 18th at nearly 15,000 km.

Japanese worked Europeans on at least nine mornings. ON4ANT worked all JA call areas on the 24th during a 90-minute opening. JA1VOK noted that JR6 stations found IT9RZR and possibly others via the long path on February 11 in the European evening. On the 27th, a more widespread long-path opening took place after 2240 with CT, EH and I stations. A few lucky Europeans worked VR2LC in Hong Kong on the 4th and Korea on the 19th.

Europeans scattered from Poland to England were probably most excited about working V73AT on February 8, 18 and 21. Typical distances were in the 11,000 to 13,500-km range. G4UPS, ON4ANT and other fortunate stations worked YI9OM in Iraq, perhaps the first 6-meter activity from that country in a long time. Other interesting Asians that made it into European logs included DU1EV and DU1/GM4COK, YB5QZ, 9M6LSC, XU7ABW, XV3AA, XW0X, JT1CO, A71MA, A45ZR, EX8MLT and 4L7IG.

Scattered openings to Africa took place on at least 10 days. Europeans logged TR8CA, TT8DX and several ZS calls. The South Africans did quite well after a long quiet spell. ZS6NK worked JF7DFA among his runs; ZS6AXT and ZR6GPM logged UT7QF; and ZS6AXT extended his reach to VU2LO. 9U4D gave many Europeans a new country, including G4UPS for his 179th.

Caribbean, Central and South America

The morning of February 2 provided the most widespread opportunities for US stations to work into Central America and adjacent areas. K1JT (NJ) logged HP1AC, PP8KWA, P43JB, PZ5RA, TG9AJR, TI2NA, TI2ALF, YV4DDK and five XE stations. W9WI/4 (TN) found FG5FR, FM5WD, HC2SD, HK3GKE, P43JB, PJ2MI and PZ5RA. VA6SZ was surprised to work CO8DM, TG9AJR, TI2ALF, TI2NA and XE1UN. K5ALE (NM) worked KP2BH and KP4 with 5 W and a J-pole antenna. Even K6LMN (CA) found several KP4s and CO8DM. US stations as far westward as California also reported 6Y5RV, 9Y4AT, 9Z4BM, CO8LY, HC2FG, KG4PK (Guantanamo) and ZF1DC sometime during February.

Several Brazilians, including PP8KWA, PY9MP and PT2GE, were reported into the Northeast and perhaps elsewhere. The PW0T expedition to Trinidade Island had made only a few contacts into North America by the end of the month, but had tallied over 1000 6-meter QSOs in at least 75 DXCC entities, including BX2AB, UT7QF and JA1VOK. Unfavorable conditions also made it difficult for the TI9M 6-meter operator to make contacts into North America. By month's end, only a handful of VE1, W1 and W4 stations in Florida reported working the Cocos Island expedition.

Africa

Western US stations enjoyed most of the action to Africa and the adjacent Atlantic. Near the end of the late-season opening to Europe on February 4, W7KNT was astounded to work 9U5D in Burundi, for an all-time US first. The next day, ZD7WT on St Helena worked K5CM and K5CW (both in Oklahoma), N0JK (KS) and N0VSB (CO). Two openings near the end of the month were more remarkable. On February 23, FR1GZ worked a number of W8 and W9 stations, along with N0VSB, W6AOL/0, K0CS, W0MS and K0GU in Colorado, up to 17,200 km distant. The next day, 5R8FU worked K8MFO (OH), and Z21FO logged W9FS (IN), K0GEI (MO) and K0MN (MN). It is about 17,000 km from Zimbabwe to Minnesota. Finally on the last day of the month, VP8CSA worked AB7UQ/5 (TX), W7RV (AZ) K7JA (CA) and K6QXY (CA).

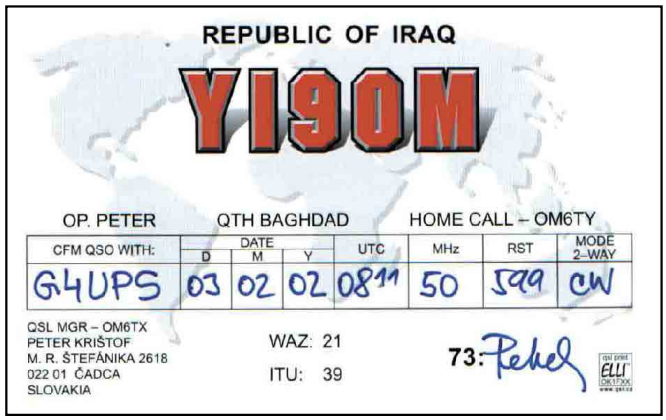
Asia and the Pacific

US stations across the country were surprised by the opening to New Zealand on February 2, from 2030 to 2300. ZL3NW made 70 contacts in all call areas, save 6 and 7, as far eastward as W2CNS (NY), K1JT (NJ), K3XA/4 (VA) and W4MW (NC). Among others reported into the US were ZL3AAU, ZL3ADT and ZL4WA. W5UWB (TX) logged seven ZL1, 2 and 3 calls. US stations in the western half of the country also nabbed V73AT and KH6/KF6GYM that afternoon. KH6/KF6GYM appeared again on the fourth and worked W5, 6, 7, 9 and 0 call-area stations.

Microwaves

WA1ZMS/4 (FM07jj) and W4WWQ (FM07ji) made a series of 241-GHz contacts on February 23 of 3.8, 6.1 and 7.3 km. These distances eclipse the previous American best of 1.1 km, established by W2SZ/4 (WA1ZMS operating) and WA4RTS/4 just three months earlier. This newest series of contacts also exceed the existing world record of 2.1 km held by DB6NT and DF9LN since 1995.

WA1ZMS improved the equipment used in the December tests (see the March column for details), primarily by stabilizing the frequencies with phase-locked 80.6 GHz Gunn sources tied to temperature-controlled crystal oscillators. They could maintain 2-kHz stability over several minutes, but frequency drift was still a problem in completing contacts with weak signals. Atmospheric absorption (in addition to normal free-space path loss) was estimated at 1.7 dB per kilometer, or more than 12 dB over the 7.3-km path. WA1ZMS thinks drier weather will be needed to extend the current distance using the same equipment. Photographs are available at **www.mgef.org**.



G4UPS's prize card from YI9OM. Isn't this an unusual catch for 6 m?

VHF/UHF/MICROWAVE NEWS

Central States VHF Society Call for Papers

The 36th annual CSVHFS is planned for July 26 to 28 at the Four Points Sheraton Hotel in Milwaukee, Wisconsin. Marc Holdwick (N8KWX), the conference technical chairman, seeks presentation proposals and papers for publication in the conference *Proceedings*. Contact Marc directly at **n8kwx@csvhfs.org**. Find out more about the CSVHFS by visiting the society's Web site at **www.csvhfs.org**.

Welcome Back, *CQ VHF*

CQ VHF returns as a quarterly subscription-based publication under the general editorial direction of Joe Lynch (N6CL), beginning with a planned May issue. Among those expected to make regular contributions are Kent Britain (WA5VJB), Gordon West (WB6NOA), Ken Neubeck (WB2AMU), Peter Bertini (K1ZJH), Jerome Doerrie (K5IS) and Arnie Coro (CO2KK). For more information, contact **n6cl@cq-amateur-radio.com**.

Italian EME Contest

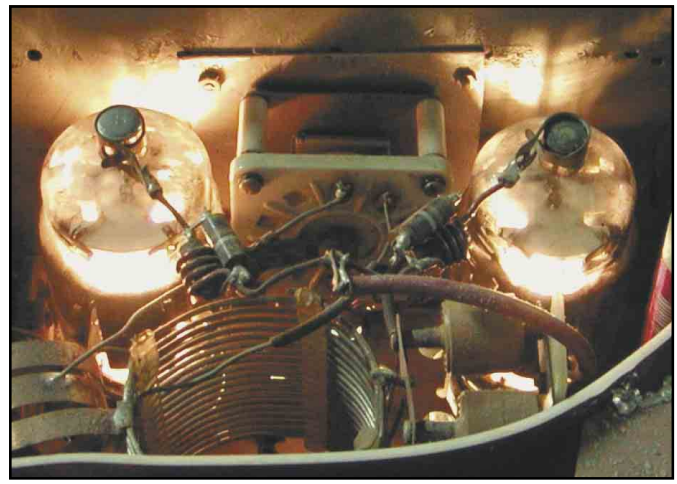
The ninth annual Italian EME contest is set for the full UTC days of May 18 and 19 on all bands 50 MHz and higher. Send signal reports (M, O or RST). Score 31 points for each contact with Italian stations and 10 points each for all others. There are multiple entry classifications based on total antenna length or dish diameter on 144 and 432 MHz. For complete rules, send an e-mail to Mario Alberti at **i1anp@lunigiana.it**. The only US station among the top five in any category during the 2001 test was N2WK. Wayne had 11 contacts on 144 MHz to take third place among the foreign stations in the B category (total antenna length of 10 to 20 meters).

Transatlantic 2-Meter Beacon

Europeans have not given up on the attempt to make contact across the Atlantic on 144 MHz. The Poldhu Amateur Radio Club has recently put a beacon on the air dedicated to this purpose. GB3SSS (IO70) transmits an FSK signal continuously on 144.407 MHz beamed toward New England. The Poldhu group is keen to have 2-meter operators on this side of the Atlantic monitor that frequency whenever they can. Send any reports to G3AGA at **dathos@btinternet.com**. The French transatlantic beacon F5XAR has been transmitting on 144.405 MHz for several years.

Tube Lore

Tube collecting is really catching on. One popular tube that hams have used and collected for years is the 813. I've asked Ludwell Sibley, KB2EVN, tube expert and well-known author to write about it this month.



BOB DUCKWORTH, WB4MNF

Figure 1—Kilowatt homebrew HF 813 amplifier, 80-10.

The Famous 813

The 813 transmitting beam power tube served in amateur transmitters over a remarkably long time span. Introduced by RCA in November 1938, it was a "big brother" to other beam tubes like the 6L6 and 807 (1936) and the 814 (1938).

It offered several design innovations: a "giant" seven-pin base, a rugged hard-glass bulb, a zirconium-coated graphite anode, and especially "button-stem" construction. In this construction, thick tungsten leads were sealed individually into a glass "dish" base. The 813 seems to have been the first tube to enjoy this construction, which enhanced VHF tubes like the 815, 826, 829B, and 832A. The result was quite a compact tube for its power rating, able to take full power up to 30 MHz. Its short element leads were always welcome. The screen grid was aligned with the control grid so as to draw minimum screen current.

This was a powerful tube, good for 100 W dissipation in commercial use and 125 W in intermittent/amateur service. A pair of 813s would "officially" handle 800, 900 or even 1000 W input in ham use.

Most triode-based final amplifiers had to use neutralization to balance out the grid-to-plate capacitance and assure stable operation. RCA claimed that, with its internal shields and tetrode construction, the 813 didn't need neutralization. The circuit designs in their early construction literature were unneutralized, although many 813-based transmitters in the *ARRL Radio Amateur's Handbook* did employ it.

The 813 enjoyed heavy use in commercial and military HF transmitters in WW II, as in ground-to-air or shipboard service. Renamed VT-144, it acted as driver or final amplifier in the Signal Corps BC-303, BC-339 and BC-401. The Navy used it in the TCK and several other transmitters, and as the pulse modulator in the SJ radar on submarines. Perhaps its most famous application was in the AN/ART-13 transmitter, "standard equipment" in PB4Y and B-29 bombers.

The 813 was more of a communications tube than a broadcast type. Only the Amperex version was listed on the FCC's 1949 list of broadcast-approved tubes, for transmitters up to 125 W output. The 833 and 833A triodes, from 1939-40, were better suited to the 500-W and 1-kW broadcast market.

A wide spectrum of tube makers besides RCA offered the 813, among them Amalgamated Wireless Valve (Australia), Amperex, Canadian Marconi, General Electric, General Electronics, Ken-Rad, Machlett Labs, North American Philips, National Union, Raytheon, Sylvania, Taylor, United Electronics, and Westinghouse. The Soviet tube industry in later years made a tube remarkably similar to the 813.

RCA promoted its tube in the amateur world, including a transmitter design advertised in 1939 with a single 813 as 150-W crystal oscillator (crystals were more robust then!). However, the tube didn't really get big amateur use until the postwar era—in part because its list price fell from $22 (1941) to $14.50 (1946). At that point, the availability of inexpensive ex-military tubes and the need to prevent television interference led to considerable use. The 813 had the advantage of much higher power gain than triodes, needing only 1 W of drive for 250 W output. In a TVI environment, low drive power (and low radiated harmonic energy) became an important advantage. The *Handbook* from 1948 to 1968 consistently included one or two transmitter designs using an 813 or a pair of them. Twenty years is a remarkably long time span for any tube!

813s are still widely available and remain popular in the "boatanchor" community.—*KB2EVN*

Ludwell Sibley, KB2EVN

His book, *Tube Lore*, published in 1996 is intended to aid the present-day user and collector of electron tubes by providing historical insight and specific technical data. Sibley has just released Supplement 3 to his book. He can be reached at **tubelore@internetcds.com** for more information. In addition to his book, he has written many articles for radio publications and was Editor of the AWA *Old Timer's Bulletin* for several years. He is a collector of telegraph, radio and early technical publications.

Tube Collectors Association

KB2EVN also edits the *Tube Collector* bulletin of the Tube Collectors Association, now in its fourth year. This group maintains a Web site at, **www.tubecollectors.org**. They welcome new members and can be reached by mail at: PO Box 1181, Medford, OR 97501. QST

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The Transverter

Why is it that great DX happens much more readily with CW and SSB than with FM or television? It's a matter of bandwidth. If you communicate with less bandwidth, then the same equipment can communicate over greater distances. This is the driving force behind the growing popularity of microwave transverters. Over-the-horizon contacts, scattering signals off of rain and mountains, even doing moonbounce (EME) all depend on recovering a very weak signal.

Hams who want to get into microwaves build upon a HF or VHF multimode radio. What they need is a way of converting this into a microwave radio, while retaining frequency control, memories, bandwidth control, noise blanking and all those convenient features of a modern communication device. The transverter accomplishes just that by adding a frequency to the transmit signal and subtracting it from the receive signal. In a real sense, the HF or VHF radio is then relegated to operation at an intermediate frequency such as 28 or 144 MHz. Microwavers refer to their transceivers as "IF rigs."

Inside the transverter we see the workings of just about any super-heterodyne radio (Figure 1). One important component is a local oscillator (LO) that set to a frequency that is the difference between the transceiver's frequency and the desired microwave frequency. Another is a mixer, which will take two input frequencies and produce their sum and difference.

Q: How are microwave local oscillators made?

A: The LO in a microwave transverter must be quite stable to allow CW and SSB QSOs to proceed without significant retuning. The LO must also be almost exactly on a known frequency in order to expect to find the other station quickly. Above all other characteristics of a transverter that can make or break a contact, having the LO on a known frequency and stable are probably the most critical. Fortunately, there are effective and affordable solutions to meet this need.

The two most common LO sources for transverters are the multiplied crystal oscillator and the phase-locked microwave oscillator. Both of these LO schemes derive their basic accuracy and stability from a crystal oscillator running in the 100 to 200 MHz range. When this oscillator is reasonably temperature stable, usually accomplished with a temperature stabilized miniature oven, the resulting microwave frequency is likewise stable. After warm-up, a simple ovenized 200 MHz oscillator stays within a few tenths of a hertz over the time that typical contacts are made. The 200-MHz oscillator is multiplied by approximately 50 to achieve an LO for a 10.386 GHz radio. One hertz of variation in the crystal oscillator will result in about 50 Hz change at 10 GHz, a noticeable but tolerable change. If the LO is to drive an 80 GHz or 145 GHz radio, the sensitivity is ten times more critical. LO techniques for Extremely High Frequency radios will be discussed in a future column.

A multiplier chain is the most common LO generation circuit in modern Amateur Radio transverters available as kits and ready-made systems. The multiplied crystal oscillator is just what it sounds like. The example in Figure 2 shows the new trend in these designs. A 189.3334 MHz output from an ovenized crystal oscillator is multiplied by 6 to 1136 MHz, filtered and then multiplied by 3 and filtered again, resulting in 3408 MHz. A further ×3 multiplier produces 10,224 MHz. Each stage requires filtering to remove the unwanted multiples and fundamental. Where large multiplication steps are taken in the multiplier chain, higher quality filtering is needed. Earlier designs used lower frequency crystals and more multiplication steps, requiring less stringent filters, but creating a more complicated circuit that requires more filters and can have more birdies.

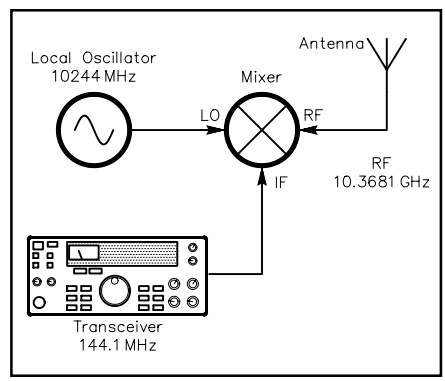


Figure 1—A simplified drawing of a transverter.

Microwave LOs in commercial and scientific converters are usually Phase Locked Oscillators or PLOs. These items cost over a thousand dollars if purchased new. However, there have been many of these PLO "bricks" at flea markets and auction sources over the past decade because of the replacement of commercial microwave links with fiber-optic circuits. I have found surplus PLO bricks to range in price from $50 down to $5, and have had only about one failure out of ten purchased. There is not enough space in the column to describe the internal workings of these units. The negatives of using a surplus PLO include the effort to retune, acquisition of a special crystal, greater weight and the need for –20 V at 1 A of power that most of them require. The positives include excellent phase noise, great stability after warm up and low cost.

Q: Why do mixers need filters?

A: For receive, our mixer will take the 10,224 MHz of LO and the 10,368.1 MHz of the station calling us, and create 10,368.1 – 10,224 = 144.1 MHz. By having the receiver in our VHF multimode radio tuned to 144.1 MHz we will hear the calling station. Likewise, when we need to respond, our 144.1 MHz trans-

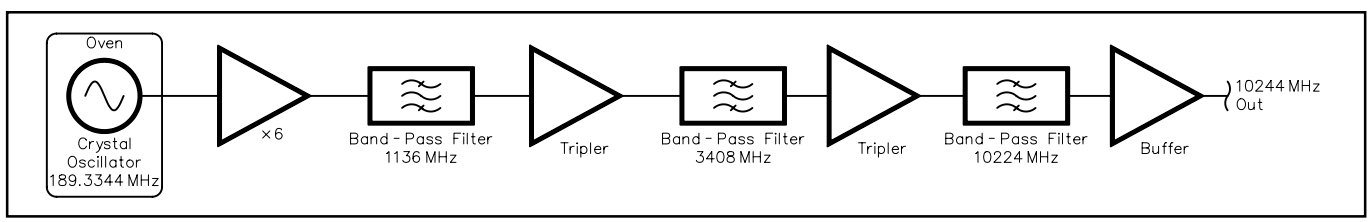


Figure 2—A local oscillator multiplier chain.

Tom Williams, WA1MBA ♦ wa1mba@arrl.org

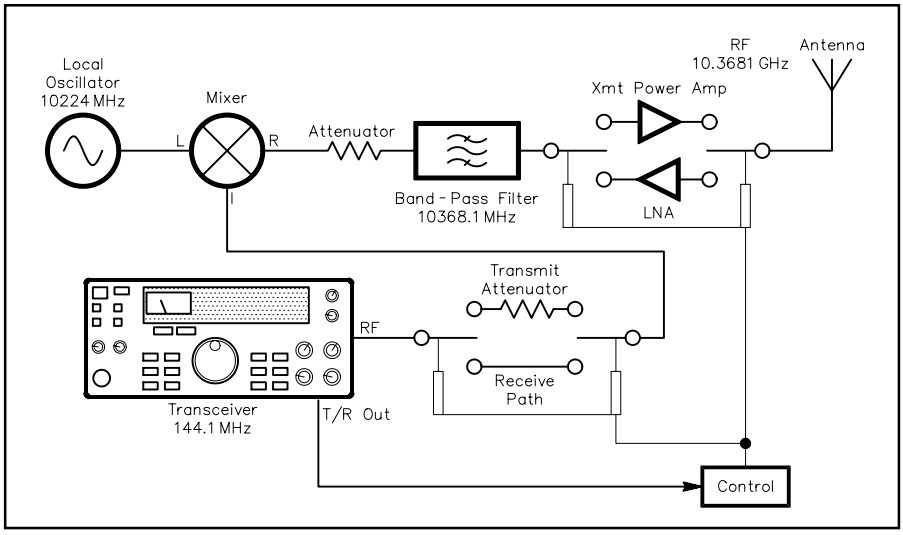


Figure 3—A more realistic transverter system.

mission will be mixed with the LO, so that 10,224 + 144.1 = 10,368.1 MHz, will be produced and transmitted.

There are some problems that have been overlooked in this simple example. Because mixers both add and subtract frequencies, our example receiver mixer will also perform 10,224 – 10,079.9 = 144.1 MHz. This means that any signal at 10,079.9 MHz will also be received within the same passband at 144.1 MHz. Although there may be no signals at that frequency, there is always noise, and to have the best sensitivity this noise (and potential interference) must be filterer out. Without the filter, 3 dB of unwanted noise will be added to the received signal. Unfortunately, if a filter is connected directly to a mixer the filter reflects the unwanted products (frequencies) back into the mixer, and those products are re-mixed causing other products and distortion. Therefore, an isolation amplifier or an attenuator is placed on every port of a mixer that has filtering. Another solution is to use a constant impedance (diplexing) filter, but they are difficult to construct at 10 GHz.

Although simply connecting the input of the mixer to the antenna will produce usable results on receive, low-noise amplifiers are available that will improve the signal to noise ratio, and so LNAs are usually placed between the receive antenna and mixer at all but the very highest microwave frequencies.

A similar frequency image problem exists on the transmit side, where 10,244 – 144.1 = 10,079.9 MHz is produced at the same signal level as the desired product. A filter with the same characteristics (in our design, the same filter) can be used to remove this unwanted product. In some cases, this product might be outside the ham bands, and therefore not legal. The other reason to filter is that any subsequent (expensive) power amplification will be wasting half of its power capability amplifying an unwanted frequency. This equates to an effective loss of 3 dB of average output power, and up to 6 dB PEP, if filtering is not used prior to the amplifier. Also, there is some leakage of the LO through the mixer, so it is good practice to filter out the LO frequency as well.

As with most RF circuits, there are variations on the theme. In one scheme separate transmit and receive mixers are used, and the LO power is either divided into each mixer or a relay is used to switch the LO between them. Although two filters are needed, the two coaxial relays simplify to SPDT rather than DPDT types (Figure 3).

Q: How are filters and mixers constructed?

A: Microstripline and cavity filters are most often used in amateur microwave transverters. Microstripline filters consist of patterns of printed circuits that are frequency selective. Cavity filters are usually constructed from small plumbing parts that are soldered to circuit boards and then tuned with setscrews. Waveguide filters are also used, most notably at 10 GHz and higher. These consist of a piece of waveguide with metal rods and irises inserted. Tuning is performed with screws.

A mixer consists of diodes and transformers. At microwave frequencies the transformers are usually printed circuits. There are packaged mixers with connectors available new for about $300 and surplus for about $40. Some transverter designs implement mixers directly on the printed circuit board along with other transverter components. Such mixers cost only as much as the diodes, a few dollars.

Resources

Down East Microwave Inc
954 Rt 519 Frenchtown, NJ 08825
tel 908-996-3584
www.downeastmicrowave.com/

SSB Electronic USA
124 Cherrywood Dr
Mountaintop, PA 18707
tel 570-868-5643
www.ssbusa.com/

Check out the following books at the ARRL Publications site at **www.arrl.org/shop/**:
The UHF/Microwave Experimenter's Manual
The UHF/Microwave Projects Manuals: Vols 1 and 2
Various issues of *Microwave Update Proceedings*

A: One of the difficulties in interfacing transceivers to transverters is to get all circuits switched in the proper order so that sensitive components are not damaged. Most transceivers have a single antenna connection and produce 10 W or more of RF, whereas most transverter designs inherently have separate transmit and receive circuits and need only 1 *milliwatt* of RF drive.

To connect the transceiver to the transverter, an attenuator needs to absorb excess transmit RF and control must be provided for internal relays and amplifiers. Usually, some auxiliary T/R output from the transceiver is used. In a permanent shack installation, microwavers often employ a sequencer as the master controller of all transverters and auxiliary equipment. For a mountain-topping microwave rig, a single transceiver needs to be interfaced to a single transverter.[1] Most commercially available kits and transverters have interfacing circuits or available external sequencers to make this work well. Each transceiver has its own quirks, so it's a good idea to get a design that has proven to work well.

In the next issue we will be looking at microwave antennas. We will explore how dishes and horns work, and take a brief look at waveguide.

I wish to thank Steve Kostro, N2CEI, for assisting in review of the column this month. Steve designs and makes practical microwave systems for amateurs. He owns and operates Down East Microwave, one of the steady sources of transverters and other components for amateurs interested in microwaves.

[1]Paul Wade, W1GHZ, "A Fool Resistant Sequenced Controller and IF Switch for Microwave Transverters," *QEX*, May 1996. QST

Potpourri

This month we're going to cover several topics relating to QRP—a potpourri of QRP, if you will.

QRP Contest Program

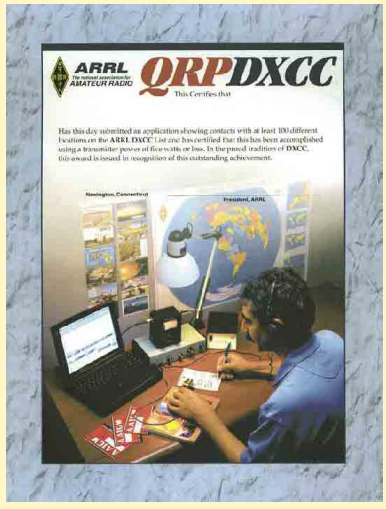
FINALLY! Someone has compiled a full-featured computer-logging program geared specifically for the QRP contester. That someone is Brian Kassel, K7RE, column editor of *QST*'s sister publication, *The National Contest Journal*. Brian's column, "Contesting for Fun," is a must read for any active QRP contester. Brian's program, *QRP Dupe*, is available *free* for the downloading at **www.dancris.com/~bkassel/index.htm**. The file comes in zipped format (180 k) and has to be "extracted" using an un-zip program such as *PKUNZIP*.

QRP Dupe is a great program. It will even run on a 386-20. If you want to use the CW sending feature, you'll need a 486-66 processor or better. *Windows 3.1* or higher is also a must.

Brian developed this program with one goal in mind: to provide a very inexpensive contest logging application that is simple to use and requires no configuration other than typing your call sign, name, etc. The program offers the normal logging and duping features associated with the expensive, high-end contesting programs, including CW sending via hot keys. *QRP Dupe* currently supports 28 contests, with plans to add more in the future. Cabrillo file format for electronic log submission is available for the ARRL and CQ contests that require it.

One really outstanding idea was Brian's use of a LARGE typeface on the screens. This is really nice for us old timers who have to rely on bi or trifocal glasses to get by. Hats off to Brian Kassel, K7RE, for taking the lead and producing a very fine logging application for the active QRP contester.

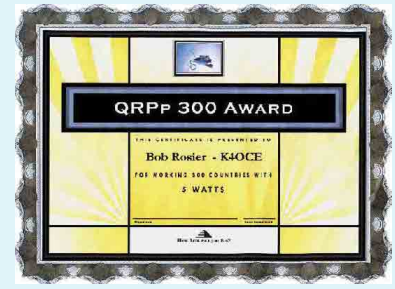
QRP Awards—QRP DXCC



The new QRP DXCC award

At long last, the ARRL offers a QRP DXCC award to any radio amateur who shows proficiency in working the basic 100 entities needed to obtain DXCC. This award is a "one time only" certificate presented to a QRPer who submits to the ARRL a list of 100 entities worked using QRP power levels. QSL cards *are NOT required* for the award. There is no endorsement for additional entities worked. To apply, send a listing of your QRP QSOs (contacts anytime in the past can count toward this award), including dates, call signs and entities along with a $10 application fee (US funds) to QRP DXCC, ARRL, 225 Main St, Newington, CT 06111. Be sure to include your name and call sign, as you want it to appear on the award, and a statement affirming that you used 5 W (or less) output power for all contacts. Applicants do not have to be ARRL members. For further details, see **www.arrl.org/awards/dxcc/qrp/index.html**.

QRPp 300 Award



QRPp 300 award from Bob Rosier, K4OCE.

To complement the new ARRL non-endorsable QRP DXCC award, Bob Rosier, K4OCE,[1] offers a very nice award for working 300 entities using 5 W or less. In the grand scheme of things, qualifying for QRP DXCC is no big deal. However, 300 entities is quite an accomplishment. Those who achieve this level of "DXpertise" deserve special recognition. The QRPp 300 Award is not sequentially numbered, but it will be dated at the time of your submission of a list, in order, of the 300 entities worked. Be sure to include your output power. Should you use less than 5 W for the *entire* 300 entities, this power level will be annotated on the award. Your list of entities should include DX station call sign, QSO date, band, and mode and DXCC entity. Although Bob offers this award free of charge, $1 US funds would be appreciated to help defray mailing costs. The QRPp 300 Award is a serious DXing accomplishment. Thanks, Bob, for your efforts to provide recognition to those serious QRP DXers who make the grade.

[1]Bob Rosier, K4OCE, 7723 Rocking Horse Ln, Fair Oaks Ranch, TX 78015

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ k7sz@arrl.org

Passive CW Filters

Since the early 1970s, QRPers have been treated to a host of active audio filters for CW and SSB reception. I still have the original MFJ CWF-3 active AF filter that I purchased in 1974. I have used it with several QRP rigs over the years and it still works amazingly well.

Before the advent of integrated circuits, however, the most popular method of providing aftermarket audio selectivity was through the use of outboard LC filter networks. Ed Wetherhold, W3NQN, a recognized expert in the field of passive audio filters, has published articles about adapting surplus 88 mH toroidal inductors as sharply tailored CW and SSB passive filters. His articles have appeared in *QST*, *QEX*, and several editions of *The ARRL Handbook, Ham Radio Magazine*, and the G-QRP-Club's *SPRAT* quarterly newsletter. Ed has been touting the virtues of passive LC audio filters for years and shows no sign of slowing down in the new millennium.

While perusing the *Ham Radio* CD collection,[2] I came across one of Ed's articles. After reading it, I decided to try contacting Ed to see whether he still had the inductor stacks required to make these filters. Not only did he have the necessary filters, he now offers complete filter kits, including all parts, case, transformers, switches and jacks for the amazing low price of only $20 including postage. Twenty bucks for an add-on CW audio filter—now *that* is a buy!

The CW filter uses a single stack of five 88 mH toroidal inductors and two bifilar-wound inductors (modified to make L2 and L4), two 8/200 Ω matching transformers and a set of matched capacitors to provide a 250 Hz band pass filter centered on about 750 Hz.

One thing I noticed when using my W3NQN passive CW filter was the lack of background hiss that is prevalent in active AF filters. Ed's filters are quiet. They don't induce any additional noise in the audio chain. This is a big plus when listening for extremely weak stations. Another thing I noticed was the "mellow" sound associated with these passive filters. They are definitely easy on the ears.

The 250-Hz band-pass filter centered on about 750 Hz.

These filters typically have a 2.7 dB insertion loss that is easily regained by increasing the audio gain on the receiver. The attractive package of the finished product makes a very nice looking addition to the shack.

The idea of having an add-on AF filter that does not require any dc power is a welcome addition to the K7SZ Field Day Kit. Power at FD is always at a premium. Any time I can find a station accessory that I don't have to add to my limited power budget I am ecstatic.

Remember last month's topic, Vintage QRP? What better way to add audio selectivity to a Boat Anchor receiver than by using a W3NQN passive filter? Placing one of Ed's filters on the output of an old vacuum tube receiver not only keeps things "original" but also provides a way to listen to only one signal at a time!

That's all for this month. Remember ARRL Field Day is coming up June 22-23. Plan now to hit the bush and participate.

[2]*Ham Radio CD-ROM*, available from ARRL Publication Sales, toll-free 1-888-277-5289, Order Nos. 8381 (1968-1976); 8403 (1977-1983), and 8411 (1984-1990).

NCJ

Speaking of the *National Contest Journal*, *NCJ* is *the* premier publication for the active contester. Emphasis on QRO notwithstanding, there is a wealth of contest related information in each issue. If you contest only occasionally, then this magazine is a bit of overkill. If you enter more than two or three contests per year, however, *NCJ* should be required reading. BIG Gun contesters didn't get to be BIG Guns just by using gobs of RF. They've developed tactics and honed their contesting skills, which allows them to outdistance the competition. As a QRP contester, these same tactics and skills can dramatically improve your contest scores and DXCC totals. Much of this information is shared in *NCJ*. See **www.arrl.org/ncj/** for subscription information. You'll be glad you did.

Camaraderie in North Georgia

Southern hospitality exists. The North Georgia QRP Club (NOGA), a "small but growing group of Amateur Radio enthusiasts, most of who live within 90 miles of Atlanta," prove it every time we get together. Since some of my in-laws (and a couple of out-laws) live in the Atlanta area, I manage at least one trip per year down south. Time and schedule permitting, I always try to hook up with the NOGA gang to enjoy some QRP camaraderie.

Recently, Mike Boatwright, KO4WX, led the effort to produce and edit the *NOGA Compendium 2001*, a collection of the various projects the club and individual members have undertaken over the last couple of years. Some of these include the NOGAnaut, a Y2K Ready Transmitter, NoGaPiG power and indicator guard, the PRG80 (Pretty Good Receiver for 80 meters), the NOGA Watt power meter (accurate down to 200 mW), the MRX-80 receiver, and, in concert with the Tennessee Exploration of Radio Devices Society, a 30 meter, three transistor transmitter project for fun and experimentation.

There is more. NOGA has a wealth of technical knowledge and ability within the membership. One of their shining stars is Mike Branca, W3IRZ. Among Mike's accomplishments are a completely home-brew version of the Sierra transceiver (I've seen this rig and it is an outstanding example of innovation), the Twin Tube 80, a vacuum tube QRP transmitter and the W3IRZ 12-V (vacuum tube) Regenerative Receiver! Mike is a prolific designer and builder who loves to share his expertise.

NOGA's *Compendium 2001* showcases much of their talent. The 108-page compendium is well worth the $6 price tag ($12 for the CD version). Check out the NOGA Web site: **www.nogaqrp.org** for details. NOGA offers technical assistance for their projects on their NOGAQRP list and NOGATECH list.

COMING CONVENTIONS

ALABAMA STATE CONVENTION

May 4-5, Birmingham

The Alabama State Convention, sponsored by the Birmingham ARC, will be held at the Zamora Temple, 3521 Ratliff Rd; take Exit 27 off I-459, follow yellow direction signs. Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 4 PM. Features include flea market (Lindberg Sanders, KC4VNO, 205-925-0838), commercial vendors, exhibitors, tailgating (Dan Morgan, KB4MDI, 205-822-5242), forums (Jack Evans, KC4PZA, 205-663-4497), VE sessions (both days, 8 AM sharp), banquet (James Pilman, KA4ZQA, 205-467-3315). Talk-in on 146.88. Admission is $5 (good both days); under 12 free when accompanied by a paying adult. Tables are $20 (flea market), $30 (commercial). Contact Glenn Glass, KE4YZK, 8368 Country Circle, Pinson, AL 35126; 205-681-5019; **ke4yzk@bellsouth.net**; **www.w4cue.com**.

WYOMING STATE CONVENTION

May 24-26, Casper

The Wyoming State Convention, sponsored by the Sweetwater ARC, will be held at the Radisson Inn (formerly the Hilton), 800 N Poplar; take Exit 188B (Poplar St) off I-25, Radisson Inn is on N side of I-25. Doors are open for setup and preregistration Friday 4-8 PM; public Saturday 8 AM to 5 PM, Sunday 8 AM to noon. Features include swapmeet, major dealers, vendors, foxhunt, forums, banquet (Saturday, 7 PM, $18), VE sessions (Saturday, 1-4 PM). Talk-in on 146.94. Admission is $7 in advance, $10 at the door. Tables are $5. Contact Dave Gregory, N7COA, 1000 S Dakota, Green River, WY 82935; 307-875-5324; **n7coa@arrl.net**; **www.qsl.net/wy7u**.

NORTHWESTERN DIVISION CONVENTION

May 31-June 2, Seaside, OR

The Northwestern Division Convention (SeaPac), sponsored by the Oregon Tualatin Valley ARC, will be held at the Seaside Convention Center. Doors are open for registration and setup Friday 11 AM to 8 PM; public Saturday 8 AM to 5 PM, Sunday 8:30 AM to 2 PM. Features include flea market (Lynn Hurd, WB7UNU, 503-624-1999; **lhurd@pacifier.com**), exhibits (Al Berg, W7SIC, 503-816-7098; **w7sic@pocketmail.com**), seminars, forums, workshops (Friday, 12:30-5 PM), VE sessions (Saturday 9 AM, Our Saviour's Lutheran Church, preregistration only by May 1, no walk-ins; Carl Clawson, WS7L, 503-629-5796; **ws7l@arrl.net**), Ladies Hospitality Suite (Room 125), banquet (Saturday, 7:15 PM, $20; special guest speaker Riley Hollingsworth; pre-banquet happy hour 6:30 PM), refreshments. Talk-in on 146.66. Admission is $7 in advance, $9 at the door, under 13 free. Contact Randy Stimson, KZ7T, c/o SeaPac Ham Convention, Box 2191s42, Portland, OR 97225-9142; 503-641-3776; **KZ7T@arrl.net**; **www.seapac.org**.

TENNESSEE SECTION CONVENTION

June 7-8, Knoxville

The Tennessee Section Convention (36th annual event; 2002 theme "Public Service"), sponsored by the RAC of Knoxville, will be held at the Cokesbury Center, 9915 Kingston Pike; I-40/75, Exit 376B toward Maryville I-140, take Exit 1A (Kingston Pike E), Center is 1/8 mile on left. Doors are open for electronics exposition on Friday 6-9 PM, and for main hamfest on Saturday 9 AM to 4 PM. Features include Hamfest and Electronics Exposition, Amateur Radio and computer equipment, flea market, fantastic inside dealers, large outside tailgate area ($5 per space), forums, clinics, exhibits, displays, demonstrations, CW contests, foxhunt, free on-site HT checking, free manufacturer product literature area, VE sessions (on site), DXCC and VUCC QSL card checking, Special Event Station, handicapped accessible, free parking, refreshments. Talk-in on 147.3, 145.21, 224.5, 444.575, 53.77. Admission is $10 for both days, $6 for Saturday, Jun 8 only. Tables are $15 (8-ft, inside, by May 31); $20 after May 31. Contact David Bower, K4PZT, c/o RAC of Knoxville, Box 50514, Knoxville, TN 37950-0514; 865-670-1503; **d.bower@ieee.org**; **www.w4bbb.org**.

April 20-21
EMCOMM, Palo Cedro, CA*

April 26-27
Southeastern VHF Conference, Oak Ridge, TN*

April 26-28
International DX, Visalia, CA*
SETI Symposium, Ewing (Trenton), NJ*

April 28
Delaware State, New Castle*

May 4
Missouri State, Lebanon*

May 31-June 2
Atlantic Division, Rochester (Henrietta), NY

June 14-15
Midwest/Dakota Division, South Sioux City, NE

June 28-30
San Francisco Section, Ferndale, CA

***See April *QST* for details.**

WEST GULF DIVISION CONVENTION

June 7-8, Arlington, TX

The West Gulf Division Convention, sponsored by Ham-Com 2002, will be held at the Arlington Convention Center, 1200 Ballpark Way, midway between Dallas and Ft Worth, just off I-30. Doors are open Friday noon to 7 PM, Saturday 7 AM to 5 PM. Features include indoor and outdoor flea markets, commercial exhibitors, manufacturers, dealers, vendors, educational programs (including SKYWARN school), VE sessions, refreshments. Talk-in on 147.14. Admission is $9 in advance, $10 at the door. Tables are $25 each. Contact Maury Guzick, W5BGP, Box 12774, Dallas, TX 75225-0774; 214-361-7574 (phone/fax); **chairman@hamcom.org**; **www.hamcom.org**.

EASTERN PENNSYLVANIA SECTION CONVENTION

June 8, Bloomsburg

The Eastern Pennsylvania Section Convention (12th annual event), sponsored by the Columbia-Montour ARC, will be held at the Bloomsburg Fairgrounds; I-80 (E or W) to Exit 232 (old Exit 34), take Rte 42S to Rte 11N to Fairgrounds on the right; from N or S use I-81 or NE extension to Rte 80W to Exit 32 (old Exit 34), then Rte 42S to Rte 11N to Fairgrounds. Doors are open for setup Friday after 6 PM, Saturday 6 AM; public Saturday 8 AM to 3 PM. Features include convention/computer show, indoor air-conditioned sales area, tailgating ($5 per 10x10-ft space), forums, VE sessions (10 AM to noon; walk-ins welcomed), free parking, refreshments. Talk-in on 147.225 (203.5 Hz), 146.52. Admission is $5, nonham spouses and under 12 free. Tables are $20 (8-ft, electricity $5 per drop, bring your own extension cords and power strips). Contact George Law, N3KYZ, 10 Whitenight Ln, Bloomsburg, PA 17815; 570-784-2299; **n3kyz@jlink.net**; **www.qsl.net/cm-arc**; or Dave Schack, WC3A, 570-752-6851; **wc3a@arrl.net**.

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

STRAYS

LOOKING FOR DD-1 COMPONENTS

◊ I'm searching for the wood cap that normally accompanied Hallicrafters DD-1 receivers in Jensen-designed cabinets. The cap contains the dual signal-strength meters and the cabling to the main receiver. Please contact Walter Williams, G0XEM, Marchwood, Coverack, Helston, Cornwall, Truro TR12 6TP, United Kingdom.

QST congratulates . . .

◊ Andreas Koenig, KB0KXW, who will receive a $5,000 award from the Grainger Foundation upon graduating from the University of Missouri-Rolla, where he is studying power engineering.

I would like to get in touch with . . .

◊ anyone who worked or used the Amateur Radio station at the O'Reilly (Military) Hospital in Springfield, Missouri between 1941 and 1955. Woodie Moore, W0ODY, Evangel University Archives, 1111 N Glenstone Ave, Springfield, MO 65802; **w0ody@arrl.org**.

◊ anyone wanting to start a net who are Titanic enthusiasts. Contact kc8egd@arrl.net.

◊ anyone with information on the Ramsey Electronics HR-1 receiver. The circuit board indicates "HR-1 b." Mike Anderson, WV7T, 2815 Main St, Colorado Springs, CO 80907-6011; **wv7t@aol.com**.

Previous • Next Strays

Gail Iannone ♦ Convention Program Manager

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 **May 1** to be listed in the **July** 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.)

Alabama (Birmingham)—May 4-5, Alabama State Convention. See "Coming Conventions."

†California (Fair Oaks)—May 19, 6 AM to noon. *Spr:* North Hills RC. Bella Vista High School, 8301 Madison Ave; from I-80 go E on Madison Ave for 5.8 miles to school; from Hwy 50, take Hazel Ave N for 2.6 miles to Madison Ave, turn left on Madison Ave, go W for 1.4 miles to school on right. *TI:* 145.19 (162.2 Hz). *Adm:* Free. Tables: $10. Kim Scheidel, KE6RKX, 6257 S Brewer Rd, Pleasant Grove, CA 95668; 916-991-9496; **scheidel@inreach.com**; **www.k6is.org**.

†Colorado (Monument)—Jun 1, 8 AM to 2 PM. *Spr:* Pikes Peak RAA. Lewis-Palmer High School, 1300 E Highway; I-25 take Exit 158 (Baptist Rd), jog right (E) on Baptist Rd for 50 feet, then N to Struthers Rd to Higby Rd, turn right (E) to school. Multiple programs, operating stations, VE sessions. *TI:* 146.97 (100 Hz), 146.52. *Adm:* $5, under 18 free. Tables: $12 (first table, includes 1 admission), $10 (each additional table. Robert Ryals, KI0GF, 3390 Blodgett Dr, Colorado Springs, CO 80919; 719-265-9950; **rryals@pcisys.net**; **www.qsl.net/ppraa/**.

†Connecticut (Newington)—Jun 2; set up 8 AM; public 9 AM to 2 PM. *Spr:* Newington AR League. Newington High School, 605 Willard Ave (Rte 173). Flea market, tailgating ($10, 2 parking spots on a first-come, first-served basis), VE sessions (noon, walk-ins welcomed; preregister with special needs; Dan Miller, K3UFG, 860-206-3379; **k3ufg@arrl.net**), refreshments. *TI:* 145.45. *Adm:* $5 (indoor and outdoor). Tables: advance $15 (make check payable to NARL and send with SASE to Bob Stanwood, KB1EYZ, 21 Stuart Dr, Bloomfield, CT 06002), door $20. Steve Taylor, W1UTQ, 172 Merline Rd, Vernon, CT 06066; 860-870-5055; **rolyats@aol.com**.

†Connecticut (Vernon)—May 25, 9 AM to 1 PM. *Spr:* Natchaug ARC. Tolland Agricultural Center, on Rte 30; I-84 to Exit 67, follow signs, approximately ½ mile. Flea market, dealers, tailgating (advance $5, door $7), computers, parts, refreshments. *TI:* 145.11. *Adm:* $4. Tables: advance $10, door $15. Wayne Rychling, N1GUS, 59 Clint Eldredge Rd, Willington, CT 06279; 860-487-1921 (eves); **n1gus@arrl.net**; **hometown.aol.com/natchaugarc/**.

†Georgia (Albany)—Jun 8, 9 AM to 4 PM. *Spr:* Albany ARC. Potter Community Center, 2621 Wildfair Rd. Flea market (screened in pavilion; tables are first-come, first-served basis), VE sessions, overnight RV parking with hookups, plenty of shaded parking, refreshments. *TI:* 146.82. *Adm:* Free. Bob Smith, K4PHE, c/o AARC, Box 70601, Albany, GA 31708-0601; 229-883-9633; **k4phe@bellsouth.net**; **www.qsl.net/w4mm**.

†Illinois (Beardstown)—May 19, 8 AM. *Spr:* Illinois Valley ARC. Union Hall, Local No 431, 8612 Arenzville Rd; W on Rte 125 from Springfield, left at stop light, go 2 miles to hall on left. Swapfest, vendors, tailgating, on site VE sessions (10 AM), free parking, refreshments. *TI:* 146.715 (103.5 Hz). *Adm:* $3, under 16 free. Tables: $10. Chuck Bailey, W9HUX, 1101 Clay St, Beardstown, IL 62618; 217-323-1243; **w9hci@yahoo.com**.

Illinois (Effingham)—Jun 9. Russ Thomas, WI9B, 217-342-3054.

†Illinois (Galva)—Apr 28, 8 AM to 2 PM. *Spr:* Area AR Operators. National Guard Armory, Morgan Rd. Large paved flea market, "All You Can Eat" Breakfast, handicapped accessible, plenty of parking. *TI:* 145.49 (88.5 Hz). *Adm:* advance $5, door $7. Tables: 6-ft $10. Matt Bullock, KB9TIO, 419 E College St, Kewanee, IL 61443; 309-856-7111; **mbullock@bwsys.net**.

†Illinois (Granite City)—Jun 9, 8 AM to 4 PM. *Spr:* Egyptian RC. Southwestern Illinois College Campus, Rte 203 and Maryville Rd; I-270 to IL Rte 203 S, ½ mile to Maryville Rd. Hamfest/Computer Exposition, educational seminars, technical forums, guest speakers, flea market, dealers, commercial vendors, computers, electronics, VE sessions (pre-registration required by May 15, 618-656-0905; free license testing for ages 16 and younger), handicapped accessible, refreshments, free parking. *TI:* 146.79 (127.3 Hz). *Adm:* advance $2 each or 3 for $5, door $4 each. Tables: $5. Patrick Riley, W9PAT, 258 W Union St, Edwardsville, IL 62025; 618-655-1232 or 618-650-2949; **w9pat@arrl.net**; **www.w9aiu.org**.

†Illinois (Princeton)—Jun 2; 6 AM (flea market), 8 AM (buildings). *Spr:* Starved Rock RC. Bureau County Fairgrounds, 811 W Peru St, ½ mile W of IL Rte 26; Exit 56 off I-80, S to Rte 6 (Peru St), W 2 blocks to Fairgrounds. Hamfest/Computer Show, flea market, dealer displays, vendors, free camping, free parking, refreshments. *TI:* 146.955 (103.5 Hz). *Adm:* advance $5, door $7. Tables: 8-ft $10 (before May 1), $15 (after May 1). Matt Weaver, KB9VZH, 320 Desoto St, Ottawa, IL 61350; 815-433-2117; **kb9vzh_gov@yahoo.com**; **www.qsl.net/w9mks/**.

†Illinois (Springfield)—Jun 1, 6 AM (flea market pavilion) to 1 PM (building opens 8 AM). *Spr:* Sangamon Valley RC. Illinois State Fairgrounds, Cooperative Extension Building; from I-55 take Exit 100B, go W on Sangamon Ave for 3 miles to Fairgrounds, enter Gate 11 at 8th St (off Sangamon Ave). Giant covered flea market, indoor exhibits, commercial vendors, VE sessions (9 AM, walk-ins accepted, no registrations accepted after 10 AM), handicapped accessible. *TI:* 146.685. *Adm:* $5. Tables: $5 (commercial vendors only). Ed Gaffney, KA9ETP, 13997 Frazee Rd, Box 14A, Divernon, IL 62530; 217-628-3697; **egaffney@family-net.net**.

†Indiana (Wabash)—Jun 9, 6 AM to noon. *Spr:* Wabash County ARC. Wabash County 4-H Fairgrounds, located on State Rd 13N. Hamfest and Computer Show, large indoor flea market, major vendors, free outside flea market space, free overnight camping with electrical hook-ups, refreshments. *TI:* 147.03, 442.325. *Adm:* advance $5, door $6. Tables: $10. Ralph Frank, KB9PLV, 4010 N 700 W, Wabash, IN 46992; 219-563-8487 (office) or 765-833-7372 (home); fax 219-563-8489; **wia1@netusa1.net**.

Iowa (Newton)—Jun 1. Robert Hellstern, K0RFH, 641-792-9298.

†Kentucky (Edgewood)—Jun 9, 7 AM to 2 PM. *Spr:* Northern Kentucky ARC. Turkey Foot Middle School, 3230 Turkey Foot Rd; Exit 82 off I-275, go 1 mile S, school on right. Flea market, vendors, VE sessions (8:30 AM), ARRL forum (10:30 AM), foxhunt (11 AM), refreshments. *TI:* 147.255, 147.375. *Adm:* $5, under 13 free. Tables: $15 (each table includes 1 admission ticket); outside flea market $2 per space . Robert Blocher, N8JMV, 2061 St Rte 125, No 10, Amelia, OH 45102; 513-797-7252; **n8jmv@arrl.net**; **home.fuse.net/dom/**.

Kentucky (Madisonville)—May 25. Charles Clark, KE4LKG, 270-525-6491.

†Maryland (Hagerstown)—May 5, 6 AM to 3 PM. *Spr:* Antietam Radio Assn. Washington County Agricultural Education Center, MD Rte 65S (Sharpsburg Pike); take Exit 29 off I-70, go S on Rte 65 for 6.5 miles to center. Indoor vendors, paved open tailgating ($5 per space; covered tailgating available), VE sessions (12:30 PM, limited walk-ins; Joe Lockbaum, WA3PTV, **ptvjoe@pa.net**), seminars, demonstrations, foxhunt, refreshments. *TI:* 147.09, 146.94. *Adm:* $5, under 13 free. Tables: advance $10, door $15. Carl Morris, WN3DUG, 521 Woodstock Rd, Chambersburg, PA 17201; 717-267-3411; fax 717-261-9487; **wn3dug@arrl.net**; **www.w3cwc.org**.

Massachusetts (Cambridge)—May 19. Nick Altenbernd, KA1MQX, 617-253-3776.

†Massachusetts (Falmouth)—Jun 8; set up 7 AM; public 9 AM to 2 PM. *Spr:* Falmouth ARA. Barnstable County Fairgrounds, Rte 151; from the N take Rte 495S to Rte 28S to the Rte 151 Exit, go E on Rte 151 approximately 5 miles to Fairgrounds on left; from the E take Rte 28W to the Mashpee Rotary, take Rte 151 approximately 6 miles to Fairgrounds on right. Ham Radio, Computer, and Electronics Flea Market; vendors (8-ft space, advance $7 if mailed by Jun 1, door $8); talk-in station; amateur radio display table; VE sessions (9-11 AM; free admission if you are taking an exam). *TI:* 146.655. *Adm:* $3. Ralph Swenson, N1YHS, 99 Fox Run Ln, E Falmouth, MA 02536; 508-548-6405; **depsher911@aol.com**; **www.falara.org**.

†Massachusetts (Whately)—May 13, 5:30 PM to 9 PM. *Spr:* Franklin County ARC. Whately Elementary School Gymnasium, 273 Long Plain Rd; I-91 to Exit 24, S on US 5 for 1.7 miles, turn left on Christian Ln, go 1.2 miles, take left onto Long Plain Rd, 0.7 miles to school on left. Flea market, tailgating, refreshments. *TI:* 146.985. *Adm:* $3. Tables: $5. Bill Boutwell, N1EWK, 18 Freeman Dr, Greenfield, MA 01301; 413-774-4669; **n1ewk@arrl.net**; **www.fcarc.org**.

Michigan (Grand Rapids)—Jun 1. Kathy Werkema, KB8KZH, 616-698-6627.

†Minnesota (St Paul)—Jun 1. *Spr:* TwinsLan ARC. St Paul Technical College, 235 Marshall Ave; I-94 to Marion St Exit, go S 1 block on John Ireland Blvd to Marshall, W to entrance. Tailgate Swapfest in parking lot ($10 per car space for sellers). *TI:* 146.76. *Adm:* $6 (buyers). Clay Bartholow, W0LED, 5124 51st Ave N, Crystal, MN 55429; 612-384-0659; **tailgate@twinslan.org**; **www.twinslan.org/**.

†Mississippi (Pascagoula)—Jun 7-8; set up Friday noon; public Friday 5-9 PM, Saturday 8 AM to 2 PM. *Spr:* Jackson County ARC. Jackson County Fairgrounds Civic Center, 2309 Shortcut Rd; Exit 69 off I-10, Hwy 63 S to Hwy 90, W to Singing River Hospital, turn right on Hospital Rd to Fairgrounds behind hospital. Hamfest/Computer Show, dealers, vendors, VE sessions (Saturday, 9:30 AM; $10.00, bring picture ID, latest license and/or all applicable CSCEs and 1 copy of each; copies must be legible), forums (ARRL, ARES/RACES), refreshments. *TI:* 145.11. *Adm:* $4, under 12 free ($10 max per family). Tables: $8 (8-ft, first-come, first-served; tables must be paid in advance to assure reserved space). Ira Groff, NN5AF, 17200 Spring Lake Dr W, Vancleave, MS 39565; 228-826-5095; **nn5af@arrl.net**; **www.angelfire.com/ms3/jcarc**.

†Missouri (Macon)—Jun 8; set up 5-8 AM; public 8 AM to 1 PM. *Sprs:* Macon County, Nemo, Tri-County, and Schuyler County ARCs. Macon Vo-Tech School, on US 63; turn S on US 63 from US 36, go 1 mile to School. Commercial vendors, dealers, displays, tailgating, technical forums, ARRL forum, VE sessions (9:30 AM), handicapped parking, refreshments. *TI:* 146.805. *Adm:*

†ARRL Hamfest

Gail Iannone ♦ Convention Program Manager

$3 each or 2 for $5. Tables: advance $10, door $15. Dale Bagley, K0KY, Box 13, Macon, MO 63552; 660-385-3629; **n0pr@arrl.net**; **www.qsl.net/n0pr/hamfest.html**.

†Nevada (Reno)—May 11, 7 AM to 1 PM. *Spr:* Reno Area Metro Simplex ARC. KNPB Television Station on Campus of the University of Nevada, 1670 N Virginia St; from I-80 take Virginia St Exit, go N 1 mile. Large indoor/outdoor swap, vendors, VE sessions (Don Freeman, W7FD, 775-851-1176; **dfree1@worldnet.att.net**), plenty of parking, refreshments. *TI:* 147.06. *Adm:* Free. Tables: Bring your own. Glen Haggard, KK7IH, 523 E 5th Ave, Sun Valley, NV 89433; 775-673-6401; **kk7ih@nvrams.org**; **www.nvrams.org**.

†New York (Bethpage)—Jun 9; sellers 6:30 AM; buyers 8:30 AM to 1 PM. *Spr:* Long Island Mobile ARC. Briarcliff College, 1055 Stewart Ave; LIE to Exit 44S (Seaford-Oyster Bay Expressway-Rte 135), go S to Exit 9 (Broadway, Bethpage), turn right onto Broadway, bear right onto Cherry Ave, right onto Stewart. Outdoor Hamfair, ham radio equipment, computers, dealers, ARRL info, tailgate spaces ($15, bring your own table, chair, umbrella; each space admits 1 person), VHF tune-up clinic, free parking, refreshments. *TI:* 146.85 (136.5 Hz). *Adm:* $6, nonham sweethearts and children accompanied by a paying adult free. Tables: $15 per space (admits 1 person; bring your own tables) . Diane Ortiz, K2DO, Box 392, Levittown, NY 11756; 516-520-9311 or 631-286-7562; **hamfest@limarc.org**; **www.limarc.org**.

New York (Mamaroneck)—Jun 2. James Faulkner, N2WQG, 914-476-1076.

North Carolina (Durham)—May 25. Paul Van Doren, KE4OXN, 919-309-2457.

†North Carolina (Winston-Salem)—Jun 8; set up 6 AM; public 8 AM to 2 PM. *Spr:* Forsyth ARC. Dixie Classic Fairgrounds; US 52 to Akron Dr (Exit 112), follow signs to Fairgrounds, enter Gate 5 off Deacon Blvd. Flea market, tailgating, VE sessions. *TI:* 146.64, 145.47. *Adm:* $5. Tables: $15. Paul Jordan, KG4LDB, 381 Westoak Tr, Winston-Salem, NC 27104; 336-768-6961; **pj735@bellsouth.net**; **www.w4nc.org**.

†Ohio (Dayton)—May 17-19; Friday 8 AM to 6 PM, Saturday 8 AM to 5 PM, Sunday 8 AM to 1 PM. *Spr:* Dayton ARA. Hara Arena Complex, 1001 Shiloh Springs Rd. Hamvention's 2002 theme is "Emergency Communications/Public Service," over 1600 exhibitors and vendors showing their latest products and equipment, unsurpassed outside vending area, forums on all facets of Amateur Radio, VE sessions (held within Hara Arena all 3 days, Technician through Extra class; reservations highly recommended, walk-ins accepted), banquet (Saturday, 6 PM, Nutter Center; tickets $45 each, must be purchased by May 6, no sales after). *TI:* 146.94. *Adm:* advance $17, door $22 (good all 3 days); under 13 free. Tables: $70 (outside vendors), $560 (inside exhibits). Jim Graver, KB8PSO, c/o Dayton Hamvention, Box 964, Dayton, OH 45401; 937-276-6930; toll-free fax 1-800-491-4267; **info@hamvention.org**; **www.hamvention.org/**.

†Ohio (Hilliard/Columbus)—May 26; set up 7 AM; public 9 AM. *Spr:* Franklin County Hamfest Committee. Franklin County Fairgrounds, Columbia St; Cemetery Rd (Hilliard) Exit off I-270 outerbelt, W side of Columbus. Electronics flea market (buy, sell, trade), equipment, computers, free parking. *TI:* 146.76. *Adm:* $5. Tables: $5. Chris Lind, KC8BUO, Box 14281, Columbus, OH 43214; 614-267-7779; fax 614-263-7934; **clind2@juno.com**.

†Ohio (Wauseon)—Jun 9, 8 AM to 1 PM. *Spr:* Fulton County ARC. Fulton County Fairgrounds, State Rte 108; just N of Ohio Turnpike. VE sessions. *TI:* 147.195. *Adm:* advance $4, door $5. Tables: $10. Angela Infante, KB2AVN, 7649 County Road L, Delta, OH 43515; 419-822-4382; **lindsay@powersupply.net**; **www.fcarc.8m.com**.

Oregon (Seaside)—May 31-Jun 2, Northwestern Division Convention. See "Coming Conventions."

Pennsylvania (Bloomsburg)—Jun 8, Eastern Pennsylvania Section Convention. See "Coming Conventions."

†Pennsylvania (Butler/Pittsburgh)—Jun 2. *Spr:* Breezeshooters ARC. Butler Farm Showgrounds, PA Rte 68, W of Butler, E of I-79. Large indoor and outdoor flea market, computers, electronics, vendors, tailgating ($5 per vehicle space), VE sessions, plenty of parking, handicapped parking, overnight camping with hookups ($10), refreshments. *TI:* 147.36. *Adm:* $5, under 12 free. Tables: $15 (Rey Whanger, W3BIS, 412-826-8006; **w3bis@arrl.net**). Ed Wolf, N3UE, Box 100158, Pittsburgh, PA 15233-0158; 412-221-3806; **n3ue@arrl.net**; **www.breezeshooters.net**.

†Pennsylvania (Fredericksburg)—May 11; set up 6 AM; public 8 AM to 4 PM. *Spr:* Appalachian AR Group. Fredericksburg Fireman's Park, Rte 343; 1.3 miles S of Rte 22, N of Lebanon. Tailgating ($5 per space), ham and computer equipment auction (noon, 5% of selling price donated to AARG), refreshments. *TI:* 146.64. *Adm:* $5, under 16 free. Tables: 8-ft $15 (with electricity, in pavilion). Neil Shatto, N3JQM, 1452 Mumma Rd, Harrisburg, PA 17112; 717-469-7357; **n3jqm@juno.com** or **info@aa3rg.net**; or Dick Wise, K3MIK, 717-534-2945; **www.aa3rg.org**.

Rhode Island (Forestdale/North Smithfield)—May 11. Rick Fairweather, K1KYI, 401-725-7507 (7-8 PM only).

Tennessee (Knoxville)—Jun 7-8, Tennessee Section Convention. See "Coming Conventions."

Tennessee (Silver Point)—Jun 1. Bobby Raymer, N2BR, 931-537-9222.

Texas (Amarillo)—May 18. Gene Bitner, WA5ETK, 806-383-0115.

Texas (Arlington)—Jun 7-8, West Gulf Division Convention. See "Coming Conventions."

†Virginia (Franklin)—Jun 8, 9 AM to 3 PM. *Spr:* Franklin AR Repeater Assn. Bronco Club, Delaware Rd; Rte 258 to Rte 687 (Delaware Rd), approximately 3 miles, follow signs. Picnic and Tailgate, NC-style barbeque, Franklin Police Dept – "Being Prepared for Terrorist Attacks," VE sessions. *TI:* 147.3. *Adm:* $5. Tables: bring your own and lawn chairs. Ralph Atkinson, WB4ZNB, 30137 Country Club Rd, Courtland, VA 23837; 757-562-5710.

†Virginia (Manassas)—Jun 2; set up Saturday 2-10 PM, Sunday 6 AM; public 7 AM to 3 PM. *Spr:* Ole Virginia Hams ARC. Prince William County Fairgrounds, 10624 Dumfries Rd (Rte 234). Amateur Radio/Computer/Electronics Show, indoor exhibits, commercial vendors, tailgating ($5 per space, plus admission), 4th Call Area QSL Bureau Reps, DXCC QSL card checking, "Virginia QSO Party" Awards Ceremony, VE sessions (Bill, K9ZD, 703-754-7913; **k9zd@arrl.net**), free parking, refreshments. *TI:* 146.97, 224.66, 442.2. *Adm:* $6. Tables: 8-ft $30 each (with electricity and chairs; includes up to 3 admission tickets per table). Jack McDermott, N4YIC, 7977 Deward Ct, Manassas, VA 20109-3120; 703-335-9139; fax 703-330-7987; **n4yic@arrl.net** or **patnjack@erols.com**; or Mary Lu Blasdell, KB4EFP, 703-369-2877; **mblasd1638@aol.com**; **www.qsl.net/olevahams**.

†Washington (Stanwood)—May 11, 9 AM to 3 PM. *Spr:* Stanwood-Camano ARC. Stanwood Middle School, 9405 271st NW; N or S on I-5 to Exit 212, W on SR 532, right at third stoplight, turn left on 271st St, proceed to school on right. Flea market, computers, electronics, VE sessions, refreshments. *TI:* 145.19. *Adm:* $4. Tables: advance $15, door or after Apr 30 $20. John McCann, N7MZ, Box 941, Stanwood, WA 98292; 360-629-2921; or Vic Henry, N7KRE, 360-387-7705; **huppert@whidbey.net**.

†West Virginia (Ripley)—May 5; set up 8-9 AM; public 9 AM to 2 PM. *Spr:* Jackson County ARC. Ripley Middle School, School St. Flea market, VE sessions (registration 8:30 AM, testing 9 AM), refreshments. *TI:* 146.67. *Adm:* $4 (extra tickets $1). Tables: $4, first-come, first-served (electrical hookup contact Joe Pickens, N8UXE, 304-372-5648; **n8uxe@arrl.net**). John Burdette, N8TX, 304-273-2628; **n8tx@yahoo.com**.

Wyoming (Casper)—May 24-26, Wyoming State Convention. See "Coming Conventions."

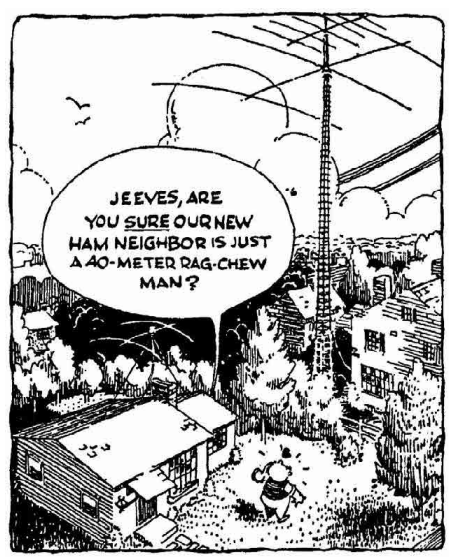
Attention All Hamfest Committees!

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 860-594-0207, or e-mail **jbee@arrl.org**. QST

STRAYS



From April 1965 *QST*

Previous • Next Strays

GARY PEARCE, KN4AQ

Frostfest presentation: ARRL Director Dennis Bodson, W4PWF (left), presents the Roanoke Division Service Award to Virginia Section Emergency Coordinator Tom Gregory, N4NW, at this year's Frostfest in Richmond. Gregory was instrumental in recruiting volunteers to assist in the wake of the September 11 disaster at the Pentagon.

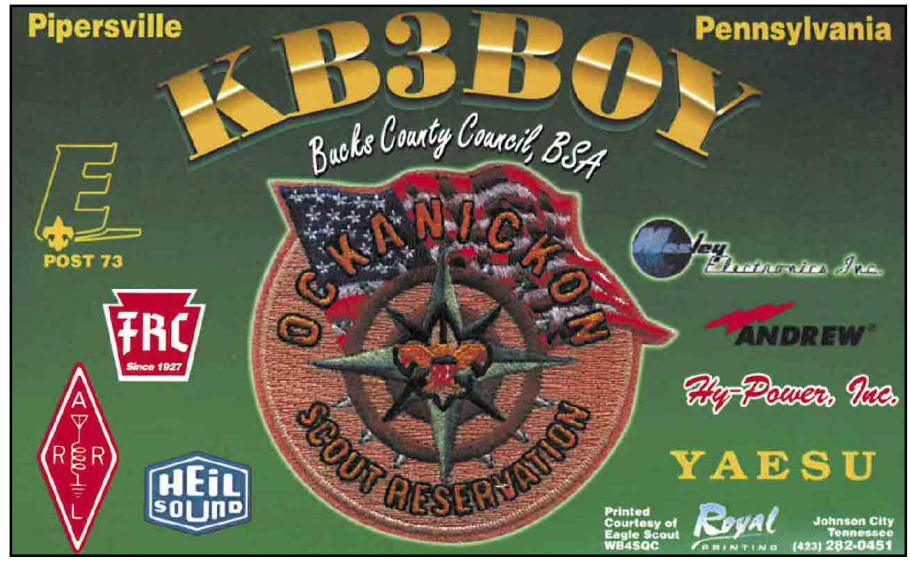
Grant Helps the Scouts of KB3BOY Camp Ockanickon

By Bob Zajko, N3RU, KB3BOY Trustee

It is a common lament heard on the bands, from 160 meters to microwave—"There aren't enough young people involved in ham radio." As you can imagine, the one guaranteed way to ensure the continuation of this great hobby is to get more youngsters interested and licensed. The Boy Scouts of America—scout summer camp to be precise—is an excellent opportunity to demonstrate Amateur Radio. Scout camps are competitive businesses and they are constantly seeking new programs that will attract new campers and keep them there. For the Amateur Radio community, this allows hundreds of young people to get a first-hand look at radio.

The typical radio merit badge class at KB3BOY, at Ockanickon Scout Reservation in Bucks County, Pennsylvania, begins like any other. Scouts weary from the heat outside wander into our shack and plop down on a seat. Most are more concerned about other things and are just happy to be in an air-conditioned place. Radio could be the last thing on their mind. However, when they see some of our QSL cards, looking over R0MIR or KC4AAA, their attitude suddenly changes. "*Wow, you actually talked to a Russian space station and the South Pole?*" Some flip through the book, seeing cards from places like Swaziland or Cambodia. "*Cool*" most of them just say. Suddenly, Internet Instant Message programs don't seem so hot anymore. When they finally get the chance to talk to someone on the air, their faces just light up when they hear this voice from across the country address them by name. Almost everyone comes in with no knowledge about our hobby, but they all leave with an experience that many find really great. This is the kind of experience that will help the ranks of licensed amateurs grow. Can you help? Absolutely.

Today, KB3BOY has an impressive antenna system, boasting stacked tribanders and a 40-meter beam, run with half-inch Hardline. A Yaesu FT-1000MP is found on the other end, complemented with an Alpha linear amplifier and a Heathkit SB-220 sitting in reserve. A FT-847 gives us VHF/UHF repeater and satellite capability, and a 2-meter packet radio sits in the corner. There is even a 440 MHz ATV transmitter and television monitor. Everything is interfaced to a computer running *DX4WIN* logging software.

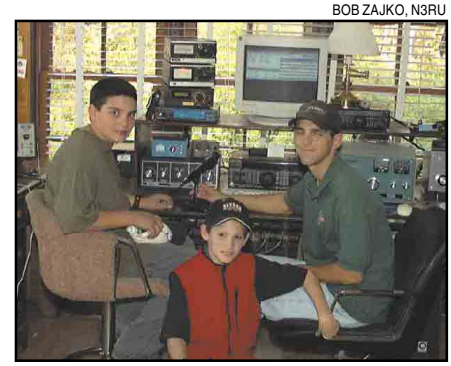


KB3BOY QSL courtesy Bob Zajko, N3RU.

BOB ZAJKO, N3RU

Mike shy? Never. Scouts are always prepared!

BOB ZAJKO, N3RU



Trading stories at the helm of KB3BOY.

If all this sounds expensive, imagine this entire station was built without any financial support from the camp that hosts it. KB3BOY started small, the same way you can help ham radio. Contact your local Boy Scout council. Say you are interested in doing an Amateur Radio demonstration at their summer camp, or even interested in becoming a counselor for the radio merit badge, and teaching theory to scouts. Explain ham radio if they are unfamiliar. Almost always, you will get an invitation to volunteer. Plan it for some weeknight, or during the day if you are available then. They will most likely provide you with a room or area to do your demonstration. Bring your home rig, some kind of portable antenna, and do your favorite ham activity. Work some HF, or bring that small ATV system mounted on a remote control car. The scouts will like it, whatever it is. Summer camps are an opportunity for scouts to try new things. Many camps have programs like mountain biking or rock climbing. Scouts can learn about nature or first aid. And most camps would be happy to add Amateur Radio to their list of activities. When a group of Scouts gets to talk on the radio, they always think it is the greatest thing.

Mary E. Lau, N1VH ♦ Secretary, ARRL Foundation Inc.

Having seen hundreds of Scouts through our radio program at KB3BOY, even if they do not understand the theory, they always get a big smile on their face when talking to someone far away. This reaction is common and is a great benefit for Amateur Radio.

After doing some demonstrations, you may find that the camp administration likes what you are doing and they ask you if you can make radio a permanent addition to their facilities. Or you could ask. They just might say yes, and possibly even give you money to start a station. The KB3BOY station began as temporary demonstrations, and was offered space in a recently vacated enclosed porch room. The first rig was an old Heathkit and small dipole. The trick to getting the station set up is finding people to help. Like many other projects, people are often reluctant to get involved in the beginning, when there is plenty of work to be done, and no immediate results. Apply for a club license.

Try to get your local clubs behind the project. Explain at club meetings how Scouts react when getting to talk on the air. With some luck, club members will lend old radios to the station, or just outright donate them. Second, write lots of letters asking for stuff. Get some camp letterhead and start writing. Explain a little about Amateur Radio if sending to non-radio companies, and talk about the opportunities and advantages young people have getting into ham radio. Send them to radio manufacturers, amplifier companies, antenna companies, wire and cable companies, radio accessory companies. Everything radio-related you can think of. If you need hardware or supplies to fix up the shack itself, write letters for that too. Even if they do not respond, at least you tried.

Our local Home Depot was particularly helpful. KB3BOY has had success with several companies who are happy to provide support. For example, Andrew Corporation, a company most known for commercial microwave and satellite antennas, provided the KB3BOY transmission line system. You may find QSL printers are willing to make your cards for free if they can put their name and number on front as a station sponsor. Again, try to get as many people involved as you can. As your station gets bigger, more people will offer to help. Talk to the camp administration about starting an Explorer post (a Scout-sponsored special interest group open to anyone male or female under 21) dedicated to ham radio. The post then can give scouts who saw the demonstration a place to pursue their interest further. Put messages out on the packet boards, and apply for grants like the ARRL's Victor C. Clark Youth Incentive Program. Pretty soon, you will have a permanent working station at a Scout camp. This can serve several functions. Visiting Scouts get the exposure to ham radio, and involved hams get a station home away from home, usually free of antenna regulations and TVI problems. Many summer camps have troops camping over the weekends in the winter. This is also a good time to open your new club station.

Show ham radio to Scouts who drop by to see what is going on. You can even find someone to make a sign for outside your station. If no one drops by, the least you will have is a few hours at your station away from home. Ask around your local club. Other people may be interested in opening the station on a winter Saturday, or doing something during the summer. The station can become a club activity, with many people giving their expertise. The Explorer post organization will also be involved. Here, Scouts interested in ham radio can be given help with earning a ticket and building a station. It was a Scout-camp run radio program at K3BSA that got your author involved in ham radio. Some young people who get a license are discouraged by the cost of equipment or the complexities of building a station. By constructing a station at a Scout camp, these new hams have a place to come and operate without having to worry about building a station at home. The final goal of this whole process is to get more youngsters interested and ultimately licensed. You will find being the trustee of such a station to be a very fulfilling activity. Every time a camper gets on the radio and you see that big smile as they talk to someone, you will know you did your little part for Amateur Radio.

Contributor's Corner

We wish to thank the following for their generous contributions to:

The WRTC – USA Youth Fund
Mark J. Wilson, K1RO
Jean F. Wilson, N1OJS
Michael S. Mitchell, W6RW

The Victor C. Clark Youth Incentive Fund
ARRL New England Division Cabinet, in fond memory of Armand Lambert, K1FLD
Tom Frenaye, K1KI
Michael J. Shovan, Jr, WB2KHE, in fond memory of John M. Haluska, WB2WXO
Kay Craigie, WT3P
Risha and Joseph K. Stern, W4LTT, in fond memory of Ed Benak, N4WMO

The Martin J. Green, Sr., K2TEO, Memorial Scholarship Fund
Martin J. Green, Jr, K2PLF
Patricia Green, N6WHB

The Bill Orr, W6SAI, Memorial Fund (pending)
Tom Frenaye, K1KI

The L. Phil and Alice J. Wicker Memorial Scholarship Fund
Mr. and Mrs. Bob Murphy, in fond memory of Alice J. Wicker, WA4ZMA
Vincent and Jacqueline Jones
Frances H. Malcolm

The General Fund
David Sumner, K1ZZ
Art Goddard, W6XD
Twila Greenheck, N0JPH
James E. Fenstermaker, K9JF
Mike Raisbeck, K1TWF
George Race, WB8BGY
Frank Fallon, N2FF
Rick Roderick, K5UR
Stephen A. Mendelsohn, W2ML
Coy C. Day, N5OK
James A. Maxwell, W6CF
Steven G. Katz, N8WL, and Constance K. Barsky, WD8ODC, in fond memory of Jan, fiancee of Trigg Tabor, K8NIO
Steven G. Katz, N8WL, and John Cochrane, W8QQ, in fond memory of the father of John Tipka, W8UL
Bob Vallio, W6RGG
Les Shattuck, K4NK
Mary Hobart, KB1HYD
Wade Walstrom, W0EJ
Henry Leggette, WD4Q
Jay Bellows, K0QB
Greg Milnes, W7OZ
Walt Stinson, W0CP
Rodney J. Stafford, W6ROD
Martin B. Gourley, K4VIQ, in fond memory of John M. Waller, K4EPJ
James E. McCobb, Jr, W1LLU
Gary Johnston, KI4LA
Bruce J. Frahm, K0BJ
Wolverine SSB Net (Michigan), in fond memory of William House, K8VDA
Frank M. Butler, W4RH
Marcella A. Mitchell, in loving memory of Charles E. Mitchell, W9MOC
C. W. Jack Barbrow, Jr, WA4IAQ, in fond memory of Henry S. Atkins, W4KOO

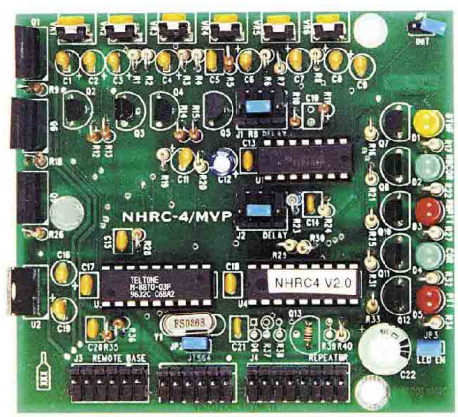
As received and acknowledged during the months of **January** and **February**.

NEW PRODUCTS

REPEATER CONTROLLER FOR GE MVP MOBILES AND BASE STATION RADIOS

◊ The NHRC-4/MVP Repeater Controller easily installs inside General Electric Custom MVP mobile and base station transceivers, converting the radios into repeaters with remote base ports. The controller features CW ID, unique courtesy tones to indicate link status and channel activity, time-out and tail timers, no external wiring and a digital output for control applications.

Price: $189. For more information, contact NHRC LLC at 444 Micol Rd, Pembroke, NH 03275; tel 603-485-2248, **info@nhrc.net**; **www.nhrc.net**.



Previous • Next New Products

SILENT KEYS

It is with deep regret that we record the passing of these amateurs:

N1DLP, Robert C. Tucker, Brunswick, ME
W1DWX, Alfred C. Dion, Pomfret Center, CT
K1FFR, Robert D. Burd, Marstons Mills, MA
N1IJD, Stephen A. Libby, Freeport, ME
N1NEK, John A. Rowe, Bangor, ME
*W1PCD, Danville S. Webber, Bangor, ME
N1WEQ, Arthur E. Spiller, Needham, MA
ex-KA1WXM, David G. Lynes, Cummington, MA
W1ZNY, John H. Wilcox, Topsfield, MA
K2BC, David C. Allen, Homer, NY
W2BGN, Kenneth J. Gardner, Walworth, NY
W2HYE, William J. Parker, St Albans, NY
W2IGI, Edwin F. Ziemendorf, Lyndonville, NY
*N2LDG, Gerald C. Fortunato, New York, NY
WA2MIH, Robert A. Plimley, Nine Mile Falls, WA
N2PMU, Charles W. Le Fevre, Elmira, NY
W2RWE, Edwin F. Odell, Utica, NY
W2RWH, Carl A. Emerson, St George, UT
W2SAI, J. D. Ransome, Ocala, FL
KA2URJ, Fred Tschudy, Shrub Oak, NY
N2WAF, Marjorie S. Eldert, Scotch Plains, NJ
WB2WXO, John M. Haluska, Milton, NY
W3AMB, Charles W. Martin, Monaca, PA
W3DAB, Dale A. Bair, Mechanicsburg, PA
W3EVW, Roger Causse, Lester, PA
W3EYF, Donald J. Simpson, Baltimore, MD
WA3FSL, Edward F. Kennedy, Reading, PA
N3GPP, Robert H. Hoffman, Lancaster, PA
WB3JFB, Roxane M. Ostrum, Ingomar, PA
W3MLY, James F. Cochran, Reading, PA
K3QZB, Milton A. Barron, New Castle, PA
W3SAY, Wilber D. Files, State College, PA
K3WN, William R. North, Stevenson, MD
*W3YO, Daniel Dax, Pittsburgh, PA
WA3ZZG, Henry A. Ludovici, McKees Rocks, PA
K4AN, Les Hunt, Woodbridge, VA
W4BLC, James A. Bowman, Jeffersonville, GA
*WA4CQA, William R. Spears, Doerun, GA
ex-W4CQL, El Hermanson, West Palm Beach, FL
W4DFK, Dana C. Huhn, Sterling, VA
W4JEE, Paul R. Hansen, Miami, FL
KD4KUP, Woodrow R. Nance, Tazewell, TN
WB4LBJ, John L. Hargis, Cottontown, TN
K4LNR, W. F. Andrews, Oakland Park, FL
WA4LUG, Gerald J. Dickinson, Dunedin, FL
K4MTX, Casimir E. Norrisey, Charlottesville, VA
W4PRM, Lester D. Chipman, Greensboro, NC
*K4PRQ, Norman G. Preston, Roanoke, VA
WA4TEE, Robert E. Pieper, Summerville, SC
WA4TWD, James D. Miles, Alachua, FL
KB5AED, Spencer L. Payne, Albuquerque, NM
KM5BO, Joe E. Soileau, New Caney, TX
W5FMG, William J. Hamm, San Antonio, TX
W5GWC, George W. Crofoot, Oxford, NC
W5IBF, Charles W. Skelton, Murchison, TX
K5INC, Corwin Butler, Blackwell, OK
N5KAM, William H. Stolle, Sherman, TX
K5LCQ, Judy A. Gerdel, Venus, TX
W5MJN, W. D. Chambers, Bonham, TX
KC5QLB, Rabon F. Ayers, Shreveport, LA
ex-W5TDB, Emma S. Bugg, Carlsbad, NM
N5UQV, Robert C. Brenner, Midway, AR
W5UUX, Donald E. Pugh, Broken Arrow, OK
N5VMW, Glen Simmons, Columbia, MS
WA6ANI, C. C. Delwiche, Davis, CA
N6BYY, Robert Yeates, Daly City, CA
KF6KGD, Edward O. Herbold, Anaheim, CA
N6LSE, Wes T. Stroud, Fresno, CA
N6LU, D. P. Lucido, Suisun City, CA
*W6MEZ, Paul Mezzapelle, Carmichael, CA
W6NU, Willard W. Wehe, San Leandro, CA
K6PNJ, Mathew R. Frampton, Garden Grove, CA
KD6RVU, Irene Bingham, Long Beach, CA
W6TNC, Victor R. Witt, Los Gatos, CA
W7CSS, B. O. Lowery, Key West, FL
KB7CTH, Carl T. Steppan, Corvallis, OR
ex-W7CVI, Leslie C. Huff, Mattawa, WA
W7DFW, John D. High, Lake Montezuma, AZ
N7GC, George C. Claussen, Grayland, WA
KL7HIU, Robert L. Page, Anchorage, AK
K7JKG, Maurice B. Knisel, Mesa, AZ
N7KYA, Gregory F. Cain, Olympia, WA
K7MIV, George W. Wright, Scottsdale, AZ
KA7NRA, Merton D. Box, Shelton, WA
ex-KA7NSA, Russell H. Farnlof, Phoenix, AZ
WA7OTZ, Arthur G. Statt, Madras, OR
W7OVO, Kenn D. Knackstedt, Medford, OR
N7ZFR, Walter Marchbank, Sutherlin, OR
KC7ZXH, Rebecca S. Collins, Yakima, WA
N8AOX, Don Lantzer, Cuyahoga Falls, OH
W8CMS, Roland C. Sutton, Newton Falls, OH
W8EXI, James M. Trutko, Cuyahoga Falls, OH
W8HHD, Herbert Watts, Hale, MI
N8JRV, Robert E. Stearns, Hamilton, OH
K8LLU, Barney T. Miller, Jackson, MI
W8MGP, Harold J. Gruber, Cincinnati, OH
KA8RMB, Paul Petty, St Petersburg, FL
K8VDA, William B. House, Troy, MI
K8YLK, Weston J. Heiks, Minerva, OH
WD9CZS, Marvin Berman, Wheeling, IL
W9EJJ, Dwight D. Valentine, Darlington, IN
K9FZK, Donald E. Holthoff, Champaign, IL
N9HE, Harold E. Elmore, Godfrey, IL
WB9IGY, Betty Taylor, Greenfield, IN
K9IRA, John Ensinger, Peoria Heights, IL
K9KPM, Kenneth J. Guge, Lombard, IL
W9LIG, Hugo R. Borri, Mark, IL
N9MMD, Dennis A. Gladkowski, Joliet, IL
WA9NNT, Robert W. Jacobs, Summerfield, FL
W9OMO, Ervin W. Busse, Manitowoc, WI
W9PST, Donald C. Drengenberg, Milwaukee, WI
K9QOF, Charles Vose, Pontiac, IL
W9QZE, Kenneth Robbins, Columbus, IN
K9RAF, Gillis B. Barton, Pleasant Hill, IL
K9UKH, Justin Donovan, Milwaukee, WI
W9WFX, Byron H. Webb, Chicago, IL
K0FBU, Melvin E. Crowell, Longmont, CO
KA0GKI, Duke K. Hoivik, Fergus Falls, MN
W0JDR, Thomas F. Shubitz, Fergus Falls, MN
W0JJK, Alan H. McMillan, Council Bluffs, IA
W0JMW, Frederick W. Pasbrig, Grand Forks, ND
W0NIC, Ed B. Lowall, St Louis, MO
W0OLN, Wilbur C. Elmore, Lebanon, MO
N0OU, Gary D. Rockett, Hardtner, KS
W0OWQ, Marvin L. Spurling, Mulberry, KS
N0PZT, Donald L. Seneker, Mount Vernon, MO
K0QHF, Billy L. Nielsen, Radcliff, KY
W0RAC, Robert A. Cross, St Paul Park, MN
W0WUU, Melvin C. Johnson, Alcester, SD
FM5WN, Fernand Sifflet, Fort de France, Martinique
SM6CST, Urban Kjellberg, Karlsborg, Sweden

*Life Member, ARRL
**Charter Life Member, ARRL

‡Call sign has been re-issued through the vanity call sign program.

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

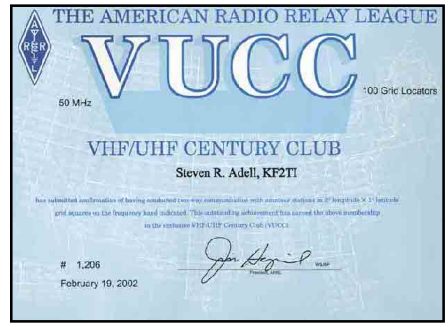
Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

Kathy Capodicasa, N1GZO ♦ Silent Key Administrator

STRAYS

VUCC

◊ The VHF/UHF Century Club is the counterpart to DXCC for the bands 50 MHz to 300 GHz. It requires working and confirming V/UHF contacts in 2×1 grid locators on all V/UHF bands. Satellite and Laser contacts count, too. Individual certificates are issued per band to those meeting the initial qualifying levels, with an extensive endorsement program for levels beyond the initial certificate. All cards must be checked by ARRL VHF Awards Managers—check the VUCC Web site for the Awards Manager near you. A VUCC lapel pin is available at a nominal charge. Additional information is available at www.arrl.org/awards/vucc.



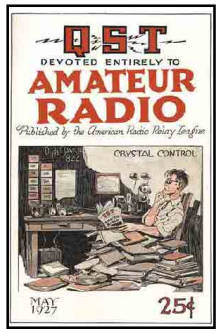
W0GBT

Olympics Special Event Station W7U made 3156 contacts in 86 countries from K1IF in Grantsville, Utah, February 8-24, 2002. That's John, W0GBT, on the left with K1IF taking a break from the action.—*Richard Cain, K1IF*

Previous • Next Strays

75, 50 AND 25 YEARS AGO

May 1927

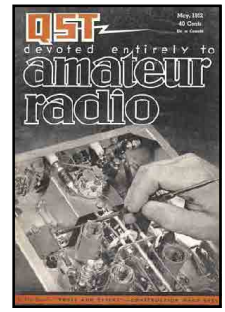


♦ The cover, by Clyde Darr, 8ZZ, shows the modern radio amateur, a pile of books beside his chair, reading a copy of *QST* and boning up on "Crystal Control." The editorial discusses the new radio regulations, pointing out that amateurs need to be sure they are "within one of the amateur bands" by May 1.

Harold Westman tells about building "A Complete Inexpensive Transmitter" for $44.75, tubes, hardware, and a key included. "Radio Regulation Returns" explains the impact of the new radio regulations on amateurs. Joseph Deckendorf tells how to improve your receiver's sensitivity, in "Some Tests with R.F. Amplifiers below 200 Meters." "The Air Pirate" tells the story of a person in Lancaster, Pennsylvania, who used a spark coil to completely wipe out local amateur and broadcast frequencies. 3BIT, 3VB, and 3ADM located the culprit and called in the Radio Inspector to shut him down. A. E. Teachman describes "A Portable Antenna Tester." V. W. Sherman tells about "The Vertical Antenna at 9BMW," made from copper gutter pipe. In "Your Wave from a Broadcast Receiver," Roy Gale tells how to use harmonics from a regenerative broadcast receiver to determine frequencies in the ham bands.

May 1952

♦ The cover photo shows a ham carefully completing another homebrew rig. The editorial begins with "Yippee! Hot Dawg! Geronimo!"—with the brand-new 15-meter amateur band opening on May 1, it's hard for the editor to maintain his usual composure and dignity. The editorial goes on to warn of a potential TVI problem: early TV sets used 21.25-21.9 Mc. as their audio i.f.!



B. W. Griffith, W5CSU, tells "The Truth about the Vertical Antenna." Calvin Hadlock, W1CTW, describes "A 50-Mc. Transmitter-Receiver for Civil Defense Use." Bert Matthews, W5OME, tells how he adds a reflector and a director to his 10-meter mobile whip when parked, to have "A Car-Mounted 10-Meter Beam." Richard Smith, W1FTX, describes "A Midget Fifty-Watter," a small C.W. rig for 80 and 40 meters. Yardley Beers, W2AWH, presents "The Wavelength Factor—II," in which he discusses propagation, modulation, and receivers. Bob Ehrlich, W2NJR, tells "How to Test and Align a Linear Amplifier." Vern Chambers, W1JEQ, discusses increased receiver sensitivity on V.H.F. in "The 6BQ7 on Six and Two." Jim Crteutz, W2PMQ, describes using a small crystal-controlled converter for "Tuning Two Meters on the Car Receiver." In "The World Above 50 Mc." conductor Ed Tilton, W1HDQ, tells how he almost killed himself in the ARRL Lab with a 1500-volt supply and a gorgeous 2-meter legal-limit amplifier. The amplifier was severely damaged, but Ed survived to warn us once again, "*Switch to safety!*"

May 1977

♦ The cover drawing reminds the reader of the ARRL National Convention, to be held in Toronto, June 3-5. The editorial points out the logic of "900-MHz Class E CB—the Ultimate Answer."

Doug DeMaw, W1FB, presents the various considerations involved in "Your First Receiver—How to Choose It." Ed Tilton, W1HDQ, considers the passing of Cycle 20 and the prospects of the new Cycle 21, in "Propagation—Past and Prospects." Walter Schilz describes shunt-feeding his tower, in "Slant-Wire Feed for Grounded Towers." Ken Powell, WB6AFT, tells about his 5-volt supply, "The 5×3 Power Supply." Bob Gervenack, W7FEN, tells how to produce "Independent Sideband for Your Drake TR-4C." Howard Stark, W4OHT, describes his homebrew paddle, "The Stark Key." Howard Cunningham, WA9VRU, discusses "A Fully Automatic Morse Code Teaching Machine." Carmen Moretti, W2AIH, has "An Ultramodern Linear Amplifier" that uses a single 4CX1500B. Bob Halprin, WA1WEM, reports on the "Inferno in Friuli," telling how hams helped following an earthquake in northern Italy. In "Pedalera Bike Run Communications," Peter O'Dell, WB8NAS, describes the League's six new professionally produced radio programs, in "ARRL Presents the Wide World of Amateur Radio." In "How's DX?" columnist Rod Newkirk, W9BRD, shows a photo of one of Amateur Radio's Iron Men, Dick Spencely, KV4AA, who ran off 35,335 QSOs as AJ3AA during the US bicentennial year. QST

Al Brogdon, W1AB ♦ Contributing Editor

W1AW Schedule

PACIFIC	MTN	CENT	EAST	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	VISITING OPERATOR TIME (12 PM-1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	TELEPRINTER BULLETIN				
4 PM	5 PM	6 PM	7 PM	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	TELEPRINTER BULLETIN				
6^{45} PM	7^{45} PM	8^{45} PM	9^{45} PM	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

♦ **Morse code transmissions:**
Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 1992 *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 for a code proficiency certificate is $10; the endorsement fee is $7.50.

♦ **Teleprinter transmissions:**
Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz. Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

♦ **Voice transmissions:**
Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

♦ **Miscellanea:**
On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day. In 2002, Headquarters and W1AW will also be closed on July 5. QST

CONTEST CORRAL

Abbreviations: SO—Single-Op; M2—Multiop—2 Transmitters; MO—Multi-Op; MS—Multi-Op, Single Transmitter; MM—Multi-Op, Multiple Transmitters; AB—All Band; SB—Single Band; S/P/C—State/Province/DXCC Entity; HP—High Power; LP—Low Power; Entity—DXCC Entity

No contest activity on 30, 17, 12 meters. Refer to the contest Web sites for information about awards. Unless stated otherwise, regional contests only count QSOs with stations in the region. Publication deadline for Contest Corral listings is the first of the second month preceding the publication date.

W1AW Qualifying Runs are 7 PM Friday, May 3, and 9 AM Monday, May 20. The K6YR West Coast Qualifying Run will be at 9 PM PST Wednesday, May 8 (10-40 WPM). Check the W1AW Schedule for details.

May 4-5

IPA Contest sponsored by the International Police Association, CW 0000Z to 2359Z May 4, SSB 0000Z to 2359Z May 5 (each mode is considered a separate contest). Frequencies: 80-10 meters. Categories: SOAB, MS, SWL. Exchange: RS(T) and serial number, IPA stations add "IPA." QSO points: Non-IPA—1 pt, Non-US IPA—2 pts, US IPA—5 pts, IPA club—10 pts, US stations with 1×1 call—20 pts. Score is QSO points × US states + IPA stations + 1×1 calls counted only once. For more information—**www.iparc.org.** Logs should be e-mailed or postmarked to **n2pig@arrl.net** or to Alex Dutkewych, N2PIG, PO Box 211, Pulteney, NY 14874-0211.

MARAC County Hunters Contest, CW, sponsored by the Mobile Amateur Radio Awards Club from 0000Z May 4 to 2400Z May 5. Frequencies: 3.575, 7.040, 14.050, 21.050, 28.050 MHz (same rules as SSB contest; see April *QST*, p 93).

10-10 International Spring Contest, CW, 0001Z May 4-2400Z May 5 (see February *QST*, p 112).

Microwave Spring Sprint, 0600-1300 local, May 4 (see April *QST*, p 93).

Indiana QSO Party, CW/SSB, sponsored by the Hoosier DX and Contest Club from 1300Z May 4 to 0500Z May 5, SO operate a maximum of 12 hours. Frequencies: CW—1.805 MHz and 40 kHz up from the band edge on 80-10 meters, SSB—1.845, 3.850, 7.230, 14.250, 21.300, 28.450 MHz, try 160 at 0200 and 0400Z, no repeater or crossband QSOs. Categories: SOAB (HP, LP <100 W, QRP <5 W), MS (incl. use of spotting assistance), Mobile (SO and MO). Exchange: RS(T) + S/P or IN county (DX stations send RS(T) only). QSO points: SSB—1 pt, CW—2 pts, contact stations once per band/mode and once per county. Score is QSO points × IN counties or S/P/C counted only once. For more information—**www.hdxcc.org/inqso**. Logs must be e-mailed (Cabrillo format preferred) or postmarked by June 14 to **inqp@hdxcc.org** or to HDXCC, c/o Mike Goode, N9NS, 10340 Broadway, Indianapolis, IN 46280-1344.

ARI International DX Contest, CW/SSB/Digital, sponsored by the ARI, from 2000Z May 4 to 1959Z May 5. Frequencies: CW/SSB—160-10 meters; Digital—80 through 10 meters, change bands once per 10 min. Categories: SOCW, SOSSB, SODigital, SO Mixed, MS Mixed, SO SWL Mixed. Exchange: RST and Italian Province or serial number. QSO points: own country—0 pts (but OK for mult), own cont—1 pt, different cont—3 pts, Italian stations—10 pts. Each station can be a mult only once per band. Score is total QSO points × Italian Provinces + DXCC entity (except I, IS0 IT9, IG9/IH9) counted once per band. For more information, send e-mail to **i4ufh@libero.it**. Logs (Cabrillo format is encouraged) should be e-mailed or postmarked by June 5 to **aricontest@ari.it** or to ARI Contest Manager, I4UFH Fabio Schettino, PO Box 1677, 40100 Bologna, Italy.

New England QSO Party, CW/Phone—2000Z May 4-0300Z May 5 and 1100Z-2400Z May 5. All 1st-district states (ME, NH, VT, MA, CT and RI) are considered New England. Frequencies: CW—40 kHz from band edge; Novice/Tech—3705, 7130, 21130, 28130 kHz; SSB—3880, 7280, 14280, 21380, 28380 kHz; VHF—50.150, 144.205, 146.55, 223.5, 432.150, 446.0 MHz; no crossmode, crossband or repeater QSOs, all CW QSOs in CW band segments. Categories: SOAB (HP, LP, and QRP), MS (includes stations using any kind of spotting assistance), mobiles use same categories. Exchange: RS(T) and S/P (non-US/VE sends "DX") or NE county/state. Work stations once per band/mode and mobiles in each county. County lines should be logged as two QSOs. QSO points: phone—1 pt, CW (includes digital modes)—2 pts. Score: Non-NE stations—QSO points × NE counties; NE stations—QSO points × S/P/C (20 max counties); mobiles total QSO points from all counties and count multipliers only once. For more information—**www.neqp.org**. Logs should be e-mailed (Cabrillo format preferred) or postmarked within 30 days of the contest to **logs@neqp.org** or NEQP, PO Box 3005, Framingham, MA 01705-3005.

May 5-11

Danish SSTV Contest, sponsored by the Danish SSTV Group, from 0000Z May 5 to 2400Z May 11 (note one week duration). Frequencies: 80-10, 6, 2 meters. Categories: SO and SWL. Exchange an image to complete a QSO. QSO points: 2 points for first QSO with a country, 1 point thereafter, 1 point bonus for Danish stations, contact stations once per band. For more information—**home5.inet.tele.dk/carle**. Logs must be postmarked by June 6 to Carl Emkjer, Soborghus Park 8, DK 2860, Soborg, Denmark.

May 11-12

Nevada QSO Party—CW/SSB/RTTY, sponsored by the Frontier Amateur Radio Society from 0000Z May 11 to 0600Z May 12. Frequencies: 160-6 meters, CW 15 kHz and SSB 25 kHz above General class band edge. Exchange: RST and S/P/C or Nevada county. QSO points: SSB—1 pt, CW/RTTY—2 pts. Score is QSO points × Nevada counties or S/P/C counted only once. Logs must be e-mailed or postmarked by June 15 to **nw7o@arrl.net** or to NW7O, Jim Frye, 4120 Oakhill Ave, Las Vegas, NV 89121-6319.

Oregon QSO Party—CW/SSB, sponsored by the Central Oregon DX Club, 1400Z 11 May-0200Z 12 May. Frequencies: CW 1815 kHz and 40 kHz above band edge, SSB 1855, 3900, 7240, 14280, 21390, 28390 kHz; no repeater QSOs. Exchange: RS(T) and OR county or S/P/C. QSO points: SSB—1 pt, CW—2 pts. Stations may be worked once per band/mode and in each county. Score is QSO points × OR counties or S/P/C + OR counties counted only once. 50 bonus points for working K7O. 100 bonus points for working K7ZZZ. Logs must be e-mailed or postmarked by June 10 to **k4xu@arrl.net** or to Oregon QSO Party, c/o K9QAM, 23083 Maverick Ln, Bend, OR 97701.

FISTS Spring Sprint—CW, sponsored by the FISTS International CW Club from 1700Z-2100Z May 11 (see February *QST*, p 109).

CQ-M International DX Contest—CW/SSB/SSTV, sponsored by the Krenkel Central Radio Club from 2100Z May 11-2100Z May 12. Frequencies: 160-10 meters including satellites, which count as a separate band; remain on a band for at least 10 min. Categories: SOSB (CW, SSB, Mixed, Satellites), SOAB (CW, SSB, Mixed, QRP—must sign "/QRP"), MS-Mixed, SWL-Mixed, WWII Veteran, SSTV, Victory. Exchange: RS(T) and serial number. QSO points: Using P-150-C award countries, own country—1 pt, same cont—2 pts, different cont—3 pts. Score is QSO points × countries counted once per band. For more information—**www.mai.ru/~crc/cq-m/cqmain_e.htm**. Logs must be e-mailed or postmarked by July 1 to **cqm@mail.ru** or to CQ-M Contest Committee, Krenkel Central Radio Club of Russia, PO Box 88, Moscow, 123459, RUSSIA.

50 MHz Spring Sprint, sponsored by the Eastern Tennessee DX Association from 2300Z May 11 to 0300Z May 12 (see April *QST*, p 93).

May 18-19

His Majesty King of Spain Contest, CW, sponsored by the Union de Radioaficionados Españoles (URE) from 1800Z May 18 to 1800Z May 19 (SSB is June 22-23). Frequencies: 160-10 meters using IARU Region 1 bandplan. Categories: SOAB, SOSB, and MS. Exchange: RST and serial number or EA province. QSO points: 1 pt per QSO. Score is QSO points × EA provinces counted once per band. For more information, send e-mail to **ure@ure.es.** Logs must be e-mailed or postmarked by June 25 (SSB by July 30) to **ure@ure.es** or **ea5al@ure.es** or Vocalia Concursos URE, Apartado Postal 87, 12200, Onda, Castellon, Spain.

Anatolian RTTY Contest, sponsored by the Anatolian Radio Amateurs Association from 0000Z May 18 to 2400Z May 19. Frequencies: 80-10 meters. Categories: SOAB, MS, SWL. Exchange: RST + serial number. QSO points: Own country—5 pts, Same cont—10 pts, Different cont—15 pts. QSOs with TA2KW, TA3KA, TA4KG, TA7KB count 150 pts on 20-10 meters and 300 pts on 80-40 meters. Score is QSO points × DXCC entities + call areas in TA, VK, VE, JA and USA counted once per band. For more information—**www.qsl.net/ta4kg/rtty/kurallar.html.** Logs must be e-mailed or postmarked by December 10 to **anarad@ttnet.net.tr** or to PO Box 97, Söke 09200, Turkey.

May 25-26

CQ WW WPX Contest—CW, sponsored by *CQ* Magazine, from 0000Z May 25-2400Z May 26 (see March *QST*, p 102).

QRP ARCI Hootowl Sprint—CW, sponsored by the QRP ARC International from 2000 local-2400 local May 26. For rules, see December 2001 *QST*, p 98, or **personal.palouse.net/rfoltz/arci/arcitst.htm.**

May 27-28

MI QRP Memorial Day CW Sprint, sponsored by the MI QRP Club from 2300Z May 27 to 0300Z May 28 (see January *QST*, p 107). QST

NEW PRODUCTS

NEW IIX EQUIPMENT CATALOG

◊ IIX Equipment Ltd announces its latest free catalog. The *Y-17 Millennium Catalog* features many accessories that can make an amateur's antenna tower more functional and enjoyable with the addition of extra antennas. Other catalog items include ginpole kits to make tower maintenance easier and safer. The catalog features universal mobile mounting systems for all vehicles that can accommodate multiple radios in a limited space. Contact IIX Equipment, 4421 W 87 St, Hometown, IL 60456; tel 708-423-0605; **iix@w9iix.com**; **www.w9iix.com**.

Previous • Next New Products QST

H. Ward Silver, N0AX ♦ 22916 107th Ave SW, Vashon, WA 98070 ♦ n0ax@arrl.org

SPECIAL EVENTS

Tulsa, OK: Tulsa Amateur Radio Club, W5IAS. 1300Z **Apr 13** to 0100Z **Apr 14**. Tulsa Health Department's "Sooner Spring" bioterrorism drill. 28.320 21.320 14.230 7.235. Certificate. Dave Cox, Tulsa Health Department, 5051 S 129 E Ave, Tulsa, OK 74134.

Ames, IA: Cyclone Amateur Radio Club, W0I. 0000Z **Apr 19** to 2400Z **Apr 23**. VEISHEA at Iowa State University. 28.475 28.055 14.225 14.085. QSL. W0ISU, 132 Broadmoor Cr, Ames, IA 50010.

Lexington, KY: Bluegrass Amateur Radio Society, KG4LDL. 1500Z to 2200Z **Apr 20**. Scout World 2002—Boy Scout event at Kentucky Horse Park. 28.400 21.350 14.300 7.250. Certificate. Lou Berry, 160 W Tiverton Way, Lexington, KY 40503-4468.

Kill Devil Hills/Kitty Hawk, NC: Tri-County ARC, NC4AR. 0900Z **Apr 27** to 1200Z **Apr 30**. Anniversary of the first powered aircraft flight. 14.260 7.260. Certificate. Harrison J. Faust, WW4HF, 509 Player Dr, High Point, NC 27260.

Vryheid, KwaZulu-Natal, South Africa: Midlands Amateur Radio Club, ZS100ABW. 1400Z **May 3** to 0800Z **May 5**. Commemorating the roles played by the British, Boers and brave Zulus during the Anglo Boer SA War of 1899-1902. 40, 20 and (eve) 80 m. QSL. Midlands ARC, PO Box 100220, Scottsville 3209, South Africa, or via Bureau. **zs5wi@iafrica.com**.

Asheboro, NC: Randolph ARC, NC4ZO. 1300Z to 2000Z **May 4**. Amateur Radio display at the North Carolina Zoo. 28.400 21.320 14.240 7.240. Certificate. Randolph ARC, 6747 King Mt Rd, Asheboro, NC 27205.

Liberty, MS: Southwest Mississippi ARC, KD5QNC. 1500Z to 2200Z **May 4**. Celebrating Liberty Heritage Days at the Ethel Vance Park. 14.270 7.270. QSL. Paul J. McGehee, 4044B Hwy 567 N, Liberty, MS 39645.

Louisville, KY: Amateur Radio Transmitting Society, W4CN. 1100Z to 1700Z **May 4**. 128th running of the Kentucky Derby. 28.350 21.275 14.275 7.200. Certificate. Shelby Summerville, K4WW, 6506 Lantana Ct, Louisville, KY 40229.

Peekskill, NY: Peekskill/Cortlandt Amateur Radio Association, W2Q. 1300Z to 2100Z **May 4**. PCARA Second Anniversary QRP Special Event Station. 28.350 21.350 14.280 7.240. Certificate. PCARA, W2NYW, PO Box 32, Crompond, NY 10517.

Poughkeepsie, NY: Poughkeepsie Amateur Radio Club, W2CVT. 1400Z to 2000Z **May 4**. Special event station from the Samuel F. B. Morse home in Poughkeepsie, New York. 28.110 21.125 14.250 7.125. Certificate. Don Stein, W2PTF, 3 Little Rd, Wappingers Falls, NY 12590.

Richmond, KY: Eastern Amateur Radio Society, KE4YVD. 1700Z to 2300Z **May 4**. At Old Ft Boonesborough honoring the discovery of Kentucky by Daniel Boone. 14.245 14.235 7.245 7.235. QSL. Eastern Amateur Radio Society, 156 Norton Dr, Richmond, KY 40475.

Martha's Vineyard, MA: The Fall River Amateur Radio Club, W1ACT. 1300Z **May 4** to 1700Z **May 5**. The 9th Annual Martha's Vineyard (IOTA NA-046) Weekend Expedition. HF, VHF, UHF and satellite. QSL. Mark Dieterich, N2PGD, 23 Naomi St, Bristol, RI 02089.

West Orange, NJ: Nutley Amateur Radio Society, W2GLQ. 1200Z **May 4** to 2100Z **May 5**. From the Edison Historical Labs, honoring the inventor of the light bulb, phonograph and many other devices that make our lives simpler. General portions of the 10-40 m bands (28.475). QSL. Nutley ARS, 169 Chestnut St, Nutley, NJ 07110.

Tobyhanna, PA: Eastern Pennsylvania Amateur Radio Association, N3IS. 1200Z to 1700Z **May 5**. 2002 MS Walkathon at Tobyhanna State Park. 14.310. QSL. Tom Clemens, W9OKA, PO Box 51, Delaware Water Gap, PA 18327.

Warsaw, IN: Hoosier Lakes Amateur Radio Club, K2BSA. 1300Z to 2100Z **May 5**. Celebrating Kosciusko District Spring Camporee. 14.280 14.260. Certificate. David B. Masterson, DC, W9UO, 309 Herscher Dr, Warsaw, IN 46580.

Batesburg-Leesville, SC: Ridge Amateur Radio Club, W4RRC. 1300Z to 2200Z **May 11**. South Carolina Poultry Festival. 14.225, 14.255. QSL. Clifton W. Gantt, W4CWG, 1254 Holly Ferry Rd, Leesville, SC 29070.

Teterboro, NJ: Bergen Amateur Radio Association, K2BAR. 1500Z to 2200Z **May 11**. Celebrating the 29th anniversary of the Aviation Hall of Fame and Museum of New Jersey, and the 39th anniversary of Bergen ARA. 10, 15, 20 m; 146.580 FM simplex. Certificate. Jim Joyce, K2BAR, 286 Ridgewood Blvd, Washington Township, NJ 07676.

Fairfield, CT: Fairfield ARA, WB1CQO. 1400Z **May 11** to 2000Z **May 12**. Celebrating the 67th annual Dogwood Festival. 28.366 21.366 14.266 7.266. Certificate. FARA, PO Box 486, Southport, CT 06490.

Fairmont, WV: The Mountaineer ARC, W8SP. 0000Z **May 11** to 2400Z **May 12**. Commemorating the first official observance of Mother's Day at the International Mother's Day Shrine in Grafton, WV. General 80, 40, 20, 15 m phone+ CW bands and Novice 10 m phone. Certificate. Charles T. McClain, K8UQY, Rt 4, Box 161, Grafton, WV 26354.

Madison, CT: CT Yankee Council BSA, K2BSA/1. 0000Z **May 11** to 1200Z **May 12**. CT Yankee Council Extravaganza 2002 (Camporee). 28.390 14.290 7.270 3.940. Certificate. Bruce Backer, WT1R, 272 Charles Ct, Orange, CT 06477.

Spartanburg, SC: Spartanburg Amateur Radio Club, K4JLA. 1400Z **May 11** to 2400Z **May 31**. Celebrating 50 years of continuous service in amateur radio. 7.270 14.270 21.370 28.370. Certificate. Spartanburg Amateur Radio Club, 104 Garner Rd, Spartanburg, SC 29303.

Twin Cities, MN: Amateur Radio Association of Bloomington, W0OEP. 1600Z **May 17** to 2400Z **May 18**. Pavek Museum of Broadcasting On the Air. 29.050 14.240 7.230 3.885. Certificate. Pavek Museum of Broadcasting, 3515 Raleigh Ave, St Louis Park, MN 55416; **www.pavekmuseum.org** .

St Louis, MO: American Archives Amateur Radio, KC8KGA. 1600Z **May 17** to 1600Z **May 19**. Commemorating the 75th Anniversary of Lindbergh's Flight from New York to Paris. 14.270 7.270. Certificate. Dave Langston, KB8RAP, c/o Maritz, 1000 Town Center, Southfield, MI 48170.

Idabel, OK: McCurtain County Amateur Radio Club (MCARC), K5OLO. 1400Z to 2300Z **May 18**. Idabel Centennial Celebration and Traveling Vietnam Wall. 28.325 14.325 7.275 14.055 CW. Certificate. Gary L. Brock, 1701 SE Ave N, Idabel, OK 74745.

Wheaton, IL: DuPage Amateur Radio Club, W9DUP. 1600Z to 2300Z **May 18**. Armed Forces Day. 145.25/145.65 28.400 14.290 7.250. Certificate. Robert B. Beatty, WB9HNS, DuPage ARC, PO Box 71, Clarendon Hills, IL 60514.

White River Junction, VT: Twin State ARC and area amateurs, W1FN. 1400Z to 2000Z **May 18**. Armed Forces Day 2002, honoring our service men and women. 28.360 21.360 14.260 7.260. Certificate and QSL. Karl Zuege, KB1DSB, 2176 Drake Rd, Bomoseen, VT 05732 05732.

Pierre, SD: Pierre Amateur Radio Club, W0PIR. 1700Z **May 18** to 0000Z **May 19**. Lewis & Clark Expedition. 28.440 14.250 7.250 3.950. Certificate. Gary Wallace, AA0CT, PO Box 1261, Pierre, SD 57501-1261. **rmrlent.dtgnet.com/parc/lcspec.html**.

St Charles, MO: St Charles Amateur Radio Club, K0LAC. 1300Z **May 18** to 2300Z **May 19**. 198th anniversary of the Lewis and Clark Expedition. 28.470 21.370 14.270 7.270, 3.970, CW up 60 on each band. QSL and Certificate. Mike McCrann, WD0GSY, 25 Elm Dr, St Peters, MO 63376.

Auburn, WA: Cascade Mountain Amateur Radio Society, WC7O. 0001Z **May 18** to 2300Z **May 25**. Commemorating those who died during the eruption of Mt St Helens. 28.360 24.960 21.360. QSL. Mark Selthofer, 35000 45th Ave S, Auburn, WA 98001.

Sturbridge, MA: Radio Operators for Missing Children and AMECO, KB1HGK. 1500Z to 2100Z **May 19**. International Missing Children's Day *Searching All Four Corners of the World*. General 40, 20 and 15 m band. Certificate. Radio Operators for Missing Children, KB1GK, c/o Lyceum Press & Gifts, 1 River Rd, Sturbridge, MA 01566. **www.lyceumpress.com**.

Camden, NJ: Battleship New Jersey Amateur Radio Station, NJ2BB. 1200Z to 2000Z **May 25**. 59th anniversary of the commissioning of USS *New Jersey BB62*. 28.462 21.362 14.262 7.262. QSL. Margaret Burgess, KB2BRR, 150 Schooner Ave, Barnagat, NJ 08005.

Chestertown, MD: Kent Amateur Radio Society, K3ARS. 1400Z to 2100Z **May 25**. Commemorating the Chestertown Tea Party of 1774. 28.340 14.240 7.240 7.040. Certificate. Paul Gerhardt, K3PG, 313 Chesterfield Ave, Centerville, MD 21617.

Meriden, CT: Meriden ARC, W1NRG. 1500Z to 2300Z **May 25**. Celebrating 54 years of ARRL affiliation. 28.375 21.375 14.275 7.275. Certificate. Meriden ARC, PO Box 583, Meriden, CT 06450. W1NRG is a 10-10 Castle Craig station.

Roanoke, VA: Roanoke Valley Amateur Radio Club, W4CA. 1400Z **May 25** to 2100Z **May 26**. Roanoke's Festival In The Park. 28.460 14.270 7.250. QSL. RVARC, PO Box 2002, Roanoke, VA 24009.

Waite Park, MN: Saint Cloud Amateur Radio Club, W0SV. 1800Z **May 25** to 1749Z **May 26**. Celebrating the Saint Cloud Amateur Radio Club's 80th Anniversary. 28.420 21.390 14.290 7.230. Certificate. W0SV, 401 N 4th St, Waite Park, MN 56387.

Baton Rouge, LA: USS *Kidd* ARC/Baton Rouge ARC, W5KID. 1400Z to 2200Z **May 27**. Honoring Memorial Day. SSB: 10, 15, 17, 20 m General band. QSL. W5KID, 305 River Rd, Baton Rouge, LA 70803.

Belleville, MI: Yankee Air Force Museum, W8YAF. 1200Z to 2000Z **May 27**. Observing Memorial Day at the Yankee Air Museum at Willow Run Airport. 7.270. Certificate. Frank A. Nagy, N8BIB, 24315 Waltz Rd, New Boston, MI 48164-1965.

Elgin, IL: Elgin Amateur Radio Society, W9IKN. 1300Z to 1800Z **May 27**. 25th Valley Foxtrot 10 Mile Run and the 800th Club Meeting. 147.525 50.130 14.240 7.240. Certificate. Elgin ARS, PO Box 1351, Elgin, IL 60121.

New Concord, OH: Cambridge Amateur Radio Association, Inc, W8VP. 1300Z to 2000Z **May 27**. Opening of John and Annie Glenn Museum and Historical Site. 14.270 7.245. QSL. Cambridge Amateur Radio Associaton, PO Box 1804, Cambridge, OH 43725.

Windsor, Berkshire, UK: Cray Valley Radio Society, Burnham Beeches Radio Society and the Radio Society of Great Britain, GB50. 0700Z-2200Z daily **May 29** to **Jun 9**. Celebrating the Queen's Golden Jubilee by Amateur Radio at Windsor Castle. 3.5 to 50 MHz CW, SSB, PSK31 and RTTY. QSL. Owen Cross, G4DFI, 28 Garden Ave, Bexleyheath, Kent DA7 4LF, Great Britain or via bureau. **www.gb50.com**.

Tupelo, MS: Tupelo Amateur Radio Club, KK5K. 2000Z **May 31** to 0500Z **Jun 2**. Celebrating the 4th Annual Elvis Presley Festival Special Event. 28.465 21.365 14.265 3.862. QSL. Tupelo Amateur Radio Club, 429 Goodlett St, Tupelo, MS 38804. QST

Maty Weinberg, KB1EIB ♦ Special Events

By Dan Henderson, N1ND
Contest Branch Manager

2001 ARRL International EME Competition Results

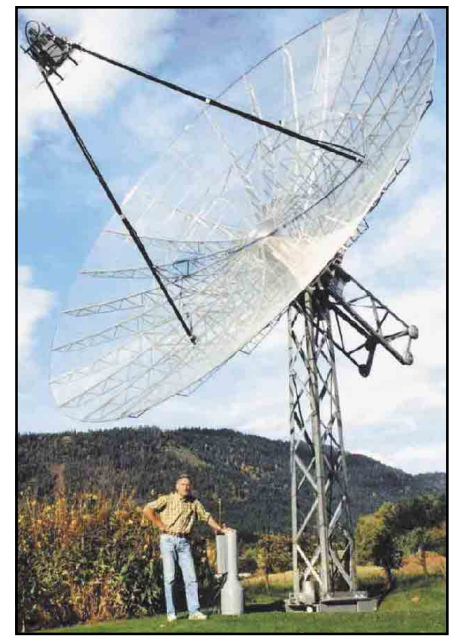
The Moon is the Earth's closest natural terrestrial neighbor. It's an average distance of 238,000 miles away and travels in its orbit at an approximate speed of 3700 miles per hour. Its diameter is about 2160 miles, about one-quarter that of the Earth.

For two weekends every fall, this moving target becomes the focus of high activity and much fun as hundreds of amateurs around the globe participate in the annual ARRL International EME Competition. Their imagination can be legendary as they push their creative talents to find an additional half dB that might mean the difference between a hard-earned complete QSO or a 10-minute exercise in futility.

In 2001, a total of 161 logs were received claiming a total of over 8400 QSOs completed on 6 VHF/UHF/microwave bands. While participation was down slightly from 2000, activity seemed good across the principal bands.

Because of the degree of technical skill required, you always seem to find familiar call signs leading the results. In the Single Operator Multiband category eight of the top 10 finishers from 2000 are found in the 2001 Top Ten in the category. Leading the pack was a 1-2-3 repeat of Gerald, K5GW (with a score of 1,731,600); Ernst, OE5EYM (1,574,400), and Stig, OZ4MM (1,548,800).

Francis, F5PAU, working on his antenna array before the start of the contest.

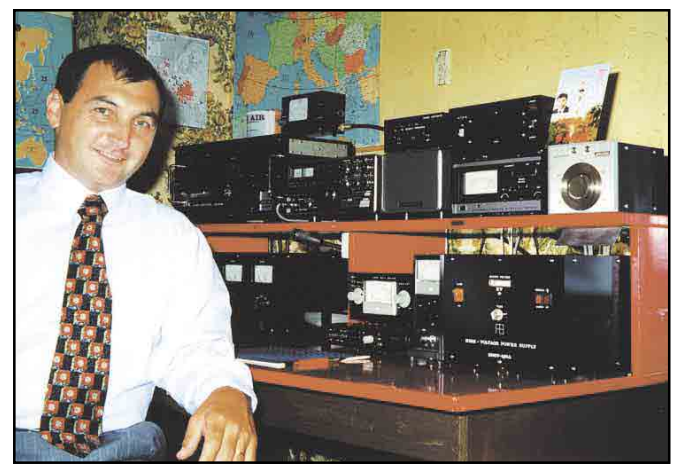


Philippe Pierrat, F2TU, and his 8-meter dish.

The 2001 Single Operator 144 MHz Top Ten finishers included 7 of the 2000 top finishers. After a second-place finish last year, Torborjn, SM5FRH, claimed top honors in 2001 with a score of 1,175,200. A score of 631,400 allowed Gianpaolo, I3DLI, to climb into second place this year after a fifth place in the last contest. Alexandr, RU1AA, improved one slot from fourth to third with a score of 516,600.

Returning as a three-peat winner in the Single Operator 432 Category is Jan, DL9KR, with a score of 381,600. Finishing strong on his heels once again is Mark, N2IQ, with a final count of 370,600. Six of the 2000 Top Ten made it back to the top of the 2001 list in the category. Gunther, DJ5NV, a newcomer to the box from 2000, took third place

The modest shack of Michael, DL1YMK, seems dwarfed by his 70 cm and 23 cm arrays.



Branimir, 9A9B, in front of his radios, ready for EME action.

Scores

Each line score lists call sign, score, stations worked, multipliers, and band (A = 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, I = 10 GHz).

Single Operator, Multiband

K5GW	1,731,600	130	39	B
		65	26	D
		27	13	E
OE5EYM	1,574,400	91	33	B
		46	23	D
		55	26	E
OZ4MM	1,548,800	27	18	B
		74	31	D
		68	32	E
		7	7	F
G3LTF	606,000	2	2	B
		38	25	D
		56	28	E
		5	5	F
SM3AKW	594,000	9	8	B
		43	24	D
		41	22	E
		6	6	F
F2TU	535,800	22	16	D
		53	24	E
		8	7	F
		3	3	H
		8	7	I
DK3WG	356,700	42	19	B
		45	22	D
JA6AHB	284,700	39	21	D
		34	18	E
EA3DXU	264,000	36	19	B
		30	21	D
W7SZ	141,900	15	12	D
		27	20	E
		1	1	I
DL1YMK	134,400	21	18	D
		21	14	E
HB9BHU	99,000	41	18	E
		4	4	I
S51ZO	83,200	17	14	B
		15	12	D
WB0GGM	82,500	11	9	B
		22	16	D
JA9BOH	69,300	24	15	B
		9	6	D
W4ZRZ	56,000	1	1	B
		27	19	D
YO2IS	47,500	11	7	B
		14	12	D
W4AD	44,200	14	9	B
		12	8	E
JH0WJF	11,000	7	6	B
		4	4	D

Single Operator, 144 MHz

SM5FRH	1,175,200	226	52	B
I3DLI	631,400	154	41	B
RU1AA	516,600	126	41	B
G3ZIG	494,000	130	38	B
DL1EJA	483,800	118	41	B
N5BLZ	464,100	119	39	B
DL5MAE	436,600	118	37	B
EA2LU	429,000	110	39	B
LZ2US	319,600	94	34	B
GM4JJJ	284,900	77	37	B
7K3LGC	266,800	92	29	B
VE3KH	254,100	77	33	B
SM5BSZ	189,000	63	30	B
WB9UWA	189,000	63	30	B
EA6VQ	180,900	67	27	B
W7FG	176,900	61	29	B
S52LM	167,400	62	27	B
OH3AWW	162,500	65	25	B
I3EVK	154,000	55	28	B
RN6MT	127,500	51	25	B
IK2DDR	123,900	59	21	B
OK1DIG	121,900	53	23	B
W0PT	114,400	44	26	B
EA2AGZ	101,200	44	23	B
DM2BHG	98,900	43	23	B
RA4AOR	93,600	39	24	B
SM7WSJ	89,700	39	23	B
PA3CWI	88,000	40	22	B
9A9B	85,100	37	23	B
DL2OM	72,000	36	20	B
K1CA	71,400	34	21	B
LA9NEA	68,400	36	19	B
JH2COZ	66,500	35	19	B
SP7DCS	63,000	30	21	B
I2RV	58,000	58	10	B
SM5CFS	55,800	31	18	B
SM0NKZ	46,400	29	16	B
YO2AMU	45,600	24	19	B
K6AAW	43,200	24	18	B
W3SZ	38,400	24	16	B
JR3REX	33,000	22	15	B
RA3QTT	27,000	18	15	B
PE1LWT	26,000	20	13	B
UA4ALU	26,000	20	13	B
K8BI	25,200	21	12	B
K6PF	24,700	19	13	B
K7XQ	22,800	19	12	B
SV1BTR	22,100	17	13	B
LU6KK	20,400	17	12	B
DL8UCC	18,000	15	12	B
IY1SP (I1ANP,op)				
	17,600	16	11	B
UR5LX	15,000	15	10	B
JH0MHE	13,600	17	8	B
RA1ZC	11,700	13	9	B
N0AKC	10,800	12	9	B
W0EKZ	7,200	9	8	B
N0KQY	7,000	10	7	B
KB5MY	4,000	8	5	B
W6TE	2,800	7	4	B
JF4TGO/8	2,500	5	5	B
K5TR	2,500	5	5	B
UA4AQL	2,500	5	5	B
NQ2O	1,800	6	3	B
PA3BUT	1,600	4	4	B
N2VR	400	2	2	B
YO3DMU	400	2	2	B
W7OE	100	1	1	B
WO9Z	100	1	1	B

Single Operator, 432 MHz

DL9KR	381,600	106	36	D
N2IQ	370,600	109	34	D
DJ5NV	329,800	97	34	D
K1FO	310,200	94	33	D
DF3RU	273,900	83	33	D
N9AB	267,300	81	33	D
DJ6MB	254,100	77	33	D
VK3UM	210,000	70	30	D
UA3PTW	186,000	60	31	D
K0RZ	170,800	61	28	D
EA8FF	148,200	57	26	D
S52CW	117,500	47	25	D
KL6M	108,000	45	24	D
K5WXN	105,800	46	23	D
DJ3FI	93,600	39	24	D
ON5OF/OQ5OF				
	73,500	35	21	D
JH4JLV	67,200	32	21	D
UT3LL	58,000	29	20	D
JJ1NNJ	55,100	29	19	D
7M2PDT	31,200	24	13	D
K9SLQ	30,400	19	16	D
DL4KG	30,000	20	15	D
SK0CC (SM5LE,op)				
	20,800	16	13	D
K6JEY	18,000	15	12	D
JA2TY	18,000	15	12	D
DL5LF	16,500	15	11	D

Single Operator, 1296 MHz

K5JL	297,500	85	35	E
K0YW	276,500	79	35	E
G4CCH	261,800	77	34	E
F6CGJ	213,900	69	31	E
KA0Y	194,300	67	29	E
HB9BBD	176,900	61	29	E
OZ6OL	165,200	59	28	E
F5PAU	156,000	52	30	E
K4QI	132,500	53	25	E
F1ANH	103,200	43	24	E
CT1DMK	74,000	37	20	E
JH5LUZ	64,600	34	19	E
EA3UM	63,000	35	18	E
F5HRY	54,400	34	16	E
F6ETI	52,700	31	17	E
DL4MUP	46,400	29	16	E
WA6PY	44,800	32	14	E
WA1JOF	36,400	26	14	E
WA4OFS	24,000	20	12	E
VK5MC	13,000	13	10	E
IK3COJ	4,800	8	6	E
K9ZZH	3,500	7	5	E

Single Operator, 2304 MHz

JA4BLC	2,500	5	5	F

Multioperator, Multiband

HB9Q (HB9CRQ,HB9DBM,HB9HLM, HB9AYX,ops)				
	2,921,100	131	43	B
		70	32	D
		72	32	E
JL1ZCG (JH1DYV,JR4ENY,JM7WXN, JA1MOH,JG1XLV,ops)				
	870,000	94	29	B
		56	29	D
S53J (S57EA,S56TZJ,ops)				
	178,200	49	28	B
		5	5	D
WD5AGO (+K5TTT,WB5YWI,N6CL, W6CL)	171,600	14	10	B
		3	3	D
		35	20	E

Multioperator, 144 MHz

I2FAK (+IK2LZT)				
	926,400	193	48	B
F3VS (+F8PKC)				
	855,600	186	46	B
KB8RQ (+N8DFN)				
	796,500	177	45	B
W5LBT (+W5UN)				
	483,600	124	39	B
KJ9I	370,000	100	37	B
W6YX (W6QI,AD6FP,W6LD,K6EEN,ops)				
	9,000	10	9	B
TI5KD (+N0KE)	100	1	1	B
PY2HCD (PY2PPZ,ZZ2WKT,ops)				
	100	1	1	B

Multioperator, 432 MHz

OH2PO (+OH6DD)				
	353,600	104	34	D
DL7APV (+DJ1SHF)				
	223,200	72	31	D
K4EME (+KR4V, AD4TJ, N4BCC)				
	71,400	34	21	D
F5KKD (F5PMB, F6GYH, ops)				
	4,900	7	7	D

Multioperator, 1296 MHz

DJ5MN (+DO6ME, DJ3MY, DK5MV)				
	143,100	53	27	E
W4OP (+W4SC)				
	54,400	32	17	E
LU8EDR (+LW5DX)				
	20,000	20	10	E
HA5SHF (HA5BGL,HA5BMU,ops)				
	12,000	15	8	E

Multioperator, 5760 MHz

OK1KIR (OK1DAI,OK1DAK,ops)				
	100	1	1	H

with a final score of 329,800.

The Single Operator 1296 MHz Category witnessed another three-peat champion as Jay, K5JL, won with a score of 297,500. The next two finishers, Bruce, K0YW, and Howard, G4CCH, returned to the Top Five box for the category with a score of 276,500 and 261,800, respectively. The final Single Band winner was on 2304 MHz with Yoshiro, JA4BLC, completing 5 QSOs on that challenging band for a score of 2500.

If, according to the old adage, two heads are better than one, then the various multioperator entries made good use of the extra ears and talents during the contest. The Multioperator Multiband winning entry was submitted by yet another repeat champion—the operators of the HB9Q station, who claimed a total of 2,921,100. In fact, all four of the entries received in this category finished in exactly the same place as 2000, with JL1ZCG (870,000), S53J (178,200) and WD5AGO (171,600) finishing 2-3-4, respectively.

There was a bit of shuffling among the top Multioperator 144 MHz entries. 2001 fourth-place finisher I2FAK leaped ahead of last year's champion to claim the category, denying F3VS the repeat victory by a score of 926,400 to 855,600. Last year's runner-up KB8RQ slipped one notch to third with a score of 796,500. The operators at OH2PO repeated as the top 432 MHz Single Band winner with a score of 353,600. The DJ3MN stations improved from a second place finish in 2000 to take top honors on in the 1296 MHz Multioperator category with a score of 143,100. Rounding out the winning Multioperator stations were the ops at OK1KIR, who snared the only QSO claimed by a Multioperator station on the 5760 MHz band.

The 2002 ARRL International EME Competition will be held over the weekends of October 26-27 and November 23-24. It takes somewhere between 2-3 seconds for a signal to be transmitted from the Earth, bounced off the Moon and return, to Earth. When you have to consider such things as Doppler shift, apogee and perigee, moonrise and tracking antennas, now is the time to start planning to participate. In many minds, competing in just *one* EME contest makes you a "top of the box" entry. QST

STRAYS

RADIO LINE-OF-SIGHT PLOT SERVER

◊ The line-of-sight plot server maintained by Matt Reilly, KB1VC, has a new Web address: **users.ren.com/acreilly/los_form.html**. This online tool was described in Matt's article "Radio Line-of-Sight Paths from the USGA Digital Elevation Database" in the September/October 2000 issue of *QEX*. By completing a simple form you can request and receive a GIF image that illustrates each point on the Earth between the starting point and ending point that you specify. This is particularly useful for VHF/UHF and microwave operators.—*Tom Frenaye, K1KI, ARRL New England Division Director*

Previous Strays

ARRL Field Day 2002 Rules

1. **Eligibility**: Field Day is open to all amateurs in the areas covered by the ARRL/RAC Field Organizations **and countries within IARU Region 2**. DX stations residing in other regions may be contacted for credit, but are not eligible to submit entries.

2. **Object**: To work as many stations as possible on any and all amateur bands (excluding the 30, 17, and 12-meter bands) and in doing so to learn to operate in abnormal situations in less than optimal conditions. A premium is placed on developing skills to meet the challenges of emergency preparedness as well as to acquaint the general public with the capabilities of Amateur Radio.

3. **Date and Time Period**: Field Day is always the fourth full weekend of June, beginning at 1800 UTC Saturday and ending at 2100 UTC Sunday. **Field Day 2002 will be held June 22-23, 2002**.

3.1. Class A and B (see below) stations that do not begin setting up until 1800 UTC on Saturday may operate the entire Field Day period.

3.2. Stations who begin setting up before 1800 UTC Saturday may work only 24 consecutive hours, commencing when on-the-air operations begin.

3.3. No Class A or B station may begin their set-up earlier than 1800 UTC on the Friday preceding the contest period.

4. **Entry Categories**: Field Day entries are classified according to the maximum number of simultaneously transmitted signals, followed by a designator of the nature of their individual or group participation. Below 30 MHz, once a transmitter is used for a contact on a band, it must remain on that band for at least 15 minutes. During the period, the transmitter is considered to be transmitting, whether it is or not, for the purpose of determining transmitter classification. Switching devices are prohibited.

4.1. **(Class A) Club / non-club portable**: Club groups (or a non-club group with three or more licensed amateurs) set up specifically for Field Day. Such stations must be located in places that are not regular station locations and must not use facilities installed for permanent station use, or use any structure installed permanently for Field Day use. Stations must operate under one call sign **(except if a dedicated GOTA station is allowed which must be operated under a call sign as provided later in these rules),** and under the control of a single licensee or trustee for the entry. All equipment (including antennas) must lie within a circle whose diameter does not exceed 300 meters (1000 feet). All contacts must be made with transmitter(s) and receiver(s) operating independent of commercial power mains. Entrants who for any reason operate a transmitter or receiver from a commercial main for one or more contacts will be listed separately.

4.1.1. Any Class A group whose entry classification is two or more transmitters may also operate one additional station without changing its base entry category, known as the GET ON THE AIR (GOTA) station.

4.1.1.1. This station must operate using a different call sign from the primary Field Day station.

4.1.1.2. The GOTA station may be operated by Novice, Technician or generally inactive hams under their existing operating privileges, or under the direction of a Control Operator with appropriate privileges, as necessary. Non-licensed persons may participate under the direct supervision of an appropriate control operator. A list of operators and participants must be included on the required summary sheet to ARRL HQ.

4.1.1.3. This station may operate on any valid Field Day band and mode. As per FCC rules, this station must have a valid control operator present if operating beyond the license privileges of the participant using the station.

4.1.1.4. The maximum transmitter output power for the GOTA station shall be 150 watts. If the primary Field Day group is claiming the QRP multiplier level of 5, the maximum transmitter output power of the GOTA station may not exceed 5 watts.

4.1.1.5. A maximum of 400 QSOs made by this station may be claimed for credit by its primary Field Day operation. A 100-point bonus may be claimed by the primary Field Day operation if the GOTA station reaches the 400 QSO level.

4.1.1.5.1. Any operator of the GOTA station is limited to completing a maximum of 100 QSOs for GOTA credit.

4.1.1.6. The GOTA station may operate on the Field Day HF and VHF Bands. However, only one transmitted signal is allowed from the GOTA station at any time (see Field Day rule 4).

4.1.1.7. The GOTA station does not affect the additional VHF/UHF station provided for under Field Day rule 4.1.2.

4.1.1.8. Participants are reminded that non-licensed participants working under the direction of a valid control operator may only communicate with other W/VE stations or with stations in countries with which the US has entered a third-party agreement.

4.1.2. Any Class A group whose entry category is two or more transmitters may also operate one additional transmitter if it operates exclusively on any bands or combination of bands above 50 MHz (VHF/UHF) without changing its basic entry classification. This station does not qualify for a 100-point bonus as an additional transmitter. This station may be operated for the entire Field Day period for the club and all contacts count for QSO credit. It is operated using the primary call sign of the Field Day group.

4.2. **(Class A-Battery) Club / non-club portable**: Club groups (or non-club groups with three or more licensed amateurs) set up specifically for Field Day, all contacts must be made using an output power of 5 W or less and the power source must be something other than commercial power mains or motor-driven generator (e.g.: batteries, solar cells, water-driven generator). Other provisions are the same for regular Class A.

4.3. **(Class B) One or two person portable**: Non-club stations set up and operated for Field Day purposes by no more than two licensed amateurs. Other provisions are the same for Class A. One and two person Class B entries will be listed separately.

4.4. **(Class B-Battery) One or two person portable**: Non-club stations set up and operated by no more than two licensed amateurs. All contacts must be made using an output power of 5 W or less and the power source must be something other than commercial mains or motor-driven generator. Other provisions are the same as Class A. One and two person Class B-Battery entries will be listed separately.

4.5. **(Class C) Mobile**: Stations in vehicles capable of operating while in motion and normally operated in this manner. This includes maritime and aeronautical mobile.

4.6. **(Class D) Home stations**: Stations operating from permanent or licensed station locations using commercial power. Class D stations may only count contacts made with Class A, B, C and E Field Day stations.

4.7. **(Class E) Home stations - Emergency power**: Same as Class D, but using emergency power for transmitters and receivers. May work stations in Class A, B, C, D, and E.

5. **Exchange**: Stations in ARRL / RAC sections will exchange their Field Day operating Class and ARRL / RAC section. Example: a three transmitter class A station in Connecticut which also has a GOTA station and one VHF station would send "3A CT" on CW or "3 Alpha Connecticut" on phone. **DX stations send operating class and the term DX (i.e., 2A DX).**

6. **Miscellaneous Rules**

6.1. A person who participates by making a QSO from one Field Day operation may not subsequently work the station from which he participated using a different call sign.

6.2. A station used to contact one or more Field Day stations may not subsequently be used under any other call sign to participate in Field Day. Family stations are exempt provided the subsequent call sign used is issued to and used by a different family member.

6.3. Each Phone, CW and Digital (non-CW) segment is considered a separate band. A station may only be worked once per band.

6.4 All voice contacts are equivalent.

6.5. All non-CW digital contacts are equivalent.

6.6. Cross-band contacts are not permitted.

6.7. The use of more than one transmitter at the same time on a single band-mode is prohibited. Exception: a dedicated GOTA station may operate as prescribed in rule 4.1.

6.8. No repeater contacts are allowed.

6.9. Batteries may be charged while in use. Except for class D stations, the batteries must be charged from a power source other than commercial power mains.

W1AW Field Day Bulletin Schedule

Day	*Mode*	*Pacific*	*Mountain*	*Central*	*Eastern*
Friday	CW	5 PM	6 PM	7 PM	8 PM
	Teleprinter	6 PM	7 PM	8 PM	9 PM
	Phone	6:45 PM	7:45 PM	8:45 PM	9:45 PM
	CW	8 PM	9 PM	10 PM	11 PM
Saturday	CW	7 AM	8 AM	9 AM	10 AM
	Phone	8 AM	9 AM	10 AM	11 AM
	CW	5 PM	6 PM	7 PM	8 PM
	Teleprinter	6 PM	7 PM	8 PM	9 PM
	Phone	6:45 PM	7:45 PM	8:45 PM	9:45 PM
Sunday	CW	7 AM	8 AM	9 AM	10 AM
	Phone	8 AM	9 AM	10 AM	11 AM
	PSK31	9 AM	10 AM	11 AM	12 PM

W1AW will operate on the regularly published frequencies. The special PSK31 bulletin will be transmitted on the regular W1AW frequencies.

7. **Scoring**: Scores are based on the total number of QSO points times the power multiplier corresponding to the highest power level under which any contact was made during the Field Day period plus the bonus points.

7.1. **QSO Points**

7.1.1. Phone contacts count one point each.

7.1.2. CW contacts count two points each.

7.1.3. Digital contacts count two points each.

7.2. **Power multipliers**: The power multiplier that applies is determined by the highest power output of **any** of the transmitters used during the Field Day operation.

7.2.1. If **all** contacts are made using a power of 5 watts or less and if a power source other than commercial mains or motor-driven generator is used (batteries, solar cells, water-driven generator) the power multiplier is 5.

7.2.2. If all contacts are made using a power of 5 watts or less, but the power source is from a commercial main or from a motor-driven generator, the power multiplier is 2.

7.2.3. If any or all contacts are made using an output power up to 150 watts or less, the power multiplier is 2.

7.2.4. If any or all contacts are made using an output power greater than 150 watts, the power multiplier is one.

7.2.5. Only one power multiplier may be applied to the score of any entry.

7.3. **Bonus Points**: The following bonus points will be added to the score, after the multiplier is applied, to determine the final Field Day score. **Only Class A and B stations are eligible for bonus points.** Bonus points will only be applied if the claim is made on the summary sheet and any proof required is enclosed with the entry.

7.3.1. **100% Emergency Power**: 100 points per transmitter classification if all contacts are made only using an emergency power source. Free transmitters that do not count towards the group's total do not qualify for bonus point credit. All transmitting equipment at the site must operate from a power source completely independent of the commercial power mains to qualify. (Example: a club operating 3 transmitters plus a GOTA station and using 100% emergency power receives 300 bonus points.)

7.3.2. **Media Publicity**: 100 bonus points may be earned for attempting to obtain publicity from the local media. A copy of the press release, or a copy of the actual media publicity received (newspaper article, etc) must be submitted to claim the points.

7.3.3. **Public Location**: 100 bonus points for physically locating the Field Day operation in a public place (shopping center, community park, school campus). The intent is for amateur radio to be on display to the public.

7.3.4. **Public Information Table**: 100 bonus points for a Public Information Table at the Field Day site. The purpose is to make appropriate handouts and information available to the visiting public at the site. A copy of a visitor's log, copies of club handouts or photos is sufficient evidence for claiming this bonus.

7.3.5. **Message Origination to Section Manager**: 100 bonus points for origination of a National Traffic System (NTS) style formal message to the ARRL Section Manager or Section Emergency Coordinator by your group from its site. You should include the club name, number of participants, Field Day location, and number of ARES operators involved with your station. The message must be transmitted during the Field Day period and a fully serviced copy of it must be included in your submission, in standard ARRL NTS format, or no credit will be given.

7.3.6. **Message Handling**: 10 points for each formal NTS style originated, relayed or received and delivered during the Field Day period, up to a maximum of 100 points (ten messages). Properly serviced copies of each message must be included with the Field Day report.

7.3.7. **Satellite QSO**: 100 bonus points for successfully completing at least one QSO via an amateur radio satellite during the Field Day period. Under the "General Rules for All ARRL Contests" (rule 3.7.2.), the no-repeater QSO stipulation is waived for satellite QSOs. Groups are allowed one dedicated satellite transmitter station without increasing their entry category. Satellite QSOs also count for regular QSO credit. Show them listed separately on the summary sheet as a separate "band."

7.3.8. **Alternate Power**: 100 bonus points for Field Day groups making a minimum of five QSOs without using power from commercial mains or a petroleum driven generator. This means an "alternate" energy source of power, such as solar, wind, methane or water. This includes batteries charged by natural means (not dry cells). The natural power transmitter counts as an additional transmitter. If you do not wish it to increase your operating category, you should take one of your other transmitters off the air while the natural power transmitter is in operation. A separate list of natural power QSOs should be submitted with your entry.

7.3.9. **W1AW Bulletin**: 100 bonus points for copying the special Field Day bulletin transmitted by W1AW during its operating schedule during the Field Day weekend (listed in this rules announcement). An accurate copy of the message is required to be included in your Field Day submission. (Note: The Field Day bulletin must be copied via Amateur Radio. It will not be included in Internet bulletins sent out from Headquarters and will not be posted to Internet BBS sites.)

7.3.10. **Non-Traditional Mode Demonstrations**: A maximum of 300 bonus points (100 points for each demonstration up to three) for setting up a demonstration of a non-traditional mode of amateur radio communications. This includes modes such as APRS, ATV and SSTV. This bonus is not available for demonstration of a mode for which regular QSO credit is available, such as PSK31.

7.3.10.1. A portable packet system may be included as one of the demonstration modes. This system must include a temporary, portable node separate from the existing packet infrastructure of your area.

7.3.11. **Site Visitation**. A 100 point bonus may be claimed if your Field Day sight is visited by an elected government official or representative of an agency served by ARES in your local community (Red Cross, Salvation Army, local Emergency Management, law enforcement, etc) as the result of an invitation issued by your group.

7.3.12. GOTA maximum achieved. A 100-point bonus may be claimed by a group whose GOTA station completes the maximum allowable 400 QSOs.

8. **Reporting**:

8.1. Entries must be postmarked or e-mailed by **July 23, 2002**. No late entries can be accepted. A complete entry consists of:

8.1.1. An official ARRL summary sheet (or reasonable facsimile) which is completely and accurately filled out;

8.1.2. A list of stations worked by band/mode during the Field Day period (dupe sheet or an alpha/numeric list sorted by band and mode);

8.1.3. Proofs of bonus points claimed (copies of visitor logs, press releases, NTS messages handled, photographs, etc)

8.2. Complete station logs are not required for submission. The club should maintain log files for one year in case they are requested by ARRL HQ.

8.2.1. Cabrillo format log files are not required for Field Day entries.

8.3. Electronic submissions should be e-mailed to **FieldDay@arrl.org** and should include, as attachments to the e-mail, the required summary sheet and dupe files as well as document files and/or jpg/gif files of any bonus points claimed.

8.4. Paper submissions should be mailed to: Field Day Entry, ARRL, 225 Main St, Newington, CT 06111

9. **Miscellaneous**

9.1. The list of bulletin times for W1AW is included in this announcement. While W1AW does not have regular bulletins on weekends, the Field Day message will be sent according to the schedule included with this announcement.

9.2. See "General Rules for All ARRL Contests," "General Rules for All ARRL Contests on Bands Below 30 MHz," and "General Rules for All ARRL Contests on Bands Above 50 MHz" (November 2001 *QST*) for additional rules.

9.3. Remember that the national simplex FM calling frequency of 146.52 MHz should not be used for making Field Day contacts.

9.4. The complete Field Day information package may be obtained by:

9.4.1. Sending an SASE with 4 units of postage to: Field Day Information Package, ARRL, 225 Main St, Newington, CT 06111;

9.4.2. By downloading from the Contest Branch home page at **www.arrl.org/contests/forms**.

9.5. For additional Field Day information or questions, contact **contests@arrl.org** or phone 860-594-0232.

GOTA: The Get On The Air Station!

The old Novice/Technician station from previous years has been replaced by a GET ON THE AIR (GOTA) station. The GOTA station will allow Novice, Technicians, and generally inactive hams a chance to GET ON THE AIR to help the group's Field Day effort. Non-licensed persons may also participate in the GOTA station, under the direct supervision of an appropriate control operator. Please review Field Day Rule 4.1.1. for information on the new GOTA station. You may complete up to 400 QSOs to your group's score with the GOTA station. In addition, any group that meets the 400 QSO goal from the GOTA station will also gain an additional 100-point bonus.

IARU Region 2 Invited to Participate Fully in Field Day 2002

You have always been able to work DX stations during Field Day. At a recent meeting, the ARRL Board of Directors voted to invite all of IARU Region 2 formally to participate in the annual ARRL Field Day. **DX stations from across Region 2—encompassing North and South America—are now invited to fully participate and submit scores to the ARRL for inclusion in the results.** DX stations should give as their sent exchange their entry category (just like W/VE participants) as well as the designation "DX"—in lieu of an ARRL section. Also, remember that third-party agreements must be observed.

See "Up Front in *QST*," this issue, for information on this year's T-shirts and pins, which feature a new "Region 2" logo.

2002 ARRL June VHF QSO Party Rules

1. **Object**: To work as many amateur stations in as many different 2 degrees × 1 degree grids as possible using authorized frequencies above 50 MHz. Foreign stations work W/VE amateurs only.

2. **Date and Contest Period**: The second full weekend in June. Begins 1800 UTC Saturday, ends 0300 UTC Monday (**June 8-10, 2002**).

3. **Entry Categories**:
   3.1. Single Operator.
   3.1.1. Low Power
   3.1.2. High Power
   3.2 Single Operator Portable.
   3.3. Rover.
   3.4. Multioperator.
   3.5. Limited Multioperator.

4. **Exchange**: Grid locator (see April 1994 *QST*, p 86).
   4.1. Exchange of signal report is optional.

5. **Scoring**:
   5.1. QSO points:
   5.1.1. Count one point for each complete 50- or 144-MHz QSO.
   5.1.2. Count two points for each 222- or 432-MHz QSO.
   5.1.3. Count three points for each 902- or 1296-MHz QSO.
   5.1.4. Count four points for each 2.3 GHz (or higher) QSO.
   5.2. Multiplier: The total number of different grids worked per band. Each 2 degrees × 1 degree grid counts as one multiplier on each band it is worked.
   5.3. Final score: Multiply the total number of QSO points from all bands operated by the total number of multipliers for final score.
   5.4. Rovers only: The final score consists of the total number of QSO points from all bands times the sum of unique multipliers (grids) worked per band (regardless of which grid they were made in) plus one additional multiplier for every grid from which they successfully completed a contact.
   5.4.1. Rovers are listed in the contest score listings under the Division from which the most QSOs were made.

6. **Reporting**:
   6.1. Electronic submissions may be e-mailed to **JuneVHF@arrl.org** and handwritten paper logs or diskettes mailed to June VHF, ARRL, 225 Main St, Newington, CT 06111.
   6.2. Entries that have been electronically generated must submit their log file in the Cabrillo file format. Paper printouts of electronic files are not acceptable substitutes.
   6.3. Entries must be e-mailed or postmarked no later than July 10, 2002. Late logs may be designated as check-logs only.

7. **Miscellaneous**:
   7.1. Stations may be worked for credit only once per band from any given grid square, regardless of mode. This does not prohibit working a station from more than one grid with the same call sign (such as a Rover).
   7.2. Only permitted one signal per band (6, 2, 1¼, etc) at any given time is permitted, regardless of mode.
   7.3. Multioperator stations may not include QSOs with their own operators except on frequencies higher than 2.3 GHz. Even then, a complete, different station (transmitter, receiver and antenna) must exist for each QSO made under these conditions.
   7.4. Forms may be obtained by:
   7.4.1. Downloading from the Internet at the Contest Branch Web site: **www.arrl.org/contests/forms**.
   7.4.2. Sending an SASE to June VHF Form Request, ARRL, 225 Main St, Newington, CT 06111.

8. **Awards**: Certificates will be awarded in the following categories:
   8.1. Single operator.
   8.1.1. Top single operator low and high power in each ARRL/RAC Section.
   8.1.2. Top single operator low and high power on each band (50, 144, 222, 432, 902, 1296 and 2304-and-up categories) in each ARRL/RAC Section where significant effort or competition is evident. (Note: Since the highest score per band will be the award winner for that band, an entrant may win a certificate with additional single-band endorsements.) For example, if W1INF has the highest single-operator all-band score in the CT Section and his 50- and 222-MHz scores are higher than any other CT single operator's, he will earn a certificate for being the single-operator Section leader and endorsements for 50 and 222 MHz.
   8.2. Top single-operator, QRP portable in each ARRL/RAC Section where significant effort or competition is evident. (Single-operator, QRP portable entries are not eligible for single-band awards.)
   8.3. Top Rover in each ARRL Division and Canada where significant effort or competition is evident. (Rover entries are not eligible for single-band awards.)
   8.4. Top multioperator score in each ARRL/RAC Section where significant effort or competition is evident. (Multioperator entries are not eligible for single-band awards.)
   8.5. Top limited multioperator in each ARRL/RAC Section where significant effort or competition is evident. (Limited multioperator entries are not eligible for single-band awards.)
   8.6. Plaques, if sponsored, will be awarded in the following categories:
   8.6.1. Top 10 Single Operator (both High and Low Power) scorers.
   8.6.2. Top 5 Single Operator QRP Portable scorers.
   8.6.3. Top 5 Rover scorers.
   8.6.4. Top 10 Multioperator scorers.
   8.6.5. Top 5 Limited Multioperator scorers.

9. **Other**:
   9.1 See "General Rules for All ARRL Contests" page 101 and "General Rules for ARRL Contests on bands above 50 MHz (VHF)" page 103 in November 2001 *QST*.
   9.2. For more information, queries or questions contact **contests@arrl.org** or 860-594-0232. QST

ARRL Contest On-Line Soapbox

Have an interesting story to share about your participation in the June VHF QSO Party? Want to share your experiences with Mr. Murphy or brag about setting a new personal best score? Have an interesting photograph take during the contest?

Now you have a chance. All participants are invited to share their contest-related stories, experiences and photographs in the new **ARRL Contest On-Line Soapbox**. This is a site for you—the participant—to post your thoughts on the Web. You can find the site at **www.arrl.org/contests/soapbox/**. It will serve as a permanent archive for much of the related information on all ARRL contests.

When you visit the site, use the dropdown box to select which ARRL contest that you wish to visit. Members and non-members alike may make posts to the site. We encourage you to particularly share stories that may help attract the interests of new hams or those who might like to try contesting. Use the site to gain information or maybe just enjoy a nice reflection of the fun you had during the contest weekend.

Questions about the ARRL Contest On-Line Soapbox may be addressed to Dan Henderson, N1ND, ARRL Contest Branch Manager at **n1nd@arrl.org** or by phone at 860-594-0232.

NEW PRODUCTS

ATOMIC CLOCKS FROM MFJ

◊ Large, small. portable or wall-mount, the new line of Atomic Clocks from MFJ contains an accurate timepiece that fits your personal and ham radio needs. Models 121, 122, 124 and 130RC have a variety of features, including, multiple time zones, battery and ac power, alarms, temperature readouts, time zone maps and more.

Prices range from $19.95 to $69.95. 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**. QST

Previous New Products

SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WB0JJX—It's with a heavy heart that I pass on that Terry Williams, N3HTX, has become a Silent Key. Terry was an active ham and frequent participant in the public service events in New Castle County, and a past-president of the DRA. Our condolences to Terry's family and his many friends. He will be missed. Field Day is just around the corner, but it's not too late to get involved. If your club does not have the resources to field a group for the full 24 hours, consider planning a club picnic and operating for just a few hours. The idea here is to have some fun, so it's not really necessary to run the full 24 hours to participate. If your club is participating, please drop me a note as to your location. I try to get around to as my sites as I can. Traffic (Feb)DTN 140 QTC 11 in 20 sess. DEPN QNI 33 QTC 1 in 4 sess. K3JL 39, WB0JJX 5.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL — SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. BM: Fredric Serota, K3BHX. OOC: Alan Maslin, N3EA. PIC: Robert Josuweit, WA3PZO. STM: Vacant. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO. Pietro DeVolpi, K3PD. L. James Biddle, W3DCL, George Law, N3KYZ, Vincent Banville, WB3YGA. DXCC Card Checker E. Pa.: Glenn Kurzenknabe, K3SWZ. In the March "Section News" article I erred. My invitation to the March 6th Lycoming County EOC was headed by EMA Director Les Gruver, N3LEQ and John Rymell N3PFF. My visit to Lycoming County was very memorable. Phil Wheeler, N3XGT, EC for Berks County accompanied me on the trip and was equally impressed. My most hearty Thank You to Les and John for such a memorable visit. The visit may well be more beneficial for quite a few Hams. I came away from that meeting with two projects. Without going into any details at this early stage let me just say that one of the ideas may well benefit Amateurs all across the country and the second idea will certainly benefit Amateurs involved in Emergency Communications throughout the Commonwealth. I suppose that it would only be fair to say that the trip was not exactly perfect. The flaw came when during the talk-in we were advised to watch for the building on the right about 300 yards off the road with all of the antennas - it was dark out and no lights on the tower. We found the place anyhow. Thanks to Les and John and all of the other members of the group who made the long trip very worthwhile. Thanks also to all of the members of the Holmesburg ARC, Philadelphia who provided a warm welcome to their club meeting on February 28th. Speaking of outstanding efforts... The Chester County Emergency Services switched from their old radio system to their new 800 MHz system. Information from CCAR "Backskatter" says that no less than 43 Amateurs gave up a large part of a weekend to assist in the effort. As a long time Amateur Radio Emergency Communications volunteer and a professional in the field of emergency services each and every one of the persons involved in the effort in Chester County are worthy of the highest praise of all. The changeover for the County Emergency Services went smoothly which meant that the Amateur operators that were on stand-by had very little to do. Everyone remained at his or her posts throughout the project. Tfc: K3BCL 577, W3IPX 267, N3EFN 171, N3SW 147, W3HK 122, W3NNL 79, W3UAQ 62, W3OKN 48, W3TWV 27, N8JSO 21, KB3CEZ 15, KB3BBR 15, W3JKX 15, KB3CVO 13, KA3LVP 9, N3AO 8, AD3X 5, KB3DDL 4, N3AS 3, KB3CKD 3, W3ZXE 3, N3HR 1:Net Reports; EPA 148, EPAEPTN 129, PTTN 95, PFN 88, LCARES 12, MARCTN 12, SEPPTN 8, CATN 8, D3ARES 2, MARCTN 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. Congratulations to the new Southern Maryland APRS Group for their ARRL affiliation! ANAR EC N3SEO reports 47 members and 4 sessions of the ANAR ARES. Newly appointed AECs include N3WOF & AA3XY. New ANAR ARES/RACES Webmaster is N8ECG.CALV EC N3HQC reports 24 members and 4 sessions of the CALV ARES Net on 146.985. CALV is teaching Morse Code on Tuesday evenings for those working to upgrade their license. Acting CARR EC WX3F reports 31 members and 4 net sessions of the CARET Net. Attendees at the Jan meeting include WX3F, N5LBJ, N3XLY, KB3CAW, N3YIM, N0NYY, KB3HKG, KB3HHK, N3UN, & KE3VIN. CARR ARES/RACES is conducting message training by voice & Packet. CHAR EC KA3GRW reports 26 members and 4 sessions of the Charles County Emergency Services Net. Participants in this month's RACES COMEX included KE3RE, N3YRZ, KB3FQE, N3YWZ, and KA3GRW. KENT EC WA6LHQ reports 20 members and 4 sessions of the KARS Net on 147.375. WASH EC KD3JK reports 70 members 4 sessions of the 4 States Net and the ARES/RACES Net each and one training session. WASH RACES participated in a combined EOC and Airport Drill on April 20. SEC WA1QAA reports conducting a traffic handing class in PRGE on Feb 16. Attendees included KT3D, WA3TMC, KB3HDV, KB3ELA, KB3DVC, K3WLW, W3TOM, KB3BWR & WI3N. 73, de Tom. With the Nets:- Net/Net Mgr/QND/QTC/QNI: MSN/KC3Y/28/57/363, MEPN/N3WKE/28/87/412, MDD/WJ3K/52/130/534, MDD top brass K3JL 150, AA3SB 144, W2YVQ 105, BTN/AA3LN/28/47/334. Tfc: KK3F 1769, AA3SB 134, W3YVQ 89, AA3GV 86, N3WKE 54, K3CSX 43, KC3Y 42, N3WK 32, KB3GFC 22, W3CB 17, WA1QAA 17, N3ZKP 9, WA3GYW 4. PSHR: KK3F 225, AA3SB 156, W3YVQ 148, N3WKE 133, WA1QAA 112, N3WK 109, AA3GV 103, W3CB 96, N3ZKP 90, K3CSX 90, KC3Y 78, KB3GFC 73.

NORTHERN NEW YORK: SM, Thomas A. Dick, KF2GC—http://www.northnet.org/nnyham. E-mail: kf2gc@arrl.org ASMs: WB2KLD, WZ2T, N2ZMS, WA2RLW. ACC: WA2JPM. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: WN2F. STM: N2ZGN. TC: N2JKG. NNY had a nice Breakfast Mtg. at the Clarkson Tech. College in Potsdam, NY where I meet with many Amateurs in our NNY-Section. Many thanks to Bill Plunkett & NCRC - K2CC, the cafeteria crew and making us feel right at home. It was an informal mtg. and lots of new friends were made and the diversity of conversations abounded. Nice to hear Amateurs are interested in ARES / RACES and are taking the new courses in Emergency communication courses offered by the ARRL. We also look forward to the Rochester Hamfest 2002. We look forward to many amateurs getting involved in our own Lake Placid Hamfest 2002. The Next NNYARA Mtg. will be in Plattsburgh, NY at the EOC at 11 AM, April, 27. Test Session at EOC in Plattsburgh, NY 10:00 AM, April 6 for information or special accommodations contact wn2f@arrl.net. The Schoharie County Amateur Radio Assoc. (WA2ZWM) and the Cotton Hill VHF Group (WB2UEE) will be running a license class starting 8 April 2002. The class will follow "Now You're Talking". Mainly for entry level but will also offer CW instruction. Dates are 8,15,29 of April, 6,13,20,27 of May, 3,10,17 of June with VE Session on the June 24. "Practical Application Session" is 22-23 June. Info-from WB2KLD at 827 4800, wb2kld@arrl.net or valosin@midtel.net.

SOUTHERN NEW JERSEY: SM, Jean Priestley KA2YKN (@K2AA)e-mail ka2ykn@voicenet.com ASM: W2BE K2WB W2OB N2OO N2YAJ N2XYZ. SEC: KC2GID. STM: K2UL. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. TC: W2EKB. TS: W2PAU. WB2MNF AA2BN KD4HZW WB3IJB WA2NBL N2QNX N2XFM. A combined effort of SNJ and NNJ was successful in getting AMATEUR RADIO on our call sign license plates and the bill was signed Dec 27, 2001. It went into effect Jan 26, 2002. We now embark on how PRB-1 fits into NJ politics and better explain Amateur Radio's role in emergency communications. It's time to start Field Day plans, a 24-hr"in the field" emergency preparedness drill. This year let's remember "911". It could have been us. Also, we can be a part of Homeland Security by just being alert. Tfc-Feb. QNI RPTS. NJM 52 WA2OPY NJPN 166 W2CC NJSN 192 K2PB NJN (E) 202 AG2R NJN(L) 135 AG2R MCCNTS 60 KB2YJD JSARS 540 K2ATQ SJTN 67 KB2RTZ SJVN 225 WB2UVB (late from Jan 226). SAR: K2UL 118, KB2RTZ 58, WA2CUW 56, WB2UVB 55, AA2SV 53, K2UL-4 35, WJ2F 18, N2VQA 16, N2WFN 16, KA2CQX 9, KB2VYZ 8, KB2YJD 8, KA2YKN 5, W2AZ 4, KB2YBM KB2VSR KC2ETU 1. PSHR. KB2RTZ 205, K2UL 167, WB2UVB 156, AA2SV 122, KA2CQX 106, WA2CUW 101, KB2YJD 88, N2HQL 85, WJ2F 81, KA2YKN 78, N2VQA 70. PUT YOUR CALL HERE.

WESTERN NEW YORK: SM, Scott Bauer, W2LC— Congratulations to Al, N2CCN, on becoming a new Assistant Section Manager for WNY to compliment Al's Section Emergency Coordinator's position. Al has been a great help to me in many areas. The Skyline ARC reports that Vestal High School students contacted Dan, KD5PNU, who used call sign NA1SS on the International Space Station. Richard, N2SPI, set the radio station up for the students and Vestal HS science teacher Chris Livingstone, who was quoted saying, "it was a wonderful experience." It's great to hear about your success! The Pioneer Radio Operators Society reports a well-deserved congratulations are due to Duane, AA2JI, for 20 years of continuous service with MARS the Military Affiliate Radio Service. Binghamton ARA officers: George K2CM Pres, Bob KC2DSS VP, Ed NE2W Sect, Paul N2NCB Tres, and directors Bob K2FU, Ed KB2SCF, Ron N2RWK, Mel WE2K. 99 members and an excellent club! They do just about everything from ARES, to public service, contesting, a great hamfest, a scholarship, and Skywarn. I'm sure I missed a few things, too! Thank you to the South Towns ARS for supporting your community and the Parish Outreach Office of the Church Saints Peter and Paul in Hamburg. A non-radio contribution to their community at Christmas to families and kids in need. Remember, if your antennas didn't blow down in those early March winds, they're not big enough. Hamfests: May 4, Owego Hamfest, Tioga County Marvin Park Fairgrounds in Owego, Binghamton ARA. May 31, June 1,2 the Rochester Hamfest, and ARRL Atlantic Division Convention, at the Monroe County Fairgrounds, Route 15A and Calkins Rd, sponsored by the Rochester Amateur Radio Association (RARA). June 15, Cortland Hamfest, Cortland County Fairgrounds, Skyline ARC. Net Summaries (Feb 2002): Net Manager (Sessions) QNI QSP. Sessions in () if less than 28. BRVSN N2OYQ 142 9; CNYTN WA2PUU 327 55; EBN WB2IJZ (20) 327 0; ESS WI2G 420 144; NYPHONE N2LTC 260 395; NYPON N2YJZ 413 132; NYS/E WB2QIX 301 157; NYS/L W2YGW 224 160; NYS/M KA2GJV 154 25; NYSCN W2MTA (4) 18 5; NYSPTEN WB3CUF 354 43; OARCN N2KPR (4) 45 5; OCTEN/E KA2ZNZ 1237 258; OCTEN/L KA2ZNZ 532 220; OMEN N2UC (1) 15 1; STAR N2NCB 322 25; TIGARDS W2MTA (4) 22 3; WDN/E N2JRS 401 62; WDN/L W2GUT 391 66; WDN/M KA2IWK (8) 106 10. Traffic (Feb 2002), * for PSHR, # for BPL: N2LTC#* 1419, KA2ZNZ#* 510, WB2IJH* 369, KA2GJV* 352, W2MTA* 276, WI2G* 154, KB2KOJ* 153, WB2QIX* 112, NN2H* 79, W2LC* 71, KC2EOT* 62, KG2D* 60, KB2SNP* 58, KB2CCD 56, KA2DBD* 54, N2CCN* 54, W2PII 42, KA2IWK* 41, KB2ETO* 41, W2GUT* 37, KC2HUZ* 31, N2JRS* 29, W2RH 28, WA2GUP* 22, KA2BCE* 20, N2WDS* 18, AF2K* 18, KG2HA* 2. Digital, Rx/Tx: KA2GJV 22/0, N2LTC 462/324.

WESTERN PENNSYLVANIA: SM, John Rodgers, N3MSE. ASM: N3MYZ. SEC: N3SRJ. ASM-ARES: WB3KGT. ASM-Packet: KE3ED. OOC: W3ZPI. PIC: W3CG. STM: N3WAV. TC: WR4W. DEC: N3YEA, DEC-SO: KD3OH. DEC-N1: KB3A. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: (vacant). DEC-Rapid Response: N3ZZI. DEC-OES: K3TB. Once again this year Sally, N3MYZ, and I plan to travel throughout the section to visit various Field Day sites. Our section is extremely large and we try to cover a different portion each year. If you are interested in having us visit your field day location please let me know the details of your activities. If your club would like to have me attend a club function as a guest speaker, please contact me to arrange a date and time. I am very happy to see the high number of people in the Western Pennsylvania section that are participating in the online emergency communications courses. These courses are highly beneficial to those individuals that are looking to further peak their communications skills. Discussion is underway to conduct a one or two day emergency certification class in the section. I will report on the possibility of doing this as more details become finalized. Once again this year we will have a Western Pennsylvania Section convention. This will be held in conjunction with the Butler County Amateur Radio Association hamfest on September 8 at the Butler Farm Show grounds. More information will be available in *QST* in the coming months. I also would like to encourage everyone to participate in their local and district emergency nets. It is not only good training but a way to show your support of the ARES program. Section traffic net is at 6 PM on 3983 daily. 73 de John Rodgers, N3MSE, WPA-SM n3mse @arrl.org.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W: KB9AIL. Members of the Argonne ARC recently received training from the National Weather Service for the SKYWARN program. The St Clair ARC has named N9UDY, KA9ZAV, and KA9YZS as honorary members for 2002. The award was in recognition of their dedication and support for the club. The Belleville *News-Democrat* featured amateur radio in a recent issue. The February issue of their newsletter had a nice article by KB9UMF on antique radio collecting. N9YAY gave an interesting talk on wireless communications technology at a recent meeting of the Jacksonville ARS. The North Shore RC had an interesting program on wireless broadband technology. The club now has a new e-mail reflector on yahoogroups. The Illinois Repeater Association held its annual meeting on April 20 in Bloomington. This year two directors were elected. As of the February IRA newsletter, over 80 repeater operators had not responded to the annual update. Trustees wishing to confirm their report was received can contact IRA Coordinator K9VXW cberg@svs.com. Members of the Schaumburg ARC enjoyed a slide show about Ecuador and HF broadcaster HCJB. The Sangamon Valley RC had a program on compact multi-band radios. The Six Meter Club of Chicago held its popular ham auction in February. W9NSP has been elected as the repeater trustee for the SMCC. For the latest information on club activities call the SMCC Infoline 708-442-4961. Members of the Starved Rock RC have been making plans to participate in the La Salle nuclear station drill on March 20. Congratulations to Fox River Radio League president K9FE on being named FRRL Ham of the Year. January traffic: KA9IMX 10. February traffic: K9CNP 162, WD9F 140, NS9F 94, W9HLX 53, NN9M 37, WB9TVD-33, N9DT 30, NC9T-28, KA9IMX-23, W9FIF-14, KD9YV-14, N9WAT 8, N9PLM 2. ISN report for 02/02 de WB9TVD QNI-231, QTC-92, Sessions-28. 9RN report for cycles 1 & 2, 02/02. Sessions-56, 564 check-ins, traffic-186, average per session-3.3, Illinois represented 96% by W9HLX, NN9M, KD9YV, WW9E, and N9PLM. W9VEY Memorial Net report not received.

INDIANA: SM, Peggy Coulter, W9JUJ—SEC: K9ZBM. ASEC: WA9ZCE. STM: WA9JWL. OOC: AA9WD. SGL: K9JZZ. PIC: KB9LEI. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys. Jan 27, Walter E. Beatty, WS9O, South Bend; Feb 16, Ronald D. Winn, WA9HPC, Fort Wayne; and Feb 28, Sheldon A. Whitcomb, W9MXV, Marion. They will be missed. It is noted that there are 15 Indiana Counties that are considered "Storm Ready" by the NWS. Those counties are Delaware, Hamilton, Johnson, Knox, Madison, Marion, Miami, Monroe, Montgomery, Newton, St. Joseph, Tippecanoe, Vanderburgh, White and Whitley. Any community interested in becoming "Storm Ready" can find this information on the internet by going to the NWS Website http/ /www.crh,noaa.gov/>. Newly appointed EC for Marion Co. is Mike Palmer N9FEB. You might be interested in knowing who has been IN Outstanding Amateur of the Year. The first was awarded in 1949 to George Graue, W9BKJ, 50/ John Frye,W9EGV, 51/ Peggy Coulter, W9JUJ, 52/ Charles Reberg, W9MVZ, 53/ Galan Miller, W9ZIB, 54/ Stan Surber, W9NZZ, 55/ Fay Gehres, W9AIN, 56/ Herb Briar, W9egq, 57/ Cliff Singer, W9SWD, 58/Butch Singer, K9IXD, 59/ Frank Carroll, W9QYQ, 60/ Kent Soll, W9AYW, 61/ Leonard Chalk, W9SNQ, 62/Lynn Woodward, W9DLF, 63/ Jim Rees, K9YKH, 64/ Roberta Kroulik, K9IVG, 65/Gilbert Rager, W9BZI. More next month. NM's ITN/WA9JWL, QIN/K9PUI/KJ9J, ICN/K8LEN, VHF/WA9JWL.

Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	1330/2130/2300	2728	162	1485	77
QIN	3656	1430/0000	187	105	968	53
ICN	3705	2315	44	20	259	19
Hoosier VHF nets(10 nets)			640	31	1038	41

D9RN total QTC 186 IN 100% represented in 56 sessions by WA9JWL, WB9QPA, N9KNJ, K9GBR, K9QDR, W9FU, KE9KK and K9PUI. 9RN total QTC 211 in 56 sessions by K9PUI, KO9D, WB9OFG, WB9UYU and W9FC. Tfc: W9FC 183, K9PUI 180, WA9JWL 115, KO9D 83, WA9QCF 81, KB9NPU 62, W9JUJ 42, K9KNJ 38, WB9OFG 31, KA9QWC 27, WB9QPA 24, KB9TUI 22, K9ZBM 19, KA9EIV 18, K9GBR 12, WD9HII 12, W9EHY 12, K9RPZ 10, W9UEM 8, AB9AA 4, K9DIY 4, WB9NCE 3.

WISCONSIN: SM, Don Michalski, W9IXG— SEC: WB9RQR. STM: K9LGU. ACC: Open. SGL: AD9X. OOC: W9DGI. PIC: W9UQ. TC: K9GDF. BM: WB9NRK. ASM: K9UTQ, W9RCW,

Continued on page 116.

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- 200W, External power supply

Call Now For Low Pricing!

FT1000MP MKV field unit 100w w/built-in power supply in stock

FT-100D HF/6M/2M/70CM Transceiver

- Compact Transceiver w/detachable front panel
- Rx 100kHz to 970mHz (cell blocked)
- Tx 100W 160-6M, 50w 2M, 20W 70CM
- Built-in DSP, Vox, CW keyer
- 300 Memories

Call Now For Low Pricing!

FT-817 HF/VHF/UHF TCVR

- 5W @13.8V ext DC • USB, LSB, CW, AM, FM
- Packet (1200/9600 Baud FM)
- 200 mems, built in CTCSS/DCS
- TX 160-10M, 6M, 2M, 440
- Compact 5.3" x 1.5" x 6.5", 2.6 lbs
- 9.6v Nicad or 8 AA battery capable

NEW!

Call Now For Low Pricing!

FT-2600M 2M Mobile

- Compact 2M 60W mobile • 12000/9600 baud
- 4 selectable power levels • Built-in CTCSS/DCS
- 175 mems, 8 character alpha-numeric display
- Low intermod Rx, Rugged

Call Now For Low Pricing!

VR-500

Handheld Receiver

- 100kHz - 1300 mHz
- CW, LSB, USB, AM, FM (narrow and wide)
- Cell blocked in USA
- 1000 memory channels
- 8 character alpha-num display

NEW!

Great Sound, Call Today!

VX-5R/VX-5RS

50/2M/440HT

- Wideband RX • 6M-2M-440TX
- 5W output • Li-Ion Battery
- 220 mems, opt. barometer unit
- Alpha Numeric Display
- CTCSS/DCS built-in

Call For Low Price!

FT-50RD

2M/440mHz Compact HT

- DVR, Decode, Paging Built-in
- Alpha numeric display
- Wide Band receive
- Battery Saver • 112 Memories
- Mil-Spec • HiSpeed scanning

Call For Your Low Price!

FT-847

Ultimate Base Station, HF, VHF, UHF

- 100w HF/6M, 50w 2M/430 mHz
- DSP • Full Duplex Cross-band
- 1200/9600 Baud Packet Ready

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FT-90R

2M/440 Mini Dualbander Transceiver

- 50w 2m, 40w 440mHz
- Wide Rx • Detachable Front Panel
- Packet Ready 1200/9600 Baud
- Built-in CTCSS/DCS Encoder/Decoder
- Less than 4" wide!

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FT-920 HF+6M Transceiver

- 100w 160-6M, 12VDC
- Built-in DVR, CW Memory Keyer
- DSP, Auto-Notch • 99 Memories
- Computer controllable, CAT System

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NEW!

FT-7100M 2M/440 Mobile

- Ultra Compact • 50w/35w 2m/440
- 262 memories • V/V, U/U, V/U • CTCSS, DCS, ARTS
- Remotable front panel w/opt. YSK-7100

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- 160-10M/6M/2M/70CM
- All mode w/DSP
- HF/6M @ 100W, 2M @ 50W 440 MHz @ 20W
- CTCSS encode/decode w/tone scan
- Auto repeater • 107 alphnumeric memories

IC-718 HF Transceiver

- 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

IC-T81A 4 Band Transceiver

Worlds First 4-bander HT

- 6M, 2M, & 70CM @ 5W
- 1.2 GHz @ 1W
- AM, FM, WFM
- 124 alphnumeric memories
- CTCSS encode/decode w/tone scan
- RIT and VXO for 1200 MHz
- Auto repeater

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-2800H Dual Band Mobile

Mounting Kit Included

- 2M/70CM
- Dual band scopes
- 3" color TFT disp
- NTSC video input
- CTCSS encode/decode w/tone scan
- Selectable RF attenuator
- 232 alphnumeric memories
- Auto repeater

IC-746PRO All Mode 160M-2M

- 10-2M @ 100W
- 32 bit IF-DSP+ 24 bit AD/DA converter
- Selectable IF filter shapes for SSB & CW
- 102 alphnumeric memories

IC-V8 2M Transceiver

Commercial Grade Rugged

- 5.5W output
- 107 alphnumeric memories
- Customizable keys
- Auto repeater
- PC Programmable
- CTCSS encode/decode w/tone scan
- Drop-in trickle charger included

IC-2100H 2M Mobile Transceiver

- 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

IC-207H Dual Band Mobile

- 45W VHF (2M), 35W UHF (70CM)
- AM aircraft RX
- 182 memories
- CTCSS encode/decode w/tone scan
- Remote head capable
- Auto repeater

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- DX Packet Cluster Monitor
- 200 Mems., CTCSS
- VC-H1 Messaging Control

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VC-H1

Visual Communicator Compatible w/all FM VHF/UHF • Transceivers + HF SSB . Send/Rec Digital Images • (32 seconds) for download . Store pictures in memory • 1.8" Color TFT LCD Display • Built-in speaker + mic • Download to PC • (with special software)

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- Alphanumeric Display
- CTCSS Built It • Backlit Keypad

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2M/220/440 Dual Chanel Receive • .1 - 1300 mHz Rx, FM, AM, SSB • 5w 2M/220/440 TX, FM • 435 Memories • Li-Ion Battery •

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TM-V7A 2M/440Mhz

- 50W/35W • 280 Mems • Visual Scan
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- Computer Programmable • 9600 Baud Ready
- Cool-blue Reversible LCD • Backlit Mic

Call Now For Low Price!

TS-2000 HF/VHF/UHF TCVR

- 100W HF, 6M, 2M • 50W 70CM
- 10W 1.2 GHz w/optional UT-20 module
- IF Stage DSP • Built-in TNC, DX packet cluster
- Backlit Front Key Panel

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TM-261A 2M Mobile

- 50W + Mid and Low • Mil-Spec
- 61 Mem. Chanels • Alpha Numeric Function
- Dual Menu, DTMF Memory
- Backlit mic & built-in encode

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- 100w HF, (100w on 6M TS-570SG only)
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- DSP • Large LCD Display • Elect. Keyer
- RCP2 Radio Control Program Compatible

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TM-D700A 2M//440 Dualband

- 50w VHF 35w UHF • Opt. Voice Synthesizer
- Receives 118-1300 mHz (cell blocked)
- Remote Head Inst. only (kit included)
- 200 Memories • Built In 1200/9600 baud TNC
- Advanced APRS Features
- Dx Packet Cluster
- Tone Scan • GPS/VC-H1/PC Ports

TS-50S HF Transceiver

- TS-50S - World's smallest HF trans.
- SSB, CW, AM, FM, • 12V Gen. Cov. RX,
- 6.4 lbs., 7.16 x 2.4 x 9.32" • 100W out
- 105 db dynamic range, 100 Mems.
- Opt. ext. ant. tuners available

Call For Special Low Price!

TM742AD 2M/440Mhz

- Optional 3rd band available • Back-lit mic
- Up to 303 memories • 101 per band
- PL Encode Built in • Detachable front panel

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- RTTY, Navtex, ASCII, Wefax, CW, GPS NMEA-0183 and more!

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High-performance, low power TNC. Great for packet, and APRS compatible.

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Detailed illuminated map shows time, time zone, sun position and day of the week at a glance for any place in the world.Continuously moving – areas of day and night change as you watch.

- Mounts easily on wall. Size: 34 1/2" x 22 1/2".

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IC-R8500 Wide Band Receiver

- 100 kHz - 2.0 GHz*
- Commercial Grade • All Mode
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- Digital Direct Synthesis (DDS)
- 1000 Alphanumeric Memories
- PC Controllable w/Optional Equipment

Call For ICOM Receiver Specials

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- Synchronous AM Detection (S-AM)
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- 1000 Alphanumeric Memories
- Up to Two Optional Filters
- PC Controllable w/Opt. Equipment

IC-R3 Wide Band Receiver

- 500 kHz - 2.45 GHz*
- 450 Alphanumeric Memories
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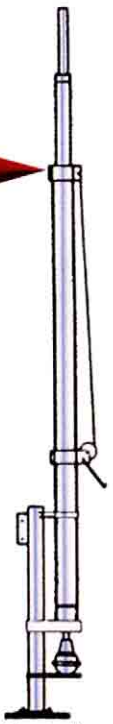
- 4 Level Attenuator
- Telescoping Antenna w/BNC Connector
- Lithium Ion Battery
- 2" Color TFT Display
- Audio/Video Output
- Four Way Action Joystick
- PC Programmable w/Optional Cable & Software

*816-901.995 MHz blocked; unblocked versions available to FCC approved users. FM video range for the IC-R3 is 900-1300 MHz & 2250-2450 MHz

US TOWER



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Handles 10 sq.ft. at 50mph
Pleases neighbors with tubular streamlined look

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Can add raising and motor drive acces.

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W9CBE. Jim Caldwell, Jr., W9YPY, passed away. Jim was very active in the Badger Weather Net. Bob Ebenreiter, W9LXC, 84, is a SK. Jill Iverson, N9RLJ, age 24, is a SK. Jill was an active member of the Polk Co. RACES. Dick Johnson, WA9LZM, 72, is a SK. Clayton Cardy, W9OVO, will soon be observing his 7th decade in Amateur Radio! Congrats! Mariann, AA9TB, obtained her DXCC award and will be retiring to Arizona, soon. The RRRC provided a demonstration and program of amateur radio for the Dodge county 4H club. A great promotional idea! I've added a listing of speakers to the section web-site: www.w9ixg.eboard.com. Please go to the "speaker's bureau" link to find experience amateurs that are willing to give a presentation to your club. If you would like to be added to that list, please contact me at w9ixg@arrl.org 9RN report for February indicates 98% Wisconsin participation. Jane Rediske, KB9SYI, is the ORC Ham Of The Year! Good, used, commercial VHF & UHF repeaters are surfacing. Does your club repeater need upgrading? GE Master II units are being replaced by Master III units by many state & local agencies. You might contact them and inquire. The Master II rigs are easily converted to amateur frequencies. 73, W9IXG. Tfc: K9JPS 895, W9RCW 613, N9VE 427, K9GU 411, N9TVT 337, W9CBE 179, W9IHW 132, K9LGU 112, N9BDL 86, KG9B 60, K9FHI 60, AG9G 55, N9KHD 51, W9YCV 49, KE9VU 47, W9UW 45, W9BHL 31, KB9ROB 30, WB9ICH 28, AA9BB 26, WD9FLJ 18, KN9P 18, W9RSX 16, W9PVD 7, K9UTQ 4.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, KM0D—MN SECTION WEB PAGE http://www.arrl.org/sections. Another winter is behind us, and we got by with such mild wx. Nothing can beat getting an early start in those vegie gardens! The criteria for the Public Service Honor Roll has been modified. PSHR is a certificate which can be earned based upon your individual monthly reports of activities related to public service. Now, credit can be applied for attending meetings related to public service communications. See *QST*, ARRL Web page, or ARRL Section Net for info. Field Day is approaching. Why not make an extra effort this year to invite folks from the public as well as local government agencies. With Homeland Security a hot topic in our current times, Amateur Radio often can play a part of emergency mgmt planning. Drop a personal letter to your county/city governments and check with your local radio stations and see if they can air your Field Day event as part of local news. 73 de Randy Wendel KM0D.

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MSPN/E	3860	5:30 P	856/78/28	KX0N
MSPN/N	3860	12 P	423/69/28	WA0TFC
MSSN	3710	6 P	N/A	vacant
MSN/1	3605	6:30 P	274/165/28	K0WPK
MSN/2	3605	9:50 P	137/29/26	vacant
PAW	3925	9A-5P	2780/102/87	KA0IZA

Tfc: W0GRW, WA0TFC, KX0N, W0LAW, K0WPK, W0HPD, W3FAF, KB0OHI, KC0HAW, KB0AII, K0PSH, N0JP, KN9U, KB0AIJ, WD0GUF, WA0YSL, K0IKO.

NORTH DAKOTA: SM, Kent Olson, KA0LDG –Field Day is one month away, so time to get the last minute prep done. I regret to inform you that Lyle Aho, KC0BET, of Stanley ND, became a Silent Key on Feb 13 following a long battle with cancer. Lyle was very active in the Stanley Area and was an officer of the Prairie Hills Repeater Association. Our condolences go out to his family, many of which are hams. Had good fun at the Bismarck Hamfest meeting and chatting with quite a few hams. They are also building a communications trailer. Congratulations to Curtis Freeman, KC0JVJ, who is the new President for the TRARC (Dickinson). They have been busy repairing repeaters and there is a new one up at Sentinel Butte (443.675+). The RRRA in Fargo has had another very successful Technician class. All of the students who took the class got their ticket. Great job! Keep your eyes open for severe WX. Peace Gardens Hamfest to be held in July. Section's Web site at: http://home.earthlink.net/~qtipf16/. HF NM KE0XT reports Goose River Net, 4/43/0; WX Net 48/884/10; Data Net 28/724/11.

SOUTH DAKOTA: SM, Roland Cory, W0YMB—Events this summer in the Black Hills include the Crazy Horse Voksmarche on June 1 and 2. The Mystic Mountain run on July 14- Heart of the Hills Run – Hill City to Keystone on July 20. Century Bike Ride on August 18. Southern Black Hill Triathalon on Aug 31 and Mt Rushmore International Marathon on Oct 13. Election results from Huron ARC are Pres WA0TDK, Vice President N0OTB, Sec-Treas., WB0LUX and activities mgr KI0BV. Hub ARC at Aberdeen is looking for 10 meter AM equipment. Contact N0AHL. Their club has a project to build a homebrew receiver any band, $20 max expenditure, battery. Only 1 battery if solid state, 2 batteries if using a tube and all must use the same antenna. New president of LARK at Watertown is WD4RDR. S Dak Novice Net in January had its best showing in over 10 years with average QNI of 13.75. N0AHL is contacting SD Senate and Congress about the use of Amateur Radio pertaining to safety issues with cell phones. Total Traffic reported for Feb was 365.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH—Pse welcome Bob Kendall, K5KBK & J.M. Rowe, N5XFW as our newest section cabinet members as ASMs. Also, congrats to the following Arkansas Section hams who have completed one or more levels of the Emergency Communications Course offered by the ARRL. They include: AD5AL, K0XXX, K1ARK, K5GBT, K5NLX, KC5NPU, KD5NHH, N5AAC, N5JBJ, N5QC, N5XFW, W5RXU, WB5VUH. Special recognition to N5AAC, N5QC, N5XFW, K1ARK & W5RXU for completing all 3 levels. Who's next to be listed for completing the courses? I hope its YOU. For more information, go to the ARRL Web site at www.arrl.org/cce/ for more information. This month, I would like to recognize our Net Managers & Net Control Stations for the work they provide on our HF nets. Included as NMs are W5SXV, WB5YLI, K5BOC, & WA5KQU. NCS include: K5MEB, KC5E, N5KKD, W5SXV, WA5CRE, K5MEB, KD5TR, WM5H, N5DSY, W5TUM, K5RO, W5LRA, KO5E, W5RXU, K7ZQR, & KA6MGL. Our section STM is Terry Brewer, WB5HIL. Thanks to all of you for your contributions to our section success. Now the traffic reports for Feb. includes: K5BOC 51, K7ZQR 32, WA5KQU 23, W5RXU 19, WB5HIL 19, KO5E 10, W9YCE 8, AD5BV 7, AD5AM 7, KC5VCU 4, W5SUB 4, & AB5ZU 1. Great job and special congrats to the OZK-CW Net for all 28 sessions held during Feb. - first time ever! Great work.

LOUISIANA: SM, Mickey Cox, K5MC - ASM: W5PY. ACC: KM5YL. OOC: WB5CXJ. PIC: K5IQ. SEC: AC5TM. SGL: KD5KNZ. LCW NM: W4DLZ. LTN NM: WB5ZED. Newly elected club officers for the Acadiana Amateur Radio Association are N5RLM, President; KN5GRK, Vice President; K5DPG, Secretary; and N5YCS, Treasurer. New officers for the Jefferson Amateur Radio Club are KD5PCR, President; KD5BPR, Vice President; N5OGW, Secretary; and W5RMX, Treasurer. A very big thanks to AC5TM, W5KB, and K5IQ for leading the ARES effort for the 2002 Super Bowl in New Orleans. Tom, Keith, and Bob put in many hours of planning before the event and their efforts, along with the many ARES and NTS participants during the Super Bowl itself, paid off handsomely. Earning Public Service Commendation certificates for their work are AC5TM, W5KB, K5IQ, WB5LLI, KD5PCR, KD5QEL, WA5RT, AF4AN, KD5EWD, N5XVV, KD5PCM, KD5PCK, KD5OEA, KD5QYV, WB5ZED, N5JU, W4DLZ, and KB5GA. The Baton Rouge Hamfest has been moved to the first weekend in November this year to avoid competing with Dayton. I want to thank our clubs for sponsoring great hamfests. It's also very gratifying to me to see the good turnouts for the ARRL Forums at our hamfests. Be sure to carefully read the new rules for Field Day! Tfc: K5MC 353 (BPL), K5IQZ 97, KM5YL 59, W5PY 16, K5DPG 12. PSHR: K5MC 240, K5IQZ 133, K5DPG 120, W5PY 114, KM5YL 97. Net Reports: sessions/QNI/QTC. LTN: 28/403/84.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Section Web Page: www.arrlmiss.org. The Tupelo ARC and hams in surrounding counties provided communications for the Red Cross during its recent unannounced emergency preparedness drill. As a result of terrorists blowing up the US Highway 78 Bridge over the Tenn-Tom Waterway, communications were needed between Tupelo and Fulton. Many valuable lessons were learned during the course of the exercise. Those participating were WJ5K, WF5F, KE4LWT, KB5NMB, KC5TVI, KD5LIJ, KD5JXM, KD5NSO, AC5ZE, N5SPG, KB5YJG, K5SEH, KD5PLG, KD5NSP, KJ5JR, KD5PYB, K4NWX, KD5CJR, AB5MQ, and KD5KMS. Jackson County ARES/RACES provided communications for the American Heart Association Walk for Health in Pascagoula. The District Heart Association Director was very complimentary of the ham support. Those participating were NN5AF (EC), AB5RS (AEC), KC5RID, KB5ZIA, AC5GX, N5RPV, KB5ZIB, KF4WNK, KC5UEC, KC5VGL, and KM5UY. Exam Coordinator AC5SU reports that the following successfully completed the ARRL Emergency Communications Course - Level 1: AB5WF, KK5PM, KC5KMJ, W5AUB, and KD5NHJ. Congratulations! Lauderdale County ARES responded to a request from LEMA for assistance in locating a 4 year old. The child was found unharmed. Those assisting were KD5GWM (EC), KD5MUF, and KD5GCK. The Lowndes County ARC conducted VE Test Sessions 3 out of 5 consecutive weekends with excellent results. Thanks to VEs W5BJM, AC5MR, NW5MP, KM5UH, and K5VVA for their efforts. The SET is scheduled for October 5th. Also take note that we need a host for our annual ARRL Day in the Park. Regret to report the passing of Lester "Whitey" Whitehead, W5HKW, a former long-time resident of Vicksburg. Whitey was very active on Mississippi traffic nets for many years and an Elmer for many new hams. OO Report: AC5SU. PIO Report: W5KWB. DEC/EC Reports: NN5AF, KD5GWM, N5NQ, AC5SU, WA5TMC, N5ZNT. Net Reports: sessions/QNI/QTC. MSPN 28/3751/53, MTN 28/101/35, MSN 28/1229/11, PBRA 28/825/3, Jackson Co Em Net 28/355/7, MSSN 20/72/2, WCMS ARES 12/116/8, MAEN 5/102/0, SW MS ARES 5/69/0, Bluff City Em Net 4/92/3, JARCEN 4/87/0, NW MS ARES 4/33/0, NW MS Trng & Info Net 4/75/0, MBHN 4/44/1, MLEN 4/58/0, Lo Co Net 4/47/0, Jones Co ARES Em Net 4/74/0, MCARA 4/41/0, Attala Co ARES 3/35/0, Laurel ARC 2M Net 3/69/0, CMSN 1/31/0. PSHR: WB5ZED 202, N5JCG 131, K5VV 123, KJ5YY 81, W5XX 78. Tfc: WB5ZED 851 (BPL), K5VV 77, N5JCG 41, KJ5YY 21, W5LEW 11, KM5WN 6, W5XX 4.

TENNESSEE: SM: Terry Cox, KB4KA—ACC: KB4KA. ASM: K4DIT & K4PZT. SEC: KB4G. STM: KR4TT. TC: KB4LJV. OOC: KE4KMG. SGL: KC4POI. PIC: N4WSM. February was a busy month with DixieFest in Memphis and Tennessee PRB-1 legislation topping the list. DixieFest was very well attended. I'm sure many wanted to hear Riley Hollinsworth's forum. Many pictures are in the Section web page at www.tnarrl.org. Tennessee PRB-1 is taking the form of SB-3058 in the Senate and HB-2973 in the house. The movers and shakers have been Dwayne-KC4POI, our SGL, Jimmy-NQ4U, LGL, Bob-KD4NEC, Myron-W4UR and a lot of you that have sent letters and emails to your representitives and senators! These bills, if passed into law, will cover the FCC PRB-1 issues and add minimum height restrictions that a city or county will be able to impose. These heights range from 75 ft to 200 ft depending on property size and population density. Hopefully you have been keeping aware of these activities through the Section web pages, the Tennessee Phone Net announcements and special announcements at clubs, etc. On a lighter note, the TN Contest Group presented its first N4HV Memorial Radio Active Award to Don-N4ZZ. Don made over 21,000 contest QSOs this past calendar year! I don't know about you, but my ALL TIME log shows only about a third of Don's one year total! Amazing! The Stones River ARC newsletter is starting a feature called Shack of the Month. Jim-WB4OFM's shack showed a Heath Kit HW-16/HG-10 among other equipment. Sure brought back memories of my first rig. Maury ARC announced N7DLS as MARC HAM of the Year for 2001. Congrats, Dan. RACK members have benefited from digital TV programs via their Tuesday night nets and they are getting ready for the Knoxville Hamfest & Electronics Expo June 7 & 8.RN5 Report TN 52%.by W4OGG, KE4GYR, WB4LGH, WA4FNY, KG4IFQ.

GREAT LAKES DIVISION

KENTUCKY: SM, John D. Meyers, NB4K—ASM's: KJ4W, N4VGI, WB4CTX, KJ4W, WA4SWF, KD4PWL. STM: K4LID. TC: KD4IXQ. SEC: KA4MAP. PIC: W2ZBY. OOC: K4LRX. SGL: WB4KY. ACC: KE4MZP. SKA K4LID. February had no Silent Keys reported. Cave City hamfest was a huge success and was really nice in the expanded building. Louisa Hamfest will May 4, 2002, for information contact Fred Jones WA4SWF at wa4swf@foothills.net . Additional information and pictures on the State ARRL Web site at http://www.arrl.org/sections/?sect=KY.

Net	Sess	Traffic	QNI	NM
KEN	4	0	103	KA4MAP
WARN	4	3	83	KA4MAP
MSU	4	0	52	K4JFD4TH
ARES	18	6	453	WA4RRR
9RN Cy 2	56	186	564	KF4UBX
NKEN	4	1	36	WD8JA
W7DARN	4	7	55	WD8JA
WKTN	56	90	1856	KB4VKS
F.C. ARES	5	0	87	N4MOM
TSTMN	28	30	551	KB8GWL
CARN	27	6	414	KG4KGY
KYN	27	46	297	K4AVX
WTEPN	4	1	37	KO4OL
KSN	28	21	212	KO4OL

(PSHR reports): NB4K 115, KO4OL 114. (SAR): WD8JAW 15, NB4K 22, K4TXJ 1, K4UNW 6, K4DZM 36, K4AVX 37, KO4OL 36, WB4ZDU 7

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net); ASM: John Freeman, N8ZE (n8ze@arrl.net); ASM: Lyle Willette AB8CB (ab8cb@arrl.net); ASM: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). SEC: Ray DeVlieg, kb8vni@arrl.net; STM: Joe Turner, K8CQF (k8cqf@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (kb8rji @arrl.net). SGL: Ed Hude, WA8QJE (wa8qje@arrl.net). TC: Dave Smith, W8YZ (w8yz@arrl.net). Youth Activities: Steve Lendzion, N8GQ (n8gq@arrl.net); BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net). Have you tried checking in to our Michigan ARPSC Net, Sunday afternoon at 5 PM on 7.232? If you haven't, you are missing out on a lot of good discussions and information that is being discussed. Please give it a try, anyone with an interest in Public Service can join in. It's a lot of fun, really informative and a great way to spend a Sunday afternoon. I hope we hear you soon. June will be here before you know it and that means the "BIG" event. If your club has not begun planning for their Field Day activities yet, now is the time to start. You need committee chairmen to help in the planning and you also need lots of helpers. A great opportunity to get some of those newly licensed guys and gals to get involved and partake in some of the fun of Field Day 2002. The ARPSC Family Outing is sponsored by the Michigan Section Staff and is intended to serve as a means of not only learning more about the world of Amateur Radio, but also to provide you with an opportunity to share and be with your family and friends in a relaxed and down to earth atmosphere. The dates for this year are July 11 thru 14 at the Woodlands Conference Center and Campgrounds, Lupton, MI. Some great new programs are planned and I hope to see you and your families. Yes, families, we also have a youth program with lots of outdoor activities for everyone including evening campfires and activities. Check out our Michigan Section Web site at www.arrl.org/sections/MI.html. 73, Dick. Tfc (Feb): K8GA 443, KB8ZYY 251, N8EIZ 186, K8LJG 281, W8RTN 191, K8AE 119, AA8PI 105, VE3EUI 83, WX8Y 68, N8UN 62, K8AMR 54, AA8SN 50, W8RNQ 45, K8JN 44, KB8GT 39, K8ZJU 36, K8UPE 28, WA8DHB 26, N8EXV 24, WR8F 23, K8YB 20, W8YIQ 20, N8JAT 20, W8WOJ 16, K8FE 16, KA8DDQ 15, WI8K 13, WB8WJV 10, KA8LAR 7, W8ZNH 7, KI8GR 6, NX8S 6, KC8SZR 6, W8NGO 3. Deadline 5th of the month. Please support the following Michigan Section Nets:

Net	QNI	QTC	Sess	NM	Freq	Time	Day
QMN	682	432	71	WB8SIW	3.663	6:30&10 PM	Daily
MITN	503	290	28	N8FPN	3.952	7 PM	Daily
GLETN	593	106	28	VE3SCY	3.932	8:30 PM	Daily
UPN	1137	47	32	AA8SN	3.921	5 PM	Daily (Noon Sun.)
WSSBN	781	26	28	K8CPW	3.935	7 PM	Daily
SEMTN	260	53	28	WI8K	145.330	10:15 PM	Daily
MACS	241	41	26	W8RNQ	3.953	11 PM	Daily (1 PM Sun.)
VHF	732	26	111	KB8ZYY	Various		
MI-ARPSC	61	4	4	W8FQT	3.932	5 PM	Sunday (Alt. 7.232)

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12 or check out the Ohio Web Page at www.arrl.org/sections/OH.html); ASM-NE: Bob Winston, W2THU, Cleveland; ASM-NW: Ron Griffin, N8AEH, Findlay; ASM-Central: Mary Carpenter, N8OAM, Westerville; ASM-SW: John Haungs, W8STX, Cincinnati; ASM-SE: Connie Hamilton, N8IO, Marietta; SEC: Larry Rain, WD8IHP, Mansfield; STM: Jack Wagoner, WB8FSV, Hilliard; ACC; Brenda Krukowski, KB8IUP, Toledo; TC: Tom Holmes. N8ZM, Tipp City; PIC: Scott Yonally, N8SY, Mansfield; OOC: Alan Cook, N7CEU, Newark; SGL: Jeff Ferriell, K8ZDA, Columbus...As you all well know by now next year Ohio is throwing itself a year-long birthday party - the Ohio Bicentennial - to honor our 200th year as a State. The Ohio Section encourages local clubs and ARES organizations to have local events - special event stations, displays or whatever else you can think of. ASM Bob Winston, W2THU, is Ohio's ARRL Coordinator for 2003 Bicentennial Activities. Back in 1996, he worked with hams from various clubs in Greater Cleveland to promote that city's Bicentennial. Bob says, "One suggestion we have is from Dave Lomady, WD8CKK of the Tusco ARC who asks special event stations be organized in sites all over Ohio." He also said the Ohio Section policy is to promote all local activity. Therefore, as local groups plan their events, please send notice to Bob at w2thu@arrl.net with your plans. He can coordinate them with the Official Bicentennial Commission. But even more important the list of these local activities will be published in the Ohio Section Journal such as VEC exams and hamfests are now. Further, this list will be sent monthly to Ohio's ham radio newsletters and, if feasible, listed in Section News of QST.... Welcome back to Northwest Ohio ARC, as an affiliated club and OH-KY-IN ARS, Cincinnati has become a SSC....Ohio ACC, Brenda Krukowski, KB8IUP, tells us that a service is available to all ARRL Affiliated Clubs for the vanity e-mail program. Details can be seen on the Web page at www/arrl.org/FandES/field/club/#clubweb under additional Club Benefits....Remember lady hams, the YLRL NATIONAL 2002 convention is coming to Ohio - Aug. 2-4 at Middleburg Heights near Cleveland....And a reminder to local clubs to get annual club reports in to ARRL. Simple to do now with the ARRL Web site...OHIO SECTION CONGRATS: (A) To new officers of Marion Radio Club: Pres. Richard Carey, KB8OTZ, VP. Dan Wade, N8WOB, Sec/Treas. Jacki Miller, KC8BOS and trustee Ron Williams, WD8NEE; (B) To Dayton ARA for the excellent idea of having area county communications vans (five made it) for members inspections in the parking lot during its ARRL night meeting; (C) To 2002 Massilion ARC officers, Pres, Gene Beckwith, W8KXR; Veep, Richard Ross, KA8ZQH; Sec, Linda Finley, K8MOO and Tres, Anna Ballinger, N8GAF; and (D) To Ohio PIC Scott Yonally, N8SY, Mansfield, for organizing our electronic pages at the above address and at www.maser.org...OHIO SECTION MAY HAMFEST: This month, as always the biggie - The Dayton Hamvention May 17-19. See everyone there....de K8QOE. Now for the February traffic reports.

Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	142	63	240	28	1845	3.577	WD8KFN
BN (L)	—	—	—	—	2200	3.577	NY8V
OSN	123	42	450	28	1810	3.708	WB8KQJ
OSSBN	1837	826	4576	84	1030, 1615, 1845	3.9725	N8IO

Tfc: N8IXF 356, N7CEU 318, K8PJ 271, WD8KFN 236, N8IO 225, N8BV 221, KD8HB 165, W8STX 162, W8QIW 138, AB8KB 115, N8DD 114, N8OD 104, N8TNV 93, KA8VWE WA8SSI 87, WB8SIQ 84, W8PBX 79, KC8FCC 72, WA8EYQ 58, W8RG 54, KX8B 49, N8CW 49, KB8SBK 49, WB8HHZ 45, NS8C 42, KC8HTP 38, KC4IYD 38, KC8DWM 37, K8CAV 33, NY8V 31, W8RPS 30, N8IBR 29, WD8KB 29, KI8IM 25, KD9K 24, N8YWX 18, KB8ESY 17, WB9PMG 17, N8WLE 14, KC8KYP 13, KC8PDY 11, K8QIP 11, K8AJS 10, N8GOB 10, KC8SIA 9, N8RAK 8, KD8DUX 7, WB8IOW 5, KC8TXV 5, K8WC 0 (Jan) K8WC 0.

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. Spring is here and time to work on those antennas, but be careful. Join in with your club on Field Day, it's coming up fast and there are some new rules this year. Listen up on the VHF nets for info on the letter writing campaign for PRB-1 type bills now in Albany. Thanks to Dir. Fallon and all the others traveling to Albany and doing the hard work for us on these bills. 73 de Pete N2YJZ, n2yjz@arrl.org, February - PSHR: N2JBA 149, KC2DAA 141, WB2ZCM 141, K2CSS 139, N2YJZ 138, WA2YBM 135, K2YS 107, KC2HUV 102, N2RTF 99. Tfc: N2YJZ 94, K2CSS 75, K2YS 61, KC2HUV 32, KC2DAA 30, N2RTF 29, WA2YBM 26, N2TWN 26, WB2ZCM 26, WA2BSS 18, W2AKT 13, N2VC 12, K2AV V 8, KL7JCQ 1, Nets: QNI/QTC+QSP AES 32/6 CDN 236/89 CGESN 30/8 CHN 122/39 ESS 420/288 HVN 624/166 NYPHONE 260/800 NYPON 413/273 NYS/E 301/324 NYS/L 224/340 NYSPTEN 354/86 SDN 369/117.

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. Congratulations to the new 2002 officers of KCRA: President: Edward W2SN; VP: Kenneth AB2LB; Secretary: Hyman, KB2MQT; Treasurer: Jay, W2CSS. Congratulations to the new 2002 officers of the Order of Boiled Owls: President: Tony N2UN; VP: Les W2LK; Secretary: Dennis K2SX; Treasurer: Andy K2LE. Congratulations to the 2002 officers of Nassau ARC: President: Phil N2LVG, VP: Dave W2UQ, Secretary: Jim W2KFV, Treasurer: Herb N2XXP. RECWA will hold a SKYWARN session on Thursday May 2, at 7 PM in Rockaway Beach, Queens. Contact Joe Albertus KB2QLE at recwa@recwa.com or 718-868-8468. SEC Tom KA2D reports he continues to solicit monthly reports and has been monitoring ARES nets. He continues to answer questions concerning 9/11. Annual renewals are in progress. Please take time to answer the survey about "Amateur Radio Communications" identification apparel. ARES will be supporting the Long Island Marathon on May 5 - contact Nassau DEC George WA2WKV to help out. STM Charlie WA2YOW reports Bill, WB2GTG, has made the BPL again this month - congratulations! The new officers for 2002 of the Order of Boiled Owls Contest and DX Club are: President - Tony N2UN, VP - Les W2LK, Secretary - Dennis K2SX, Treasurer - Andy K2LE. KCRC has moved their meeting night to the Third Wed. of the month at Floyd Bennett Field, Brooklyn at 8 PM. The 2002 officers for The Nassau Amateur Radio Club are: President - Phil N2LVG, VP - Dave W2UQ Secretary - Jim W2KFV, Treasurer - Herb N2XXP. Please e-mail me with your club's information, especially your Field Day plans and I will get it in my monthly newsletter and on the web. 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 582, N2AKZ 155, WA2YOW 96, KB2KLH 84, K2GCE 68, N2WGF 39, KE2SX 38, AB2IZ 32, N2AVY 20, KA2UEC 29, KA2YDW 18, WA2VZK 11, N2TEE 4.

NORTHERN NEW JERSEY: SM, Bill Hudzik, W2UDT—ASM: K2WJ. STM: WB2FTX. ACC: N3RB. SEC: K2SO. OOC: K2ZD. SGL: K1XV. Web Page: www.arrlhudson.org/nnj. Field Day is June 22-23. Many NNJ clubs are gearing up for the annual event. Don't forget to invite to invite some of your local officials. Field Day is a good example of the public service aspect of Amateur Radio. Good winter conditions allowed KF2TI to get 6M DXCC as well as 6M VUCC. Congrats Steve! K2NJ also got 6M VUCC and was not far from DXCC in the same submittal. W2VTV also got his WAS. Please remember that eQSLs are not acceptable for ARRL awards. Our ARES group continues to grow. WB2AZE is the new Hunterdon County DEC. The county net meets Thursdays at 8PM on 147.375 +600 Hz. Welcome to a new Affiliated Club; the Lt. Robert D. Cirri Memorial RC. The Hudson ARES group reformed as an honor to one of its members KA2OTD. In March, I got a chance to visit the Tri-County ARC, Ramapo Mt. ARC and the Ocean-Monmouth ARC. I am looking forward to visiting other clubs in the section. Hopefully, by the time this is in print the new Call Letter License Plate forms will be available from the NJ DMV. Check the Web page for updates. 73, Bill Hudzik W2UDT.

ICOM

IC-756 Pro II HF/6M Transceiver **$2969.95**
32 Bit IF DSP. Selectable IF filters. Digital Twin PBT

IC-746 Pro 160-2M Transceiver **$1899.95**
32 Bit IF DSP. Selectable Filters. Built-in Automatic Antenna Tuner

IC-718 HF Transceiver **$599.95**
General Coverage Receive. Direct Frequency Entry. Built in VOX and CW Keyer.

IC-706 MkIIG Transceiver **$899.99**
HF + 6M (100W) + 2M (50W) + 440 MHz. (20W)

CTCSS Encode/decode. Free RMK-706 thru 3/31/02.

IC-910H VHF/UHF Transceiver **$1099.95**
144MHz + 430MHz + optional 1.2GHz. 99 Memories. Optimized for satellite operation.

IC-V8000 ***New!*** 75 Watts, 207 Memories 2 Meter **$249.95**

IC-2800H 2M/70CM Mobile **$499.95**

IC-207H 2M/70CM free OPC 600 thru 3/31/02 **$299.95**

IC-2100H 50 2M Mobile **$149.99**

IC-V8 ***New!*** 5.5 W 107 Memories. 2M H-T **$149.95**

IC-T81A Quad-Band HT 6M-144-440-1296 MHz **$279.95**

IC-Q7A 2M-70CM Wideband Receive H-T **$129.95**

IC-T2H 6W Wideband Receive 2M H-T **$149.95**

IC-T7H 6W Dual-Band H-T **$199.95**

IC-R10 .5 – 1300 MHz (cell blk) Receiver **$309.95**

IC-R3 .5-2450 (cell blk) MHz Audio/Video Receiver **$349.95** AM/FM/WFM/AMTV/FMTV 2-inch TFT color display

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NJN/L	28	135	45	42
CJTN	28	192	48	43
IART	4	13	1	1
NJVN/E	28	444	41	40
NJVN/L	28	385	35	35

Tfc: W2MTO 93, N2OPJ 47, N2RPI 37, N2GJ 35, KB2VRO 31, KJ2N 27, K2PB 27, KC2ANN 27, K2VX 26, N3RB 18, W2CC 17, N2BVM 16, N2DBK 15.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD—SEC: NA0R. ACC: N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. STM: KB0RUU. Thank you, Richard. KB0RUU has been Section Traffic Manager for several months and has done a very good job. Thank you, Richard. But, Richard is moving on... so... The King is dead, long live the Queen... er.. uh... Welcome to Mary Keener, K0YL, the new Section Traffic Manager for Iowa. Mary and I have known each other since... for... a long time. Mary will do a fine job for all of us. Please help her any way you can. TCARC is looking for reps along the north end of the big river for a HAZMAT drill in August. Call Ernie at 563-547-2366 or by e-mail at leewalt@powerbank. net. DTEN was 94.7% rep from Iowa with WA0AUX, WA0KLD, W0FNN, and K0YL. TEN Cy 4 was 96% with WB0B, N0JL, N0SM, W0SS, and W0YLS. GCARC had 11 examiners for the session and 24 new or upgraded hams. GCARC are also putting a battery backup system on the local repeater. There is a letter to the editor in the DMRAA paper noting a very productive meeting. How was yours? Most clubs can use your help in planning and doing public service and keeping us on the air. Newsletters were received from TSARC, FMARC, GCARC, DMRAA, OARC. Tfc: W0SS 160, KB0RUU 152, WB0B 51, N0JL 21, KB0FB 11. See you at the hamfests this year. Tfc: W0SS 160, KB0RUU 152, WB0B 51, N0JL 21, KB0FB 11.

KANSAS: SM, Orlan Cook, W0OYH— ASM/ACC/OCC: Robert Summers, K0BXF, SEC: Joseph Plankinton, WD0DMV. STM: Ron Cowan, KB0DTI. PIC: Scott Slocum, KC0DYA. TC: Rick Carver, WA0KS. SGL: Steve Hamilton. I had a nice surprise Sunday afternoon. A man walked up to my door and said I am Anatoli, UA6HCQ, from Russia and I need help to get an American ham license. Looks like he will be taking the General test in 4 days. Bill, WO0E ,VEC group will be doing the honors. GL Anatoli. I want everyone to go to http://www.arrl.org/ & click on "Section" in upper right to go to http://www.arrl. org/sections/KS.html and please add this to your bookmarks. This news column you're now reading will move from *QST* to this Web site. I can edit this Ks news page anytime I want and keep you right up to date. It is OJT for me so be patient. Photos can be placed on it. See my KAR news letter for more. To subscribe orlan@swbell.net. Jan. Kansas Nets: sessions/QNI/QTC, KSBN 31/1280/55 KPN 21/371/22 KMWN 31/681/507 KWN 31/656/520 CSTN 27/2284/ 91 QKS 62/311/125 QKS-SS 12/ 39/9 SEC48/559/15QNS KB0AMY N0BTH KC0CFL KC0CIG WD0DDG AA0IQ W0NXS W0PBV WD0DMV SEC Joseph. TEN 62/QNI/229 Ks 95% with AA0FO K0PY W0WWR NB0Z W0SS/Mgr. TRN 62/596/310 Ks 100% with KB0AMY KC0IDI N0KJ AA0OM W0FE W0WWR KB0RUU Mgr. Ks tfc W0WWR 934, NB0Z 79, KB0DTI 37, W0OYH 27, N0RZ 26, KC0GL 7, N0ZIZ 7. Need your call here.

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 ARRL Missouri State Convention and Lebanon ARC Hamfest will be held in Lebanon, MO. The event will be held in Cowan Civic Center, an outstanding facility, with 46,000 sq ft of space. Bill Wheeler, K0DEW, and others have done a great job promoting the event. There will be an ARRL, DX, QRP, Sky Warn with NWS participation, and DXCC and WAZ Card Checking. Wayne Mills, N7NG, ARRL Membership Services Manager, who manages DXCC, Contest, QSL Bureau, General Awards and W1AW will be the featured speaker. This should be a great convention and all MO Section Appointees are urged to attend. Patrick Boyle, K0JPB, SEC, reports that Jack Davis, AB0TE, of Bragg City has been appointed as EC for Pemiscot County. The latest Radio Club to become affiliated with the ARRL is the Southeast Missouri ARA in Poplar Bluff, MO. Members of other ARRL Affiliated clubs need to check to see if their club has updated its information on the ARRL Web site in the past 2 years. If not, that needs to be done. Congratulations to Rick Crockett, W0PC, for being nominated as the 2001 Herb S Brier Instructor of the Year Award. Rick was nominated by Ron Ochu, KO0Z. Best of luck to Rick and all those that are supporting him for this award. The Hamfest date for the Ararat Shrine ARC Hamfest has been changed to April 20th, because of a conflict in scheduling at the Ararat Shrine. Please pass this information around to Amateur Radio operators in your area. The Legislative E-Mail Alert system is still functional, but as of this date, there has been no significant legislation related to Amateur Radio filed in the MO State Legislature. If a member hears of something that may have been missed, please contact the MO Section Manager. Net Sess/QNI/ QTC/NM WAARCI 4/92/N0VT; MTN 28/548/ 125/K0DAT Rollabillboard 27/ 454/20/NA0V; Sullivan ARC 4/ 51/4 KB0ROX; Jackson CO ARES 4/40/0 K0UAA. 10 RN 56/ 802/274/W0SS; Audrain Co ARES 4/62/4/WB0SEN. Tfc: KE0K 94. PSHR:KE0K 111.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. It is with deep regret to inform you that Helen Meyerson, wife of World Radio Labs founder Leo W0GFQ has passed away. Survivors include children and grand children. Congratulations are in order for Evan Anderson, KC0CWP of Ashland. Evan received his Technician license at the age of 10 and recently upgraded to General. Evan's parents, grandfather and uncle are also hams. If you haven't checked out my Web site, please do. The URL is: http:/ /www.arrl.org/sections/?sect=NE. I try and update it several times per week, so check back often. Net Reports: NESN, QNI 968, QTC 14 & 28 sessions. MIDNE 2m ARES, QNI 324, QTC 47 & 28 sessions. MARES, QNI 114, QTC 2 & 3 sessions. NMPN, QNI 1562, QTC 36 & 28 sessions. NPPARC, QNI 19,

QTC 2 & 3 sessions. NE40, QNI 420, QTC 6 & 28 sessions. W0IRZ Memorial Net, QNI 80, QTC 2 & 2 sessions. WNE Net, QNI 1289, QTC 77 & 23 sessions. Saunders County ARES: QNI 38, QTC 2 & 2 sessions. Tfc: K0PTK 91, KE0XQ 24, WY0F 4, W0UJI 4, KA0DOC 4, W0DED 2, W0EXK 2, KA0O 2, KA0DBK 2, W0WHY 2, KC0DVG 2. PSHR: KC0HOX 44, KA0DBK 89, KB0YTM 16.

NEW ENGLAND DIVISON

CONNECTICUT: SM, Betsey Doane, K1EIC—ASMs: KZ1Z, NK1J, K1STM. BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: KB1CTC. SGL: W1UTQ. STM: K1HEJ. TC: W1FAI. Congrats to Technical Coordinator Joe, W1FAI, on becoming a grandfather of twins! That's why he could not make the cabinet meeting I held for all program leaders—first things first! Looking forward at this writing to seeing many of you at The Southington Hamfest April 14. Sky Warn Training is scheduled for Fairfield County at Norwalk City Hall April 30—contact Philip, KA1YIQ asap if you are going to attend. Special congratulations to The Meriden Amateur Radio Club on celebrating fifty-five years as a club! Those of you active in clubs know that this milestone is a real achievement. Actually, we have several clubs in CT which have long histories of activity. I very much enjoyed my visit with the Candlwood ARA and The Greater Norwalk ARC. At CARA, I was joined by Gerry Hill, KH6HU, coordinator of "The Big Project" at ARRL and at GNARC, the guest speakers were Dan K3UFG, Continuing Education Manager at ARRL. SEC Mike, KB1CTC and Allen, W1AGP, who led a topic relevant to emergency communications. Be sure and participate in the New England QSO Party weekend of May 4-5. For complete information, go to http://www.neqp.org, the URL of the New England QSO Party Web Site. The QSO Party is coordinated by Division Director Tom Frenaye, K1KI. Plan for The New England Division Ham Fest Boxbor, MA in late august—contact Mel, W1ZQ, mel@shore.net for reservations. Once again, it's time to plan for "The Big E", The Eastern States Exposition West Springfield, MA Sept. 13-29. Working at the booth is a whole lot of fun—we explain Amateur Radio to the public and demonstrate various aspects of the hobby. If you or your club is interested, contact Al, N1JWF aln1jwf@juno.com. Net sess/QNI/QTC/NM: WESCON 28/274/65/KA1GWE; ECTN 28/233/165/WA4QXT; nvtn 24/142/42/KB1CTC; CN 28/96/43/N1AEH; CPN 28/246/74/N1DIO; BOMN 25/289/210/NM1K. Tfc: NM1K 2007, WA4QXT 315, KB1CTC 275, KA1VED 245, K1UQE 150, KA1GWE 145.

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: NZ1D. TC: N1UEC. e-mail list: ema-arrl@qth.net, web: http://www.qsl.net/ema-arrl. Cape Ann ARA members have made major repairs to their club shack: fresh paint, repairs to the kitchen and sub flooring, plus new counter tops. Boston ARC has been holding practice nets for training net controls with great success. Billerica ARS will conduct a joint Field Day operation with the MITRE-Bedford ARC. Several of the BARS members enjoyed working the recent ARRL DX CW weekend. Harvard Wireless Club welcomed a visiting student from Namibia at one of its meetings recently. Incidentally, several HWC members will soon travel to PJ5AA in Sint Eustatius. Mystic Valley ARG is constructing a hidden transmitter suitable for fox hunting. MVARG reports, "the soldering irons will be warmed up, coffee will be hot, and the donuts dunkin'." Several Waltham ARA members took time off to assist with a major work effort on the club's 6, 2, and 440 MHz repeater systems. The work was conducted at both Prospect and Bear Hill locations. And in downtown Boston, an antenna replacement by another dedicated crew has freed the Boston ARC repeater of "snap, crackle, pop" noises that have plagued the .23 machine for months. At the writing, the Genesis ARS is conducting a Tech class in Kingston. The Cape Cod ARES group continues to enjoy great participation in its weekly drills. DEC WQ1O reports ten participants handled NTS radiograms and tested home brew antennas, 2m SSB gear and self-contained "go-kits." Only a few months to go before Field Day! Kick your FD promotion into high gear by offering Field Day pins and tee-shirts. The Natick Radio Emergency Net invited Framingham ARA members to attend a recent NREN meeting in Natick featuring a talk by MEMA Area Radio Officer KA8SCP. Framingham ARA has formed a committee headed by AA1IZ to explore how to provide better communications in local communities during emergencies. How do you jazz up that ham radio exhibit? Take a tip from the USS Salem ARC! They teach youngsters how to spell their name using the phonetic alphabet, and in Morse code. The K1USN crew also hands out ARRL literature and old *QST*s donated by members. Southeastern MA ARC has started up its 2002 season foxhunts in So. Dartmouth. Sturdy Memorial Hospital ARC reports increased security procedures are now in force at their hospital meeting QTH. 73 de K9HI. Tfc: W1GMF 2241, KW1U 527, NG1A 345, NZ1D 156, N1LKJ 143, K1BZD 129, KD1LE 107, N1AJJ 87, WA1FNM 63, WA1LPM 55, K1SEC 47, N1LAH 42, N1IST 24, KB1EB 23, KB1CVH 20, NC1X 12.

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. 2MT DXing has become a reality for Hams who can access the KS1R repeater in Brunswick (147.210 + 88.5) It's a real treat. Thanks to the efforts of the Merrymeeting ARC, cutting edge technology incorporating the Internet and Amateur Radio, allow Hams worldwide to access this repeater via the World Wide Web. Amateurs from Europe are found on the air first thing in the AM and later in the day, the west coast is on the air for your enjoyable QSO. So the next time you hear the doorbell ring on the KS1R repeater, you may be in for a big surprise as to who may be on the other end of the line. Field Day should be extended - it is really a shame it is only a 24 hr event, because it is the biggest event of the year for many Hams. Many participants try to show up at other sites, in order to show their support, and one day is not enough time to visit them all, especially in a state as big as Maine. As Section Manager, I will try to visit as many sites as possible during this fun and exciting event. Now with the Red Cross chapters on the air, hopefully we can include them in next year's activities. 73, Bill, N1KAT. Tfc (Feb): W1KX 130, W1QU 62, W1JX 27, KA1RFD 27, KA2ZKM 25, N1JBD 22, W1JTH 15. (Jan) W1KX 144, W1QU 60, N1JBD 32, KA1RFD 31, W1JTH 31, W1JX 27, KA2ZKM 25, AF1L 18.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org)—(www.nhradio.org). MAR - New hams in NH for March was "11". I am pleased to announce the appointment of Jim Van

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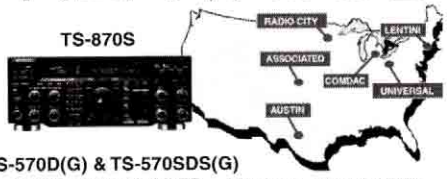

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Dongen, KB1EJY, as Public Information Coordinator for NH. Jim serves as the PIO for NHOEM. Jim's duties will include publicizing the activiies of NH-ARES and forging new club PIO relationships. Congrats to Jim for recently earning his Extra ticket. Jack Sheehy, W1JS, has elected to step down as OOC after taking on added responsibilities at work. Thanks, Jack, for your continued support of the Field Organization. The NH-ARRL will sponsor the plaque for the NH High Score in the firsat NEW ENGLAND QSO PARTY to be held May 4-5. Contest info and rules are available through a link in NH web page. NH-ARRL will again have its booth at Hosstraders on May 3-4. Come by to kibbitz and buy a book or two. Have a great summer. 73, N1FIK 603-487-3333. Net/NM sess/QNI/QTC: GSFM N1RCQ/27/134/24; GSPN WB1GXM 28/164/43/; VTNH WA1JVV. Tfc: N1NH 87, WA1JVV 67, W1ALE 41, WB1GXM 34, N1CPX 6, K1TSV 2.

RHODE ISLAND: SM, Bob Beaudet, W1YRC—ASM & ACC: WA1RI. BM: KA1BNO. OOC: W1AOM. PIC: WB1P. TC: K1DFT. SEC: N1JMA. SGL: vacant. STM: vacant. Your Director, K1KI, and I had the privilege of presenting special certificates to Al, W1JUN (age 95) and Lester, W1ABE (age 100) recognizing their long amateur careers. In separate occasions, their clubs arranged very nice events in their honor. W1JUN is with the PVARC and W1ABE is with NCARC and both old timers are still on the air daily! It must be the Rhode Island water or maybe the Johnny Cakes that keeps us clamdiggers going so long! Thanks to everyone who has helped me in these first few weeks as SM. Particular thanks to the clubs who have unselfishly offered so much help. Great spirit, gang! It's really appreciated. I still need a couple of brave souls to recruit for STM and SGL duties to help me build the RI section into one we can be proud of. What say someone? I can't do this without your help. What are you doing with your spare time that's more important than restoring ham radio? QTC: N1YKH 23.

VERMONT: SM, Bob DeVarney, WE1U—ASM: N1RJF, N1PDL, W1AD, KD1R. BM: WA1SQO. OOC: W1MP. SGL: WB1AJG. STM: KB1DSB. TC: W1SJ. ARRL VT Section Web page:www.arrl.org/sections/VT.html. Nets submitted by STM KB1DSB. Net/sess/QNI/QTC/NM: VT YL Net 4/36/0/KA1LDS; GMN 26/717/18/N1HXC; VTNH 28/146/131/WA1JVV; VPEN 4/34/1/WA1DLA; VPTN 28/270/357/KB1DSB.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org ASM: N1MAP. ASM (digital) KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1W. HCRA is in the process of getting Internet Radio link node up and running, and it should be on line within a couple of months. K1AXN presented a program on military radio equipment at the club meeting. The ARC-5 aircraft trans/rx ws one of the units displayed. Congrats to Juergen, DK1TM, for his effort earning QRPDXCC. Chasing DX with 1.5 kW and 5 over 5 is simple. Try it with 5 watts if you want a challenge! Every Monday at 7:30 PM on 146.910 KA1SON and KB2SAE have a New Comer Net. It's purpose is to familiarize newly licensed hams to the protocol of general and repeater operation. Sounds like a winner to me. K1TTT was the host of the Introduction to Contesting seminar held at his home. The group also enjoyed a tour of his 5 position contest station. This bash was sponsored by the YCCC. WA1VHC spoke at the HCRA meeting and showed pictures of his experiences while being attached to the Red Cross at the Pentagon during the 9-11 disaster. Tfc: N1WAS 183, K1TMA 122, KD1SM 17, W1ZPB 72, N1RLX 8, W1UD 285. 73, Bill.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB—Matanuska Amateur Radio Club is having a Flea Market on May 5, 2002, in Wasilla. Also the Iditarod Special Event Station of MARA did real well thanks to Len Betts, NL7NF. Hoonah has a new repeater thanks to the Juneau Amateur Radio Club, Jerry Pindle, KL7HFI, and the Anchorage Amateur Radio Club. The Anchorage ARES has a new repeater 147.27 do to Jim Wiley, KL7CC, and John Lynn, KL7CY. Have you checked out the ARES Web site at www.qsl.net/aresalaska? ACWN messages can be sent to Larry Ledlow, e-mail N1TX@amssat.org or Linda at 488 7046. Snipers 3920 at 1800; Bush Net 7093 at 2000; Motley Group 3933 at 2100; and Alaska Pacific net M-F 14.292 at 0830.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—Steve LaLonde, WA7WKX, an instructor at University HS in Spokane was informed that the school has been selected as a Pilot School for ARRL's Amateur Radio Education Project, a new initiative partnering Amateur Radio and education by integrating technology with various subject matter. Congratulations, Steve. In Walla Walla Co, new ham radio gear will be provided and installed in a new fire station at Burbank, as well as in the county EOC. Also people are going to get some First Response training in a Civilian Emergency Response Team (CERTS) program in Walla Walla to help the authorities. Net Activity for February: WSN: QNI 760, TFC 190; Noontime Net: QNI 9321, TFC 467; WARTS: QNI 3235, TFC 119. Tfc: K7GXZ 153, W7GB 104, KA7EKL 84, K7BFL 64, KK7T 24. PSHR: W7GB 128, K7GXZ 118.

IDAHO: SM, John Cline, K7BDS — ASM: K7FR, K7TIH, K6ZVA, KJ7TH, KB7TYA. STM: W7GHT. OOC: W7ZU. SEC: AA7VR.TC: N7ZFE - How many Hams in Idaho? The RAID Book now lists over 5,393. More new Hams are getting their ticket every week. We old-timers need to encourage each of the new Hams to become active participants in local Amateur Radio Clubs, public service communication, and to become members of ARRL. With the ticket comes fun and responsibility. Please welcome the new District Three ASM Gary, K7TIH. Only District Two remains without an ASM. Thanks to those who sent messages in February. Please check idahohamradio.com frequently. Tfc: W7GHT 193, KB7GZU 60, WB7VYH 50, W6ZOH 32. PSHR: W7GHT 120, WB7VYH 105. Nets: FARM 31/ 3379/31/W7WJH; NWTN 31/1379/57/KC7RNT; IDACD 23/ 504/15/WB7VYH; IMN 31/568/ 96/W6ZOH.

MONTANA: SM, Darrell Thomas, N7KOR— The Hellgate Amateur Radio Club ARES team was contacted by the Missoula based Civil Air Patrol and the Ravalli County Search and Rescue team to provide assistance in a joint exercise simulating a lost snowmobiler near Lolo Pass on February 9th. The CAP had some new HF-SSB transceivers that they wanted to try out. The ARES team assembled two dipoles cut for the CAP primary frequency just below the 75-meter band. They then deployed and installed the antennas at the incident command post location for both groups. They received a "thumbs up" from the CAP for a "5 by 5" signal at both ends of the links. They proved the utility of NVIS propagation techniques for communicating in and out of difficult areas and the ability of ARES to respond and support public service and safety agencies. On February 23rd, the Hellgate Group conducted a class in Missoula on handling emergency messages and traffic. The same day a Hamfest and Swapmeet was held in Stevensville MT. This event was well organized and enjoyed by all that attended. Net QNI/QTC/NM MSN 163/0 W7OW, MTN 1780/33 KD7HWV, IMN 437/106 W6ZOH.

OREGON: SM: Bill Sawders, K7ZM—ASM: KK7CW. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. STC: N7LA. ACC: K7SQ. It's time again for the annual Oregon QSO Party! Sponsored by the Central Oregon DX Club, the event takes place one day only, Saturday, May 11th, from 7 AM to 7 PM. Operate a few minutes, a few hours, or the entire event. Most of Oregon's 36 counties will be represented in what is expected to be the best-ever Oregon QSO Party! This is the first year we've gotten excellent publicity about the event, and stations all over the United States (and other parts of the world) will be tuning for Oregon stations! Some club members are traveling to rare counties (like Wheeler and Gilliam) to make them available to "county hunters". All you have to do is get on the air and work as many stations as you can, giving them THEIR signal report and your COUNTY. That's all there is to it! Look in this issue of *QST* for "Contest Corral" for full details, and let's put OREGON on the air! The annual SEAPAC convention takes place this month and next (May 31st through June 2nd). There will be lots of swap tables filled with goodies, plus plenty of great programs and demonstrations. The highlight will be during the Saturday night dinner program, where FCC. Special Council for Amateur Radio Enforcement Officer, Riley Hollingsworth will be the guest speaker. See you there, and keep in touch! NTS traffic totals for February: W7IZ 167, N7DRP 75, N7YSS 67, KC7SRL 53, W7VSE 45, KK1A 44, K7NLM 40, KC7ZZB 36, KC7SGM 11.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—The Washington State Emergency Net preamble has been revised. Check in on 3987 kHz Monday evening at 6:30 PM and meet other ARES people from around the State. Can't make it Monday? Then try Saturday morning at 9 AM on 3985 kHz. News from Clark Co. finds the ARES group attempting to untangle the procedure for erecting a 100 foot tower with city approval. The tower was purchased from a well- known manufacturer, but it became necessary in order to obtain approval to erect said tower that the weld of the joints be inspected by a firm other than the manufacturer. An organization from Portland was hired to X-ray the welds. Many failed the inspection and as of this writing the tower is still horizontal. For message traffic reports and Western Washington news please visit the Section Manager Web page http://www.arrl.org/sect/wwa. This news from Western Washington via SEC N7NVP. San Juan Co. ARES took part in the biannual airport exercise. EC Charile, KD7MOU, reported, a turnout of 13 local amateurs gave us a good high profile in the eyes of the emergency services. Should the need have arisen, we could have handled their backup communications if their radios became overloaded or had failed. Mark Whitaker, KD7KUN, is the new Operations AEC for ARES of King County. Mark will fill in for EC KB7TBF during out of area trips. Clark Co. is keeping a group of packeteers interested and involved by having monthly exercises designed to improve and practice their procedures. How does your unit keep its digital capability viable? There is a statewide Red Cross HF net that operates on Wednesday evenings at 1830 local on 3993 kHz. Does your unit have a representative checking in?

PACIFIC DIVISION

EAST BAY: SM, Andy Oppel, N6AJO—ASMs: NJ6T, KE6QJV. SEC: KE6NVU. 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. ROVARC congratulates KG6JID for upgrading to General and honored KC6SSF, W6DEI, WB6NOV and WA6KCP with "Ham of the Year" awards. HRC announced officers for 2002: K6BIR/Pres, KE6PID/VP, KF6HFK/Sec, N6OJJ/Treas, KC6QHM/Par, KF6GZX/SAA. MDARC has a new web site: http://mdarc.org. EBARC mourns the loss of longtime member WA6TNI. ORCA continues Oakland fire station radio installations with two more planned for March. SARS welcomes new licensee KG6JRY. CCCC welcomed new member KA6BQF. Feb tfc: W6DOB, WB6UZX. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7PM; NCN2-Slow Sess/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Jan Welsh, NK7N—OOC: Steve Lybarger, NU7T. SEC: Paul Cavnar, NN7B, ASM: Dick Flanagan, W6OLD. EC: Dick Grady, AC7EL is over in S. Nye Cty. Pahrump is busy trying to get non- profit status to be able to equip his group. He has 2 AECs, James Tully-N7ENB and Andrew Gudas- N7TP. Tnx guys. Clark Cty. Red X AEC is Norm Lizotte-KE7DB. Laughlin's EC is John Kennon-N7CQQ. I have been receiving correspondence from many appointee's around the state and will try to include several of the lesser known one's so you'll all be more familiar with them should you meet them. So many of you are never recognized for your assistance, and we're quite often not even aware of what you do on our behalf. Please let us know what you're doing. We are interested! We regret hearing Ken Broome-KD7DFB is now a SK. His friends will miss him. Ken Murphy-KC7ELH seems to have picked up how to do newsletters pretty quick. Looks like Carol Massie-NV7YL will get over the 1st edition of the YOUNG LADIES HARMONICS, the YLRL publication too. Good job by both. Nevada has talented newsletter editors which make for pleasant reading. 73, Jan, NV SM nk7n@arrl.org. Tfc: K7NHP 198, W7TC 161, W7VPK 84, N7CPP 11, NV7YL 6, W7YDX 2.

PACIFIC: SM, Ron Phillips, AH6HN— Dean Manley, KH6B, accepted the "tuna can" cw transmitter from Ed Hare, W1RFI, for a month's test. Dean's report is as follows: "Thanks again for the loan. Also returned was the TT2 in a circuit-board box and a novice-band crystal. I believe the unit is inoperative as it arrived with only one transistor and a dangling key (?) jack. No attempt was made to use the unit or to trouble-shoot/repairs. The box of crystals came in very handy as I used 3 or 4 of them. Of the two crystals marked "7040" used with the TT2, resulted in operation near 7039 and 7041. When first using the TT2 with these two crystals, I noted the frequencies as 7041 and 7043. The winding for the oscillator collector choke was slipping off one end. Maybe 5 or 6 turns were carefully moved back onto the ferrite form. This is when I noted the change in crystal frequencies. No attempt made to glue the winding. No

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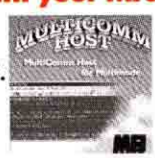

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other changes were made nor required. In the log for contacts with the TT2: AK7D, KH6BMM, KH6KT, W6ORS, KH7T, NH7D, AH6HN, KH7M, WH6WI, NH6XK, AH6NJ, KH6HE NH6WW, AH6HB and KH6B. This is the four major Hawaiian Islands plus Oregon. Also, there were several days of viewing and touching the original TT2 on the daily sessions at Jack in the Box in Hilo. One lunch session at the Hilo Hawaiian Hotel. A total of 30 or more radio amateurs saw/touched the TT2 as well as a copy of May 1976 QST." Thanks again, Ed for the loan of your unit. Bob Schneider, AH6J and I attended the governor's R U Ready conference on Oahu. Both ARES and RACES were represented and we had a very informative display. Thanks to all those hams who participated, especially to Ron Hashiro, AH6RH for setting up all the displays. Mahalo and 73.

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ—Congratulations to K6SOJ and the entire crew that made EMCOMM 2002 such a success. We were honored that Steve Ewald, WV1X, was able to attend and offer comments from the perspective of an ARRL HQ staffer. Our Division Director, W6CF, added his sage wisdom to the event as well. The North Hills Radio Club recently had a "bring a friend night" meeting for non-amateur friends of members. They had a full array of operating displays to entice new members to our fraternity. This is an approach many clubs might emulate! In case time has flown by too fast, a reminder that Field Day is next month. This is another excellent opportunity to expose non-amateurs to the excitement of our service. It is also a great opportunity to invigorate some hams whose enthusiasm may have waned over the years—invite them to participate and appeal to the expertise they possess that your newer members could benefit from. Congratulations to N6SSQ for his recent actions in reporting and assisting with a vehicle on fire.... It was being driven at the time by a woman who did not know her car was burning underneath her! If you have not yet provided your input about the changes proposed for *QST* (Section News, Contest Results being shifted to the Web or NCJ) please provide it ASAP. Finally, are you ready for fire season? It is nearly upon us (actually it may be already by the time you read this). There is seldom, if ever, a year in our Section when Amateur Radio EMCOMM isn't needed in support of a fire fighting operation. Until next month, 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn,WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. ASEC: KE6IAU. The "Lost Coast" San Francisco Section Convention will be held in Ferndale, Humboldt County, on June 28/30. This is NOT Field Day weekend! Motels and camping spots are available. Glad to announce that KE6JQW is the new DEC for Humboldt County. Fort Bragg High School senior KG6JSA (a new ham) is working on Amateur Radio emergency communications and the City of Ft. Bragg as his senior project. Thanks Nick. The Red Oak Victory radio club along with many others will be active on the air in July during the Museum Ship event. Date, time, and frequencies to be announced. REDXA had a speaker from a group of doctors that flies into Mexico regularly. SSTV is being used more in the section for emergency work. This can be done on SSB or thru repeaters. Information from SCRA is available. Lake County Amateur Club meets even months on the west side of the lake, and odd months on the east side of the lake. ALL clubs PLEASE send in your Web site addresses, meeting nights and times, location of meetings, and talk-in frequencies. This will be placed permanently on the Section Web site. The SM also requests via e-mail a list of speakers /programs that you have had in the last two years. I am trying to make up a list to circulate to all clubs. See you in Ferndale!

SAN JOAQUIN VALLEY: SM, Charles McConnell, W6DPD—ACC: W6DPD. SEC: K6IN. OOC: N1VM. Thanks to Don Costello, W7WN, for his years of service to Amateur Radio as the SJV SM. Thanks again, Don. All affiliated clubs should update their annual report on the ARRL Website, arrl.org. If you don't do this, after 2 years you club will be placed in the inactive file. To get back on the active list, just update your report. I would like all clubs in the Section to put me on your newsletter mailing list. See page 12 of *QST* for my address. You can also send the newsletter as an Adobe Acrobat file to w6dpd@arrl.org, if that is better for you. If you want your event listed here, send them to me. Remember there is a 2-month delay in publication. It is my sad duty to report that KN6BB and N6DI are Silent Keys. Officers of the Fresno Amateur Radio Club for 2002 are Pres. KF6CL, VP W6YEP, Sec KA6J, and Trees KF6ZSW. The Fresno Hamfest is May 4, 2002, at Riverland Resort on Highway 99 at the Kings River, 25 miles south of Fresno. Bring you items to swap and your appetite. There will be lots of goodies for you to take home if you are lucky. Talk-in will be on W6TO/R 146.34/94. For information, email w6to@arrl.net.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W—OOC: Mitchell E. Lee, KB6FPW. PIC: Alan L. Zeichick, K6ALZ. SEC: Don Carlson, KQ6FM. TC: Kit Blanke, WA6PWW. For news around the Section, check the ARRL SCV Section Web Page on the ARRL Web: http://www.arrl.org/sections/SCV.html.

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC - SEC: KE4JHJ. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl.org. Whether you are involved in a radio club, ARES group or a net, membership (or participant) retention is an important issue that you will face. All groups will naturally lose members due to silent keys and relocation, but we should strive to retain members that we can. A sales meeting I once attended emphasized that it is six times harder to recruit a new customer than it is to keep the ones you have. This certainly can be applied to membership (or participation) as well. Why do people become involved in organizations? Three main needs are filled by joining an organization: to learn from others, to be of service to others, and to socialize with others. Make sure your group meets these needs of its members. Training will help newcomers learn and provide mentor opportunities for those wanting to serve. Community involvement provides service opportunities for all. Make sure people feel welcome, and feel like they are needed. The social needs of your members should not be minimized - if someone develops friendships in an organization, they will keep coming back. A member's interests and availability will change over time, make sure you can accommodate them as they do. Finally, an organization that does a good job of retaining members will not have a hard time recruiting new ones. Hamfest: Durham May 25. Feb. traffic: W4EAT 481, K4IWW 316, K4RLD 180, NC4ML 170, KI4YV 163, W4UEF 123, AA4YW 116, W3HL 70, KE4JHJ 68, W4IRE 63, AD4XV 47, W4CC 35, N0SU 34, KE4AHC 32, K4WKT 29, WA4SRD 27, WA2EDN 25, N4NTO 18, N4TAB 15, KF4VTT 10, WD4LSS 8, KR4OE 8, W4EHF 7, NT4K 7, WD4MRD 6.

SOUTH CAROLINA: SM, Patricia M. Hensley, N4ROS — The most recent census of Amateur Radio operators indicates a population of 680,000 plus. Approximately one-half (318,000) of these hold Tech/Tech Plus licenses. Another publication surveyed radio club participation. Sixty percent of the respondees said they either had never attended any club meetings or had never returned after their initial encounters. This is a staggering finding. Do the interests of various licensees differ that significantly? By definition, amateur radio involves interactive communications. Yet, it seems unusual that a majority of those with supposed similar interests (licensed amateurs) do not choose to participate in "group interactive communications (club meetings). SC has 7000 plus licensees of which nearly 3000 are Tech/Tech Plus. Application of the preceding data would predict that 3500 plus individuals are not involved in any SC club. Therefore, I ask that SC amateurs send me what they like and dislike about their club. These comments, in turn, will be compiled and distributed to our respective leaders. Hopefully, this information can contribute to a club atmosphere which will be attractive to all amateurs. Tfc: AF4QZ 218, KA4LRM 81, KA4UIV 63, WD4BUH 20, WA4UGD 18, K4JIF 14, K3LM/WB4PCS/N4VVX 9. PSHR: AF4QZ 150, KA4UIV 121, KA4LRM 109, N4VVX 100. SEC Report 315.

VIRGINIA: SM, Carl Clements, W4CAC—ASM: W4PW. SEC: N4NW. STM: W3BBBQ. PIC: W4PW. ACC: W4IM. OOC: W4NEZ. TC: W4RAH. Web page; www.arrlva.org. Chesapeake has been a busy city in the Amateur Radio world the last several months. The Chesapeake Amateur Radio Service held an open house for youth at the Chesapeake Center for Science and Technology on March 9th. Organized by John Collins (K4BAY) along with his daughter Samantha (K4GEM) this open house introduced Amateur Radio and broadcast radio to 10 youth. Some youth actually read weather reports on the air for the WFOS broadcast station. They also learned about Skywarn and were provided the opportunity to make contacts via Amateur Radio. Then on April 20th, the CARS hosted the Springfest at the Hickory Ruritan Club. The American Diabetes Association's Tour De Cure, also on April 20th, was supported by the Amateur Radio community. This event started in Chesapeake and finished in Manteo, North Carolina. The Shamrock Marathon was held in Virginia Beach for the 30th year. The amateurs of the Virginia Beach Amateur Radio Club along with amateurs from throughout the surrounding area, provided communications assistance as they have done for the last 23 years. Approximately 65 amateurs participate in this event every year. The world-class Amateur Radio Exhibit at the Virginia Air & Space Center continues to draw the attention of its many visitors. With trained station operators from the many Tidewater area clubs on duty daily through the 'prime' visitor hours, thousands of school youth and other visitors have learned about this fascinating hobby of ours. The Virginia Appalachian Wireless Association, with the approval of Dr. Richard Turner, principal of William Byrd High School, Vinton, Roanoke County Schools, has been working with about 10 students to instruct them on how to become amateur radio operators. Dr. Turner has been kind enough to provide 2 classrooms, 2 computers, and a room near the rooftop of the building to establish a ham radio station for the training and use of the students. Remember, the new PSHR criteria went into effect on May 1st. File your May PSHR reports accordingly. 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. 73 de Carl, W4CAC. Tfc:

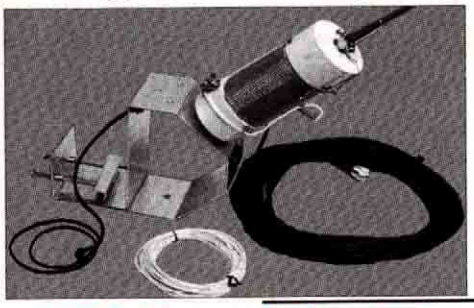
WEST VIRGINIA: SM, Hal Turley, KC8FS— Section Web site at www.qsl.net/wvarrl. WV gets its version of PRB-1 with passage and 3/7/02 signing of HB4335 by Gov. Wise. Tnx to all for contacting lawmakers and standing behind bill sponsor Delegate Sharon Spencer, KC8KVF throughout this process. Gov. Wise, no stranger to ham radio, also proclaimed 3/7/02 Amateur Radio Operator Appreciation Day in the Mountain State. His father, Bob, Sr., WA8AYP is a Silent Key. Speaking of SKs, WV hams were saddened to learn of the passing of Calvin Basham, W8NR, also on 3/7/02. Though small in stature, Cal loomed large in the eyes of all hams that knew him. He will be missed. I have completed a new ARRL display that I will be taking to hamfests/conventions around the state— would appreciate your feedback. Jackson County Hamfest May 5 CU there. Unfortunately, Plateau Hamfest for 5/11 has been cancelled. 73 es CUL de Hal. Tfc (Feb.) KA8WNO 354, W8YS 90, N8NMA 86, KC8CON 52, WW8D 39, WW8F 36, WD8DHC 35, N8FXH 32. PSHR: KC8CON 145, W8YS 143, WW8D 130, W8WWF 127, WD8DHC 105, W8IVF 88, KB8NDS 74, N8NMA 72. WVMDN 71/24/446 WW8D; WVN(E) 102/71/242 N8NMA; WVN(L) 127/74/265 N8NMA; WVFN 1,147/126/822 KC8CON; MSEN 76/01/72 N8TMW; BDARC (2mtr) 266/1/515, PARA (2mtr) 42/4/82.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Jeff Ryan, K0RM— ASM: Tim Armagost, WB0TUB. ASM: Jerry VerDuft, AD0ØA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MYY. On October 29th last year, I submitted an application to the FCC for a vanity call. With the anthrax scare and FCC's lost mail, my application was one of hundreds that got stalled for over four months. The logjam finally broke this week and my new call sign application was granted. K0RM is the new call-and I expect it may take several weeks for all of the various databases with my 'old' call to catch up. If you need to send me an e-mail, try both n0wpa@arrl.org and k0rm@arrl.org for now. I had a great time at the EOSS-54 balloon launch on 2/23 at Meadow Lake airport near Colorado Springs. Go to their Web page at www.eoss.org for info on future flights. See the ARRL Colorado Web page at www.arrl.org/sections and click on Colorado. If you have items you'd like me to post on this page, email them to me. If you have items for this column, let me know that as well. 73, de K0RM. And de WB0TUB with sad news: Bill Sheffield, KQ0J, passed away this past month. Bill was Section Manager for a number of years and as such had a hand in many activities. During his watch we had the division convention at the Holiday Inn at Chambers and I-70 in Denver; he coordinated the ham activities for the International at Castle Pines and he worked to get a statewide link up and operational. He was Chairman of the CCARC at the same time as SM, worked with the Red Cross,

MFJ *Apartment* Antenna

Covers 40 thru 2 Meters . . . Mounts outdoor to windows, balconies, railings . . . works great indoors mounted to desks, tables, bookshelves



MFJ-1622 **$99.95** *New!*

New MFJ-1622 Apartment Antenna lets you operate 40 thru 10 Meters on HF and 6 and 2 Meters on VHF with a single antenna!

Its universal mount/clamp lets you easily attach it to window frames, balconies and railings. It also works great indoors mounted to a bookshelf, desk, or table. It's not a 5 element yagi, but you'll work your share of exciting DX!

Highly efficient air wound "bug catcher" loading coil and telescoping 5½ foot radiator lets you really get out! Radiator collapses to 2½ feet for easy storage and carrying.

It includes coax RF choke balun, coax feed line, counterpoise wire and safety rope. Handles 200 Watts PEP.

Operating frequency is adjusted by moving the "wander lead" on coil and adjusting counterpoise for best SWR.

MFJ Ground-Coupled Portable Antenna Base

Provides effective RF ground and stable mount for vertical antennas . . . Antennas radiate well with low SWR

MFJ-1904 **$99.95** *New!*

MFJ *Ground-Coupled Portable Antenna Base*™ provides an *effective* RF ground 160 through 2 Meters and a stable mount for vertical antennas.

Capacitive coupling to ground is a *time-proven* principle. It needs no tuning and antenna radiates well and gives good SWR on all bands. Performance is similar to mobile stations when using a mobile antenna but is far better with longer antennas.

The base can support a lightweight multiband vertical antenna -- like the all band Hy-Gain 18AVS and the bandswitching MFJ-1795 -- and provide a semi or permanent installation.

You can easily set up and take down vertical antennas for stealth operation and hide the base by covering it with dirt.

The MFJ-1904 is a 2x2 foot *stainless steel* square with reinforcing bends that greatly strengthens it. Folded and tapered six-inch *stainless steel* legs firmly anchor the MFJ-1904 into the ground.

Built-in antenna mount with SO-239 coax connector and two U-bolts lets you mount most standard and homebrew vertical antennas.

Standard 3/8-inch x 24 mobile mount is built-in for MFJ Mobile Whips, bug catchers, *Hustlers* and screwdriver antennas.

Two handles make carrying and removing the base fast and easy. You can also attach radials for improved performance.

33 Feet Telescoping fiberglass Mast . . .

Collapses to 3.8 feet, weighs 3.3 lbs.

MFJ-1910 **$79.95**

Super strong fiberglass mast has huge 1¾ inch bottom section. Flexes to resist breaking. Resists UV. Put up *full size* inverted Vee dipole/vertical antenna in minutes and get *full size performance!*

MFJ Vertical

for Antenna Restricted Areas

40, 20, 15, 10 Meters, Automatic Band Switching

MFJ-1795 **$149.95** *New!*

Perfect for permanent or portable operation in antenna restricted areas. Hide behind trees, fences, buildings, *in* bushes -- only 7 to 10 feet tall (adjustable).

Low angle of radiation for DXing, omni-directional, handles 1500 watts PEP, low SWR.

Highly efficient end-loading. Entire length radiates.

Ground mounts with suitable ground such as MFJ-1904 *Ground-Coupled Antenna Base*, radials or ground rods. Or roof mount with radials.

HF mini-Bugcatcher

Highly efficient 40 - 6 Meter base-loaded 5½ foot Bugcatcher mobile antenna . . . Use light duty mounts

MFJ-1624 **$79.95** *New!*

Become an *"HF Mobileer"* almost instantly with this *new* MFJ high-efficiency *mini-bugcatcher* mobile antenna! Have tons of fun rag-chewing and DXing on the HF bands. Turn boring drives into fun-filled ham adventures.

Attach a simple mount to your vehicle (*mounts*: trunk lip, MFJ-347, $39.95; mirror or luggage, MFJ-342, $9.95; tri-magnet, MFJ-338T, $19.95) . . . **Screw** in your MFJ *mini-bugcatcher* . . . **Throw** your rig into your car, plug into cigarette lighter and turn power down to 20 Watts (to avoid overloading your cigarette lighter; MFJ-1624 handles 300 Watts PEP). **Operate!**

Bugcatcher design uses large highly-efficient *air-wound* inductor -- far out performs other compact HF antennas. *Exclusive* built-in inductive matching network keeps SWR low. 5½ foot whip collapses to 2½ feet for easy storage and low garages. Base loaded for minimum wind load and light duty mounts. Change band by moving *wander lead*. 3/8x24 in. mount.

MFJ Portable Antenna

MFJ-1621 **$89.95**

Operate from apartments, homes, hotels, campsites, beaches or any antenna restricted area. Work all bands 40, 30, 20, 17, 15, 12 and 10 Meters.

DXCC, WAZ, WAC, WAS have been won with the MFJ-1621! Compact 6x3x6 inch cabinet has 4½ foot telescoping whip, built-in antenna tuner, field strength meter and 50 feet coax. Handles 200 Watts.

MFJ Super High-Q Loop

MFJ-1786 **$379.95**

MFJ's *tiny* 36 inch diameter *high-efficiency* loop antenna performs like a *full-size* dipole! Operate 10 thru 30 MHz *continuously* -- including WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics or mobile homes.

Mounts vertically or horizontally. Low angle radiation gives you excellent DX.

Super easy-to-use! Remote control auto-tunes to desired band, then beeps. No control cable needed. Handles 150 watts.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- *gives you highest possible efficiency*. Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

Free MFJ Catalog

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http://www.mfjenterprises.com for instruction manuals, catalog, info

was active in coordinating many events and eventually re-signed as SM (after about 10 years!) to become the Division Vice Director. This is a VERY brief list of his accomplishments! He was quite a force in the amateur community in the 1980s and will be missed by many. Our thoughts go out to his family and his many friends.

NEW MEXICO: Joe T. Knight, W5PDY—ASM: K5BIS, N5ART & KM5FT. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. Efforts to get the New Mexico PRB-1 Legislation voted on this session were successful, thanks to the persistence of AC5ZO and many others. What a great job everyone has done for the State! Just received a telephone call indicating that Governor Johnson has signed or PRB-1 Bill. Boy, what great news! A celebration is being planned to honor AC5ZO on March 16th. Excellent news letters from the Pecos Valley ARC, Deming ARC, Gila ARS, ABQ ARC, ABQ Caravan Club, ADXA, El Paso Clubs, 0-Beat from Pikes Peak ARC, Mesilla Valley ARC, ABQ QCWA, and perhaps others that I may have overlooked. The Midland ARC is holding their St. Pat's Day Hamfest March 16th and 17th. The ABQ Spring Tailgate is scheduled for April 27th and the Mesilla Valley ARC is planning their Annual "Bean & Chili Feed" on April 28th. Sorry to report the passing of W5AHB, KC5KEC, N5SNV & W5RKP.Lots of good Net Reports with activity on the increase. An ARES Fire Exercise is scheduled for March 16th & 17th in the ABQ East Mtns. With the extreme drought, we may be needed in a number of areas this summer. Best 73 to all, W5PDY.

UTAH: SM, Mel Parkes, AC7CP—I have been very impressed with all the volunteers who worked so hard and made the 2002 Olympics a big success. It would be difficult to begin naming individuals, but we certainly know over three hundred hams and many hundreds of man-hours were provided to ensure the communications would be available in the event of a special need or requirement. I would encourage all hams in the state to give serious thought to helping more young people get involved with Amateur Radio. The future is in their hands and we can play a key role by helping them learn about our favorite hobby. Help a relative, neighbor or friend get into Amateur Radio! By the way the Utah Hamfest 2002 & Rocky Mountain Division Convention will be hear soon have you registered yet? **http://www.utahhamfest.org/**

WYOMING: SM, Bob Williams, N7LKH—We extend condolences to Rev Morton, WS7W, and his family, on the recent loss of his father, and we also regret to announce that Pat ("Doc") McCue, NE7D, has become a Silent Key. Pat was very active in the Cedar Mountain ARC, and was the one who ALWAYS showed up for exercises and for Field Day. He was a VE and a former county EC, and an active CW operator, and was also active in the Sage Hoppers radio-controlled model airplane club, the Boy Scouts, and the Good Sam Club. We will miss him. On a lighter note, don't forget the Wyoming State Ham Convention, at the Radisson Hotel in Casper, May 25-26, 2002. There will be vendors, swap tables, a fox hunt, and a VE testing session, as well as the usual door prizes, ARRL Forum, and State Ham Meeting. Other forum topics will include QCWA, Emergency Management, APRS, and the National Weather Service (to be confirmed). There will be the traditional banquet on Saturday evening, with a surprise program. Registration and hotel info is available on the hamfest Web site, http://www.qsl.net/wy7u/Convention%20page.htm, or from Dave Gregory, n7coa@arrl.net.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ — ASMs W4XI, KB4KOY. STM: W4ZJY. SEC: W4NTI. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. The Birmingham ARC will have its hamfest on May 4 and 5 at the Zamora Temple. Doors will be open on Saturday from 9:00 AM to 5:00 PM and on Sunday from 9:00 AM to 4:00 PM. Admission is $5.00 per adult and is good for both days. Details may change, so check their Web site at www.w4cue.com/fest.html or contact Glenn Glass (KE4YZK) by phone at 205-681-5019 or by e-mail at ke4yzk@bellsouth.net. While at the Birmingham Hamfest please attend the ARRL forum. I would like to meet with you and go over what is going on with the Alabama Section. June is just around the corner and that means its time to finalize your Field Day plans. If your club is planning Field Day operations, please e-mail me a summary so that I can report them to the rest of the section. My e-mail address is kr4tz@arrl.org. Better yet, is your club officers members of alhamclubs@qth.net? Encourage them to email me (kr4tz@arrl.org) to join, and use the list reflector to coordinate the Section's field day activities. There is always something going on in our section, so please check out our Web site at www.kr4tz.org/al-arrl for more up-to-date news and information. 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: Eddie Kosobucki, K4JNL. ACC: Mary Ahls, W4NZJ. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. State Web site: www.qsl.net/arrl-ga. Sincere thanks to the members of the NoGA QRP Club and the Atlanta ARC for pooling their resources to buy and assemble a K-2 QRP transceiver and donating it to the STARS station at the SciTrek museum in downtown Atlanta, and to all of the wonderful hams in the area who've been volunteering their time to keep that station up and running.... what a great place to show off the wonders of amateur radio to the public! Congratulations to both the ARC of Athens and the Valdosta ARC for recently renewing as Special Service Clubs, and to 10-year-old Stephanie McClarsky, KG4GQX, of Murray county, who recently won 1st place in a 4-H competition with a project on fiber optics, optioelectonics, and laser technologies. Pretty impressive, huh? Special kudos to all of the industrious hams in Fayette County, who make their EC Ed Ferguson, N4YTR, so proud that he wrote me a 3-page letter singing their praises. It's good to know that enthusiasm and the can-do spirit is still burning bright in Fayetteville, GA. Sadly, 2 SKs to report: Terry Queen, KD4IXO, of Dalton, GA, and George Haddock, KB4HCB, a 7-year Army MARS director for GA, and most recently, national software librarian for Army MARS. Condolences to the families and friends of both Terry and George. Until next time, take care of yourselves. And each other. 73, Susan. Tfc: KG4FXG 208, WB4GGS 189, W4WXA 164, AF4NS 148, K4BEH 53, WB4BIK 46, KA4HHE 44, K4ZC 24, K4WKT 23.

MFJ *Speech Intelligibility* Enhancer

. . . makes barely understandable speech highly understandable!

MFJ-616
$169.95

"What did you say?" ***Can you hear but . . . just can't always understand everything people are saying?***

As we get older, high frequency hearing loss reduces our ability to understand speech. Here's why . . .

Research shows that nearly *half* the speech intelligibility is contained in 1000 to 4000 Hz range, but contains a miniscule 4% of total speech energy.

On the other hand, the low frequencies, 125 to 500 Hz have most of the speech energy (55%) but contribute very little to intelligibility -- only 4%.

To dramatically improve your ability to understand speech, you must:

First, drastically increase the speech energy above 500 Hz, where 83% of the speech intelligibility is concentrated.

Second, drastically reduce speech energy below 500 Hz where only 4% of speech intelligibility lies.

The MFJ-616 splits the audio speech band into four overlapping octave ranges centered at 300, 600, 1200 and 2400 Hz. You can boost or cut each range by nearly 20 dB.

A balance control and separate 2½ Watt amplifiers let you equalize perceived loudness to each ear so both ears help.

By boosting high and cutting low frequencies and adjusting the balanced control, speech that you can barely understand become highly understandable!

Even if you *don't* have high frequency hearing loss, you'll dramatically improve your ability to understand speech. You'll get an edge in contesting and DXing and enjoy ragchewing more.

Here's what *QST* for April, 2001 said . . . *"I expected a subtle effect at best, but I was astonished . . . The result was remarkably clean, understandable speech without hissing, ringing or other strange effects . . . made a dramatic improvement . . ."*

Immuned to RFI. Has phone jack, on/off speaker switch, 2 inputs, bypass switch. 10Wx2½Hx6D". Needs 12 VDC.

MFJ-1316, $19.95. For 110 VAC operation. Provides 12 VDC/1.5 Amps.

MFJ-72, $58.80. *All-in-one MFJ-616 Accessory Pack.* Includes MFJ-392 headphones, two MFJ-281 speakers and MFJ-1316 power supply. ***Save $7!***

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.

MFJ Contest Voice Keyer

Transformer-coupled -- No RFI, hum or feedback . . . 75 seconds total, 5-messages . . . Records received audio . . .

MFJ-434
$179.95

Let this *new* microprocessor controlled MFJ *Contest Voice Keyer*™ call CQ, send your call and do contest exchanges for you in your own natural voice!

Store frequently used phrases like "CQ Contest this is AA5MT", "You're 59" . . . "Qth is Mississippi" . . . Contest by pressing a few buttons and save your voice.

Record and play back five natural sounding messages in a total of 75 seconds. Uses *eeprom* -- no battery backup needed.

You can repeat messages continuously and vary the repeat delay from 3 to 500 seconds. Makes a great voice beacon and calling CQ is *so* easy.

You can also record and play back off-the-air signals -- great help if you didn't get it right the first time! No more "*Please repeat*".

A playing message can be halted by the *Stop Button*, your microphone's PTT/VOX, remote control or computer.

Has jack for remote or computer control (using CT, NA or other program). Lets you select, play and cancel messages.

Your mic's audio characteristics do not change when your MFJ-434 is installed.

All audio lines are RF filtered to eliminate RFI, audio feedback and distortion. An audio isolation transformer totally eliminates hum and distortion caused by ground loops.

It's easy to use -- just plug in your 8 pin mic and plug the MFJ-434 cable into your transceiver. Internal jumpers let you set it to your rig. Use your mic or its built-in mic for recording.

Built-in speaker-amplifier. Speaker/phone jack. Use 9 Volt battery, 9-15 VDC or 110 VAC with optional MFJ-1312B, $14.95. 6½Wx2½Hx6½D in.

MFJ-73, $29.95. MFJ-434 Remote Control with cable.

60 dB Null *wipes out* noise and interference

MFJ-1026
$179.95

Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise -- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker! Interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequences from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network.* You can combine two antennas to give you various directional patterns. Null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312B, $14.95. 6½x1½x6¼ in.

MFJ-1025, $159.95. Like MFJ-1026 less built-in active antenna, use external noise antenna.

MFJ *tunable* Super DSP filter

MFJ-784B
$249.95

Only MFJ gives you *tunable* and *programmable* "brick wall" DSP filters.

You can continuously *tune* low pass, high pass, notch and bandpass filters and continuously *vary* bandwidth to pinpoint and eliminate interference.

Only MFJ gives you 5 factory pre-set and 10 programmable pre-set filters you can customize. **Automatic** notch filter searches for and eliminates multiple heterodynes. Advanced adaptive noise reduction silences background noise and QRM.

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NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—Senior Staff not included. The Orlando HamCation was highly successful. The Northern Florida Section Form was well attended. John Fleming, Communication Officer for the State of Florida presentation was very good. John stressed the procedures the State EOC uses during disasters, and in particular in times of hurricanes. There are many modes of communication, but he emphasized the part amateur radio plays in their operation. John asked that anyone wanting to know how to communicate is to take a copy of the Northern Florida Section Emergency Communication Plan and follow it. "READ IT, USE IT". If you are active on the NFAN and NFPN, and to not have a copy of the Nfl Plan, contact your District Emergency Coordinator or your County EC. The NFAN Net meets each morning at 0900 Eastern, and the NFPN meets at 18:30 Eastern. All amateurs are welcomed to check-in, and when there is an emergency in the Section, information will be on these nets. The frequency used for these nets are explained in the plan. Any questions should be directed to the DEC, SEC, WA4NDA and myself. Another special activity during the forum was presentation of Plaques to the individuals involved with the Amateur Radio station set up for the President of the United States to speak to the ham operators. Those receiving plaques were: John Schmidt, AF4PU, Joettee Barnett, KG4HPN, and Cliff Fraser, KE4HIY. The President's speech was during the ARES Net on 3950. Another special event during the month was the Blue Angel Marathon held in Pensacola. Jim Waters, WA2GIN was the Chairman for the amateurs. Approx 1800 runners participated, with 20 radio operators providing ham radio communications. The operators received a "T" shirt for their performance or their participation. This is an annual event put on the Navy, which claims they could not do this without the assistants of the ham community. 73, Rudy. Tfc: WX4H 1373, NR2F 354, KE4DNO 233, K1JPG 188, K8KV 184, WD4GDB 175, KE4PRB 174, N9MN 125, KF4WIJ 103, WB2FGL 101, AG4DL 85, KD4GZN 78, AF4PU 56, KJ4HS 53, W4KIX 37, W8IM 34, WB2IMO 16, KB4DCR 14, N3JN 8, WD4IIO 6, WB9GIU 6, W1KAM 5, WD4LIF 4.

PUERTO RICO: SM, Víctor Madera, KP4PQ — La actividad este mes ha sido excelente. Tuvimos la oportunidad de participar en la reactivación del PRARC. Luego de una larga etapa durmiente, un grupo de radioaficionados ha trabajado para hacer posible la reactivación del club más antiguo. Felicitamos a NP3Z quien fue seleccionado para presidir la nueva junta. Ofrecimos una charla sobre OOs al grupo La Polilla. Este nuevo grupo se organizó recientemente y va en crecimiento. Lo dirige WP4KS. Visitamos Cabo Rojo donde pudimos compartir en un hamfest que organizó la FRA y el grupo "Radioaficionados en Acción". Allí se reunieron cerca de 200 radioaficionados y compartieron todo el día. Hubo talleres técnicos, cambalaches un buen almuerzo y rifas. Felicitamos a WP4MJP quien preside la FRA y a KP4DL, KP4FKB y KP4DYV quienes coordinan los trabajos con "Radioaficionados en Acción" y el grupo de "La Tecnología". Se completó el entrenamiento para Technicians en Humacao. Tuvimos la oportunidad de dirigirnos a ellos en su última clase. Le hablamos sobre el ARREL y el programa de exámenes del VEC. El instructor fue la NP3HM. Tuvimos la oportunidad de dirigirnos a los nuevos candidatos durante el cierre de su sesión de clases. El ARRL/VEC (Team de Puerto Rico) ofreció sesiones de exámenes en San Germán, PR. La próxima sesión será en Ponce, PR. Las clases preparatorias para Technician que ofrece el PRARL en la UPR están por completarse. Los instructores que han estado trabajando en este proyecto son entre otros, KP4NNC, WP4AOH, NP3OD, WP4LNY y WA6LBB y KP4PQ. Anunciamos la triste pérdida de KP4BKY (SK). Puedes comunicarte con tu Section Manager vía email a kp4pq@arrl.org.

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI— Web Page: http://www.sflarrl.org. See the pictures on the ARRL Web page (SFL). Ed Petzolt, K1LNC, made news again by assisting Skipper, KG4OAK, to get a seriously ill passenger moved from his sailing vessel to a medical facility in Kingstown. Ed, patched through Miami to the Coast Guard Station in San Juan, relayed information between them and the vessel as needed. AROUND THE SECTION: Eighteen hams from the Titusville ARC participated in the St. Lucie Power Plant Radiological Drill and statewide NWS Drill. The IRARC provided CAT team members to support the Nuclear Accident Drill and Evacuation from the Port St. Lucie area. Communication support to the Red Cross damage assessment teams was conducted during the Skywarn drill the following day. They simulated loss of 3 primary repeaters and all power. In addition they coordinated between the Suntree Comm Emer Rct Team and Central Brevard hams in a simulated search and rescue for a Skywarn reporter who was too diligent in his tornado investigation. They will defeat Murphy when the real thing happens!! CAT team members are installing the new dish for the GOES-8 satellite downlink to allow copy the portion of the EMWINS signal applicable to Brevard. South Brevard reports that the Tiger Dash went smoothly and they are looking forward to the 100 Mile bike tour. Broward County ARES helped man the Miami Hamboree Welcome Booth where videos of ARES, SAREX were shown, the UHF portable repeater was demonstrated, and Jim, WA4CSQ drew many curious attendees with his working telegraph sounder. Collier County recognized the many hams who helped get emergency communication in order with a 440 MHz Repeater, 40-ft tower, and tri-band antenna and Azden 4300, rotor, ICOM 735, MFJ-969 tuner, 2 KAM's, two computers and printer, G5RV, and ICOM all mode 2-meter rig. Dade reports the passing of Joe Kallaher, KG4GTS, an active VE and club member who will be greatly missed. Contact Indian River's EC, Chris KF4DQY, for the Statewide Hurricane Exercise info and Wilma's track. Lee County hams operated a popular special event station and message center at the Edison/Ford Estate during the Pageant of Light week. Martin County ARES/RACES Emergency Net and Skywarn were activated for the St. Lucie Power Plant drill. All ARES/RACES participants made an excellent team appearance in newly acquired hats and shirts with a club logo. Osceola continues to grow with another addition to the ARES team. Palm Beach County's new club is the Major Armstrong FM Association with ACC, Jeff WA4AW, as president. The Wellington club was invited to join Storm Intercept Teams from the Southeast to learn about their severe WX experiences. St Lucie County participated with local county agencies in the FP&L Nuclear Power Plant drill this month. February Traffic by STM WA2YL: WA9VND 484, KA4FZI 461, K4FQU 294, W4LX(Club)196, WA2YL 128, KD4GR 124, KC4ZHF 86, AA4BN 56, KG4MLC 53, K4VMC(Club)51, WA4EIC 50, KG4QIP 48, KG4MLC 44, KE4BI 42, KD4HGU 38, WB4PAM 35, KE4UOF 30, KG4ILJ 27, W6VIF 22, WA4CHQ 22, KG4CHW 16, AF4NR 13, K4ENA 11, W4WYR 10, KI4ZW 2, K9GZT 2. 73, Phyllisan West, KA4FZI.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St. Croix— ASM: Ron KP2N, St. Thomas; ASM: Mal, NP2L, St. John. Sect. Internet Mgr, SIM: Jeanette, NP2C, St. Croix. SEC: Duane, NP2CY, St. Thomas. PIC: Lou, KV4JC, St. Croix. ACC: Debbie, NP2DJ, St. Thomas. NM: Bob VP2VI/W0DX Tortola. Want to pass along regards to former VI residents NP2IF Franklyn and NP2BW Cleo, both who have moved to Florida. We will be assisting in communications in the St. Croix International Triathlon again this year. Looks like we will need approximately 12-14 people. The date is May 5th and the start time is 0630 yawn. Larry, N4FD, and NP2B operated the ARRL DX contest this year to the tune of 3225 valid QSOs after the dupes were edited out. St. Croix hams are urged to contact Bernie NP2W or me with regard to QSL card delivery. Bernie is the new QSL manager. Please e-mail me with section news (np2b@atthehelm.com or np2b@arrl.org) section Web site is www.viaccess.net/~jellis, repeaters 146.63 St. John, 146.81 St. Thomas and 147.25 St. Croix. 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 Paul Toth, NA4AR, as the new Section Emergency Coordinator. Many thanks to David Colburn, KD4E, for his two years of service as SEC. For upcoming events, check the Web page for time and location. National Hurricane Conference April 2. The MS-150 bike race is scheduled for April 20 and 21, contact na4ar@arrl.net if you can lend a hand. WCF Radio Chek April 20, bring your radio to the TARCfest Hamfests for a FREE analysis of your radio. The March of Dimes Walk America April 27. Get on the air April 27 and 28 for the Florida QSO Party. Club Leadership Conference May 4 in Tampa. Governor's Hurricane Conference May 21 in Tampa. WCF appointee appreciation picnic May 27. Hamfests: Tampa TARCfest Apr 20, Lake Maggoire May 5. SEC KD4E reports an increase of 4 ARES members with a new total of 536. In Feb, there were 36 ARES Nets. 4 public service events, 9 drills and 0 emergency for a total of 13 ops. The total man hours reported is 223 hours. ECs reporting: KB0EVM, KN4YT, KC4QCN, AC4MK, AE4GB, AI4ET, K4FB and WD4AHZ. Upcoming ARES activities. Charlotte: Annual ARES meeting March 28. April 12, 13, 14 International Air Show. Pasco/Pinellas MS-150 Bike Race April 20 & 21. STM AB4XK reports Feb Net Report:

Net/NM	*QNI*	*QTC*	*Bulls*	*QND*	*Sess*
AIN/WA4ATF	31	1	4	54	2
PIN ARES/WB2LEZ	88	0	2	169	8
POK ARES/KD4EFM	64	1	8	111	4
SPARC/KF4FCW	540	31	0	915	28
TURTLE/KT4TD	324	60	0	418	27
EAGLE/KT4PM	401	63	0	712	27

Feb PSHR: K4SCL 145, K4RBR 139, KF4KSN 125, KF4OPT 110, AB4XK 105, WB2LEZ 96, AE4MR 95, W4AUN 93, KD4EFM 74. SAR: K4SCL 242, AB4XK 175, KF4OPT 57, K4RBR 20, KT4TD 32, W4AUN 13, KF4KSN 10, WB2LEZ 4, KD4EFM 15, AG4PN 5, KG4FCD 5, AE4MR 3. 73, Dave AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—This is the month for the annual Cochise Amateur Radio Association (CARA hamfest. It will be held at their club location, Green Acres, on May 4, 2002, starting at 0600 hours (to early in the morning), and ending early afternoon. Talk-in will take place on their 2-m repeater, 146.76 (-) (pl 162.2). CARA does a lot of public service activities to include providing back-up communications for Cochise Co government. The club is located in Sierra Vista area but has many members from Benson, Wilcox, Tombstone, and even the Douglas area. They meet on the first Monday of every month and the club web site is www.qsl.net/k7rdg. If your in the area stop by and see their facilities and/or talk with members on their repeater. Here in the state we have over 50 more clubs. The ARCA Web site has been changed to "www.arca-az.org/arca". Take time to visit their Web site and get to know this organization and the officers. ARCA is an organization that represents or 25 of the state Amateur Radio clubs here in Arizona. They do a lot more than just put on the Fort Tuthill Hamfest. By the way, have you made your reservations for Fort Tuthill for either selling or staying at a motel room? Time is getting short. Most motel rooms are gone by the middle of May. If you have not rented you selling space, you can contact ARCA by telephone or using their Web site. ARCA representatives will be at the CARA hamfest so you can make reservations at this time. Don't forget to checkout our state Web site at "www.qsl.net/arriaz". This site has all the latest information and links to the many clubs here in Arizona, throughout the country, and has a listing for the entire state ARRL volunteer's. Tom Fagan, WB7NXH, has done an excellent job of setting up and maintaining this web site. Another nice place to visit when in the Phoenix area is the Arizona Science Center. Inside this building there has been placed a working amateur radio station. This station is set up to show kids what they can do with Amateur Radio. This station has a licensed operator on duty during science center operating hours. They can provide kids with a live demonstration. I plan to be at the CARA hamfest, so stop by and talk with me on ARRL events or just suggestions on how to improve amateur radio throughout the state. 73, Clifford Hauser KD6XH. ATEN 969 QNI, 45 QTC, 28 sess. Tfc: W7EP 52, K7POF 25.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF— It has been my pleasure to work almost every kind of mobile HF station known to man. This includes submarines and a doctor operating elephant mobile in Africa, but last month I worked a new one. This contact was with a five-watt personal (handicapped) mobile station on the edge of a forest in Oregon, N7GSU. Robin was using an FT-817; his signal was S 7 to S 9 in LA. He had just worked the east coast and Japan on 15 meters. So he was having a blast except for the fact that he needed a mirror to see the dial and S meter on the FT-817 in his "back-pack". His antenna was 108-inch long whip with a calibrated military quarter wave trailing wire for a counterpoise. If you haven't used this multi-band FT-817 you should give it a test run. It even has a "built- in keyer," an internal battery and some VHF/UHF bands as well as 160 meters. Two or three could fit in an average ladies handbag, so you could work sev-

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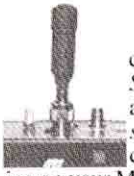

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eral bands at once ladies. Al Hart, W6UBM, and Art Enockson, W6EA, and Lyle Brown, W7LGB, attended the Retired Telco Amateur Radio Club's luncheon in Pasadena last week. There were 100 retired telephone engineers in attendance. Art, W6EA, is one of the top DXers in the World and past president of the Southern California DX Club. Art is especially proud to show off his "good", confirmed North Korean QSL card. If you haven't heard Art's encounter with the FCC, when he was a very young lad and CW capable, you should ask him to relate the true story as he remembers it. The IEEE Radar Conference is scheduled for April 22nd in Long Beach where the theme is Digital Technology. New capabilities like space time adaptive processing, synthetic aperture radar algorithms, and multiple hypothesis tracking will be discussed and explained. I hope to see you soon in Long Beach, Visalia or Pasadena. Check out our Web site for accuracy and speaker listings.www.qsl.net/arrlsw/lax . VY 73 & DX, Phineas, W6BF.

ORANGE: SM, Joe, W6UBQ, 909-687-8394—ASM: Riv. Co, Brett, N6NLN, 760 436 6291. ASM Org Co. Richard, WA6NOL. 714-835-3295. ASM: SB Co. Jeff, W6JJR, 909 886 3453. From (TC), Art KQ6HF. Hats off to Tech Specialists, Gus WM6J, and Jack W4KH, for their recent efforts and investigations to resolve reported Amateur Radio related EMI problems. From Joe, K0OV, USA ARDF Coordinator. The 2002 season of on-foot hidden transmitter hunting is under way. Enjoy a walk or run in the fresh air, while you experience the challenge of finding concealed "foxboxes" on two meters and 80 meters. There will be one local hunt per month at various locations in Southern CA, as beginners learn the sport and advanced hunters train for national and international competitions. Loan RDF equipment is available. For further information contact Joe Moell at homingin@aol.com. Phone 714 879 6895. Inland Empire Council Amateur Radio Organizations. 2002 Officers are Chair. Jeff W6JJR, V Chair Gary KD6QLT, Sec Jay KD6TGH, Trea Don KD6UVT. A Financial audit of the 2001 SW Div Convention and council books is being performed. The report will be submitted to the member Organizations. The Orange County Council of Amateur Radio Organizations has two topics for discussion, one the Orange County Fair Ham Radio Display and the Division Ham Convention in 2003. STM. Glenn N6GIW traffic report. KC6SKK 230, K6IUI 108, W6QZ 97, W6QZ NTS BBS 149. PSHR: W6QZ 158, KC6SKK 107, K6IUI 85. SM Comments: Attention all Amateurs.I WOULD LIKE BE ON THE MAILING LIST FOR YOUR CLUB NEWSLETTERS. PLEASE ADVISE YOUR CLUB EDITOR THAT IN ORDER FOR ME TO PUBLISH BITS OF WISDOM, CLUB ACTIVITY OR INFO OF MEMBERS RECEIVING HONORS. I MUST HAVE THE NEWSLETTER FROM YOUR CLUB. Thanks, Joe H Brown, W6UBQ, Orange Section Manager.

SAN DIEGO: SM: Kent Tiburski, K6FQ, k6fq@arrl.org 619-575-1964—The year has started off very dry, almost no rain. The winds we had and subsequent fire in Fallbrook on February 10 are an unhappy harbinger for the year. Kazuo, WA6BCC, will be soliciting for CDF the next few months. Now is the time to prepare for a potentially bad fire season. I'd like to thank all of you who attended the SEMS/ICS training at the County EOC on 9 March. Nearly a 100 folks were there to receive this excellent training. SANDRA is still working to repair their repeaters which were damaged. They have managed to get two machines up and running as well as the FILIMARS 220 machine which is co-located. Kudos to the Fallbrook Club for their efforts on February 10, a bunch of excellent hams up there. Bill Dewey, WD6AHW, of the Fallbrook club suffered a stroke, we wish him well. Bill and his son Wayne, WD6AHX, were the father/son net control during the Fallbrook fire and did a superb job. I'll be making the rounds and presenting certificates of appreciation, which you'll have by the time you read this column. Our ARES membership is growing, a good sign. I again would like to ask each person reading this column to pass to their fellow hams and clubs, we need your assistance in public service. If each of you or your members could support one, just one, public service event per year, it would be greatly appreciated by your communities and brings high visibility on who and what we hams are about. The President has identified Amateurs as playing a key role in the Homeland Security of our nation. Now is the time to join ARES and RACES to make difference and serve our country as Amateur Radio Operators. NTS: San Diego Co Traffic Net (SDCTN) Manager, N6TEP sess = 14, Total check-ins = 108 total traffic= 61, PSHR totals: N6TEP 60, KD6YJB 39, KC6NXZ 27, K6DAY 30, K6CD 30. 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) & as Webmaster, Jack Bankson, AD6AD (ad6ad@arrl.net); & DECs: Santa Barbara, Dave Lamb, (wa6brw@arrl.net); San Luis Obispo-Bill Peirce, KE6FKS (ke6fks@arrl.net) & Ventura-Dave Gilmore, AA6VH. Our new Technical Coordinator is Paul Andreasen, K1JAN. Paul has served as both a Technical Specialist and OO for the central Section area. Welcome Paul! Thanks SBARC for warm welcome! Swapfest is set for June 12th. I look forward to seeing you. FREE instant Section news updates? Join the SB Reflector! E-mail arrlsb-request@mailman.qth.net the message subscribe arrlsb. 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. 73, Rob, K6YR.

WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL— It's hard to believe that the year is moving as fast as it has. The Belton Hamfest has just past, Dayton is about to happen and just a few short weeks from now will be Ham-Com 2002. I have just returned form a steering committee meeting and it will be another exciting event. The keynote speaker will be David Dewhurst. Mr. Dewhurst is currently serving as the Texas Land Commissioner as well has the Chairman of the Texas Homeland Security Commission. Along the lines of Homeland Security we will have programs on FEMA's Disaster Medical Assistance Teams, EMWIN Broadcasting, ARES and we home to have on display several governmental disaster communication vans. The Lone Star DX Society will have another exciting program so be sure to order your luncheon tickets early. There will also be a Wouff Houng Ceremony on Friday night and a skywarn school on Saturday evening. The NTS in North Texas has lost a valuable member in Norm N5NHJ as he has relocated to San Antonio; well our loss is a gain for the South Texas Section. Leo Salas N5JEP has sent me this website that they have up in Paris for skywarn and EMWIN that you might want to check it out www.lamarcountyares.cjb.net. Hope to see ya'll at Ham-Com, 73 de KA5TXL. Feb SAR: K5UPN 533, K5MXQ 234, KC5OZT 109, KB5TCH 73, W5RDM 53, K5NHJ 45, WA5I 45, AC5Z 30, N8QVT 2.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL. I'm having to write this before the March Oklahoma State QSO party so look for some tidbits about that next month. Greencountry hamfest was a great success. The new location at the Claremore Expo Center was nice. There was a good turnout and we had lots of people in the forums and testing. Congratulations to Ray Shank, WA5RAY, for his work on the Greencountry hamfest Web site for which he receive a certificate of merit. Also congratulations to the 2002 Greencountry hamfest scholarship winner Kirk Williams, KC5EXM, of Miami, Oklahoma. Kirk is an Honor Graduate from Miami High School. He is pursuing a degree in Electrical Engineering Technology at Pittsburg State University in Pittsburg, Kansas. He was listed on the Dean's Honor Roll while attending Missouri Southern State College and Northeastern Oklahoma A and M College prior to transferring to Pittsburg State. Kirk holds a General Class Amateur Radio License and has been licensed since 1994. 73, Charlie. Tfc: KF5A 1197, N5IKN 516, WA5OUV 278, K5KXL 218, KK5GY 212, WB5NKD 212, WB5NKC 167, WA5IMO 138, KM5VA 124, KI5LQ 82, KM5VA 124, N5ZVA 49.

SOUTH TEXAS: SM, Ray Taylor, N5NAV— ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, W5JAM. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. PIC: KD5HOP. Here it is May, how time flies. We have had the coldest weather ever recorded for the month of February and March. We have had 3 Silent Keys in South Texas who will really be missed by all. K5GDH, W5FOZ, and K5IDJ gave back more than they took from ham radio. I just learned that N0FBW also became a Silent Key. He was a very active traffic handler. We're losing a lot of good hams lately, but I'm happy to see all the new young hams that are checking into the nets to fill the gap. They are starting out to learn the procedures of traffic handling and emergency communications. One of my students, KD5ORM, came on the air for the first time with traffic to some kind folks. He has also started being a net control on the 2 meter net. He got his neighbor interested and he is now a ham. When you who are teaching ham radio, it's a good idea to teach traffic handling and emergency communications along with the course. Learning to be of help to others in time of need is one of the greatest rewards of this hobby. You will also be giving something back instead of just taking from the hobby. I've seen a few comments on the Section Manager reflector that the NTS is not useful in an emergency, they are only traffic handlers. I will have to disagree to the highest level on that statement. I have used the NTS during emergencies, they have people on standby to assist and monitor your frequencies IF YOU request their assistance at the first of the emergency operation. I recall during Hurricane Hugo, the DPS office called me from the San Antonio for info from one of their men in the Virgin Islands. I took the request to the TCC group and we had the answer in less than 15 minutes. So the system does work, but only if you LEARN how to use the system. It's just like your radio; if you don't know how to turn it on it won't work. We're having an increase in club affiliation in South Texas. New hams are finding the way to these clubs where they can learn more about the hobby and all the avenues this great hobby has to offer. Several of the clubs are promoting Field Day for the new hams. I think this is great, most young people like to go camping, so this fills there desire and improves their antenna skills along with the thrill of talking to someone on the radio. Techs can talk as long as there is a control operator, so take time to work with them. This will increase the desire to upgrade more than anything else. Some time ago I stated that I would prefer to get the club newsletters by e-mail if you are able to do this, since then I dropped down to only 1 per month. 73 and God Bless America. Tfc: KA5KLU 488, W5GKH 111, W5KLV 106, AC5XK 97, W5ZIN 67, W5ZX 63, N5OUJ 56, N5SIG 47, N5NAV 25, K0YNW 24, KD5GM16.

WEST TEXAS: SM, Lee Kitchens, N5YBW—Clubs all over the section are concentrating on emergency preparedness training. FEMA is conducting NBC (Nuclear, Biological, & Chemical) training. The major item in this course is being able to properly and safely identify the threat so as not to become part of the problem rather than part of the solution. Local EOCs are teaching the Incident Command System which all hams need to be familiar with so as to be able to most effectively interface with those in charge during and event. If you are not able to take advantage of some of this training, keep in mind the ARRL Emergency Preparedness courses. Finally, keep your radio gear up to date, batteries charged, and be ready to respond when needed. Remember, our primary role is to provide communications support, not to try to run things.

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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.

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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.

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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 (10¼Wx4½Hx15D in).

MFJ AirCore*™ *Roller Inductor gives high-Q, low loss, high efficiency and high power handling.

MFJ's exclusive *Self-Resonance Killer*™ keeps damaging self-resonances away from your operating frequency.

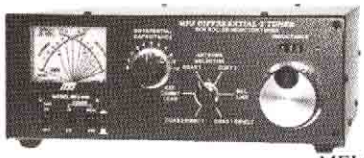
Large, self-cleaning wiping contact gives good low-resistance connection. Solid 1/4 inch brass shaft, self-align bearings give smooth non-binding rotation.

MFJ *No Matter What*™ Warranty

MFJ will repair or replace your MFJ-989C (at our option) *no matter what* for one year.

More hams use MFJ tuners than all other tuners in the world!

MFJ-986 Two knob *Differential-T*™



MFJ-986 **$329.95**

Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10¾Wx4½Hx15 in.

MFJ-962D *compact* Tuner for Amps

MFJ-962D **$269.95**

A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10¾x4½x10⅞ in.

MFJ-969 300W *Roller Inductor* Tuner

MFJ-969 **$199.95**

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

MFJ-949E *deluxe* 300 Watt Tuner

MFJ-949E **$149.95**

More hams use MFJ-949s than any other antenna tuner in the world! Handles 300 Watts. Full 1.8 to 30 MHz coverage, 48 position *Precision48*™ inductor, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E *super value* Tuner

MFJ-941E **$129.95**

The most for your money! Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10½Wx2½Hx7D in.

MFJ-945E HF+6 Meter *mobile* Tuner

MFJ-945E **$119.95**

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $4.95,** mobile mount.

MFJ-971 *portable/QRP* Tuner

MFJ-971 **$99.95**

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6½x2½ inches.

MFJ-901B *smallest* Versa Tuner

MFJ-901B **$79.95**

MFJ's smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-16010 *random* wire Tuner

MFJ-16010 **$49.95**

Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 *6 Meter* Tuners

MFJ-906 **$79.95**

MFJ-906 has lighted Cross-Needle SWR/wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $49.95.** Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 VHF/UHF Tuners

MFJ-921 or MFJ-924 **$69.95**

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

MFJ-922 *144/440 MHz* Tuner

MFJ-922 **$79.95**

Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-931 *artificial* RF Ground

MFJ-931 **$89.95**

Creates artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95,** Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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AMERITRON True Legal Limit™ Tuner

Easily handles 1500 Watts continuous carrier even on 160 Meters . . . High-current edge-wound silver plated Roller Inductor . . . Two 500 pf high capacitance tuning capacitors with 6:1 vernier reduction drives . . . 3 core choke balun . . . Six position antenna switch . . . True peak reading Cross-Needle SWR/Wattmeter . . .

Call your dealer for your best price!

AMERITRON ATR-30

$599

Suggested Retail

- *Handles 1500 Watts carrier*
- *Super High Current edge-wound silver plated Roller Inductor*
- *500 pf tuning capacitors with 6:1 vernier reduction drives*
- *3 core choke balun*
- *6 position antenna switch*
- *True peak reading meter*

AMERITRON's ATR-30 *True Legal Limit*™ roller inductor antenna tuner is ham radio's toughest! It'll handle 1500 Watts *continuous carrier output* on *all* modes and *all* HF bands into most antennas -- even on 160 Meters where most antenna tuners fail.

It's perfect for Ameritron's most powerful amplifiers where the ATR-30 just loafs.

All band coverage operates 1.8-30 MHz including all MARS and WARC bands.

Super High Current Roller Inductor

You'll see Ameritron's new *super high current* air core roller inductor. It's *edge wound* from a thick solid copper strip and silver plated. This produces a large surface area and a massive conductor. It can carry huge circulating RF currents and withstand tremendous heat that'll melt or burn ordinary roller inductors.

A gear driven turns counter and crank knob gives you precise inductance control.

Two 500 pf Tuning Capacitors

Two 500 pf -- *the highest of any antenna tuner* -- variable transmitting capacitors give you no-arc wide range impedance matching for true high power performance.

6:1 vernier re-duction drives makes capacitor tuning smooth and easy.

Super Balun, 6 position Antenna Switch

Super heavy duty three core choke balun lets you match virtually any balanced feedline antenna without core saturation.

A 6 position antenna switch lets you select your desired operating antenna.

Read *true* Peak Power

Ameritron's active electronic *true* peak reading meter accurately reads forward and reflected power and SWR *simultaneously* on a lighted Cross-Needle meter.

Roomy Cabinet maintains High-Q

Roomy extra-strong .080 inch thick aluminum cabinet gives highest efficiency and lowest loss. 13¼Wx5⅝Hx17½D inches.

AMERITRON ATR-20 Antenna Tuner

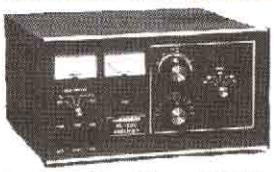
ATR-20, $459. Handles full 1.2 kW SSB/600 Watts CW. Handles full SSB power of Ameritron AL-811/811H/80B/ALS-500M/600, other 1.2 kW SSB amps. Roller inductor, turns counter, verniers on capacitors, balun, cross-needle SWR/Wattmeter.

Ameritron has the best selection of *TrueLegalLimit*™ HF Amplifiers

AMERITRON's legal limit amplifiers use Peter Dahl super heavy duty Hypersil power transformer capable of 2500 Watts!

Ameritron's *most powerful* Amp

with Eimac® 8877 ceramic tube



AL-1500

$2945

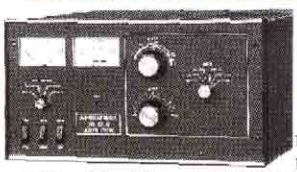
Suggested Retail

TrueLegalLimit™

Ameritron's *most powerful* amplifier uses the herculean Eimac® 8877 ceramic tube. It's so powerful that 65 Watts drive gives you the full output power -- and it's just loafing because the power supply is capable of 2500 Watts PEP. All HF bands, all modes. 77 pounds, 18½Dx17Wx10H in.

Ameritron's *toughest* Amp

with Eimac® 3CX1200A7 tube



AL-1200

$2495

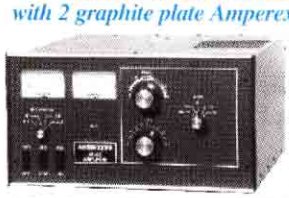
Suggested Retail

TrueLegalLimit™

Get ham radio's *toughest* tube with AL-1200. The Eimac® 3CX1200A7 has a 50 Watt control grid dissipation and the lowest history of field replacement of any modern transmitting tube that we use. 90 Watts in gives you full power out. All HF bands, all modes. 76 pounds, 18½Dx17Wx10H in.

Ameritron's *classic* Amp

with 2 graphite plate Amperex® 3-500ZG tubes



AL-82

$2395

Suggested Retail

TrueLegalLimit™

Most linears using 3-500s can't give you 1500 Watts because their lightweight power supplies *can't* use these tubes to their full potential. AL-82 is ham radio's *only* super 3-500 amp! 100 Watts in gives you full power out. All HF bands, all modes. Hefty 76 pounds, 18½Dx17Wx10H inches.

1.5 *plus* kW SSB HF Amp

with 2 Eimac® 3CX800A7 tubes

AL-800H, $2495 suggested retail. Two Eimac® 3CX800A7 tubes produces 1500 *plus* Watts SSB PEP with 55 Watts drive. 52 lbs., 8½Hx16½Dx14¼W in. **AL-800, $1695** suggested retail, single 3CX800A7, 1250 Watts out with 70 Watts drive.

NearLegalLimit™ Amp

with four 572B tubes

AL-572, $1395 suggested retail. New class of *Near Legal Limit*™ amplifier gives you 1300 Watts SSB PEP power output (70 Watts drive) for 65% of price of full legal limit amps! Instant 3-second warm-up. 40 lbs. 8½Hx15½Dx14½W inches.

1 kW Desktop HF Amp

with Amperex® 3-500ZG tube

AL-80B, $1299 suggested retail. Gives you full kilowatt SSB PEP output (85 Watts in) from a whisper quiet compact desk- top linear. 8½x14x15½ in. Plugs into 120 VAC outlet. Graphite plate *Amperex®* 3-500ZG tube. Nearly 70% efficiency. Weighs 48 lbs.

Precision SWR/Wattmeter

AWM-30, $149 suggested retail. Active circuit gives *true* peak/average readings on lighted Cross-Needle meter. 3000/300 Watt ranges. Remote sensor.

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Power your HF transceiver, 2 meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies! No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

MFJ's new adjustable voltage switching power supplies do it all! Power your HF or 2M/440 MHz radio and accessories.

MFJ's *MightyLites*™ are so light and small you can carry them in the palm of your hand! Take them with you anywhere.

No more picking up and hauling around heavy, bulky supplies that can give you a painful backache, pulled muscle or hernia.

MFJ's 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

No RF hash!

These babies are clean . . . Your buddies won't hear *any* RF hash on your signal! *None* in your receiver either!

Some competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

These super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

Low Ripple . . . Highly Regulated

Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

Fully Protected

You won't burn up our power supplies!

No RF Hash!

MFJ-4225MV
25 Amp
$149.95
plus s&h

MFJ-4245MV
45 Amp
$199.95
plus s&h

No RF Hash!

They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Replaceable fuse.

MightyLites™ *. . . Mighty Features*

Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Brightly illuminated 3 inch meters let you monitor load voltage and current.

A whisper quiet internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¼Wx4½Hx6D in.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

NEW! 25 Amp *MightyLite*™

Super light, super compact switching power supply delivers 25 Amps maximum/ 22 Amps continuous at 13.8 Volts DC. Low ripple, highly regulated. *No RF Hash!* Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 3.5 lbs. 5½Wx2½Hx10¾D in.

MFJ-4125
25 Amp
$109.95
plus s&h

MFJ 35/30 Amp Adjustable Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

MFJ-4035MV
$149.95
plus s&h

MFJ's heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

MFJ *High Current* Multiple DC Power Outlets

Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

MFJ-1118
$74.95
plus s&h

MFJ-1116
$49.95
plus s&h

MFJ-1112
$34.95
plus s&h

New!
MFJ-1117
$54.95

MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

Built-in 0-25 VDC voltmeter. Six feet super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs. Heavy duty aluminum construction. 12½x2¾x2½ in.

MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $34.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

NEW! MFJ-1117, $54.95. For powering four HF /VHF radios (two at 35 Amps each and two at 35 Amps combined) simultaneously. Tiny 8x2x3 inches.

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All are protected by MFJ's famous No Matter What™ one year limited warranty.

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.

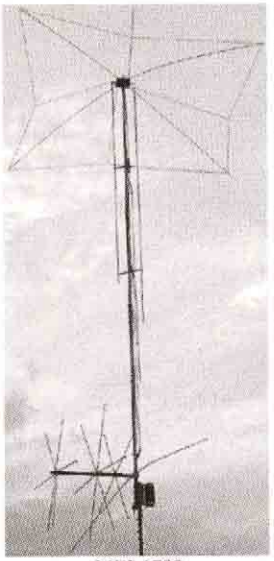
Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

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

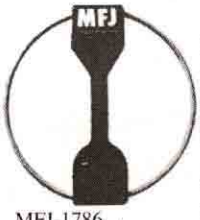
The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

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.

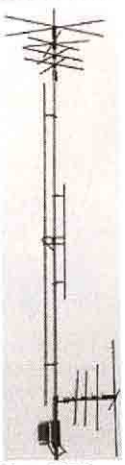
MFJ's G5RV Antenna

MFJ-1778, Ship Code A **$39.95**

Covers all bands, 160-10 Meters with antenna tuner. 102 feet long, shorter than 80 Meter dipole. Use as inverted vee or sloper to be more compact. Use on 160 Meters as Marconi with tuner and ground. Handles full legal limit power. Add coax feedline and some rope or other nonconductor and you're *on the air!*

MFJ halfwave vertical

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed



MFJ-1796
$209.95
Ship Code F

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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.

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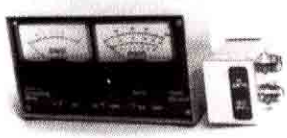

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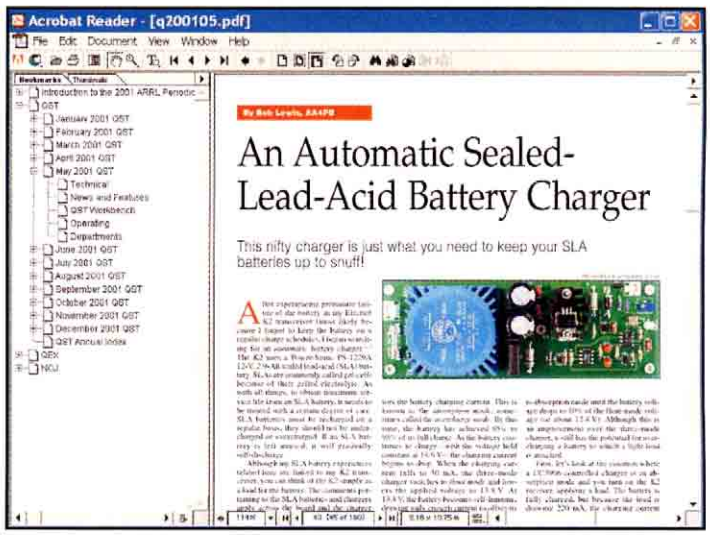

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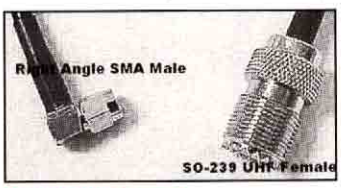

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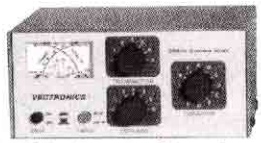

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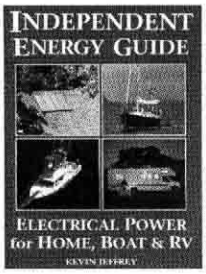

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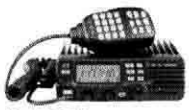

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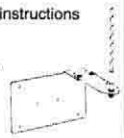

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CD-45II, $369.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control 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 3/8Hx8 D inches.

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Wind Load (with mast adapter)	10 sq. ft.	7.5 sq. ft.	5.0 sq. ft.	1.5 sq. ft.
Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
Brake Construction	Electric wedge	Electric wedge	Disc brake	Disc brake
Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
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.

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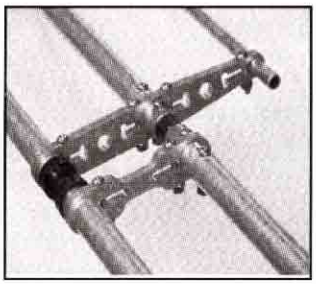

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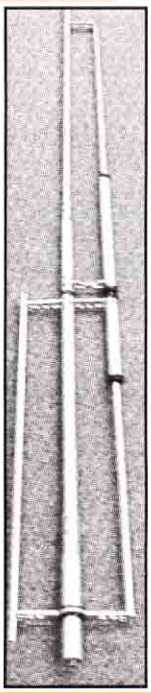

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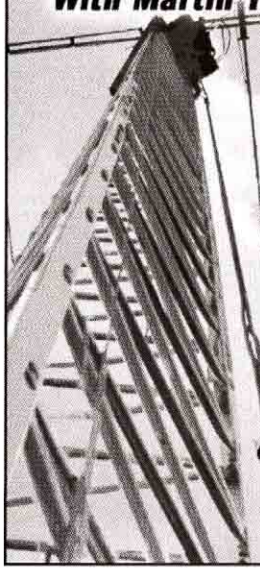

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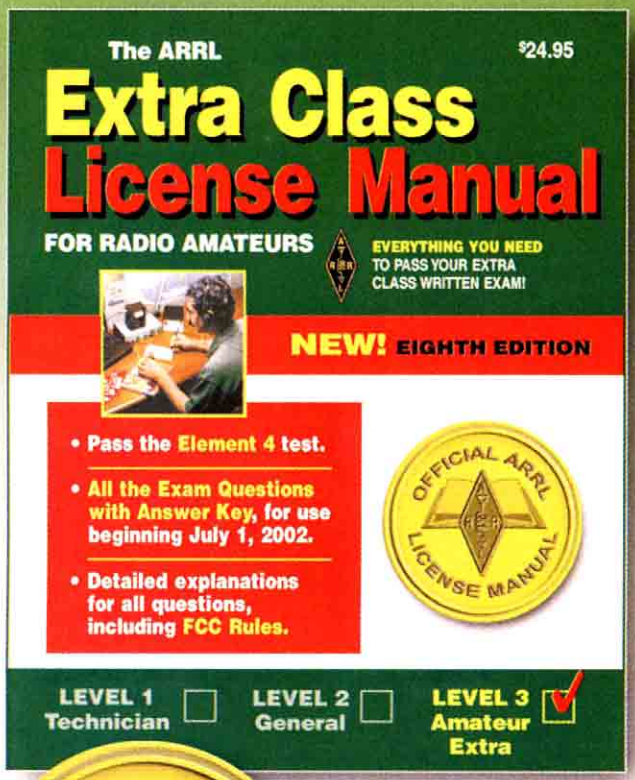

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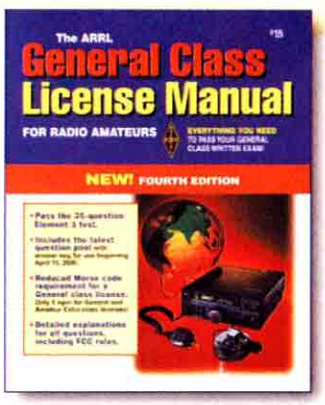

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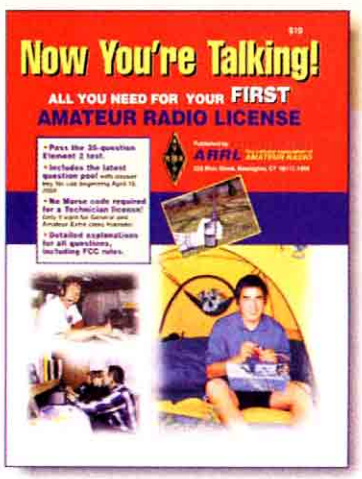

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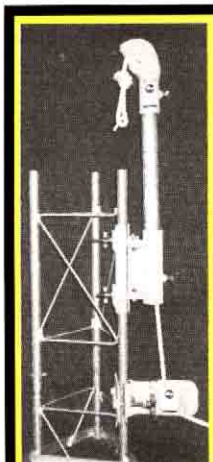

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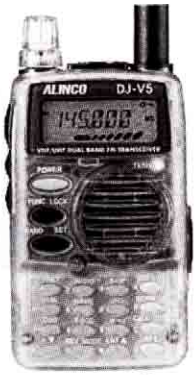

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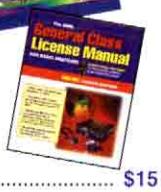

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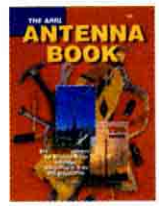

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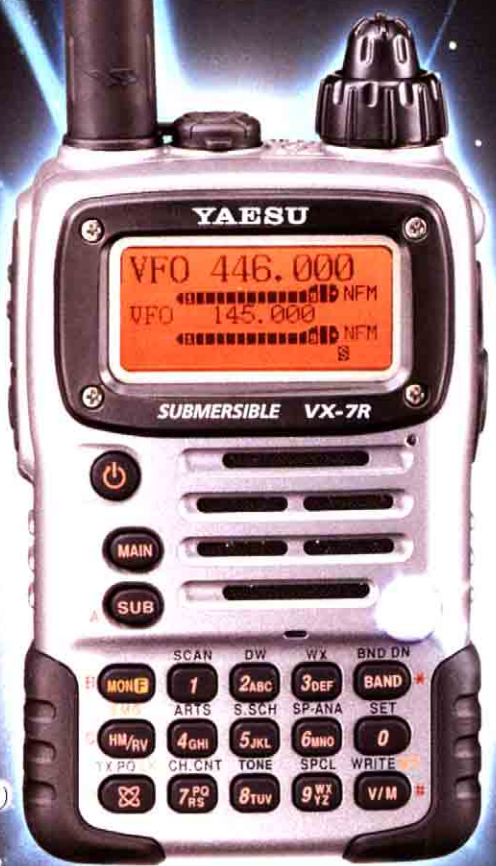

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- Battery indicator • Internal VOX • MCP software

[1]Note that certain frequencies are unavailable. [2]5W output

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NEW TH-F6A TRIBANDER

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