Official Journal of
ARRL
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QST

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AMATEUR RADIO

September 2001

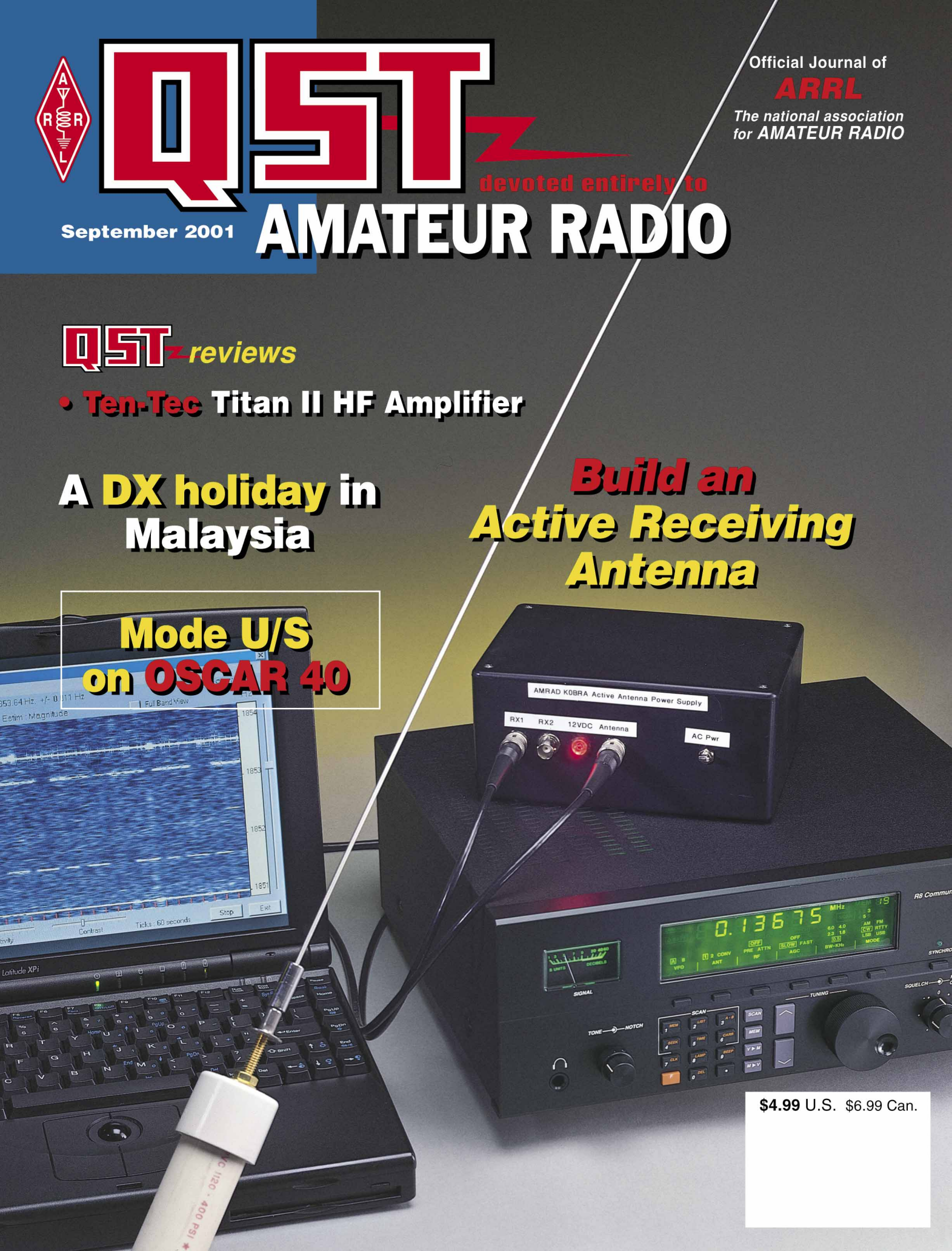
QST reviews

- Ten-Tec Titan II HF Amplifier

A DX holiday in Malaysia

Mode U/S on OSCAR 40

Build an Active Receiving Antenna



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WHEN THE SKY TURNS DARK, TURN TO ICOM's NEW IC-V8

Easy to Use. The compact size of the 'V8 is just right; full function DTMF keys are well spaced and large enough to allow quick operation, especially when you're out on the go. An initial set mode and alphanumeric display allows for fast, frequency access and response.

Excellent Audio. Due to its acoustic design, the 'V8 has excellent recovered audio. Loud, clear and intelligible with no distortion - you won't miss any of the action with this rig.

5.5 Watts Out of the Box. You need plenty of power to punch through rugged terrain or carry a signal to the horizon. The 'V8 delivers, whether you stick with the standard Ni-Cd pack or upgrade to the available Ni-MH battery. An alkaline case is optional.

CTCSS/DTCS and Tone Scan, standard. Get onto the repeater, fast! 50 CTCSS and 38 DTCS codes gain you quick repeater access and eliminate unrelated chatter. Pocket beep keeps track of calls, and tone scan detects the subaudible tone. Don't know the input tone? The 'V8 will find it and give you the info you need!

DTMF Encode, standard. 5 DTMF memory channels with up to 24 DTMF codes allow for remote operation. Great for phone patch! An optional DTMF decoder unit (UT-108) provides code squelch operation and pager function.

Mil Spec Rugged. The 'V8 is a land mobile grade radio, built solid and ready to tackle the elements.

BC-146 Drop In Charger Included!

BC-146 Drop In Trickle Charger comes as standard equipment with the IC-V8. CP-17L In-Car Charger & OPC-515L Rapid Charger are both optional.

Whether you're chasing storms, working a repeater, or just ragchewing with your buddies, the new IC-V8 is the HT for you. For more information see your authorized ICOM dealer, visit www.icomamerica.com or call our literature hotline at 425-450-6088.

IC-V8. Tough. Simple. Green.

144-148 MHz TX • 136-174 MHz RX • 5.5/0.5W selectable • 107 Memory Channels • Fast Scanning-40 Ch/Sec • 300mW Audio Output • CTCSS/DTCS • DTMF Encode • Reverse Shift Function • Backlit LCD • Alphanumeric Display • Auto Repeater • Reversible Up/Down Switch & Rotary Selector • Drop-In Charger • PC Programmable*

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ICOM MOBILES - Plenty of Power, PC Programmable*, and Ready for FUN!

IC-207H The ultra-compact remote control* head of this 2 meter/440 MHz dual bander fits on just about any kind of dashboard. Also enjoy: CTCSS encode/decode; tone scan; up to 9600 bps packet*; built-in duplexer; 182 memory channels; full control mic; auto repeater; and more.

IC-2100H *Simple to Use. Land Mobile Rugged.*

2 meters has never been easier or more fun! 50 watts of power; PC programmable*; 113 alphanumeric memory channels for easy identification; die cast aluminum chassis; full control mic; CTCSS encode/decode; tone scan; highly intermod resistant; and a cool DUAL color display.

Selectable Green or Amber backlit display, with four different lighting levels, gives easy viewing in any lighting condition.

QST *says this about the '2100H:*

"Those shopping for a wide variety of advanced features in an economically priced 2-meter mobile will find the ICOM IC-2100H worthy of serious consideration."– *QST, 1/99*

Limited time offers. See dealer for details.

IC-2800H Audio excellence, video excitement. 2M/440MHz dual bander with: remote control head; independent tuning & control knobs; cross band repeat; TFT color LCD display; NTSC video input; dual band scope; 9600 bps data port; CTCSS encode/decode; tone scan; 232 alphanumeric memory channels for easy indentification; PC programmable*; die-cast aluminum chassis; full control mic; and MUCH more.

Gordon West *says this about the '2800H:*

"We are happy to report programming is a snap, and seeing the TFT color display on your dash is no problem during the day, and graphically tantalizing at night!"– *Amateur Radio Trader, 9/99*

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- Use optional holder for AA, AAA, C, D Battery cells.
- Digitally displays capacity.
- Digitally displays voltage.
- Digitally displays time.
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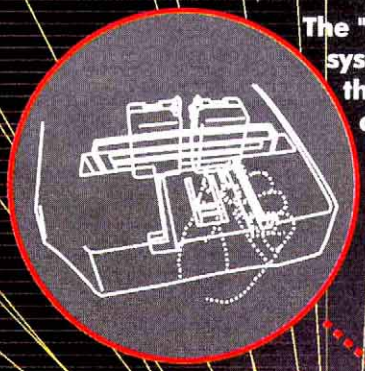
- Car kit included.



The "floating contact pins" system enables you to move the contact pins from left to right and top to bottom to charge almost any shape of battery pack.

Sample LCD read out during discharging, showing current voltage, time, and discharging capacity.

Sample LCD read out during charging. Shows current voltage, time, and charging capacity

FEATURES

- Analyzes and conditions battery packs.
- Supports Lithium Ion, NiMH and NiCD battery chemistries.
- Digitally displays capacity, voltage and time during charging and discharging.
- Supports a wide voltage range of 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.
- Special external charging connector allows you to charge a wide variety of batteries, including AA, AAA, C, D cells using optional battery holders.
- Intelligent microprocessor driven Negative Delta V detection, Zero Delta V and temperature sensor.
- Includes a light wight travel AC adapter (110/220V) and car kit.

SPECIFICATIONS

Detection: Negative Delta V, Zero Delta V, and tempture sensor.
Chemistry Supported: Li-Ion, NiMH, NiCD
Voltage Supported: 1.2V to 14.4V (NiMH, NiCD), 3.6V to 14.4V (Li-Ion).
Rapid Charge Current: 800mAh +/-50mAh for NiMH & NiCD and 400 mAh max for Lithium Ion.
Trickle Charge Current: 70mA
Discharge Current: 300mA
Safety Timer: 13 Hours
Adapter: 100-240VCD 50/60Hz Auto switch to 24VDC 0.83A

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IC-R75

Pull out the weak signals

30 kHz - 60.0 MHz

Commercial grade • synchronous AM detection (S-AM) • optional DSP with auto notch filter • all mode • triple conversion • twin passband tuning (PBT) • front mounted speaker • large display • well spaced keys and dials • 1000 memory channels • up to two optional filters • PC remote control with ICOM software for Windows®.

Limited time offers. See dealer for details.

"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

IC-R10

Advanced performance and features

500 kHz – 1.3 GHz†

All mode • alphanumeric backlit display • attenuator • 7 different scan modes • beginner mode • 1000 memory channels; band scope • includes AA Ni-Cds and charger.

IC-R2

Excellent audio, tiny package

500 kHz – 1.3 GHz†

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See and Hear all the action.

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450 Memory Channels with Alphanumeric Names • CTCSS with Tone Scan • 4 Level Attenuator • Telescoping Antenna with BNC Connector • Four Way Action Joystick • Lithium Ion Power • 2" Color TFT Display with Video/Audio Output.

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IC-PCR1000

The original "black box" is still best

100 kHz – 1.3 GHz†

AM, FM, WFM, USB, LSB, CW • unlimited memory channels • real time band scope • IF shift • noise blanker • digital AFC • "VSC" voice scan control (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 • DSP optional • download and demo the latest software for free at <www.icomamerica.com>

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

IC-PCR100

Much like its big brother, but for less

100 kHz – 1.3 GHz†

AM, FM, WFM • many of the same features and performance as the IC-PCR1000 • designed for Windows® 95 or 98 • download and demo the latest free, full version software today: <www.icomamerica.com>

IC-R8500

The experts choice

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"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

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QST

September 2001 ♦ Volume 85 Number 9

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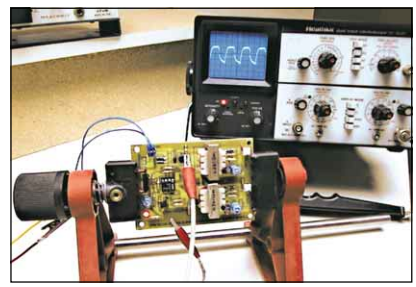
Technical



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News and Features

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QST Workbench

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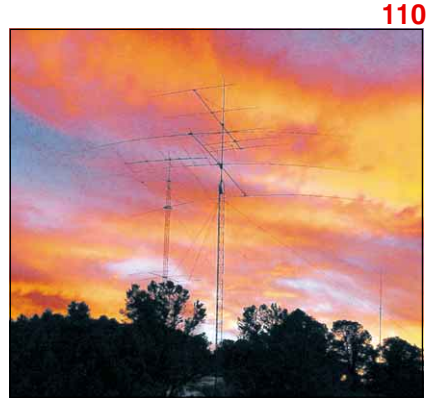

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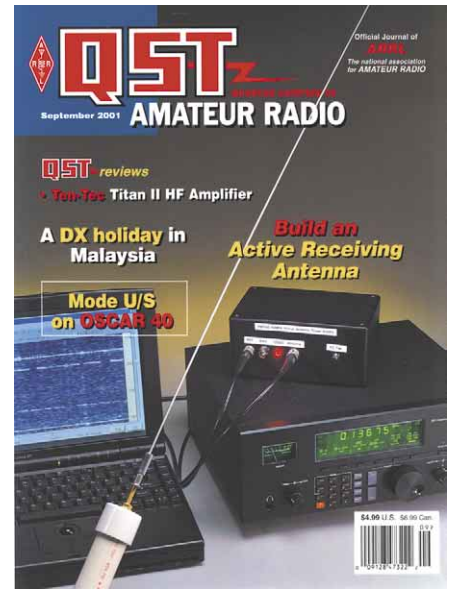

Our Cover:
With a US amateur allocation at 136 kHz on the horizon, this is a good time to begin exploring the low frequencies. This active receive antenna will give you the "ears" you need for LF listening, and sensitivity all the way up to 30 MHz.

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 following rates: Age 12 and under, $8.50 and age 13 through 21, $16. 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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Affordable Multi-Mode 6 Meters

You just got your ham ticket, the club has been looking at increasing 6 Meter activity or it's just time to get away from 2 meters. You look at the ads, check the bank account and figure, maybe next year...Not anymore!

Need a reliable rig for 6-meter band openings or public service and emergency operations? Wondering why you have to pay for bands you don't plan to or can't use with your present license?

We have the answer.

Ranger Communications again sets the standard for value with a multi-mode, 6 Meter transceiver that is long on performance and short on price. The RCI-5054DX is perfect for the newly licensed ham who wants to try his hand at local FM operation as well as the experienced DX enthusiast who wants an economical SSB or CW 6 meter rig featuring a quiet receiver, all-mode squelch, extensive shielding and the performance and reliability that up to now you could only get with the multi band "high dollar" rigs.

The RCI-5054DX covers the full 6 meter band with an output power of 10W RMS or 25W PEP. Like the popular RCI-2950DX 10 & 12 Meter rig, the RCI-5054DX also has programmable repeater split (up to ±2 MHz in this model), optional CTCSS tone, 10 frequency memory and two programmable scanning modes. Add a large easy to read display and you have the perfect rig for home, mobile or field day. At a suggested retail price of only $329.00, the RCI-5054DX is an excellent buy for new or old hams alike.

Come see the new RCI-5054DX at the Ham Radio store near you. Don't know where? Call us Toll Free for help in finding the dealer nearest you.

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The DXer's Advantage... Packet Cluster Tune

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IF stage DSP in the main band and AF stage DSP in the sub-band provide unparalleled noise reduction performance. Because the **TS-2000** has a built-in TNC, DX Packet Cluster Tune is available on the sub-band and can automatically shift the desired HF or 6 Meter frequencies direct to the main band for instant contacts. A DXer's dream come true. You will also be sure to enjoy the built-in antenna tuner, 5+1 antenna ports, RS-232 terminal and the world's first HF fully backlighted front control panel.

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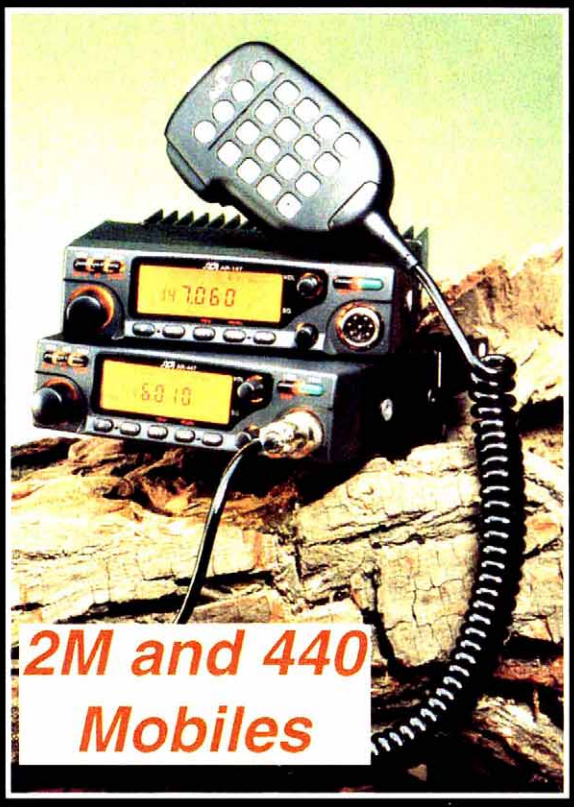

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ARRL is an incorporated association without capital stock chartered under the laws of the State of Connecticut, and is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1986. Its affairs are governed by a Board of Directors, whose voting members are elected every three years by the general membership. The officers are elected or appointed by the directors. The League is noncommercial, and no one who could gain financially from the shaping of its affairs is eligible for membership on its Board.

"Of, by, and for the radio amateur," the ARRL numbers within its ranks the vast majority of active amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs.

A *bona fide* interest in Amateur Radio is the only essential qualification of membership; an Amateur Radio license is not a prerequisite, although full voting membership is granted only to licensed amateurs in the US.

Membership inquiries and general correspondence should be addressed to the administrative headquarters; see page 10 for detailed contact information.

"IT SEEMS TO US..."

Antenna Restrictions

"The ability of amateurs to erect and use antennas is as essential to the existence of Amateur Radio as the defense of Amateur Radio Spectrum." With these words at its July meeting the ARRL Board of Directors adopted, as a major goal of our advocacy activities, legislative action granting the Amateur Radio Service the same level of protection from private Covenants Conditions and Restrictions (CC&Rs) prohibiting or restricting Amateur Radio antennas as is presently available to other services. The Executive Committee was directed to develop a plan of overall strategy to direct and focus the efforts of the various entities of the ARRL to achieve that goal.

Why legislative action? Why did the Board take this action now? What protections do other services now enjoy? What does this mean for amateurs who live in areas where antennas are restricted by CC&Rs?

The reason the Board specified legislative action is that so far we have been unable to persuade the FCC to act on its own initiative. When the FCC adopted its PRB-1 limited preemption policy in 1985 at ARRL request, the Commission said it believed it did not have the jurisdiction to preempt private land use regulations such as CC&Rs. It is now clear that the FCC does indeed have such jurisdiction to the extent required to further an important federal interest. In 1996 the ARRL pointed this out and argued that the FCC should use its authority to ensure that adequate emergency communications are available to residents of areas blighted by CC&Rs. The FCC Wireless Telecommunications Bureau (WTB) twice has declined to do so; our application for review of the WTB decision by the full Commission is pending. While we haven't given up on the application for review – a majority of the Commissioners are brand new to their jobs and surely haven't yet made up their minds – the new FCC Chairman, Michael Powell, is known to be strongly inclined against preemption except when explicitly instructed to do so by Congress.

There is another reason for acting now. While CC&Rs have been problematic in some areas for years, they are now spreading like a plague across the American landscape. It is increasingly rare for new housing developments to be free of restrictions on homeowners' enjoyment of their own property. In the immortal words of '60s songwriter Malvina Reynolds, "They're all made out of ticky-tacky and they all look just the same."

Congress has acted to protect a few other services against inappropriate restrictions on antennas. Closest to the situation faced by amateurs is Section 207 of the Telecommunications Act of 1996, which instructed the FCC to prohibit restrictions that impair a viewer's ability to receive over-the-air television broadcast signals, multichannel multipoint distribution service, or direct broadcast satellite services. The FCC did so, adopting what are commonly called "OTARD" (over-the-air reception devices) rules. A recent federal appeals court decision affirmed that the FCC's authority even extends to rental property. For example, a landlord cannot prevent a tenant from installing a small direct broadcast satellite antenna on a balcony or patio.

If you are presently limited by CC&Rs, don't get your hopes up that this will change overnight. We face a long, uphill battle. Congress has an aversion to considering legislation that affects favored interest groups, and there are few groups with greater influence than real estate developers. In the case of OTARDs there was a strong pro-competitive argument for preemption; in our case the rationale is different. Our initial efforts on the Hill to promote the concept of OTARD-like relief for amateurs have not met with much encouragement, even from longtime friends of Amateur Radio. It will take a lot of work by all of us to make any headway on the legislative front.

Neither should you necessarily expect to be able to put up the tower and beam you've always wanted. Let's face it, there are some housing situations where a large multiband HF beam simply isn't reasonable. For increasing numbers of amateurs it would be a significant improvement just to be able to install an outdoor antenna with a visual impact roughly equivalent to that of an OTARD.

The Board's actions against antenna restrictions were not limited to CC&Rs. To build on recent successes in writing protections similar to PRB-1 into the laws of 13 states, the Board instructed staff to develop a "how to" guide for amateurs seeking similar legislation in the remaining states. If you will forgive a shameless plug for a new ARRL publication, Fred Hopengarten, K1VR, literally "wrote the book" on how to cope with local land use regulations. Entitled *Antenna Zoning for the Radio Amateur*, it contains sample ordinances and even includes a CD-ROM with extensive reference material and sample letters that can be edited to suit individual circumstances. You can find it in the on-line catalog at **www.arrl.org/catalog/**.

Radio amateurs are not alone in wanting to continue to enjoy the use of our private residential property without unreasonable restrictions. Let us hope that our society continues to value choice in housing, and that we're not all "Put in boxes, little boxes, all the same."—*David Sumner, K1ZZ*

We're At Your Service

ARRL Headquarters is open from 8 AM to 5 PM Eastern Time, Monday through Friday, except holidays. Call **toll free** to join the ARRL or order ARRL products: **1-888-277-5289** (US), M-F only, 8 AM to 8 PM Eastern Time.

If you have a question, try one of these Headquarters departments . . .

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

ARRL on the World Wide Web

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

www.arrl.org/

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

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- Our on-line Web magazine, the *ARRLWeb Extra* with colorful news and features you *won't* see in *QST*.
- *QST* Product Review Archive. Get copies of *QST* product reviews from 1980 to the present.
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- Previews of contest results and product reviews. See them here before they appear in *QST!*
- Access to your information in the ARRL membership database. Enter corrections or updates on line!

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*Executive Committee Member

Stereo SSB and CW? Yes! (and more!)

A "Must Have" Station Accessory!

AOR's new Multi-Media Terminal (MMT) is a powerful new tool to add to your station. More than just DSP, transmit and receive PSK31 and RTTY, listen to amazingly clear audio, equalize your mic, apply potent filtering and hear "weak ones" others may miss.

AOR MMT TDF-370

- **Derived Stereo SSB and CW signals are incredibly clear.**
- **Use powerful DSP noise reduction and filtering technology, including Fast Fourier Transform.**
- **Decode and display PSK31 or RTTY, on the LCD panel, no external PC required!**
- **Enhance your transmitted audio with 8 channels of mic equalization.**
- **Digitally record up to 102 seconds of audio in up to 8 memories.**
- **Receive SSTV 56.7 kHz (external PC and software needed for viewing).**

AMAZING AUDIO

With a new Fast Fourier Transform audio filter, the MMT applies DSP filtering and creates a more "natural" sound, pleasing to the listener. Line enhanced noise reduction uses new algorithms to dramatically reduce background noise. An auto-notch function can be used to reduce or eliminate annoying interference. You won't believe your ears!

"HIGH FIDELITY" SSB

This is not a conflict of terms! AOR's unique technology derives unbelievable audio from a 2.4 kHz source in simulated stereo, through the provided headphones. The results are amazing and have been compared to "FM quality" reception. You didn't know your radio could sound this good. Just about everyone who hears it says, "Wow!"

BETTER TRANSMITTED AUDIO

Use the built-in microphone equalizer to enhance your transmitted audio. Contour a profile for your vocal characteristics or overcome some of the limitations that may exist in your microphone.

IMPROVED CW OPERATION

Built-in 100, 200 and 300 Hz audio band pass filters. Center frequency is adjustable from 800 Hz with 450 Hz pitch. There is also a special noise reduction circuit just for CW operation.

"STEREO" CW RECEPTION

The built-in band pass filter has independent outputs for the left and right channels, allowing independent bandwidth settings heard through the included stereo headphones.

DIGITAL MODES WITHOUT A PC

Receive and display PSK31 and RTTY (Baudot) modes without the need for a PC. AOR's MMT displays text on its easy-to-read LCD display. PSK31 formats include BPSK and QPSK. RTTY operations include 170, 425 and 850 Hz shifts.

PC INTERFACE

The MMT has a rear panel DSUB9 connector and a serial cable is provided. You can set internal parameters of the MMT and operate PSK31 and RTTY using a simple terminal program. You can also transmit and receive SSTV (56.7 kHz) through your computer (optional software needed for SSTV).

DIGITAL VOICE RECORDER (DVR)

Capture up to 102 seconds of audio, in as many as 8 memories, in the MMT's DVR. DPCM compression saves space and delivers good fidelity.

POWER MISER

The AOR MMT operates with just 4 internal AA batteries or from a regulated external supply of 9 ~ 15 VDC.

ACCESSORIES INCLUDED

With the AOR MMT, you get: input cable, stereo connectors, 8-pin mic connectors, power cable, stereo earphones and serial cable for connection to a computer. Note: some soldering of wires and connectors may be required to adapt your transceiver's mic and mic input with the MMT. No alteration to your existing equipment is necessary.

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Torrance, CA 90501, USA
Tel: 310-787-8615 • Fax: 310-787-8619
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Get to Know Your Section Manager

The 15 divisions of the League are arranged into 71 administrative *sections*, each headed by an elected *section manager* (SM). Your section manager is the person to contact when you have news about your activities, or those of your club. These news items could find their way into the pages of *QST*! If you need assistance with a local problem, your section manager is your first point of contact. He or she can put you in touch with various ARRL volunteers who can help (such as technical specialists).Your section manager is also the person to see if you'd like to become a section volunteer. Whatever your license class, your SM has an appointment available. If your ARRL section has a Web site, the address can be found at **http://www.arrl.org/field/org/smlist.html**.

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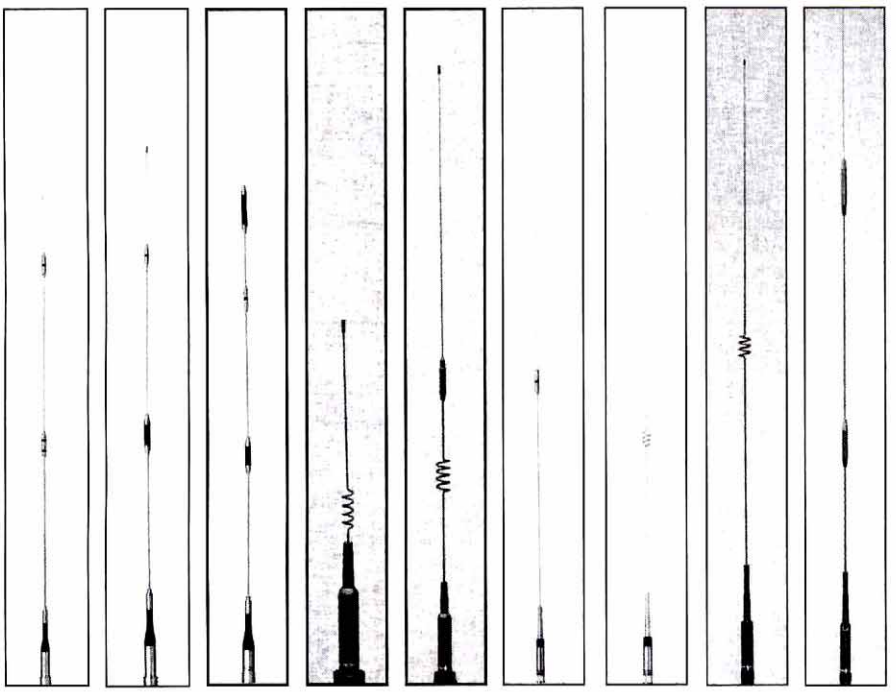

SG2000HD | SG7500A SG7500NMO | SG7900A | NR72BNMO | NR73BNMO | NR2C | NR770HA NR770HB | NR770HNMO NR770HBNMO | CR627B CR627BNMO

HV7A Mobile Antenna System

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

Optional Loading Coils

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

Recommended Antenna Mounts: K400C or K600M

MX62M Duplexer

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

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

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

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

MX62M

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

SPECIAL FEATURES:

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

FOLD-OVER

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

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

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

1/4λ rated in dBi.

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

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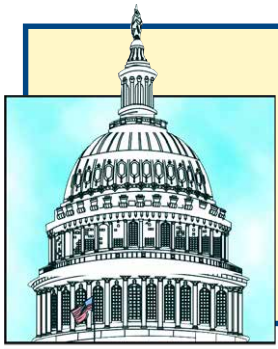

DC Currents

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.

"Tauzin-Dingell" Dominates Telecom News on the Hill

The progress of a deregulatory bill that turned out to look extravagantly complex recently seemed to have brought Congressional action on other telecommunications bills to a grinding halt as lawmakers tried to sort out what the bill might actually do. The issue had all the makings of a television drama (or was it a sitcom?) about life on Washington's Capitol Hill. There was intraparty squabbling. There was dramatic political rhetoric about the interests of telecommunications giants. There was rural vs. big town politics. There was an acrimonious split between two House Committees claiming jurisdiction over the issue. There was a big-time advertising campaign including prime time television ads in the Beltway area to reach Congressional minds. And, it was all seasoned by the fact that both proponents and opponents often depicted the very survival of the Internet as depending upon whether the bill rises or falls. If you haven't guessed by now, the bill was the so-called Tauzin-Dingell bill (HR.1542), officially dubbed the "Internet Freedom and Broadband Deployment Act of 2001." "Tauzin" is, of course, House Energy and Commerce Committee Chairman, and "Dingell" is the Ranking Minority Member of that committee. However, the bill was actually introduced with a raft of about 74 additional cosponsors.

The bill was described by Representative Tauzin as being "broadband deregulation," and its basic idea seemed fairly simple…permit regional Bell operating companies to offer Internet backbone and high speed long distance data connections without prior FCC approval. Many members of Congress felt that this reverses a policy established in the Telecommunications Act of 1996. HR 1542 would also allow them to lease local lines to other digital subscriber line (DSL) services. The intent of the bill was to foster the growth of the Internet. But like many other "simple" ideas in Congress, many of this bill's economic, political and technological nuances generated opposition and have created headaches for lawmakers who understand that simple language in a telecommunications bill may actually contain hidden and "unexpected consequences." While the true nature of those consequences were unclear, some of America's largest telecommunications interests claimed that the bill would hamper the development of Internet services in small towns and inner cities, and tilt the Internet scales in favor of cable companies.

Indeed, many of the largest telecom players weighed in against HR. 1542, and, as we went to press, the bill also faced difficulty in Congress, namely, large divisions of opinion among Senators and Representatives about how to accomplish broadband deregulation. In addition to differences of opinion between the House and Senate, the bill also evolved in two directions as one version emerged from the House Energy and Commerce Committee amended and with a favorable report, and another from the House Judiciary Committee where it was amended and reported unfavorably. While such "sequential" committee actions are not unknown, they often signal deep divisions of opinion within Congress.

Legislation (S.1126) on the same issue has also been introduced in the Senate by Kansas Senator Sam Brownback, but it is now so different that it can scarcely be called a "companion" bill, and it has not drawn the same heated response as the House bill.

How About Those Bills at the Cellular Level?

● Hams around the country continue to express some concern about the proliferation of state level legislation aimed at curbing the use of cellular telephones while driving a motor vehicle. Last installment of "DC Currents" we reported on a federal bill that would require each state to pass legislation outlawing talking on a cellular phone while operating a motor vehicle, and from time to time we have also reported on state legislation that does just that. As we went to press, it appeared that in many states throughout the US (where legislatures were still in session), many such bills have been introduced. The highest estimate we've run across is 100 bills, but that cannot be confirmed. Whatever the number, many are no longer under consideration and most are not expected to survive, according to statehouse gossip.

Even so, some hams have been worried by anti-driving-while-cellular bills in their own states, wondering whether or not such legislation might also ban, or be construed to ban, mobile ham operation in the process. Some hams are also perplexed by the fact that many of the bills contain what seems to be an inexplicable exemption for CB radio operation. So far, ARRL has kept track of most of these bills, has carefully evaluated the definition of "mobile telephones" or "wireless radio telephones" as they appear in the legislation, and we have not seen any that would seem overtly to pose a risk to Amateur Radio operators. If that "would seem overtly" reads as a hedge to some readers, we're hedging because it's important to stress that with any such legislation that might actually pass, it would first be subject to court interpretation before anyone could declare amateur mobile operation to be either prohibited or 100% safe. We have also heard through the trucking industry grapevine (but have not confirmed) that some state legislators introducing such bills include the CB exemption at the request of trucking industry representatives. Some truckers argue that CB mobile operation for truckers to keep in touch with one another on the road is a safety and economic necessity. Just because there is an express exemption for CB, however, does not mean that Amateur Radio must have an exemption of its own. The real issue is the definition of what is actually prohibited by the bill.

Of the state bills we've seen, there's at least one that shouldn't give hams major heartburn, and that is A.9280 which passed the New York State Legislature and was signed by Governor Pataki. The bill defines "mobile telephone" as a wireless device that is used to access the public telephone network and that is provided by a commercial mobile radio service.

New York hams still worried about the bill might be a little less worried to learn of a statement we have been told was made on "Meet the Governor" on WCBS in New York City by Governor Pataki who, when asked by a call-in listener about the bill's impact on Amateur Radio declared that he believed it would not affect amateur mobile operation. ARRL will continue to monitor the "driving while cellular" issue, and thanks to all ARRL members who took the time to bring various state bills to our attention.

CC&R Project Status Report

A well-known and vexing problem in Amateur Radio in the US has been the proliferation of private land use regulations (often referred to as CC&Rs). These are agreements that often apply to new private residential developments or condominiums, in which the purchasers of the property agree to certain restrictions as part of their purchase. Too often, one or more of those restrictions is a ban on antennas or towers, and sometimes, an explicit ban on any form of Amateur Radio. Correcting this problem has long been an objective of ARRL. In 1985, for example, when we filed a request for rulemaking with the FCC for the so-called PRB-1 ruling to require states and towns to exercise "reasonable accommodation" with respect to Amateur Radio installations (see **www.arrl.org/FandES/field/regulations/local/prb-1_program.html**) we also asked for a ruling affecting discriminatory CC&Rs. The Commission declined at that time, and has declined several subsequent requests for rule makings. We are still working to reverse the FCC's posture on this issue.

In an attempt to build our case, about a year ago this column requested that readers who had been adversely affected by private land use regulations send us their own ham radio horror story. Even though the request required sitting down and writing out your experience, many of you responded, and many of you went to the trouble of tracking down the actual CC&R language and sent a copy of that along as well. With much gratitude to those who took the time to respond, we thought it now time to let you know what hard work for ARRL resulted from your original hard work!

First, given what we asked of you, the response was good, and step one as the material rolled in via the mail and e-mail was simply to find a way to keep it organized and useful before we began the inevitable statistical cross-correlations and other investigative techniques. Eventually, we were able to organize everything and to begin to search for patterns that might help us. We have also used some of your statistics and some of your quotes from letters in material we have prepared for discussions with the FCC and with Congress, and this has been remarkably helpful in demonstrating the nature of the problem.

While ARRL continues to press the issue of CC&Rs and their negative impact on Amateur Radio both at the FCC and in the halls of Congress, we also will continue to study the issue. Our preliminary anecdotal study based on stories submitted by members indicates that the states where CC&Rs seem most problematic are Florida, Texas and Arizona, but of course, those are states with large and rapidly growing populations.

While we received a great deal of useful anecdotal information about how CC&Rs can actually affect the life of a ham radio operator, and are grateful for those of you who took the time to help out, one day soon we may also solicit more-detailed quantitative data to further explore the geographic dimensions of the problem (don't send anything yet).

Thanks to everyone who has helped, or plans to help!

Oh No! Not Again...

♦ "DC Currents" strives for accuracy even in the murky world of telecommunications politics. But Idaho hams have taken me to task for a "typo" that has occurred at least twice in this column. In the May and July "DC Currents" I inadvertently referred to Idaho Senator Michael Crapo, a long-time and strong supporter of Amateur Radio, as being from South Dakota. This is one of those situations where my typing fingers developed a mind of their own, and the resulting error was overlooked by this writer. There's nothing wrong with being from South Dakota, but I *know* Senator Crapo is from Idaho and I ought to get it right. The Senator introduced the "Amateur Radio Spectrum Protection Act" (S.549) and Amateur Radio is lucky to have him as a friend on Capitol Hill. His Washington staff has also been enormously helpful to ARRL. As the owner of the typing fingers that *twice* committed the error (yeah, sure, blame it on the fingers), I apologize both to the Senator and to *QST* readers, especially those from Idaho. I have taken steps to ensure that the error is not repeated.—*N1MZA*

Media Hits

• Our thanks to Jim Houser, WA8JIM, who brought to our attention the excellent publicity efforts of the Cambridge (Ohio) Amateur Radio Association: CARA scored four good media hits in less than a week in the *Daily Jeffersonian*. While CARA got plenty of good publicity, so did Amateur Radio. Prominently featured in the stories were Evelyn Barton, KA8NZS (CARA's Public Information Officer) and Sonny Alfman, W8FHF. Interestingly, one of the stories was an Associated Press filing datelined from Clarksville, Tennessee. It referred to local Tennessee hams Hank Koebler, KF4UXR, Al Furlow, KA1FFO and Linda Rye, KG4LZX.

• Connecticut hams were celebrated in a Field Day story that appeared in the *Stamford Advocate* and named not only names, Tony Salvate, N1TKS, Ed Ashway, K3EIN, Robert Sambolin, WP4YJ, and Neidi Luz Collazo, but also told the ham radio story and expressed the true value of Field Day in preparing for emergency communication.

• Brookline (Mass.) hams received coverage in the wide-circulation *Boston Globe* with a Field Day story that featured Dave Hunt, WX1G, Jim Topali, N1FCR, Joe Ball, Harold Chamberlin, W1PFX, Bill McIninch, KA1MOM, and Bob Salow, WA1IDA. Salow reinforced the message "hams very often are the only means of communication during an emergency."

• An article in the *Greater Cleveland Sun* depicted having fun during Field Day. Featured in the article were Mike Balach, KB8UGT, David Morley, W8IXY, Terry Pillatt, Glenn Shore, KG8MR and Tom Wayne, WB8N. The writer of the story was John Kametz, KC8KYW.

• *Many* thanks are in order. Field Day continues to be the biggest publicity maker in Amateur Radio, and we have tried to present a small sample of the type of stories published. But to describe the actual volume of clippings and other news coverage ARRL has received since June would be impossible! Across the US, hams have been able to generate very fine and positive news coverage of Amateur Radio while also having fun during Field Day. Those stories do make a big difference by appearing in your local news media (press, radio or TV), even if they weren't mentioned in this month's "DC Currents." Thanks again!

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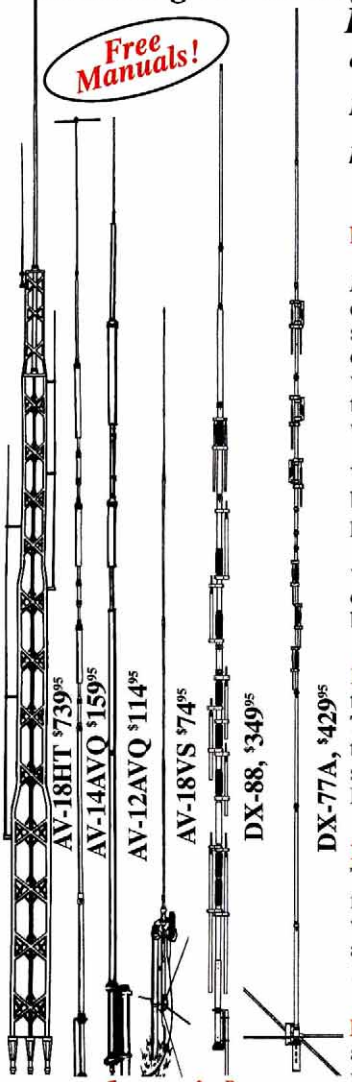

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Includes all stainless steel hardware. Recessed SO-239 prevents moisture damage.

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AV-18HT, $739.95. (10, 12, 15, 20, 40, 80 Meters, 160 Meters optional). 53 ft., 114 lbs. **Standing** 53 feet tall, the famous *Hy-Gain HyTower* is the world's best performing vertical! The AV-18HT features automatic band selection achieved through a unique stub-decoupling system which effectively isolates various sections of the antenna so that an electrical 1/4 wavelength (or odd multiple of a 1/4 wavelength) exists on all bands.

Approximately 250 kHz bandwidth at 2:1 VSWR on 80 Meters. With the addition of a base loading coil (LC-160Q, $99.95), it also provides exceptional 160 Meter performance.

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AV-14AVQ, $159.95. (10,15,20,40 Meters). 18 ft., 9 lbs. The Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $79.95.

AV-12AVQ, $114.95. (10, 15, 20 Meters). 13 ft., 9 lbs. The AV-12AVQ also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $79.95.

AV-18VS, $74.95. (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. High quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $79.95.

DX-88, $349.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs. All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $179.95. Ground Radial System, GRK-88, $81.95. Roof Radial System, RRK-88, $89.95.

DX-77A, $429.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs. *No ground radials required!* Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$739.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$159.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$114.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$74.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$349.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$429.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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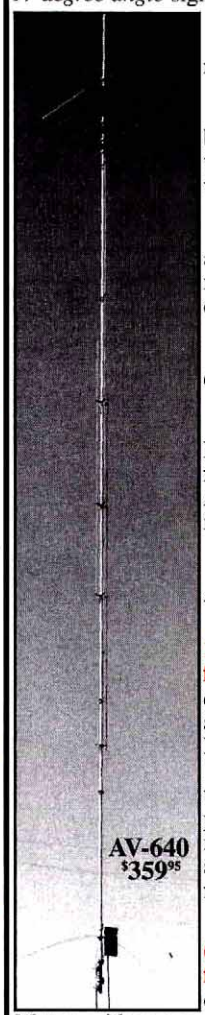

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AV-640, $359.95. (6,10,12, 15,17,20,30,40 Meters). 25.5 ft., 17.5 lbs. The AV-640 uses quarter wave stubs on 6, 10, 12 and 17 meters and efficient end loading coil and capacity hats on 15, 20, 30 and 40 meters -- no traps. Resonators are placed in parallel not in series. End loading of the lower HF bands allows efficient operation with a manageable antenna height.

AV-620, $269.95. (6,10,12,15,17,20 Meters). 22.5 ft., 10.5 lbs. The AV-620 covers all bands 6 through 20 Meters with no traps, no coils, no radials yielding an uncompromised signal across all bands.

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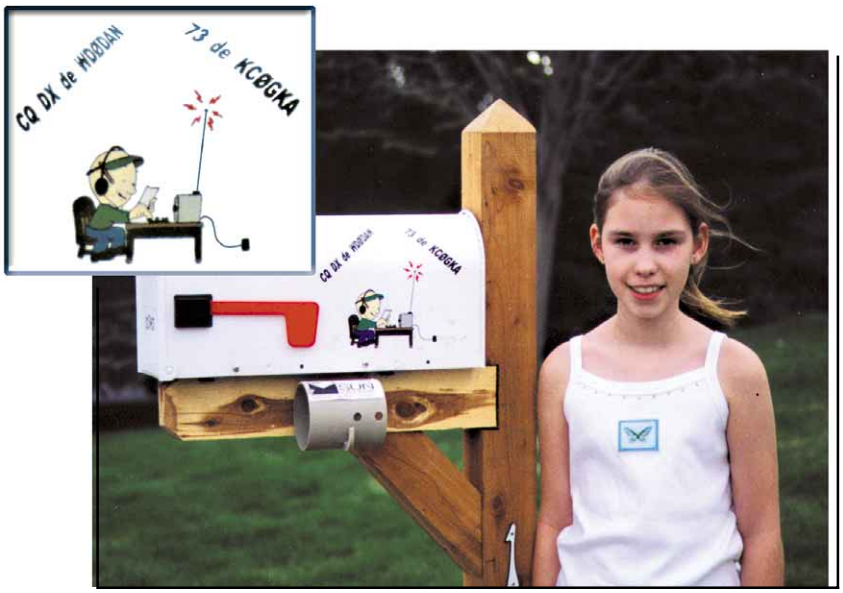
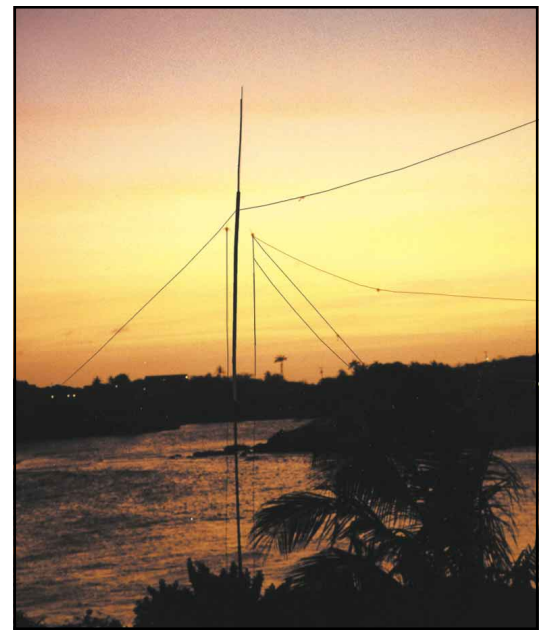
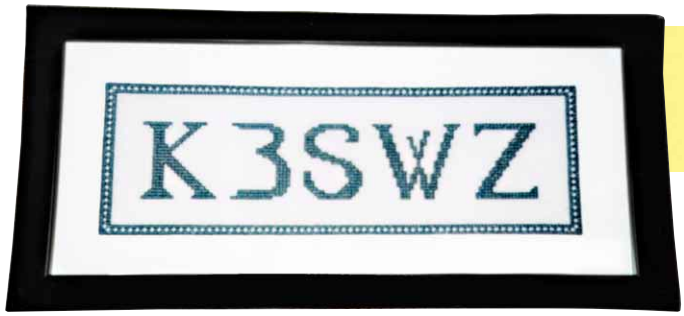


Wait a minute, Mr Postman... Katelyn Johnson, KC0GKA and her father Scott, WD0DAN, decorated their mailbox in the hope of attracting more elusive DX QSL cards!

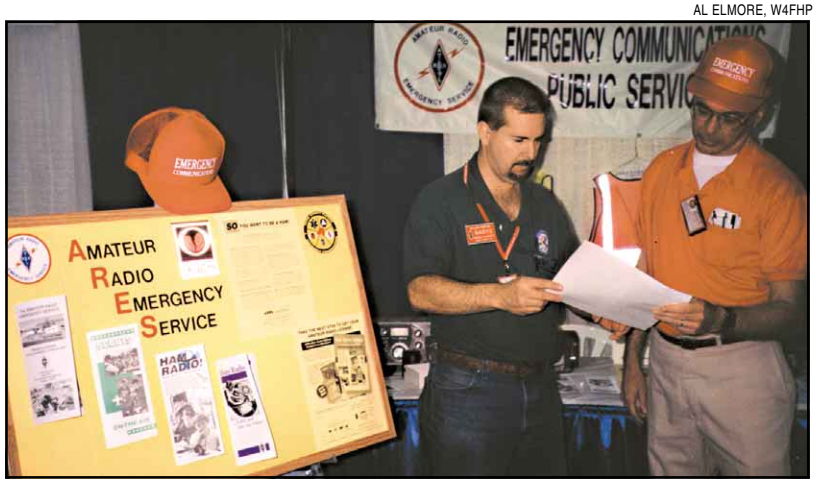


You don't need a cold Piña Colada to enjoy this Grenada sunset. J3/W1HEO and J3/W5PF glimpsed several sunsets during their 2-week DXpedition. The duo made 3600 contacts from Grenada.



K3SWZ is in "stitches." Glenn Kurzenknabe says, "My wife has done cross stitch needlework as gifts for many people. Finally, after 20 years, she did one for me!"

AL ELMORE, W4FHP

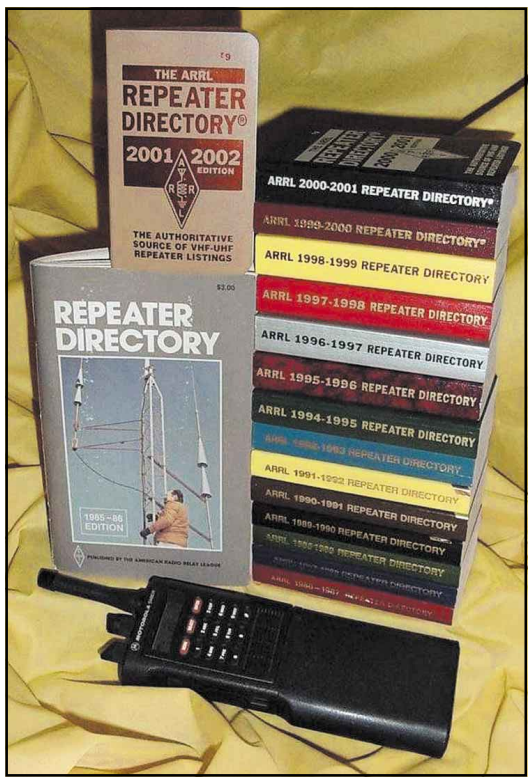


Ham radio is alive and well in Jacksonville, Florida. Duval County Emergency Coordinator Miller Norton, N4RYX (left) and Assistant EC Bill Sander, KA4OBP, prepare for visitors at the ARES booth. Their presentation was part of a seminar that showcased emergency services to local businesses last February.

A ramblin' man. Budd Drummond, W3FF, has been walking and talking with his backpack station since January 2000. So far he has worked all US states and Canadian provinces, along with more than 120 DXCC entities. Budd's pedestrian portable operation consists of a 5-band dipole, a Kenwood TS-50 transceiver and a 4-pound sealed lead acid battery. This photo found him in California with Mt Shasta looming in the background.

Meet *Miss Piggy*. Last spring, amateurs from the National Hurricane Center enjoyed a personalized tour of NOAA's Hurricane Hunter WP-3D Orion aircraft. The rugged *Miss Piggy* has penetrated 59 hurricanes since 1977. Three crewmembers (in the center of the lineup) are amateurs. From left to right, John McHugh, KU4GY; Captain Dave Tennesen, NL7MT; Lieutenant John Adler, KD6CFW; Flight Director Tom Shepherd, WB5ELO and Julio Ripoll, WD4JR.

Cruising for contacts. Tom Krawczyk, N9BBG (left) and Bruce Jenvey, AA8YC, demonstrated how Amateur Radio can enhance boating safety at the United States Power Squadron District 10 Spring Conference. Tom is the head of the District's Radio Committee and Bruce is publishing editor of *Great Lakes Cruiser* magazine.



When you've been a repeater coordinator for nearly 16 years, you tend to accumulate a lot of *ARRL Repeater Directories*. This collection traces the coordinating experience of Paul Gilbert, KE5ZW. Paul is presently the chairman of the State Frequency Coordination Committee for the Texas VHF-FM Society.

Anywhere you can hang your hat is home. Richard Arnold, K8RJA, fashioned this unusual coat tree from actual parts of an old telegraph pole.

Juggling dollars for 54 years! The Nittany Amateur Radio Club of State College, Pennsylvania, recently honored Wilber (Bill) Files, W3SAY, for 54 years of *continuous* service as the club's treasurer. Bill accepted the plaque of appreciation with his wife Riba.

ANDY VAVRA, KD3RF

A hefty check will bring a smile to anyone's face! ARRL Roanoke Division Director Dennis Bodson, W4PWF (center), recently presented a $1000 check from the ARRL Foundation to the Peninsula Electronic Amateur Radio Society. On hand to accept the check was Bud Russell, WZ4DX (left), PEARS president and Ray Mottley, WL7CKD, PEARS secretary. PEARS won the ARRL Club 2000 Achievement Award (small club category).

Guess who's coming for dinner? Earlier this year Jaro Jamrich, SU9ZZ and his wife visited the United States and enjoyed a picnic feast at the New Jersey home of Shel Darack, WA2UBK. From left to right: Faye Darack, WA2KVV; Zev Darack, N2WKS; WA2UBK (seated); Irwin Darack, KD3TB; Martina Jamrich and Jaro Jamrich, SU9ZZ.

What do you do when you move to Florida and get a new boat? If you are a ham, you name it the *Sea Q*. The Junior Op, Andrew, is the grandson of the boat's owner, George Wagner, K5KG, and the son of Brian Wagner, N2IFF. *—Tnx K5RC*

Brad Nuttall, AB7MA, of Mt Pleasant, Utah, doesn't give a hoot about birds roosting on his antennas. With a Great Horned Owl standing guard, other avian visitors are few and far between. No, this magnificent bird isn't plastic—he's the real thing!

A monument for all amateurs. Thanks to this group of Argentinean hams, in cooperation with local entrepreneurs (left to right: Reinaldo Szama, LU2AH; Jorge Ortiz, LU6HI; Carlos Ontivero; Julio Miranda; Daniel Gigena, LU1HK and Luis Gomez, LU1BR), a fitting monument to amateurs throughout the world was unveiled last December near the city of Albahacas.

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Bring Ham Radio along on your next hiking, camping, or business trip with Yaesu's amazing new FT-817 Multimode HF/VHF/UHF Portable Transceiver!

- **ULTRA COMPACT:** Measuring just 5.3"x 1.5"x 6.5" WHD (135 x 38 x 165 mm) and weighing about 2 1/2 pounds (1.17 kg, including the supplied antenna and alkaline cells), the FT-817 is small and light enough to take along wherever you're going.
- **WIDE FREQUENCY COVERAGE:** 160-10 meters on HF, plus the 50, 144, and 430 MHz Amateur bands. Plus FM Broadcast, AM Aircraft, and Public Safety receiver coverage.
- **MULTIMODE DESIGN:** Ready for action on SSB, CW, AM, FM, FM-Wide (Rx), 1200/9600 bps Packet, and Digital, including dedicated USB and LSB PSK-31 configurations.
- **5 WATTS POWER OUTPUT:** Using a new-technology all-band MOS FET power amplifier, the FT-817 provides 5 Watts of power output when using a 13.8 Volt DC source. When using Alkaline batteries or the optional FNB-72 Ni-Cd Battery Pack, power is automatically set to 2.5 Watts;via Menu, this can be changed to 0.5 Watt, 1 Watt, or up to 5 Watts.
- **WIDE CHOICE OF POWER SOURCES:** The FT-817 is equipped with an alkaline "AA" cell battery case, and a 13.8 volt DC cable is also supplied. Available as an option is the FNB-72 Ni-Cd Battery Pack (9.6 V, 1000 mAh), which can be recharged using a 13.8 Volt power supply while the radio is being operated.
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FINALLY ON THE AIR WITH OSCAR 40

♦ Little did I know when I wrote in *QST* about preparing my station for Phase IIID back in 1997 ("A Phase 3D Jump Start," September 1997 *QST*) that it would be almost four years before I would get a chance to test my station's capabilities on AO-40. But it looks like it's been well worth the wait!

May 9, 2001 was my first opportunity to get up on the new bird. I had a ball. The bird has good ears, and it's not yet operating at the efficiency levels that we can expect if there are no further problems. Using the combination of U band (435 MHz) on the uplink and S band (2.4 GHz) on the downlink, I enjoyed a full night's worth of contacts, both DX and domestic, that were armchair copy. I could hear my downlink when uplinking on L band (1.2 GHz), but I used U band since I am currently limited to 10 W on L band. But the setup works. I can add a small brick to the 1296 side to boost my uplink on that band if needed.

After AO-40 experienced the damaging "event" last winter, I was uncertain as to how useful this new satellite would be to the ham community. However, based on my experiences with AO-40 so far, this satellite should be a fantastic performer. As long as the command team does not encounter any more serious problems, AO-40 will be a great satellite offering strong signals and ease of use. Kudos to the ARRL, AMSAT, and all who supported this ambitious project, and special thanks to the designers, builders and the command team.—*Jim Kelly, KK3K, Philadelphia, Pennsylvania*

A CAUTIONARY TALE

♦ For a few months I was plagued with loud static on 80 meters. The noise only appeared when our clothes dryer was running, and it had the same rhythm as the rotating drum. My first thought was static discharge across the oil film in the dryer bearing, since I've encountered that before. (I later remembered that our Kenmore dryer drum doesn't have a bearing *per se*—it sits on rubber rollers and is driven by a circumferential belt.)

I finally became annoyed enough to try to fix the problem. I took my Sony portable receiver into the laundry room, and listened while I opened the dryer door, held the interlock closed with my finger and touched a grounded clip lead against the inside of the rotating drum. *Kapow!* A fat arc leaped from my clip lead. The drum had 120 volts on it!

That made the problem obvious—it had to be a bare wire in contact with the drum. Sure enough, a plastic clip holding the door-switch wires away from the drum had come loose and one wire was rubbed bare. Luckily, it was on the downstream side of the switch, so the drum wasn't hot all the time; if it had been the other wire, someone could have been killed loading wet clothes. Even so, they still could have gotten zapped if they accidentally pushed in the interlock. I cut and spliced the wire and backed up the plastic clip with a tie wrap. I also plan to install a ground fault interrupter in the laundry circuit for additional protection.

Arcing between the drum and wire as it charged and discharged the drum-to-frame capacitance caused the radio static. If it hadn't been for the radio noise, the condition would have gone undetected until someone was shocked.

Two morals to the story: Use caution when diagnosing weird RFI problems; and track them down promptly—even if you think you can live with the racket. That annoying noise in your radio might be symptomatic of an underlying safety hazard.—*Cliff Bader, W3NNL, West Chester, Pennsylvania*

OLD AND NEW THRILLS ON 50 MHZ

♦ The excitement of a band opening is a thrill that 6-meter operators enjoy and wait days, sometimes weeks for. These operators monitor certain designated frequencies listening for signals on groundwave, meteor scatter, sporadic-E, tropo and F2 propagation. The smart operator keeps his ears tuned to the hissing audio as his rig scans the band.

Six meters offers many challenges. Unlike some of the HF frequencies, the operator must work harder and longer for most awards. The Worked All States award is within reach of many 6-meter enthusiasts, but it requires hours of monitoring and a certain amount of luck. It took me three years to work my WAS. The Worked All Continents is another award that can present a substantial challenge on 6 meters, but it can be done. The list of six-meter awards is really quite long. If you're active in the VHF contests, you can soon work 100 grid squares and be eligible to join the ranks of the VHF/UHF Century Club, or VUCC. Or you can opt to hunt counties rather than grid squares. I have achieved the USA Counties Award and now have about 900 counties on 6 meters.

Six meters, I believe, is the best band for working meteor scatter. A few have daily schedules using sideband and others are using High Speed CW (HSCW) or a digital mode designed for meteor bursts. I have made contacts using FastHell (5X or 9X). There are other experimental modes that a few operators are using. Talk about excitement! Seeing the print flow across my screen during a meteor burst is a real thrill.

The digital revolution that is sweeping through Amateur Radio has made itself known on 6 meters. Contacts are being made with PSK31 and other modes on 50.290 MHz during band openings.

Join the fun and add 6 meters to your station. I'll be listening for you!—*Randy Tipton, WA5UFH, Edna, Texas*

A LITTLE COURTESY GOES A LONG WAY

♦ My two sons (N2EGE—11 years old and KB1GCS—10 years old) earned their Technician licenses late in 2000 (thanks to help from Dan Miller, K3UFG, at Headquarters' Field and Educational Services department). Within a couple of months I was beginning to work on the code with them. This was at *their* request. They saw dad do it, and naturally wanted to follow.

After about 3 weeks we had mastered all of the characters, and within another week they were showing enough proficiency to operate on the air. Ability and courage are two different things, of course! It was a couple more weeks before the courage came. Again, I think watching dad operate was the factor that finally motivated them. Since the first born often tends to get favored by default, I intentionally had the younger son go first. With me as the control operator at station N1EGE, KB1GCS hit the airwaves on 40 meters. From here on out, our experience was everything ham radio should be.

My son's first contact was like some-

thing out of a storybook. The other station was calling CQ, and we made contact with Howard, N2CYO. Of course, my son was going quite slow. N2CYO immediately accommodated. He and my son had a brief but delightful QSO. N2CYO's sending was slow, steady, solid and easy to copy. Exactly what a first-timer needs!

We exchanged QSL cards, as did N2CYO. Howard included a nice letter with his QSL card, and I quote it in its entirety:

> Thanks a lot for the very enjoyable QSO we had the other night. I was very glad to be able to be your first CW contact. Your first contact is always a very memorable one, and I am proud to be a part of it.
>
> I wish you the best in your ham radio hobby and hope that you can continue on up the ladder to Amateur Extra in the future. This will give you all the band privileges that I know you will enjoy.
>
> You send very good CW. It is easy to copy and pleasant to listen to. I will look for you on the bands in the future and maybe we can chat again.
>
> 73 for now to you and your dad, and once again, the best of luck to you.
>
> Best regards, Howard, N2CYO

This is the best of ham radio. I would encourage all amateurs to make this storybook example an everyday affair. *—Steve Ege, N1EGE, Plainville, Connecticut*

A WRINKLE IN CEPT

♦ I read with great interest the June installment of "Washington Mailbox" by John Hennessee, N1KB. My wife and I are in the final stages of planning a combination vacation and mini-DXpedition to Greece (SV1) and the Island of Rhodes (SV5) scheduled for June and July of this year. We have done a great deal of research into the issue of operation in the European area and were pleased to see this issue addressed by the section of the article dealing with CEPT.

The information presented was accurate as far as it went, but failed to address one important factor. Although there are 34 European countries that have implemented the recommendations of the CEPT T/R 61-01, not all of those 34 nations recognize the participation of the United States as a non-CEPT participating country. Greece is one of those countries and the non-recognition is based upon the fact that the US is not a member of the European Economic Community. There may be other European administrations that also do not recognize the participation of the US based upon the same or similar issues. Also, I believe that the same problem exists for amateurs licensed in the other non-CEPT participating countries that are also non-EEC countries. This includes Canadian amateurs.

Due to this exception imposed by Greek authorities, US licensed amateurs must request a reciprocal temporary operating permit. This is done by applying in writing, several months in advance, to the Greek Ministry of Transportation and Communications, 2 Anastaseos St 10191, Athens, Greece. Be sure to supply all information including call sign, license class, dates of your visit and the model and serial numbers of all transmitting equipment you plan to transport into Greece. The Greek authorities do not charge for the permit.—*Mike Nowack, NA9Q and Arlyce Nowack, NB9Q, Quincy, Illinois*

HAZARDOUS AND ILLEGAL USE OF RADAR

♦ There seems to be a dangerous trend occurring among our ranks regarding the indiscriminate use of marine-based and land-based radar sets for storm spotting in motor vehicles.

These operators have obviously failed to visit Part 80 of the FCC Rules regarding the specifics of marine radar and are in violation on numerous points. You must possess a General Radiotelephone operator License (GROL) including a radar endorsement to install such a device. There have been some who have purchased land-based radar systems and have submitted the license application to the FCC Wireless Division with hopes of operating the radar legally. To their dismay they learn that their application was dismissed because land-based radar is limited to specific users with special permits such as storm-spotters from various universities with special grants from NOAA.

If these operators did the RF Safety formula for proximity radiation with their transponders at a mere 7 feet above ground level, they would discover that they are not in compliance by a long shot. Marine radar emits 4000 W of pulsed RF. Coupled to a high gain antenna, the effective radiated power of this device exceeds 100,000 W. This is enough to cause total blindness to an unsuspecting person nearby who is unlucky enough to be looking into the antenna.

I've attempted to contact some of these individuals and warn them of the hazards. In most cases, however, my warnings have been turned away with a cavalier, arrogant attitude.

I have contacted the FCC about the problem, but the solution really lies in better awareness at the local level. *—Bob Bailey, KA0MR, Moundridge, Kansas* QST

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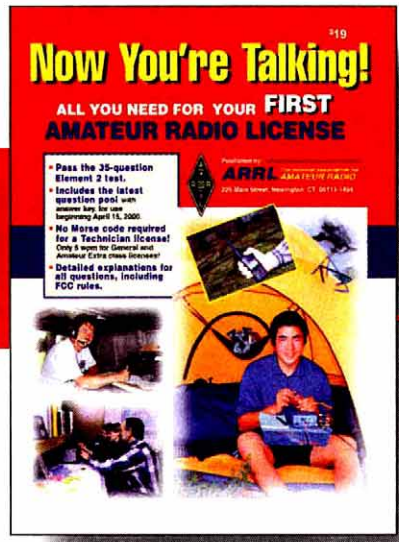

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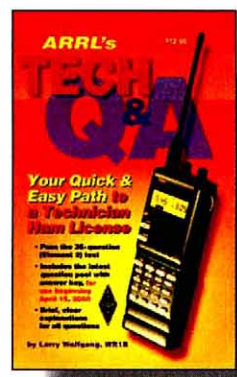

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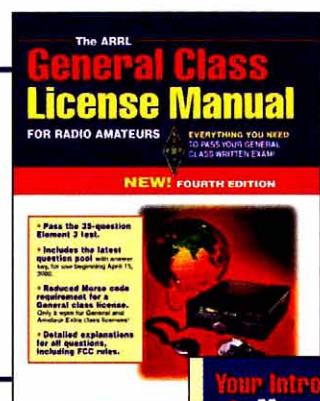

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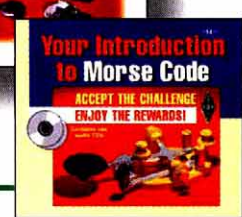

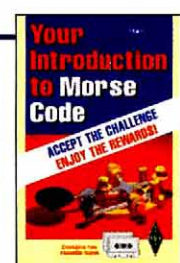

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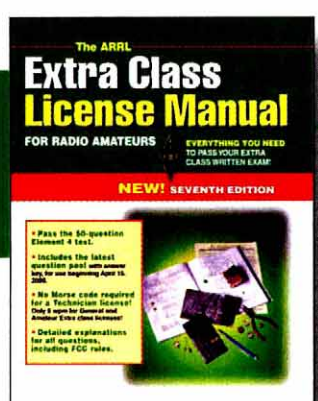

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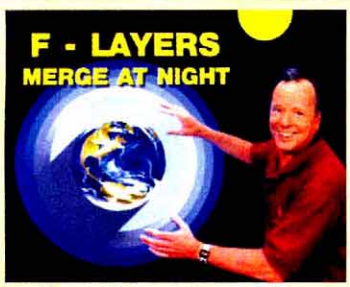

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By Mike Bryce, WB8VGE

The Digital Meter Supply

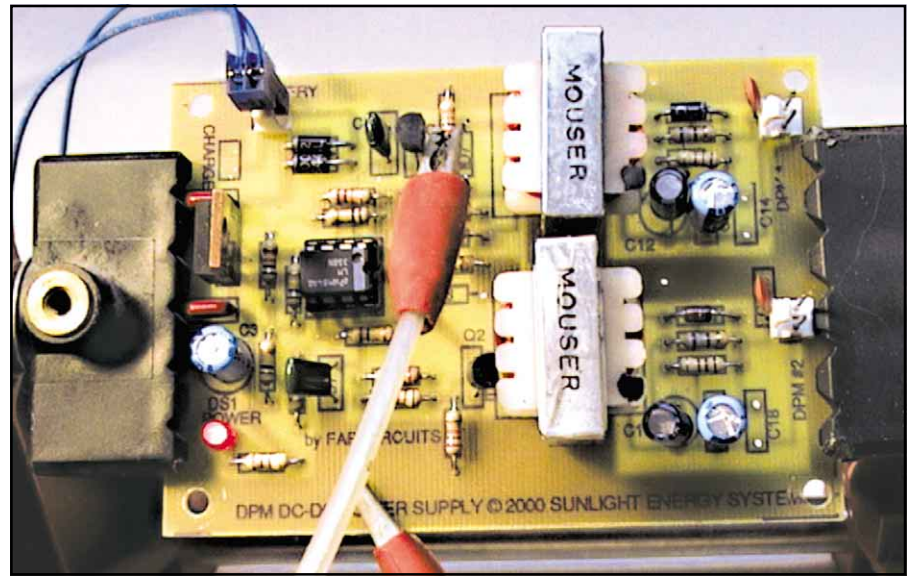
Here's a simple-to-build project that will allow you to put those surplus digital panel meters to good use.

Even though we live in an analog world, we are surrounded by digital electronics. With everything going to ones and zeros, it's possible to pick up some bargains when it comes to digital panel meters (DPM). I picked up several at a local hamfest for five bucks a pop. They will display three and a half digits and have an input impedance of over 200 MΩ. They're cheap, but very usable. All you need to put these guys to use is an isolated power supply. For you see, nearly all surplus[1] DPMs require their own separate power source. For example, most digital panel meters can't monitor their own source of power. This problem can be traced to the internal A/D converters the digital panel meters use. So, if you want to use two or more DPMs, then you need to power each one by its own separate power supply. I wanted to monitor my storage batteries in the shack. One DPM for voltage, and another to monitor current flow out of the battery. Two meters, two separate supplies.

Since most of the surplus digital panel meters use a LCD display, their power requirements are very low. For short term portable use, a standard 9-V battery can be used. Operating a DPM in a hand held device is one thing; running one in the shack for hours on end from a 9-V battery is another. Running a DPM for hours on end can really eat up the batteries!

To solve all of these problems and to avoid the extra cost of a separate ac power supply to operate each meter, I designed the digital meter supply. The digital meter supply will power two separate LCD digital panel meters at one time. Each digital panel meter has its own separate isolated power supply. Both supplies are isolated from each other as well as the input power supply.

Best of all, the digital meter supply is really easy to build. The entire DPM meter supply is on a small PC board,[2] and is very inexpensive to build. In fact, a complete kit of parts, including the PC board, is less than $30.[3]



Here's the digital meter supply undergoing tests. This is one of the first PC boards.

Here's How It Works

To simplify the discussion of the digital meter supply, only one section of the digital meter supply will be explained. The other is an exact copy. Its operation is identical. Take a look at Figure 1.

There are two different ways to power the digital meter supply. Steering diodes D1 and D2 select from either of two different inputs. You may want to operate the digital meter supply from a wall wart or from the unregulated side of a power supply or both at the same time. Diodes D1 and D2 will automatically select the higher voltage of either input.

A LM7810 voltage regulator is used to provide the digital meter supply with stable operating voltage. However, as we will see later, you can change the voltage regulator to suit your needs. The voltage regulator is bypassed for stability. An LED will illuminate when power is applied to the PC board. The digital meter supply draws about 140 mA from a power source. Each section requires 70 mA and there are two supplies on the board for a total of 140 mA of current.

The digital meter supply uses a single, dual op amp, the LM358. One section of the LM358 is used as an astable oscillator for each supply. Each op-amp oscillates at about 2.5 kHz using the component values shown. The square wave output of the op-amp is then used to supply base drive to Q1. Resistor R6 limits the base current while R7 guarantees that Q1 will be off when the output of the oscillator approaches 0 V.

When Q1 is turned on, collector current passes through R9 and R8, which limits collector current, and then through the secondary windings of T1. Resistors R8 and R9 are rated at 2 W and are com-

[1]Notes appear on page 30.

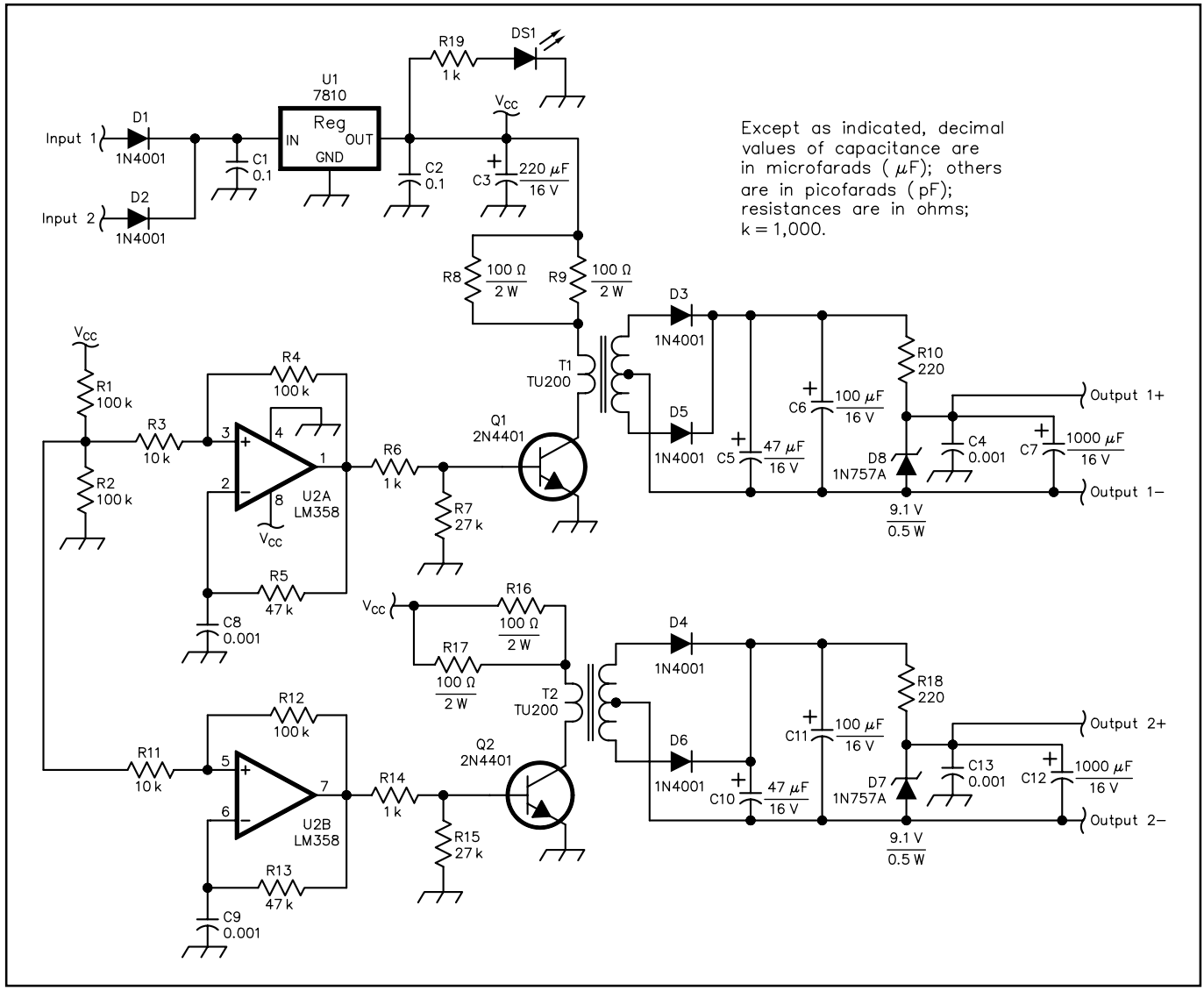


Figure 1—Schematic diagram of the digital meter supply. Part numbers in parentheses are from Mouser Electronics, tel 800-346-6873.

C1, C2—0.1 μF ceramic.
C3—220 μF electrolytic, 16 V (140-XRL-16V220).
C4, C8, C9, C13—0.001 μF ceramic.
C5, C10—47 μF, electrolytic, 16 V (140-XRL-16V47).
C6, C11—100 μF, 16 V.
C7, C12—1000 μF, 16 V (140HTRL16V1000).
D1-D6—1N4001 (625-1N4001).
D7, D8—1N757A (610-1N757A).
DS1—Red LED.
Q1, Q2—2N4401 (610-2N4401).
R1, R2—100 kΩ, 1/4 W.
R3, R11—10 kΩ, 1/4 W.
R4, R12—100 kΩ.
R5, R13—47 kΩ, 1/4 W.
R6, R14, R19—1 kΩ, 1/4 W.
R7, R15—27 kΩ, 1/4 W.
R8, R9, R16, R17—100 Ω, 2 W (282-15-100).
R10, R18—220 Ω, 1/4 W.
T1, T2—Transformer, 200 Ω pri/8 Ω sec (42TU200).
U1—7810 voltage regulator (511-L78M10CDT).
U2—LM358 (511-LM358N).
Heat sink (532-576802B31).

bined in parallel so their combined resistance is 50 Ω at 4 W.

When Q1 switches off, the magnetic field collapses and induces a voltage to the primary of T1. Diodes D3 and D5 then rectify the output. These two diodes along with the center tap of T1 form a full wave bridge rectifier. Capacitors C5, C6 and C7 filter the output. Capacitor C4 shunts to ground any switching noise that made it through T1.

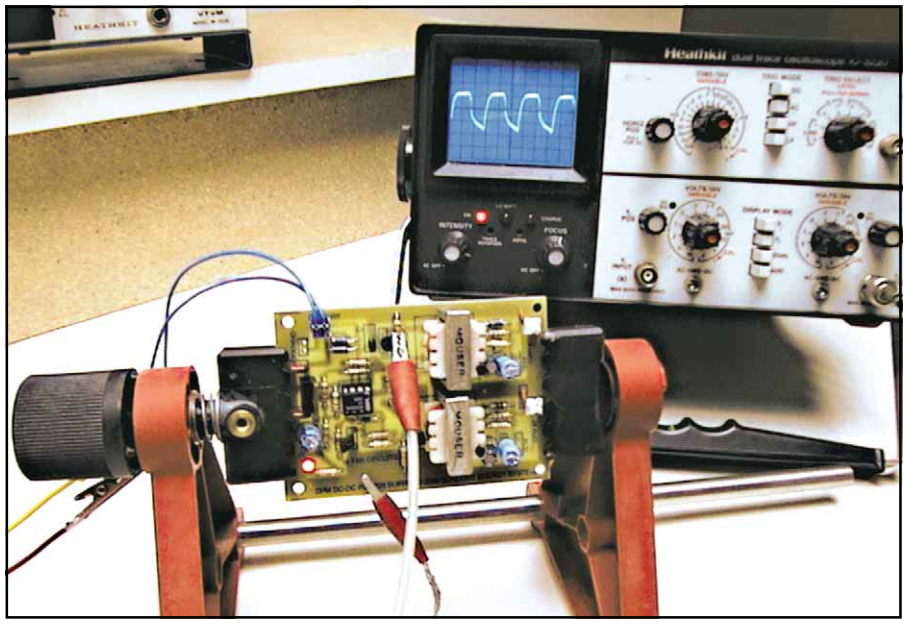
The rectified and filtered voltage developed by T1 is about 45 V. To keep our DPM happy, resistor R10 and Zener diode D8 regulate the voltage down to 9 V. The values shown are for a 9-V DPM. Some digital panel meters work at 5 V; others like to see 9 V.

Since neither output of the digital meter supply is tied to ground, the DPM being powered by the digital meter supply will accurately resolve the input voltage applied to it. Both outputs of the digital meter supply are isolated from the input voltage and from each other. Operating two digital panel meters at the same time will not produce any interaction between the two.

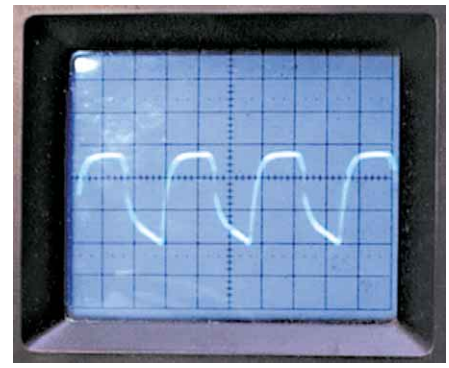
Building the Digital Meter Supply

Really, the best way to assemble the digital meter supply is by using the PC board. However, there's nothing carved in stone that says you can't perf-board the circuit. The PC board is just easier and much faster.

No attempt was made to make the PC board as small as possible. The PC board is large enough for even the



The digital meter supply shown operating. The output of the first op amp is displayed on the scope.



The waveform generated by the digital meter supply. This display was generated at the base of Q1.

greenest solder melter.

All connections between the digital meter supply PC board and the outside world are made using AMP MTA headers and sockets. Of course, you don't need to get this fancy, and can just solder the wires to the PC board. But the MTA headers (on 0.100-inch centers) make for a very neat installation.

Substitution of Parts

This is a junk box project, so use what you have! There's nothing special about any of the values used. With the exception of the transformers, just about all the parts can be obtained from your local RadioShack store.

Even the transformers are not that special. The ones specified work because they fit the PC board! You can use just about any small PC mount signal transformer. Just try to keep the resistance of the secondary and primary coils close to those I have specified. I even gave some thought to winding my own transformers using a toroid.

You can change the frequency of the oscillator by selecting different values for R5 and C8. The smaller the values, the faster the oscillator runs. I've played with the values for R5 and C8 and can't see any difference in the operation of the circuit.

Transistors Q1 and Q2 can be any junk box NPN transistor. I've used the 2N2222, 2N4401 and MSPA06 as well as others and they all work.

If you plan on powering the digital meter supply from a battery, you could get fancy and use a low dropout regulator in place of the LM7810, but they are kind of expensive. Or, if you want, remove the LM7810 altogether and replace it with a jumper wire. The circuit will work just fine without the regulator if you plan on using a stable power source all the time to operate the digital meter supply. If you plan on using the digital meter supply with a high voltage dc input, such as an unregulated supply, a small heat sink on U1 would be a good idea.

Operation and Setup

There's nothing to adjust. All you need to test the digital meter supply is a power source and a VOM, digital of course, to check the output voltage.

Apply at least 13-14 V to either input terminals. The LED should light. Check to be sure +10 V appears on the output of the voltage regulator U1. Now, attach the positive probe of your VOM to output #1 positive and the negative lead to output #1 ground. Remember that both outputs float, so measure from the plus and minus side of the output. Do not measure the output voltage to ground. You won't see anything!

Now, connect your DPM to the output and monitor the voltage from the digital meter supply. The voltage should hold steady and the DPM should come alive. The values shown work quite well with the surplus DPM modules I have used. Remember that the digital meter supply will only drive LCD type digital panel meters.

Oh No! It Won't Work

If you have 10 V on the output of U1, but nothing coming out of one transformer, check the other half of the circuit. If both are showing zero output voltage, use a scope and check to see that there's a square wave on the outputs of the LM358. If you don't have a scope, a logic probe will work too, as the frequency is slow enough to see on the logic probe. You should see the waveform on pins 1 and 7 of U2. If you see the wave, but still have no output, check Q1 and/or Q2.

On the other hand, if you have a good solid square wave and no output, probe around D3/D5 for solder bridges. Also, the output current of either supply is very limited. If your DPM loads the circuit down too much, you'll not see the output voltage. Remember that the most you can get from either output is about 10 mA or so.

That's it! You can now put the digital meter supply to use. It's great for monitoring your power supply in the shack, or the battery at Field Day. Don't forget to upgrade that old SWR meter with digital meters. If you're like me, you'll find dozens of places to use DPMs now that you can power them up!

Notes

[1]Some digital meters will in fact read their own power source. They are rare and very expensive.

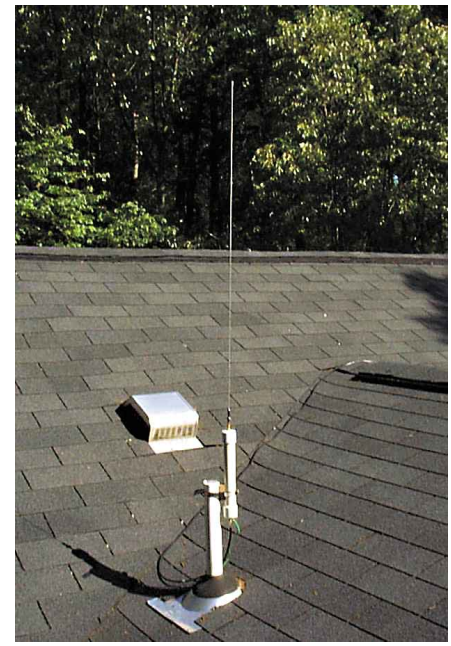
[2]A PC board for this project is available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269; tel 847-836-9148 (voice and fax). $5.50 plus $1.50 shipping for up to four boards.

[3]A complete kit of parts including the PC board may be obtained by sending $30 + $4 shipping to: SunLight Energy Systems, PO Box 377, Massillon, OH 44648; tel 888-476-5279. Checks, money orders and Visa/MC accepted.

You can contact the author at 955 Manchester Ave SW, North Lawrence, OH 44666-9438; **prosolar@sssnet.com**

By Frank Gentges, K0BRA

The AMRAD Active LF Antenna



You can tune into LF activity with this easy-to-build and erect active antenna. As a bonus, you get MF and HF coverage, too—not to mention world-class performance!

The Amateur Radio Research and Development Corporation (AMRAD) is a nonprofit radio club that specializes in cutting-edge—yet fun—Amateur Radio technology. In a jump back to the future, several of us decided to look into low-frequency radio (LF). Many European countries now have an Amateur Radio allocation at 136 kHz, and AMRAD, hoping for a future FCC amateur allocation there—obtained an FCC Part 5 license to operate experimentally on those challenging low frequencies. Many hams wanted to listen to our transmissions, but lacked a suitable receiving antenna. The antenna described here should do nicely.

Some Background

The evolution of our present antenna has a proud lineage. AMRAD member Dick (WA3USG) Goodman's Monster Loop is an excellent antenna and met our initial need.[1] Another member, Bill Farmer, W3CSW, built a loop antenna in his attic that also performs well.[2] Low-frequency veteran Ken Cornell, W2IMB, described several active antennas, including his varactor-tuned active antenna.[3] And engineering whiz Andre Kesteloot, N4ICK, presented an even better design. His varactor-tuned active antenna has the tuning stage *ahead* of the FET follower.[4] N4ICK's antenna works very well, but like the Cornell design, it must be tuned to the desired frequency. Because of their simplicity and performance, Ralph Burhans' active-antenna designs became popular with LOWFers (low-frequency experimenters) in the 1980s.[5,6] Even though they're a few years old, Burhans' articles provide important information about the workings of active antennas. These antennas were a starting point in our quest for an improved LF active antenna.

The US Navy gave the club access to some large LF *transmitting* antennas that were scheduled for demolition. We conducted a series of tests and concluded that for LF receiving, a well-designed active antenna in a low-noise area can perform as well as much larger antennas.[7]

This Project

The active antenna described here can be a powerful tool for the future LF-active ham seeking to work Europe and win the *Bobek LF Transatlantic Challenge* (once an LF Amateur Radio band is allocated by the FCC, of course). For more information about the Challenge, see **www.g3wkl.freeserve.co.uk/awards/136_trans_challenge.html**.

We set out to build a transatlantic-grade LF antenna that any ham could build with simple hand tools. We also wanted our design to improve on Burhans' IMD performance to enable urban hams to receive the LF bands without dealing with spurious signals caused by IMD. We also wanted our antenna to work to 30 MHz, if possible, to make the antenna generally more useful. We're pleased to report that this antenna exhibits improved IMD performance and has a useful range of 10 kHz to 30 MHz.

What is an Active Antenna?

An active antenna is an electrically and physically small antenna combined with an active electronic circuit, such as an amplifier. An active antenna, like the one described here, uses a small whip—one that is a fraction of a wavelength long at

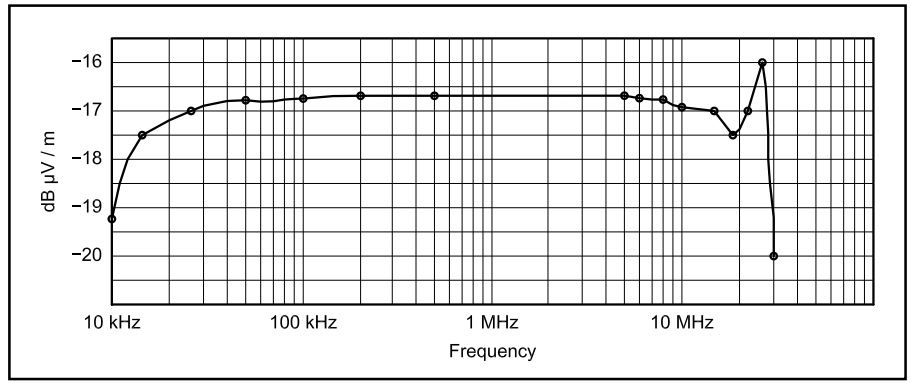


Figure 1—Active antenna response curve.

[1]Notes appear on page 37.

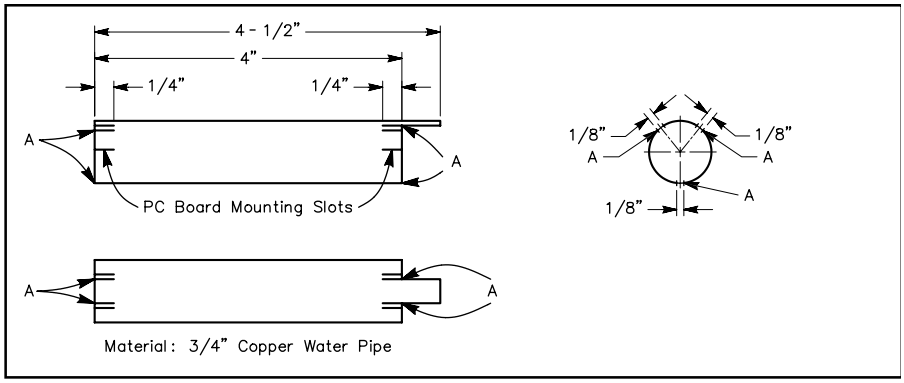


Figure 2—The heat sink is made from a 4 1/2-inch piece of 3/4-inch copper pipe cut and shaped as shown. Cut pairs of 1/4-inch deep slots at the "A" points indicated. These form tabs that center the pipe in the PVC tube (see text and Figure 5).

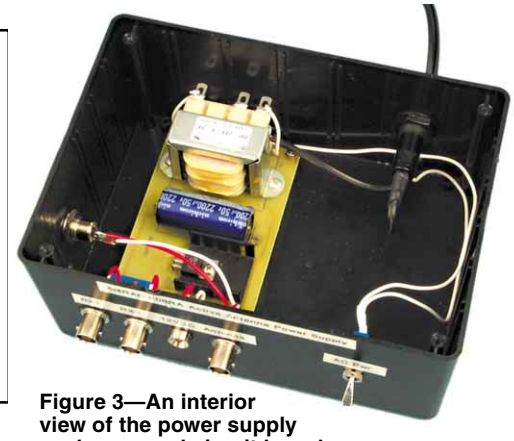


Figure 3—An interior view of the power supply enclosure and circuit board.

Figure 4—The amplifier, heat sink and PVC tube housing.

the desired frequency—connected to an active impedance-conversion circuit.

An electrically short whip has a high output impedance. For example, a 1-meter whip at 10 kHz has an input impedance of almost 2 MΩ. If such a whip were connected directly to a 50-Ω load, signals reaching the antenna would be attenuated almost 114 dB by the time they reached the receiver. The active impedance-conversion portion of this antenna is a high-input-impedance FET follower feeding a 50-Ω load, eliminating much of the signal attenuation. In this design, the attenuation is only about 16 dB. Reducing the nonlinearity and the resulting IMD products was the major design challenge.

Although the Burhans antennas have IMD performance that exceeds that of many active antennas, urban hams need even better performance. After trying a number of changes to Burhans' designs, we found that performance could be improved by increasing the level at which clipping began and by using a more linear transistor. The problem with increasing the clipping level is that the transistor operating voltage and the bias current almost certainly increase, resulting in increased power dissipation by the transistor.

Simultaneously, we received some key design details from Dr Dallas Lankford, who was working on an HF antenna.[8] He identified the Crystalonics CP-640/CP-650 series of junction FETs as outstandingly linear for active antenna applications. He was kind enough to share his design ideas and provide help with our IMD measurements. AMRAD kudos go to Dallas for his assistance.

The increased transistor heat dissipation is handled by a homemade heat sink constructed from 3/4-inch copper pipe. Readily available PVC pipe fittings make a protective enclosure for the antenna.

A PC-board prototype was built using a resist pen printed circuit board and, after a few trials and changes, the antenna performed well up to 30 MHz. Three additional antennas were built and used in AMRAD's annual LF expedition to North Carolina's Outer Banks—an environment that has low LF noise and superb LF propagation from Europe (as observed by monitoring European LF broadcast stations). The singular problem is a Coast Guard Loran-C transmitter at Carolina Beach, North Carolina. It operates on 100 kHz, transmitting short, 600-kW pulses.

During the Outer Banks expedition, the new antenna performed well. It was so good that the receiver, a modified Ten-Tec RX-320, became the limiting element.[9] A 136-kHz filter placed between the antenna and the receiver solved the receiver IMD problem and brought receiver sensitivity down to the local noise floor.

Power Supply

The power supply (see Figure 3) is designed to minimize coupling between the power line, the antenna and station ground. The power transformer chosen is the result of carefully testing and sorting commercially available transformers. Similarly, the signals from the antenna are coupled to receiver ports **RX1** and **RX2** through a wideband isolation transformer, T2. This prevents noise on the receiver ground from coupling into the antenna ground. Isolation transformers such as this have been invaluable in reducing noise coupling in LF receiving systems.

The power supply has a provision (J4) for using an external 24-V dc source (ie, a battery) for portable operation. 1- or 2-Ah gel-cells provide power for several hours given the 53-mA load.

The antenna is designed to work into a 50-Ω load. Ideally, a 50-Ω receiver is attached to **RX1** and a high-impedance device, such as an oscilloscope or counter, is connected to **RX2**. Although the output impedance of **RX1** and **RX2** is about 14 Ω, a load less than 50 Ω degrades the IMD performance. Running multiple receivers on a single antenna has

turned out to be very handy at times.

Performance

This antenna achieves very good intermodulation and overload performance at some sacrifice in output level. The AMRAD amplifier is based on Burhans' noiseless feedback design. The frequency response curve for the antenna with a 1-meter whip is shown in Figure 1. The input capacitance of the active amplifier is about 29 pF.

AMRAD member Steve Ratzlaff, AA7U, helped measure the second- and third-order intercept points. Overload and intermodulation performance are measured much as they would be for an RF amplifier or receiver.[10] For second- and third-order intercept point measurements, a hybrid combiner is used.[11] We used a lower-frequency transformer for the hybrid that consisted of 25 bifilar turns of #30 wire on an Amidon FT-87-J ferrite toroid core.

Test signals were fed through a 12-pF capacitor to simulate the source impedance of a 1-meter whip. Referenced to the antenna output, the following values were measured: 1-dB compression point, +25 dBm; second-order intercept point, +53 dBm; third-order intercept point, +37 dBm.

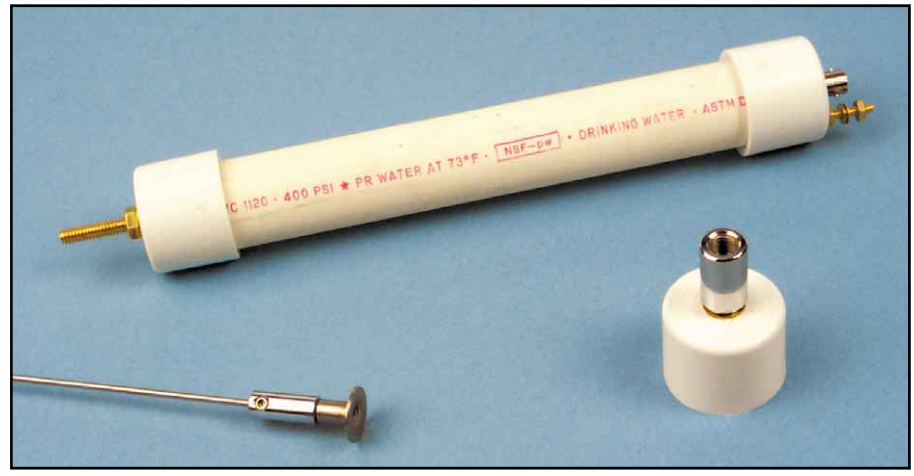
The performance of the AMRAD antenna considerably exceeds that of every readily available active antenna we tested. You can expect similar performance, save for the last 5 dB or so of second-order IMD performance, which may have to be squeezed out using a test setup to fine-tune the bias current.

The second-order intercept point relates to the antenna's distortion product (f1–f2). Second-order intercept values often take a back seat to the more commonly measured third-order values. They become important in LF listening, however, because second-order distortion products can create spurious signals in the LF band in the presence of two local AM broadcast stations; the higher the number, the lower the distortion level. This number in no way implies that the antenna can withstand a signal-input level of +53 dBm, much less perform usefully under such conditions.

Construction

You can build the antenna using readily available hand tools. The PC boards are available from FAR Circuits.[12] The only required adjustments are setting the power supply voltage to 24 V and setting the amplifier transistor bias for a source current of 53 mA.

Q1 is special and available only from Crystalonics, which specializes in high-performance RF devices. Although the company usually doesn't sell single devices, it has kindly agreed to sell them to readers of this article.



The active antenna is housed in a Schedule-40 PVC tube with connections at opposite ends for the whip antenna element and the coaxial cable to the power supply and receivers.

PVC Case

Prepare the pieces of Schedule 40 PVC pipe as follows:

Cut an 8-inch-long piece of 1-inch Schedule 40 PVC pipe (the amplifier case). Drill a 1/4-inch hole in the center of a 1-inch PVC pipe cap. This will become the top of the amplifier case. Similarly, drill a 3/8-inch hole in the end of a 1-inch Schedule 40 pipe cap. Drill a 9/64-inch hole in the end of the cap near the edge, 0.50-inch from the center. Countersink this hole for a #6 brass flathead grounding screw. Cut two 1-inch-long pieces of 1/2-inch PVC pipe to act as spacers at the top and bottom of the printed-circuit board.

Place the BNC connector in the pipe cap via a 3/8-inch hole with the connector facing outward. Solder a short piece of #24 bus wire (approx) to the head of a #6 × 1-inch brass screw. Install the screw with the threads facing out. Solder the wire to the ground tab of the BNC connector. Solder a 1 1/2-inch piece of wire to a 1/4-20 × 1 1/2-inch brass bolt. Install it in the other PVC cap and seal it with Permatex *Silicone Windshield and Glass Seal,* available at auto parts stores, to seal the bolt, nut and washers to the PVC cap. This sealer is thinner than regular silicone sealer and flows into cracks and crevices for a better seal.

Note that the RadioShack BNC chassis connectors specified for this project are different than common chassis connectors. They have a small solder lug on the edge of the ground side that is used to connect the ground side of each signal line from the printed-circuit board. The ground tab cannot be bent out to make soldering easier. *It will break off.*

Tip: When mounting a BNC connector in plastic, apply a few drops of super glue (cyanoacrylate cement) to the edge of the connector next to the plastic. Rotate the connector a turn or so to distribute the cement along the joint where the connector meets the plastic. Tighten the nut and the connector will bond into place. While in service, the connector will not rotate when the bayonet connector ring is engaged or disengaged.

Place the two end caps on the 8-inch piece of pipe and make two small marks where the pipe caps meets the edge of the pipe when fully seated. Use these marks during final assembly to make sure that the caps are well seated on the pipe.

Heat Sink

Refer to Figure 2 while building the heat sink. Cut a 4 1/2-inch piece of 3/4-inch copper pipe. On one end cut two slots 1/2-inch-long spaced 3/8-inch apart. Place the assembly in a vise and cut off 1/2-inch of the end of the pipe; leaving a tab. Do this by cutting around the pipe so that the tab remains between those slots. The tab that remains should be 1/2-inch long and 3/8-inch wide. This tab will contact the transistor case to help dissipate heat.

Cut two slots 1/4-inch deep and 180° apart on the tab end, placing the tab halfway between the slots. Cut two more slots on the opposite end of the pipe at the same position as the slots on the tab end. The metal next to these slots will be bent inward slightly to hold the PC board in place.

To keep the copper heat sink from rattling against the PVC pipe enclosure, cut six 1/4-inch-deep slots on each end to form six small tabs. Bend these out slightly, as shown in Figure 5.

Active Antenna PC Board

The antenna's schematic is shown in Figure 6. Make the wideband transformer

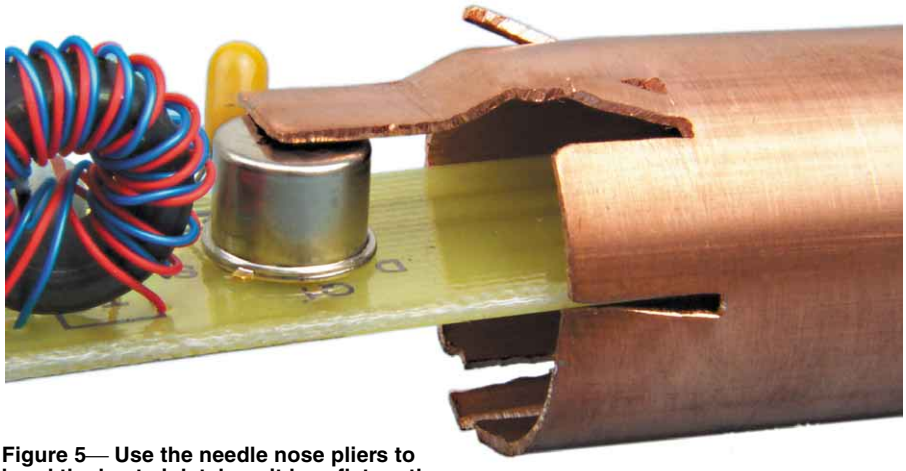


Figure 5— Use the needle nose pliers to bend the heat sink tab so it lays flat on the transistor case. Carefully bend the tab to maximize contact.

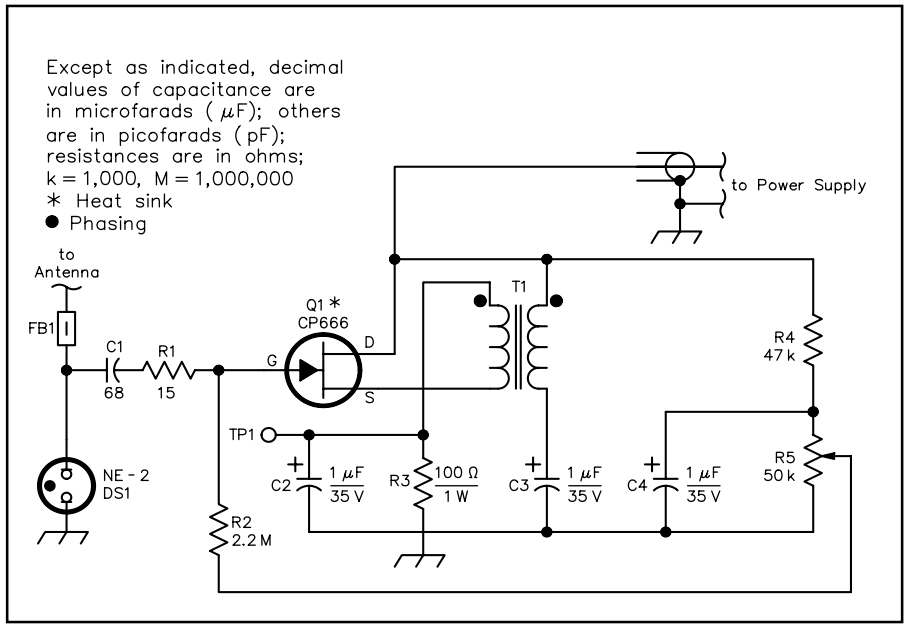


Figure 6—Active antenna schematic. Unless otherwise specified, resistors are 1/4-W, 5%-tolerance carbon-composition or metal-film units. Part numbers in parentheses are from RadioShack. Equivalent parts can be substituted.

C1—68-pF ceramic capacitor, 2 kV.
C2-C4—1-μF, 35-V tantalum (272-1434).
DS1—NE-2 neon lamp (272-1102).
FB1—Ferrite bead, Amidon FB43-287.
J1— BNC jack (278-105).
Q1—CP-666 JFET (Crystalonics Inc, 17 A St, Burlington, MA 01803; tel 781-270-5522, fax 781-270-3130; www.crystalonics.com. When ordering, refer to this *QST* article. International orders accepted. Price: $14.75 plus shipping.)
R1—15 Ω; see text.
R2—2.2 MΩ.
R3—100 Ω, 1 W (271-152).
R4—47 kΩ, (271-1342).
R5—50 kΩ potentiometer.
T1—17 bifilar turns #30 AWG wire wrapping wire (278-501) wound on an Amidon FT50-75 or FT50-J core.

by twisting two 18-inch-long pieces of #30 wire wrapping wire together. The wires should be different colors so they can be identified after winding. Wind 17 turns of the bifilar wire on the Amidon FT-50-J or FT-50-75 ferrite core. Note that the first time the wire passes through the center of the core counts as turn number one. Each additional time the wire passes through the core is considered an additional turn. The transformer design was optimized to avoid core saturation at maximum signal levels while having good VLF response. Adding turns will degrade the intermodulation performance. Sensitivity at 10 kHz is quite adequate.

Insert and solder the parts. Insert the wideband transformer wires so that the lead from the start of each winding is inserted in the PCB holes identified with the dots. Insert the lead from the finish of each winding into the PCB transformer holes without the dots, keeping the primary and secondary windings connected as in Figure 6. Use different wire colors to distinguish the primary and secondary wires. When the PCB is completed, wideband transformer T1 can be secured to the board using a dab of silicone sealer.

Positioning the assembly on a hard, flat surface, carefully flatten the heat sink tab with a hammer. Slide the heat sink over the PC board and, using needle nose pliers, twist the pipe in at the slots under the heat sink so the board rests on the "shelf." See Figure 4.

Use the needle nose pliers to bend the tab so it lies flat on the transistor case. Carefully bend the tab to maximize contact. See Figure 5. You may need to remove, adjust and replace the parts several times to get the tab positioned correctly. *This part of the assembly is very important!* Be patient and be sure to get this right so the transistor doesn't burn up. The slots on the opposite end are bent inward slightly to form another "shelf." This shelf will press in the opposite direction and cause the PC board to bend *slightly* so that the PC board acts as a spring and holds the transistor against the heat sink tab.

Slide the8-inch piece of PVC pipe over the PC board. Adjust the three small tabs on each end of the heat sink (shown as "A" on Figure 2) to make the heat sink snug inside the pipe. Remove the PVC pipe and set it aside.

Solder a 4-inch-long piece of wire to the antenna pad of the PC board. Wind the wire through the holes near the pad to relieve the strain on the solder pad. Use a small dab of silicone to secure the wire in the holes.

Solder two 4-inch pieces of wire (different colors) to the signal connector pads on the other end of the PC board. Wind them through the nearby holes to act as a strain relief for the solder pads. Use a small dab of silicone to secure the wires in the holes.

Slide a 1-inch-long piece of 1/2-inch PVC pipe over the signal leads. Check the fit over the ground screw and file a clearance area on the edge of the spacer, if needed. Now trim and connect the signal leads to the BNC connector in the PVC pipe cap. Use small dabs of silicone sealer on the BNC connections to seal them and to provide strain relief. *Remember, the tab won't bend without breaking!*

Slide the 8-inch PVC pipe over the PC board and down into the BNC connector pipe cap. Place the other one-inch-long piece of 1/2-inch PVC pipe over the antenna end of the PC board. Make sure that everything fits and that the antenna end

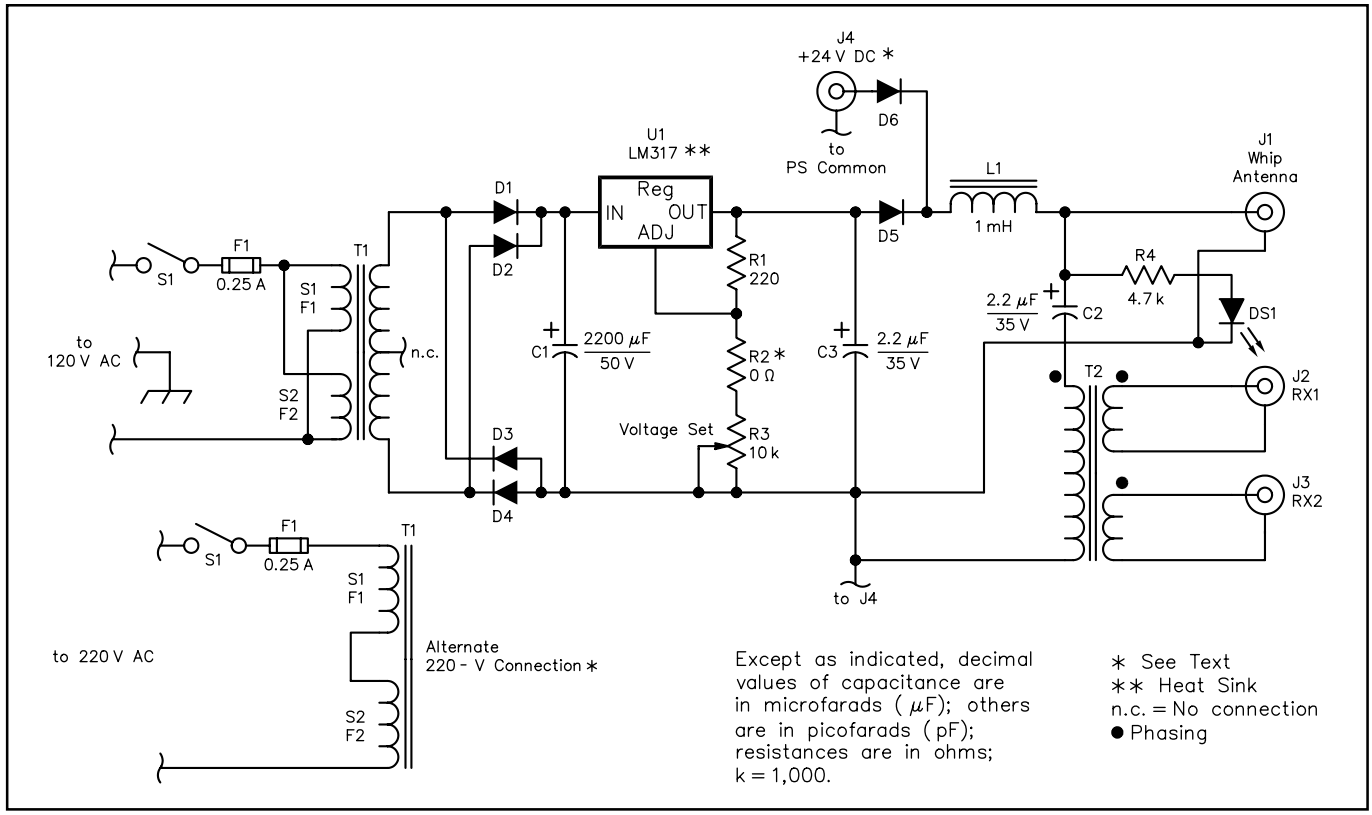


Figure 7—Power supply schematic for the AMRAD active antenna. Unless otherwise specified, resistors are 1/4-W, 5%-tolerance carbon-composition or metal-film units. Part numbers in parentheses are from RadioShack. Equivalent parts can be substituted.

C1—2200 µF, 50 V (278-1048).
C2, C3—2.2 µF, 35 V tantalum.
D1-D6—1N4003, 200 PIV, 1 A (276-1102).
DS1—LED (276-307).
F1—0.25 A AGC (270-1002).
J1-J3—BNC jack (278-105).
J4—Coaxial power jack (274-1563A).
L1—1 mH choke, 100 mA.
R1—220 Ω.
R2—Zero Ω resistor or jumper wire.
R3—10 kΩ multiturn potentiometer (271-343).
R4—4.7 kΩ (271-1330).
S1—SPST toggle (275-634B).
T1—24-V transformer, split-bobbin design. Signal Transformer DP 241-4-24.
T2—20 trifilar turns #30 AWG wire-wrapping wire (278-501) wound on an Amidon FT50-75 or FT50-J core.
U1—LM317 adjustable voltage regulator, TO-220 package (276-1778).
Misc: Heat sink, TO-220 (276-1363); hardware; enclosure.

pipe cap will fit in place properly.

The transistor bias needs to be adjusted, so set the active antenna assembly aside without cementing the pipe caps in place at this time.

Power Supply

Assemble the power supply board. The schematic is shown in Figure 7. The wideband transformer consists of 20 turns of trifilar wire on an FT-50-J or FT-50-75 Amidon ferrite core. Three pieces of #30 wire wrapping wire are twisted together to make a trifilar winding. Again, using different-color wires will make finding the individual windings much easier to identify.

Attach 2-inch leads to each of the antenna signal leads, RX1 and RX2, and the battery plus and minus. Attach an LED on 2-inch leads to the LED pads on the PC board. Once the power supply PCB is installed in the case, these leads can be soldered onto the connectors and the LED.

The RadioShack cases have molded card guides that interfere with the BNC connector mounting nuts. Remove these card guides with a sharp wood chisel and hammer. This flattens the inside surface. Prepare the case with the connectors positioned near the leads that connect to them. Place the fuse and power switch as far away from the rest of the circuitry to minimize coupling capacitance.

Assemble the printed circuit board into the power supply case and solder the wires to the connectors and the ac power. Note the polarity of the antenna connector, apply power and check the voltage on the antenna connector. Adjust the **VOLTAGE ADJUST** potentiometer until +24 V appears on the center pin realtive to the outer shell.

This completes the power supply assembly and checkout.

Initial Test and Checkout

Remove the PVC pipe from the active antenna to gain access to the bias potentiometer. Adjust the bias potentiometer, R5, so that the wiper is at ground potential.

Method 1: Temporarily connect the active antenna to the power supply while running the center conductor (a clip lead, etc) through a milliameter. Adjust the bias for a current of 53 mA.

Method 2: Connect the active antenna to the power supply using a BNC cable. Put a voltmeter across R3 on the printed circuit board. Adjust the bias potentiometer, R5, for a voltage of 5.3 V.

If you have the equipment necessary to measure second-order intermodulation values you can fine-tune R5 to obtain the best performance. On the four units we tested, the optimum current was only 2 mA above or below the design value of 53 mA.

This completes the setup of the active amplifier.

Connect the active amplifier to the power supply with a BNC cable. Let the amplifier warm up while checking the transistor case temperature. It should be only slightly warm to the touch, showing no more than a 10 degree F temperature increase over that of the heat sink. If needed, place a thin coating of heat sink grease on the top of the transistor to reduce the thermal resistance. Use only a slight amount of grease as it can become fluid and drip onto the PC board and components on a hot day.

The active antenna power supply enclosure with BNC jacks for the coaxial cables to the active antenna and receivers.

Use small dabs of silicone sealer at the four points where the heat sink tabs contact the PC board to secure the heat.

Install the PVC pipe onto the amplifier. Place the 1-inch-long piece of 1/2-inch PVC pipe over the wire from the printed circuit board. Slide a ferrite bead over the wire. Use a short piece of insulated sleeving to slide over the solder joint and solder to the wire from the top cap. Shape the wire into a springy coil so it will fit into the standoff tube. The top cap can now be slid over the PVC pipe. Use the mark on the pipe to make sure that the cap is fully seated and not pinching the antenna wire. Use caution when rotating the pipe caps during assembly or disassembly so the wire leads remain untwisted.

The assembly is now ready for outdoor testing with an attached whip. Connect a BNC coaxial jumper between the active antenna and the antenna connector on the power supply. Caution: Connect only the active antenna to the power supply connector. Receivers and other devices can draw excessive current and burn out L1 or damage the connected equipment. If, when connected, the choke burns out, the LED on the power supply will not light up. You may want to wrap a piece of colored tape near the end of the coax going to the active antenna to identify it as the correct cable. Connect a receiver to the RX1 or RX2 connector.

You should hear AM broadcast and HF signals. LF signals and noise should be heard when the receiver is tuned to the LF range. When you're satisfied that everything is working properly you can take down the antenna and seal the assembly.

Final Assembly

Once the caps are properly seated the amplifier can be sealed using silicone. Permatex *Silicone Windshield and Glass Seal* is thinner and will fill joints better than the more familiar silicone caulking. Seal around the top bolt, the top and bottom cap and the ground screw. After the goop hardens overnight the antenna amplifier is ready to install. To regain access to the printed circuit board, peel the silicone sealer from around the edge of the pipe caps and force them off the PVC pipe by hand.

Several different whips can be used on the active amplifier. Short automobile replacement whips made to attach over the stub of a broken auto antenna can be found in most auto parts stores. One-meter stainless steel whips are available from RadioShack (21-952A). The RadioShack whips have 1/4-20 studs, so a 1/4-20 threaded sleeve is needed to mate the whips to the bolt stud on the top of the active amplifier. We used a stainless steel 1/4-20 T-nut for this purpose.

Up-to-date details on construction, assembly and testing can be found at **www.amrad.org/lf/active**.

Siting and Installation

This small antenna can be mounted almost anywhere, but an electrically quiet site will produce the best results. Rooftop vent pipes work well because the PVC vent pipes and the PVC antenna housings camouflage one another. Thin whips also disappear at a distance.

Use the ground screw next to the antenna BNC connector to establish a quiet ground reference for the antenna. This ground usually works best if it's *not connected to any other ground*. Testing various ground rod locations while monitoring LF noise on the receiver can help you pinpoint the best location for minimizing received ac power-line noise. Because of the low capacitance of the antenna and the coupler, a 12-inch ground rod may be satisfactory. A sheet of chicken-wire screening can be laid beneath the antenna and connected to the antenna ground to stabilize the fields around the antenna to further reduce noise coupling. Chicken-wire screening in rooftop installations is generally hard to see from the ground.

One source of intermodulation of which the US Navy is especially aware is the "rusty bolt" effect. When a corroded joint exists between two pieces of metal, the joint can act as a nonlinear junction. In a strong RF field, the corroded junction creates intermodulation between the strong signals. On a ship (with its many transmitters) or in an area with several strong AM broadcast stations, the intermodulation is reradiated and receiving antennas, including this active antenna, can pick it up. This problem appears as LF carriers that have two sources of audio modulation. When these carriers are tuned in with an AM receiver, it sounds as though two stations are talking simultaneously. If this problem occurs, move the antenna or find and clean the offending joint.

A block of wood with wedges cut in it can be used between the antenna and a mast. Use a stainless steel hose clamp to secure the assembly. Avoid placing metal hose clamps or other metal objects near the upper half of the antenna as nearby metallic objects can add to the input capacitance and slightly degrade the antenna performance.

Keep the coax run to the shack insulated from any grounds as it wends its way to the power supply. With such low capacitance between the power line and the receiver grounds, it's important to minimize parasitic noise coupling in the antenna ground circuit by keeping the line away from other grounds and power lines.

Best LF performance is obtained if the antenna whip is higher than nearby conducting objects. Imagine pulling a giant plastic sheet over your house and yard. The whip should be above this imaginary sheet. A more accurate (and much more complex) way to think of it is to imagine a large metal sheet several hundred feet above your house and yard (play along). Now imagine that the sheet is charged with a high dc voltage. If you were to examine the electrostatic field around and above your house and yard, you would discover that those points below the plastic sheet are at a 0-V field potential.

LF signals have very long wavelengths: at 136 kHz, 1 wavelength is 7181 feet. At these wavelengths, the average suburban yard is less than 1/10 wavelength across, so an electrostatic field may be used to approximate LF waves. Thus, at LF, those areas with a zero electrostatic field will also have a zero, or near-zero LF field strength. The freely downloadable student version of the QuickField Finite Element Analysis program (**www.quickfield.com**) can be used to plot the electrostatic field around a simple house and yard model.[13] Or, as mentioned above, simply visualize the plastic sheet and make sure the antenna isn't mounted "underneath" the imaginary boundary…

Measuring Field Strength

This active antenna has reasonably re-

producible sensitivity when the PC boards and listed parts are used. This makes it possible for you to measure signal strength in volts-per-meter, which means that the overall efficiency of an LF antenna can be measured rather than estimated.

Using a receiver S-meter and a signal generator, the signal voltage from the antenna can be measured by substituting the signal generator for the antenna and adjusting the signal generator to get an identical S-meter reading. A selective voltmeter that can directly indicate the voltage at a received frequency is even better. Once the antenna output voltage is known, the field strength can be calculated by using the antenna factor, which is added to the antenna-voltage reading, to give the field strength in volts-per-meter. When using the antenna for measuring field strength, avoid using any metal clamps or other metal around the upper half of the antenna.

If you are using dBm to express voltage and dBµV/m (dBµV/m = dB above 1 microvolt per meter) to express field strength, the antenna factor is –16.5 dBµV/m. If you want volts-per-meter, multiply the measured voltage by 6.683 to convert to volts-per-meter. This antenna factor is accurate (for this antenna) between 20 kHz and 26 MHz (see Figure 1). Keep in mind that this isn't an individually hand-calibrated EMC antenna, so use the results with care. Above 10 MHz, measurements become questionable with any E-field antenna and become more subject to minor construction variations.

Variations on a Theme

A standard 108-inch CB whip with a $^3/_8$-24 stud can be mounted to the active amplifier using a RadioShack "$^3/_8$-24 to Lug Mount adapter" (21-950). This large whip needs a firmer attachment at the top cap. Use $^1/_4$-inch-diameter brass washers on each side of the pipe cap on the $^1/_4$-20 bolt. The bolt length may need to be reduced to match the thread length inside the $^3/_8$-20 adapter. Use plumbers PVC cleaner and PVC cement to firmly attach the cap to the pipe. If you later need to access the PC board you'll have to saw off the top and make another PVC housing.

If low-band VHF or TV Channels 2 or 3 are particularly strong in your area, you may need to add two or three ferrite beads on the wire between the amplifier and the whip. These added beads roll off the response starting at about 10 MHz rather than 30 MHz, providing greater attenuation at the low-VHF range. In place of using R1, another choke can be added to further reduce the higher-frequency response.

A sheet of chicken-wire screening can be laid beneath the antenna and connected to the antenna ground to stabilize the fields around the antenna to further reduce noise coupling. Chicken-wire screening in rooftop installations is generally hard to see from the ground.

If connector confusion could lead to connect 24 V where it shouldn't be, substitute an F, TNC or Mini-UHF connector for the antenna BNC connector.

The length of the PVC pipe can be made longer and the whip contained inside along with the PC board. It then can be mounted on a windowsill and disguised as a flagpole to hide its true purpose.

If you require less capacitive coupling to the power line, you may be interested in knowing that we tested a Tamura 3FL30-200 transformer and found a capacitance of only 14.7 pF between the two 120-V primary windings. If this model is used as an outboard isolation transformer, the combined capacitance between the power line and the dc supply is reduced to only 9.25 pF. This applies only if you are using the 120-V connection. We haven't yet seen the need for such a low capacitance, but it's comforting to know there is a solution if one is needed.

Acknowledgments

Many people helped with this project, and the AMRAD lunch crowd attendees who eat tacos and talk Amateur Radio at 12:30 each Saturday at Tippy's Taco House in Merrifield, Virginia, certainly contributed their share. Come by and see us and talk about LF while chowing down on a basket of tacos. Thanks go to Ralph Burhans, who set out a clear discussion of active antennas in his writing; Chuck Rippel, WA4HHG, who provided key comments and encouragement; Steve Ratzlaff, AA7U, who provided a number of useful suggestions on the design and conducted the antenna's intermodulation testing. And finally, Dallas Lankford must be recognized for providing key help on the design, especially the CP-666 transistor.

It is with sadness we note that Ralph Burhans passed away in May 2001. He had indicated his interest in our active antenna project until his death.

Notes

[1]Dick Goodman, WA3USG, "The Monster Loop," *QST*, Sep 2000, pp 38-40.

[2]Bill Farmer, W3CSW, "Attic Loop Antenna," *AMRAD Newsletter*, Nov-Dec 1999, pp 4-5; available at the AMRAD Web site LF page, **www.amrad.org/projects/lf**.

[3]Ken Cornell, W2IMB, "Varactor Tuned Remote Active Antenna," *The Low and Medium Frequency Radio Scrap Book*, 8th Edition, Ken Cornell, Point Pleasant Beach, NJ, 1992.

[4]Andr Kesteloot, N4ICK, "A Remotely-Tuned Active Antenna for LF," *AMRAD Newsletter*, Nov-Dec 1998, p 10.

[5]Ralph Burhans, "All About VLF Active Antennas," *Radio-Electronics*, March-June 1983, pp 63-68.

[6]Ralph Burhans, "Active Antenna Preamplifiers," *ham radio*, May 1986, pp 47-54.

[7]Frank Gentges, K0BRA, "Annapolis Report," *AMRAD Newsletter*, May-Jun 1999, pp 8-10.

[8]Private e-mail with Dr Dallas Lankford, Professor, College of Engineering and Science, Louisiana Tech University.

[9]Frank Gentges, K0BRA, "Modifying the RX-320 Receiver for LF/VLF Operation," AMRAD Web site LF page, **www.amrad.org/projects/lf**.

[10]"Receiver Performance Tests," *The 2001 ARRL Handbook for Radio Amateurs*, p 26.45.

[11]"Hybrid Combiners for Signal Generators," *The 2001 ARRL Handbook for Radio Amateurs*, p 26.40.

[12]FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269; tel 847-836-9148. Price: $8.50 per set plus $1.50 shipping for up to four boards.

[13]Frank Gentges, K0BRA, "How Low is LF?" *AMRAD Technical Symposium 2000*, pp 69-79.

Frank Gentges, K0BRA, was first licensed in 1956 as K0BRA. He upgraded to Extra Class in 1964 and was later licensed as W3FGL and AK4R, but chose to reclaim his old call sign when the FCC made that possible. He became an associate member of ARRL in 1953 and became a full member in 1956. He graduated as an Electrical Engineer from Kansas State University in 1965. After school he worked for Rixon Electronics, followed by the US Navy, where he retired in 1987. Frank is now president of Metavox, which develops new tactile technology for profoundly deaf infants. You can contact Frank at 9251 Wood Glade Dr, Great Falls, VA 22066; **fgentges@mindspring.com**.

By Steve Ford, WB8IMY

OSCAR 40 on Mode U/S—No Excuses!

If you're eager to experience satellite DXing, what's stopping you?

If you read the article by Ed Krome, K9EK, in the July *QST* ("Getting Started with AMSAT-OSCAR 40," page 42), you know that the OSCAR 40 satellite is now open for business. It's been a long time coming, but well worth the wait.

The history of this spacecraft reads like a soap opera. First we endured almost 10 years of planning, building and several disappointing setbacks. When OSCAR 40 finally soared into space last November, everything appeared to be working perfectly—until the big bird went ominously silent during an engine firing a few weeks later. As the late Jim Morrison of The Doors lamented, "This is the end, my only friend, the end."

Not quite.

The command team reestablished communication on Christmas Day 2000 and OSCAR 40 suddenly returned to the land of the living. The spacecraft had suffered serious damage, but almost all of its receivers were operational along with its powerful 2.4 GHz transmitter. As this article went to press, the OSCAR 40 team was still working on possible fixes for the remaining transmitters.

But for now, it looks like OSCAR 40 is going to be talking to us almost exclusively on 2.4 GHz and listening on either 435 or 1269 MHz. The most popular uplink/downlink combination so far is 435 MHz up and 2.4 GHz down, otherwise known as *Mode U/S*.

"I Don't Do Microwaves"

I don't know what it is about frequencies defined in "GHz" that makes some amateurs cringe. Yes, there was a time when working with microwave RF components was a considerable challenge. It still is if you are exploring the rarified upper reaches of the spectrum. But gear for the "lower end" of the microwave range is plentiful these days and easy to use. Despite this fact, I still hear objections such as:

- **It's too complicated.**

Oh, please! The 2.4 GHz receive equipment you need for OSCAR 40 is as close to plug-and-play as you're likely to get. My seven-year-old daughter has put together the receive side of my OSCAR 40 station. She compares it to playing with Lego blocks.

- **I don't have microwave test equipment.**

Neither do I. My "signal generator" is

My portable OSCAR 40 antenna system with the barbecue grill dish attached. The tripod was purchased at RadioShack and the PVC is courtesy of my local hardware outlet. I can set up my antennas in about 15 minutes.

This is yet another incarnation of my OSCAR 40 antennas, this time using the Down East Microwave helical antenna (the glaringly white plastic tube aimed at the heavens). I find that I achieve somewhat better performance from the dish, but the helical antenna does an adequate job—especially when I have the 2.4-GHz preamp in the line.

OSCAR 40's beacon. I point my antenna at the place in the sky where the satellite should be and *listen*.

● **I can't assemble and adjust a microwave antenna.**

Most of the antennas that hams are using with OSCAR 40 assemble with a screwdriver in about 15 minutes. No adjustments are required. In fact, some antennas come entirely preassembled.

● **It's too expensive.**

While UHF and microwave gear isn't free, it is a heck of a lot less expensive than your typical gee-whiz HF transceiver—especially if you shop smart. More about this in a moment.

Perhaps the best way to convince you is through my own experience. I've been on Mode U/S with OSCAR 40 for a couple of months now with a portable antenna system. With two antennas on my little tripod, I can sit on my backyard patio, cool beverage in hand, and talk to stations in other countries through a spacecraft that is more than 50,000 km distant. Believe me, Amateur Radio doesn't get much better than this.

First, We Must Listen...

You have a wide range of 2.4-GHz antenna choices. Ed Krome pointed out several vendors in his article, and you'll find them listed again in the "Resources" sidebar. My primary antenna is the so-called "barbecue grill" dish. It's lightweight and easy to manage with plenty of gain to boot. Another lightweight option is the helical design where the antenna element is wound like a bedspring. The helical model pictured in this article is from Down East Microwave (model DSH12-17) and it is encased in a PVC tube. Pick the antenna that is best for your particular situation—the one that gives you the most bang (gain) for the buck.

The Boost that Refreshes

With the antenna out of the way (wasn't that quick and painless?) we have to consider what to do with the energy it collects. The signals from OSCAR 40 have traveled a long way to reach you and they are exquisitely weak. Your antenna gathers as much as it can, but you need to give the signals a righteous kick in the pants before you can really make use of them. In addition, you need to convert these microwave signals to lower frequencies that you can hear on the kind of receiver you're likely to own (maybe an HF rig or 2-meter CW/SSB radio). That's the job of the *downconverter*.

Downconverters are available from a number of sources. I actually own two models: One is a consumer-grade unit originally made for the R. L. Drake Company for use with terrestrial microwave TV. I picked this little gem up for $25 and modified it for ham applications (see my article "Microwaves in Your Back Yard" in the February 1998 *QST*). Similar TV downconverters are still available, though they are not always easy to find. Check out the Web site of Mark Fossum, N0NSV, at **www.markfossum.com/** and click on his "Mode S" link. Mark sells several models that you can modify for OSCAR 40 reception at bargain prices.

If you prefer the no-modification option, there are ready-to-go downconverters that you can buy right off the shelf. My plug-and-play model is the Down East Microwave 2400-144 RX. Another excellent product to consider is the UEK-3000 from SSB Electronic. These units convert the 2.4-GHz signals to 2 meters and they typically sell in the $200-$300 range. They are well engineered and come with comprehensive warranties.

Depending on the type of antenna you choose, you may find that the gain of the downconverter is not quite sufficient to render useable signals at your receiver. If this is the case, you may need to give the microwave energy a shot in the arm *before* it reaches the downconverter. I use a Down East 2.4 GHz preamplifier that gives the wispy signal a tremendous kick. Because the signal is still at 2.4 GHz, I need to get it to the downconverter right away, and over the shortest distance possible (common coaxial cable is like a sieve at microwave frequencies). To achieve this, I connect my preamplifier directly to my downconverter at the antenna. I power both units with dc sent through the coaxial cable, but you could also run a separate power cable.

Putting together a 2.4-GHz receive system is child's play—literally. My daughter attaches a preamp to a modified Drake downconverter in preparation for another OSCAR 40 session.

Getting the Signal to your Receiver

My "microwave" radio is an ICOM IC-706 Mk II transceiver. Like a number of newer HF rigs, the '706 offers 2-meter all-mode receive capability. This is ideal for use with the 2.4-GHz downconverter. I just tune to the converted microwave signal at 144 MHz and I'm ready to go.

Other options abound. You could put another downconverter in the line and convert the 2-meter signal to 10 meters. Down East offers a converter (the model 144-28) that performs this task nicely. With the signal now on 28 MHz, you can listen with just about *any* radio that is capable of receiving CW and SSB on 10 meters. One fellow I know uses a 30-year-old RadioShack shortwave radio to listen to OSCAR 40 in this fashion.

Also consider the VHF/UHF multiband all-mode transceivers. The modern-day models will set you back as much as $1600 new. If you have that kind of cash lying around, go for it! They are superb radios. On the other hand, you can find perfectly adequate models on the used market below $1000. The advantage of the multiband all-mode radio is that it offers several features that make satellite operating much easier—including the transmitter to generate your 435 MHz uplink.

After going to the trouble of receiving and converting the OSCAR 40 signal, don't make the mistake of squandering precious RF energy in lousy coaxial cable. Yes, the

Resources

AMSAT-NA
850 Sligo Ave, Suite 600
Silver Spring, MD 20910-4703
301-589-6062
www.amsat.org
Tracking software: **www.amsat.org/amsat/catalog/software.html**

AMSAT-DL (Germany)
Lots of AO-40 information. English is available for many sections.
www.amsat-dl.org

Down East Microwave Inc
954 Rt 519
Frenchtown, NJ 08825
908-996-3584
www.downeastmicrowave.com

SSB Electronic USA
124 Cherrywood Dr
Mountaintop, PA 18707
570-868-5643
www.ssbusa.com

Hamtronics
65 Moul Rd
Hilton, NY 14468-9535
716-392-9430
www.hamtronics.com

PC Electronics
2522-Q Paxson Ln
Arcadia, CA 91007
626-447-4565
www.hamtv.com

signal may be at 2 meters or even 10 meters, but every dB counts. Install low-loss coax between your downconverter and receiver. It is money well spent.

Finally, beware of frying your 2.4-GHz downconverter. If you're using a transceiver as your microwave receiver (like I do), it is remarkably easy to grab the wrong microphone and key substantial RF power directly into your sensitive downconverter. How do you avoid disaster? My technique is basic diligence. I make sure my IC-706 transceiver is powered up (and not accidentally transmitting!) before I attach the coax to the downconverter. I also disconnect the '706's microphone before operating. Perhaps some clever amateur will come up with a circuit to sense RF from the transceiver and automatically protect the downconverter. The proper design could even be written up as an article for a magazine…such as *QST!*

Tune for the Buzzsaw

I suggest you start your first OSCAR 40 listening session by searching for the *Middle Beacon*.

The quest for the Middle Beacon has nothing to do with spiritual enlightenment and everything to do with testing your receive system. OSCAR 40 has two S-band downlink transponders known as S1 and S2. The S2 transponder is carrying all of the activity at the moment. So, you want to hunt for the Middle Beacon of the S2 transponder. All the active frequencies are shown in Table 1, but if you can't divert your eyes from this riveting text, I'll tell you that the S2 Middle Beacon frequency is 2401.350 MHz. You'll know the signal when you find it. This beacon carries telemetry and its 400-baud PSK data stream makes an unmistakable buzzsaw sound.

Use satellite tracking software (see the list at **www.amsat.org**), or get pass predictions for OSCAR 40 from the Web at **www.heavens-above.com**. With the information the software provides, make your best guess at where and when the satellite will appear in your local sky. Aim your 2.4 GHz antenna in that direction and start tuning through the frequency range with your receiver. With luck you'll spot the beacon right away. Adjust your antenna aiming for the loudest beacon signal strength and you're done.

Unless you are monitoring the satellite as it passes near the Earth, the signal frequency should only drift slightly due to Doppler shifting. This is because the position of the satellite relative to your position is changing quite slowly. In fact, you may discover that you only need to re-adjust your antenna aiming about once every 30 minutes or so. This means that you can do away with the cost of an azimuth/elevation antenna rotator unless you absolutely *must* have the convenience of adjusting the antenna position from the comfort of your shack.

Table 1
Transponder Frequency Band Plan for AMSAT-OSCAR 40

Uplink Frequencies

Band	*Digital*	*Analog (SSB, CW)*
70 cm	435.300 - 435.550 MHz	435.550 - 435.800 MHz
23 cm (L1)	1269.000 - 1269.250 MHz	1269.250 - 1269.500 MHz
23 cm (L2)	1268.075 - 1268.325 MHz	1268.325 - 1268.575 MHz
13 cm (S1)	2400.100 - 2400.350 MHz	2400.350 - 2400.600 MHz
13 cm (S2)	2446.200 - 2446.450 MHz	2446.450 - 2446.700 MHz
6 cm	5668.300 - 5668.550 MHz	5668.550 - 5668.800 MHz

Downlink Frequencies

Band	*Digital*	*Analog (SSB, CW)*
13 cm (S1)	2400.650 - 2400.950 MHz	2400.225 - 2400.475 MHz
13 cm (S2)	2401.650 - 2401.950 MHz	2401.225 - 2401.475 MHz
1.5 cm	24048.450 - 24048.750 MHz	24048.025 - 24048.275 MHz

Telemetry Beacons

Band	*General Beacon (GB)*	*Middle Beacon (MB)*	*Engineering Beacon (EB)*
13 cm (S1)	2400.200 MHz	2400.350 MHz	2400.600 MHz
13 cm (S2)	2401.200 MHz	2401.350 MHz	2401.600 MHz
1.5 cm	24048.000 MHz	24048.150 MHz	24048.400 MHz

The "shack end" of my OSCAR 40 station. At the left is the IC-451 all-mode 70-cm transceiver. My IC-706 transceiver (right) serves as the microwave receiver. I can operate from this desk or, when the spirit moves me, I can drag everything out to the patio for a little "satellite *al fresco*."

By the way, if you are curious about the information contained in the beacon signal, it won't cost you a penny to eavesdrop if you already have a sound-card-equipped computer. Get on the Web and go to **www.qsl.net/ae4jy/** and download the latest version of *AO40RCV*. This clever piece of software designed by Moe Wheatly, AE4JY, uses your sound card as a modem to convert the receive audio from the beacon to information on your computer monitor. Just watch the numbers and you'll instantly know the "health" and status of the satellite.

Time to Transmit

Monitoring OSCAR 40 is fun, but it only takes you so far. In my case, I grew weary of listening to everyone else enjoying themselves after the first week. Unfortunately, I owned no 435-MHz transmitting gear whatsoever. Zip. Nada. Not even a decent antenna. What to do?

Using Ed Krome's article as my guide, I figured that I needed to generate about 50 to 100 W to an 11-element Yagi antenna. I also needed to be able to transmit and receive *simultaneously* so that I could hear my own signal coming back from the satellite. This would allow me to compensate for Doppler shifting, and to make sure I was uplinking on the correct frequency. OSCAR 40 uses *inverting* transponders, which means that if you want your signal to appear in the upper portion of the downlink passband, for example, you must transmit in the *lower* portion of the uplink passband. In addition, if you want to be on upper sideband (USB) on the downlink, you need to transmit in lower sideband (LSB) on the uplink.

If I could have shelled out the cash for one of those nifty multiband, multimode transceivers, I would have been all set. They operate in full duplex and many automatically link the uplink and downlink VFOs so that they track one another in backward fashion, which effectively removes the inverting transponder confusion factor. Of course, the multimode aspect is important because you must use CW or SSB with OSCAR 40—FM is *verboten* on this bird.

Alas, my wife peeked at the budget figures and started imitating Commander

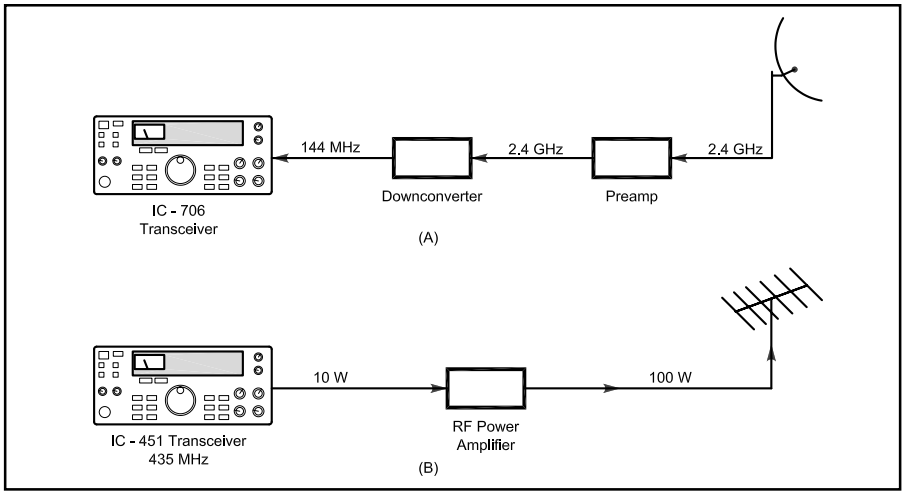
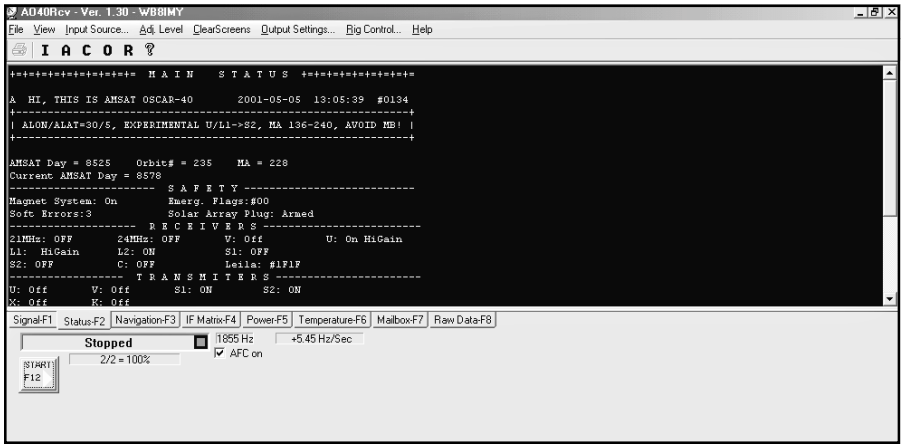


Figure 1—My OSCAR 40 station is as basic as it gets. Assembling the uplink station (B) depleted my bank account by $470. My downlink gear (A) rang in at $240 (not counting the IC-706 that I owned already), making the total cost of my OSCAR-40 station about $710.



This is *AO40RCV* as it decodes and displays the information in OSCAR 40's telemetry beacon. All you need to run the software is a PC with a sound card. You can download *AO40RCV* on the Web at www.qsl.net/ae4jy/.

Scott from *Star Trek* in one of his standard vein-popping moments. ("I dinna think she can take the strain, captain!")

Sufficiently chastised, I began prowling the flea markets, both real and virtual. On eBay (www.ebay.com) I discovered an ICOM IC-451 all-mode 70-cm transceiver on the auction block. It was a 20-year-old radio, but the seller claimed it was in mint condition. I jumped into the bidding war and finally emerged victorious at $250. The IC-451 was indeed in pristine condition, but it only pumped out about 10 W of RF.

I visited *Radios On Line* on *ARRLWeb* (www.arrl.org/RadiosOnline/) and ran into a fellow who was selling a vintage Mirage 100-W UHF RF power amp for only $120. I snapped it up in a heartbeat.

Being proud of my thrifty ways, I decided to splurge and buy the Yagi antenna brand new. I settled on an M^2 11-element beam that I picked up for just under $100. Not counting the coaxial cable, my uplink station depleted my bank account by $470. My downlink gear rang in at $240 (not counting the IC-706 that I owned already), making the total cost of my OSCAR-40 station about $710 (see Figure 1). If you're willing to do a bit of homebrewing, I bet you could shave at least $200 off that price tag, if not more.

Busted by LEILA

Is 100 W to a small Yagi antenna enough to reach a satellite that's more than 50,000 km away? If the satellite is OSCAR 40, the answer is "yes." I've been astonished at the strength of my signal on the downlink. The first time I heard my own voice coming back to me through the satellite, my hair stood on end. I still find it hard to believe that my meager antennas, bolted to a PVC **T** on a tripod in my back yard, can communicate with a spacecraft at that distance.

Once my blood pressure returned to normal after that first transmission, I realized that my signal was a bit too strong (it was nearly as loud as the Middle Beacon). I was pondering this fact and making some test transmissions when I heard what sounded like a police siren on the downlink. *LEILA* had found me!

LEILA is a German acronym for LEIstungs Limit Anzeige. Translated, it means "power (or 'performance') limit indicator." LEILA is a program in OSCAR 40's primary computer that monitors the strength of each signal sent to the satellite. Signals that are too strong can "swamp" the transponder, effectively drowning out most of the weaker transmissions. When LEILA finds an obnoxiously strong signal, it sends a siren-style warning on the corresponding downlink frequency (the one you're supposed to be listening to if you are operating full duplex). If you ignore the warning and fail to crank down your power, LEILA will notch you out! Think of it in terms of your kindergarten days when the teacher said, "If you can't play nicely, you can't play at all."

When I heard LEILA's siren call, I knew I was running way too much power. I reduced my output from 100 W to about 60 W and LEILA was happy. She (it?) resumed scanning for other offenders and didn't even write me a ticket.

Embrace the Challenge

Now I don't want to be accused of over-hyping the ease of satellite operation, even through a bird as magnificent as OSCAR 40. Let's be frank—if you are new to amateur satellites, you have an educational hill to climb. You need to become familiar with our diverse satellite "fleet," and with the fundamentals of orbital mechanics, Doppler frequency shifting, transponders and more. You're about to explore a new world, so expect a certain amount of confusion and, dare I say it, frustration.

If you're looking for an effortless, undemanding Amateur Radio experience, you've come to the wrong place. But if you're willing to step up to the challenge and begin thinking in new ways, the rewards of amateur satellite operating are considerable. I'm talking about more than bagging your satellite DXCC through OSCAR 40 (although I'm wondering who will be the first). Centuries from now, when students read of the beginnings of space travel and of mankind's migration from the Home World, the story of a ragtag band of "primitive" amateur space communicators may be lurking somewhere in the fine print. To know that I might be a minuscule participant in that history is reward enough for me. QST

By Dave Bell, W6AQ/9M6AQT/9M6V

The Ultimate DX Holiday

What happens when a couple of phone guys decide to enter the ARRL DX CW Contest from an exotic location? Pretty much what you'd expect. But as these two CW greenhorns discovered, the sweet salve of a tropical paradise—and not the ionosphere—is the great equalizer!

My friend Don, K6IPV, called me a few months ago and suggested that I join him for a DXpedition to the Hillview Gardens Resort in Keningau, Sabah, East Malaysia, to celebrate a significant birthday. Because Don is an eligible bachelor, I won't divulge his age, but let's just say he's not exactly a spring chicken. More of a fall chicken, actually.

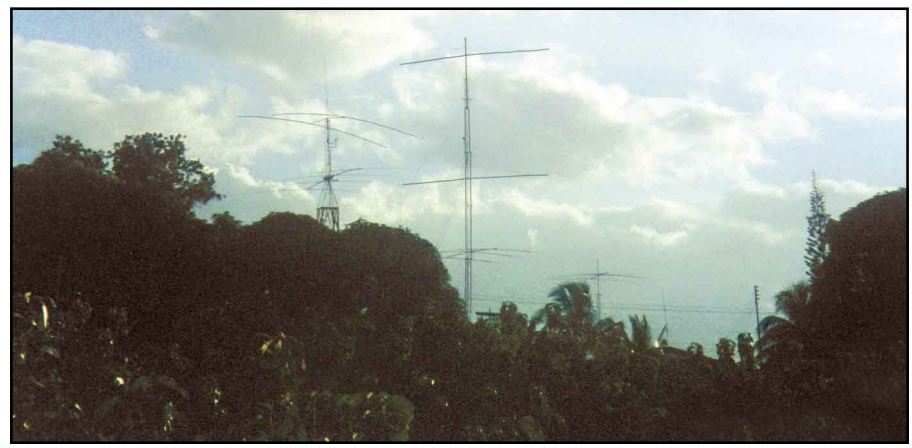
And because 2001 is my 50th anniversary as a ham, I was thinking about a couple of DXpeditions anyway—to places that have a bunch of antennas already in place and fully equipped hamshacks perched on plateaus with omni-directional views, pools, all meals and exotic, tropical climates!

The dates Don suggested for our vacation had us returning from Malaysia *one day before* the ARRL DX CW Contest was to begin. Whatever virtues Don may claim, being a contester clearly isn't among them. Having embraced contesting fairly late in my ham career, I was ready to evangelize.

First, I talked him into shifting his holiday—which he'd been planning for a year—forward a week so the DX Contest would fall in the middle of our visit. He said if I would promise to join him there, he'd change his plans.

But before heading halfway around the world (nearly), there were a few things I had to do. First was the question of my

Don, K6IPV, left, and Dave, W6AQ, with the banner that greeted them at Hillview and informed them that they had received their special call sign for the ARRL DX CW contest. The 40- and 20-meter beams loom in the background.



The Hillview Gardens antenna farm. From left to right: a two-element 40 over a four-element 20; stacked six-element, 6-meter beams over a tribander fixed on the States. In the background is a C-3 tribander at 50 feet.

Hillview Gardens is located in the city of Keningau, Sabah, in eastern Malaysia.

"DXpedition station." Although Hillview Gardens boasts several complete ham stations, that wouldn't be the case at the other places I dreamed of visiting, so my theory was to assemble my own "DXpedition package," take it to Hillview (where there's plenty of support) and see if everything worked.

After a lot of tire kicking, my DXpedition radio of choice turned out to be the FT-1000MP Mark V, which is also my new home station transceiver. It's not exactly compact and lightweight, but in my view, at least, it has a superior combination of features for a DXpedition radio.

As it turned out, Don and I did not travel together. He went first, to visit a ham friend in Perth, Australia, and I followed a week or so later to join him at Hillview. After Malaysia, he was heading home and I was going on to Tokyo, where I was to meet my wife and spend a week with an old college friend (and *QST* author), W8JJO, who was teaching English as a second language in Japan.

My deal with Don was that I'd bring the padded suitcase (carrying the Mark V) and all of the goodies that make a complete station (minus antennas), and he'd bring them home. He whined a bit, but when I explained that taking a Yaesu transceiver *to* Japan was a bit like taking coal to Newcastle, he saw the wisdom of my argument. My theory was that US Customs wouldn't raise an eyebrow over a Japanese radio coming in from Malaysia, but coming in from Japan?

Don did extract a promise from me in return for packing my DXpedition radio home: If we didn't kill each other on this trip he would pick out some exotic DX spot later and I'd join him (with the radio, of course). I agreed to that caveat if he'd take care of all the licensing paperwork and logistics for Malaysia and anywhere else we might go. Deal!

The big antennas don't look so big, or even very high, on this fat tower at 9M6AAC. Looks can be deceiving.

Four-wheeling over the mountains the next day, with Phil behind the wheel of his Range Rover, was heart stopping, to say the least.

It's only fair. Don is more or less retired and I am more or less working. So he had time for the paperwork, or so it says here in small print.

But then Don brought up a possible problem. The ARRL DX CW contest was a contest where everybody only sent Morse code, wasn't it? And he wasn't a CW operator. I told him that wasn't a problem because *I* wasn't a CW operator, either. Two negatives make a positive, right? Why hadn't he thought of that? Besides, if we sent slow code, the stations we were calling would send slowly, too, right? One guess. More on that later…

So, I gathered up the gear and Don gathered up the paperwork and it came time for me to figure out how I was going to get from Los Angeles, to Kuala Lumpur (I didn't even know that the fabled city was in Malaysia), to Kota Kinabalu, to Keningau, to Hillview Gardens, to Tokyo and, finally, back to LA—without breaking the bank or my back.

Malaysia Bound

Because I was going to Malaysia, I decided to try Malaysia Airlines. Makes sense, right? I had a great flight. The flight attendants even put doilies under the drink glasses, and that was in coach! The airline delivered me fat and happy to Kota Kinabalu, where I was picked up by Phil Weaver, 9M6CT, who was filling in for my hosts, Alfons and Doris, because Phil was heading over the mountain the next day to celebrate *his* birthday along with Don's birthday. Because my birthday was only a month back, I got to be a birthday boy, too. Besides, Phil and I had met on the air and in person at the Visalia DX Convention some 20 years earlier. We were looking forward to seeing each other again.

Phil waltzed me and the Mark V—stuffed in its huge, puffy suitcase—right past customs without so much as a farethee-well. After a stop at my overnight hotel to drop the bags it was off to Phil's apartment for a couple of drinks and to check into Seanet using my new 9M6AQT call sign for the first time. Tomorrow we would be off to Hillview.

Four-wheeling over the mountains the next day, with Phil behind the wheel of

Dave, W6AQ/9M6AQT, operating 9M6V during the ARRL DX CW contest.

Lunch at the "CQ Bar" includes (left to right) Don, K6IPV/9M6IPT, Phil, 9M6CT, the author and their host, Alfons, 9M6AU.

Alfons (left) explains the Hillview tradition that starts with squares of wet cement.

Don, K6IPV/9M6IPT, Doris, Alfons and Phil, 9M6CT, celebrate Don and Phil's birthdays at one of Hillview Gardens' many parties. There is so much partying, it is difficult to find time to get on the air.

his Range Rover, was heart stopping, to say the least. Not because of the views, which were green and spectacular, but because of the race we were in. I didn't realize that a green flag had dropped as we left KK (local slang for Kota Kinabalu). Phil was out to take the checkered flag, and if that meant facing down oncoming traffic until the final second before swerving out of the way of sure disaster, so be it.

As we arrived at Hillview Gardens Resort the cloud of dust that had been trailing us from KK finally caught our speeding vehicle. We slid to a stop right in front of a big banner that read, "Welcome Don and Dave, 9M6V." Doris and Alfons had come through with a special call sign for the contest! I found my pal Don at the CQ Bar. He informed me that he was scheduled to get a massage after dinner, proving to me that this DXpedition wasn't going to be quite like Clipperton or Bouvet.

And then I was greeted by Alfons and Doris, 9M6MU and 9W6DU, respectively, the creators of Hillview Gardens. I say "creators" advisedly. After spending eight days there, it was clear to me that Alfons' dream of making this place out on the edge of nowhere into a number one ham radio location had been achieved in no small part because of Doris' hustle. He philosophizes and she makes it happen. He's Malaysian and she's Chinese by way of Singapore. They couldn't be more different—and they're perfect together.

Trouble in Paradise

Don and I began preparing for the contest, which was now three days away. The Mark V replaced Alfons' FT-990 at the main operating position; my Toshiba laptop with *CT* and *DX4WIN* replaced the station's desktop computer; the Bencher paddle found a handy spot, as did the Logikey keyer. All of this stuff was new to me and *very* new to Don. Our trip was a shakedown cruise and a learning experience all in one—and during a major contest to boot.

Checking out the antennas, we found that the Force 12 beam worked well, the Cushcraft two-element, 40-meter beam had a good SWR near 7.050, and the 80 and 160 dipoles were flat and remarkably quiet. But the big four-element, 20-meter beam wouldn't rotate, which would have been okay had it been stuck pointing northeast, toward North America. Presently it was pointed 90 degrees south of that. Yuk!

Our trip was a shakedown cruise and a learning experience all in one—and during a major contest to boot.

Dave, W6AQ/9M6AQT, at the top of the "big" tower getting the four element, 20-meter beam pointed Stateside.

Alfons told us that something was wrong with the ring rotator and he was waiting for his "antenna guy," Jani, YB0US, to show up and fix it. Because Don and I had hosted Jani to a dinner in Hollywood only a week or so earlier, we knew that he would not pop in prior to the contest. So who's going up the big tower?

As I've often said in my speeches to ham clubs, "I knew I was getting old when the kid I hired to climb my tower got too old to climb my tower."

Don and I stared each other down and he flinched first. When Don picked up Jani's safety belt, however, the situation was like cutting a piece of coax after *estimating* the required length. When placed around Don's waist there was a 4-inch gap between the end of the belt and the buckle. At hip level the gap was still 3 inches!

Only hours earlier I had insisted that the big 20-meter beam was essential if we were going to make a dent on that band. I was, as they say, hoisted on my own petard. So, after lecturing Don about spending some time at the Pasadena Athletic Club, I put on the belt and very carefully worked my way up the tower.

At what seemed like the 200-foot level I discovered the problem. The feed line loop had gotten hung up on a tower brace, causing the ring rotor to bind and shift slightly out of alignment. The gears weren't meshing. I wondered whether I should loosen all of the bolts holding the ring to the tower and realign it, or merely free up the bind and get the beam pointed

The finished cement "art," proving that Don at least had learned a couple of words of Malaysian.

toward the States? You guessed it. I fixed the small problem and left the major work for Jani.

For the non-contesters who have made it this far, the ARRL DX CW (and Phone) contests have the rest of the world trying to contact stations in North America. During the contest we faced several incontrovertible realities. First, conditions weren't great for much of the contest, at least in our part of the world, and second, Japan was between us and the United States. Even so, we two reluctant CW operators worked more than 550 stations (my goal was a thousand, which is why I have to go back and try again) to the tune of about a quarter-million points. We only managed to get three "runs" going in the entire contest—and we sent a lot of CQs on what seemed like clear frequencies. Apparently, most NA stations don't point toward the Pacific until Europe dies.

Life in the Fast Lane

Incidentally, we were zealous about always sending the call sign of the stations we contacted at least once *after* we made contact, and often, if there was any doubt about it, twice or even three times. So, if we didn't get your call sign right, don't blame us. You didn't correct us, as so many diligent operators did. (For the record, I joined FISTS a few years ago in the hope that membership would improve my Morse code aptitude. It didn't. FISTS' motto is something like "accuracy over speed." Amen.)

Speaking of speed, as I was merrily searching and pouncing, I came across a multi-op station with a showboat at the paddle. He was streaming along at about 45 WPM. Stations would call him and he'd come back in a blaze of dits, dahs and submicroscopic spaces. The callers usually sent question marks. The showboat would resend his report *at the same speed*, which often prompted the callers to send more question marks—and those who didn't were probably guessing. Was that TX he sent? Or was it GA? After taking a minute to complete a 20-second QSO, good old "I'd rather die than QRS" blazed off another QRZ.

I listened to his call 10 times before I finally had it right. So, with an educational bent, I cranked *CT* to 60 WPM and gave him a call. At that speed 9M6V sounds like an Uzi in a drive-by. After a pause, *he* sent a question mark. After several exchanges, ratcheting the speed down each go-around, we finally settled at 45 WPM. I immediately gave him his report at a leisurely 20 WPM. He sent "R" and QRZ with his call sign at 45 WPM. Once a showboat, always a showboat!

If you get the idea that Don and I don't take contesting too seriously, you're right. We're in it for the fun. And fun it was. I think that contesting is one aspect of ham radio that's going to lure some kids away from their computers, so when friends of mine complain about contests screwing up the bands, I tell them to stop whining and try 12, 17 or 30 meters. It's quiet as a cemetery on those bands.

With the contest behind us, we settled into the delightful, euphoric life at Hillview Gardens. Eat, drink, make phone contacts, tour, swim, enjoy the balmy weather—you get the idea. This out-of-the-way paradise that Alfons and Doris have created may just *be* ham radio's elusive Shangri-La. It's not Club Med, nor is it The Ritz Carlton. But it sure is comfortable and friendly.

During my morning jogs, passing cars would toot their horns and the drivers would wave. Friendly. Or maybe they were just astonished at seeing this big, crazy Anglo jogging up a hill in the hot sun. You know what they say about mad dogs and Englishmen...

My friend Don says the trip reinvigorated him and renewed his interest in ham radio. It certainly did the same for me. I made a resolution that when I got home I was going to totally renovate my ham shack. And Don is rereading OH2BH's book, *Where Do We Go Next*?

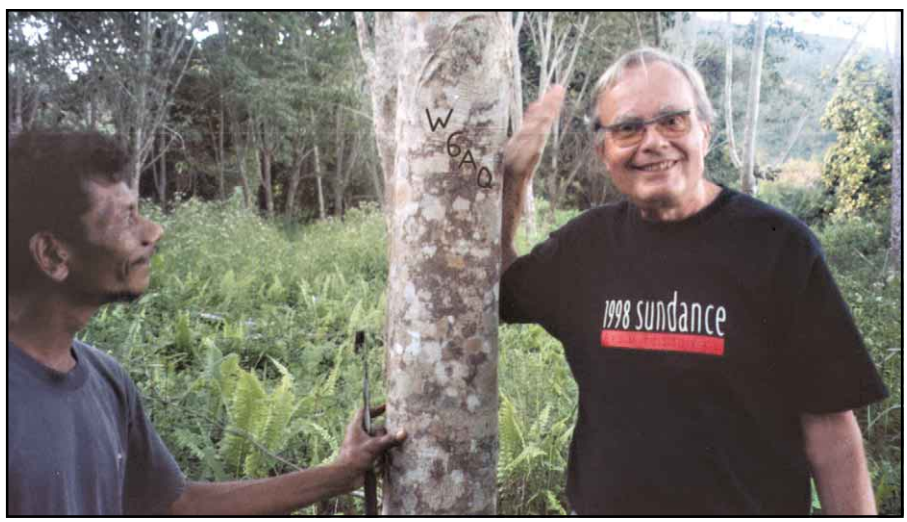
Wherever that is, I'm sure we'll return to Hillview.

Thanks

In my whirlwind efforts to prepare for this trip, I owe special thanks to my other Don friend, W6EEN, who tutored me on *CT*, built my CW interface and configured my computer. And I only worked him once during the contest. Don, I looked for you, I really did! Thanks also go to Norm, W6ORD, for being the QSL manager for 9M6V, 9M6AQT and 9M6IPT. Special thanks go to Bob, N2OO/9M6OO, who is the godfather of the Hillview Gardens Amateur Radio Club, of which Don and I are now badge-wearing members.

And for those of you to whom we gave a multiplier or two, you're welcome. You didn't enjoy it half as much as we did!

You can contact the author at 5700 Hill Oak Dr, Hollywood, CA 90068; **dbellw6aq@aol.com**.



W6AQ/9M6AQT beside the rubber tree he adopted. If you look closely, you might notice his call sign scratched in the bark by the little rubber plantation's single employee.

By Greg Fields, K0OB

Priceless Communication from the Serengeti

For some of us, ham radio is mostly a hobby. For volunteers far from home, however, Amateur Radio can provide a critical lifeline to the outside world—sometimes for years at a time!

In 1992, my friends Jim and Joann Arneberg were preparing to leave for Tanzania, East Africa, to become missionaries—while expecting their first child. Getting ready for this major transition was keeping the Arnebergs very busy. Amateur Radio wasn't part of their plans, but after I showed Jim my ICOM IC-745 transceiver, he started wondering whether he could take a radio overseas so we could communicate on a regular basis. Having just returned to the hobby, I hadn't even considered suggesting it to him.

Jim left the house excited about the possibility! There was so much that would have to happen before we could hear Jim's voice on the radio from Africa that the whole mess seemed impossible. I was also excited about the prospects, but I wondered how Jim could ever get a working station on the air from Tanzania by himself.

That said, if anyone could do it, Jim was the guy. He has an incredible ability to get himself out of jams and to get things done at the last minute (a skill that would prove priceless in Tanzania). In four short months Jim got his license—Extra class, no less. He had proven that he was more than serious! The couple's belongings were leaving via boat in just a couple of months, so time was running out to raise funds for the radio equipment. Knowing this, I gave Jim my rig (which was also a good excuse for me to buy a new, even bigger one!).

Africa Bound

Jim and Joann left for Africa in August of 1993 with two other families. After training in Nairobi, Kenya, they arrived in Mugumu, Tanzania, a small village on the edge of the Serengeti. The radio had arrived after surviving a long boat trip, potential thieves and a bumpy trip via truck. I got the good news from Jim in a letter, which also had a bit of bad news. A tribander and a tower we thought would be available was nowhere to be found. After some studying and consulting with local DXers, I sent Jim a two-element, five-band quad. Air freight shipping cost more than the antenna did. Jim's ingenuity would have to solve the tower problem.

While I waited for Jim's on-air debut I busied myself with my own antenna chores. I erected a roof-mounted tribander at 33 feet and bought a 500-W amplifier. Jim wouldn't have an amplifier, so the great unanswered question was whether a small station in Minnesota could communicate reliably with 100-W signal from the edge of the Serengeti.

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Jim reported that Mugumu had only one telephone—and it was unreliable at best. The nearest reliable telephone was more than three hours away, so our ability to communicate via Amateur Radio seemed more important than ever. Additionally, power would come from a rebuilt 5-kW generator and a few batteries. The two were quite cut off from the comforts of Western life.

While enduring the long wait for his 5H license, Jim figured out a way to get the quad up 35 feet on a pipe. It took a group of local villagers and two attempts, but the antenna did go up! In August of 1994, Jim's mother-in-law reported that Jim had called her from Dar es Salaam, Tanzania,

where he had just picked up his ticket. He was now 5H3JA!

By previous arrangement we were scheduled to meet on 20 meters the next Sunday. I wasn't much of a DXer yet, so using the propagation charts I had calculated the best time and frequency to meet and had sent Jim this information in a letter. Neil, N0TRB, and I listened for Jim that afternoon. After an hour we gave up. I felt crushed. We had worked so hard for this moment and we didn't hear even a peep. Maybe our low antennas meant we couldn't talk reliably? How could I tell all the relatives—who were counting on the radio link for peace of mind—that it didn't work?

After dinner a local ham called us on the telephone. He was talking to Jim on 20 meters! I rushed to the shack and turned on the rig. To my amazement I could hear Jim loud and clear! We talked excitedly with each other for more than an hour. This began seven years' worth of memorable and reliable QSOs.

Jim, 5H3JA, and Joann, 5H9MG, Arneberg in Mugumu, Tanzania. Note the 5-band quad antenna in the background.

A Sudden Arrival

In these seven years, the radio played an important role. There were numerous times the radio gave Jim and Joann comfort, but one incident stands out from the rest. In 1994, Jim and Joann were waiting for the arrival of their second child. They planned to leave Mugumu three weeks before Joann's due date to travel to a medical facility with a resident American doctor. As Jim was packing the Land Cruiser for an early morning departure, Joann came outside to announce that the baby had just changed their plans. Joann's water had broken and there was no time to make the five-hour trip to the doctor! Mugumu had a local hospital, but it wasn't something we in the West would recognize as such.

Being good under pressure, Jim quickly packed clean sheets, rubber gloves, water, etc, and rushed Joann to the local hospital. The local doctor gave Joann a cursory examination and, before leaving for home, said she had hours to go. Again, the baby had different plans and started the trip to the outside world! Fortunately, the birth went perfectly and a local midwife delivered a healthy baby boy. The midwife then told Jim and Joann they shouldn't stay long at the hospital (for the baby's sake).

At daylight, Jim and Joann went back to the house. Because the nearest reliable telephone was hours away, Jim got on the radio and was able to get through to the American doctor, who braved the semi-passable roads in a Land Rover to see Joann and the baby. Jim then contacted someone in Florida on 20 meters who called me on the telephone with the big news. We set up a schedule the next day.

That day I arranged for both sets of grandparents to be in the shacks of other hams at two locations to listen to the story straight from Jim and Joann. During our conversation, the baby could be heard crying in the background! That day Jim and I knew that the radio gear was priceless.

Ham Radio Confirms "All is Well"

The couple's story is a courageous and fascinating one. The two left Mugumu for good in April of 2001 after living there seven years. I had a number of people over to the house so they could hear Jim and Joann and know all was well. I'm certain many of these family members will never forget the role Amateur Radio played in their lives. The many thanks—and the tears—said it all.

Although Jim and his partner Paul, 5H3PW, were the first amateurs in the group, more followed. Joann became 5H9MG and Cabot (another team member) became 5H3CS. Another missionary group settled in Bariadi, Tanzania, with amateurs Tamara, 5H3TA; John, 5H3CA; and Lorin, 5H3LB. A new family has settled in Mugumu, and Craig is waiting for his 5H license. And it doesn't stop there! The Iowa mother of 5H3TA was so determined to talk to her daughter on a regular basis that she earned her General-class license and added a 70-foot tower to the skyline of the family farm!

During Jim's seven-year expedition, we talked well over 100 times. You could count on both hands the number of times Jim and I couldn't make a QSO of it. There were some rough times on 20 meters when the sunspot cycle was bottoming out, but at the peak ends of the cycle, 15 meters was a delight.

In the last year of their stay, Jim, Joann and the Bariadi group enjoyed semi-reliable telephone service—and e-mail! That definitely lessened the *need* for Amateur Radio, but Jim and I continued to talk anyway. Jim and Joann left their radio gear behind for the newcomers, and twice a week the Mugumu and Bariadi groups talk on the radio to trade ideas and to keep in touch.

Besides talking with me, Jim thrilled the contesting community several times (at my coaxing) and quickly learned how to handle the pileups. He didn't see the point of it at first, but quickly found out how exciting contesting can be—especially with a sought-after call sign!

I hope many of you had the chance to talk with Jim during the contests. He and Joann are truly amazing people who followed their calling. They came back to the United States with four children and a view of the world most of us will never see. The next time you talk with a missionary in some far-off place, remember that they, too, may need the radio more than you will ever know!

You can contact the author at 4931 Triton Dr, Golden Valley, MN 55422; **gwfields@mediaone.net**.

By Jean Wolfgang, WB3IOS

Jamboree on the Air 2001

Food, Friends and Fun—all in one October weekend.

Every year, new and seasoned Amateur Radio operators alike participate in Jamboree on the Air (JOTA), which provides an opportunity for Boy Scouts and Girl Scouts to enjoy the opportunity to talk with other scouts and hams. This year's JOTA will be October 20-21. It is a tradition that started back in 1957. More than a half century later, JOTA continues to expose young people to the wonders of ham radio.

Bob Houf, K7ZB, of Tempe, Arizona, recounts his JOTA 2000 adventure:

I acted as the ham advisor and station operator for JOTA ham radio station K7ZB/7 for the weekend camping trip for Troop 16 of Ahwautukee, Arizona. We went up to the high country in Arizona (7000 feet ASL) and camped in the tall Ponderosa pines. This late in October it starts getting cold, and it snows, but we caught a good weekend with highs in the 40/50s and only occasional sprinkles. The deteriorating weather as Saturday progressed did not dampen the enthusiasm, however, and the troop had a great time.

The scouts of Troop 16 arrived at 9 PM Friday night, and amazed me by putting up their campsite in the dark (well, with a few Coleman gas lanterns, that is...).

Several of the scouts and their Scoutmaster, David, KD7KMA (a new ham) immediately wanted to try out the radio, so we commenced DXing until the Jamboree started at midnight. Our station consisted of a complete 300-W 20-meter HF station with stacked dipoles at 75 feet, a generator for a desktop linear amp and my TS570D.

This was truly an enjoyable time ... an absolutely clear, cold, night up in the high country, millions of stars overhead, in a cabin tent with 20 meters alive in the middle of the peak of Sunspot Cycle 23! The scouts talked to both hams and scouts around the world.

I had to shut down the rig at 1 AM in order to get some sleep. Saturday morning came with a drip, drip-drip, drip-drip-drip... at 6 AM. (A short night and sprinkles of rain—now *this* reminded me of scouting as a kid!)

Troop 16 scouts Patrick and Sheehan enjoy JOTA during a weekend camping trip.

World Wide Scout Frequencies (MHz)
Dates: October 20-21, 2001

Band (Meters)	*Phone*	*CW*
80	3.740 and 3.940	3.590
40	7.270	7.030
20	14.290	14.070
17	18.140	18.080
15	21.360	21.140
12	24.960	24.910
10	28.390	28.190

In the morning, several of the scouts wanted to begin making contacts immediately on the radio. Eventually we began to rotate scouts on the microphone until 4 in the afternoon. We worked many stations in Canada, the Pacific NW and Mexico as part of JOTA. The stacked dipole orientation coupled with 20-meter band conditions during the day Saturday precluded making quality contacts to the East Coast or Europe, but we had booming signal reports up and down the Western side of the continent.

The rapid growth of these scouts' communications skills was remarkable. Aged from 10 to 14, each of them learned quickly to handle the mic, and then improved their skill as they talked with scouts in other states and countries, including British Columbia, Washington, Oregon, Montana, Utah, Wyoming, California and Mexico.

The boys spoke with Girl Scouts, Brownies, Boy Scouts and Ventures, asking questions about their life and hobbies, whether they were camping or in a home, and other subjects.

The day ended all too soon, since a cold front was passing through, bringing the chance for snow. We shut down the radio station around 5 PM, and after being treated to an amazingly well done dinner cooked in Dutch ovens over a pinewood fire, we set off for the city.

I haven't participated in scout activities since I was a Tenderfoot myself in the late 1950s, but I must say, this weekend provided a memory that will last the rest of my lifetime. And, I think there will be a few more hams in Troop 16 before long!

For more information, please visit **www.arrl.org/FandES/ead/#scout** QST

The ARRL Novice Spectrum Study Survey

In July this survey was placed on the ARRL Members Only Web site at **www.arrl.org/members-only/NoviceSurvey.html**. If you do not have access to the Members Only Web site you may complete and send this survey (or a photocopy) to:

The Novice Spectrum Study Committee
ARRL
225 Main St
Newington, CT 06111

The ARRL Board of Directors needs your input and thoughts on what to do with the current HF Novice frequencies. In the 1950s the FCC created the Novice license as a method for people to enter the Amateur Radio Service. The 5 word per minute code exam and a simple theory test brought the new licensee a taste of Amateur Radio worldwide communication in selected portions of the 80, 40 and 15 meter CW bands.

For 30 years this license was the primary way people entered the Amateur Radio Service.

In 1990 the code-free Technician license was introduced. Interest in the Novice license waned dramatically as the code-free Tech became the entry-level license of choice. In 2000 the FCC announced that due to a lack of interest, the Novice license would no longer be issued. Having completed its task with distinction, the Novice license has been retired.

What impact does this have on current Novice licensees? There are currently about 40,000 Novices in the FCC's database. That number has declined by about 6,000 a year through non-renewal and upgrading. Recent studies of the Novice portions of most HF bands show that those frequencies, once a hotbed of new amateurs, are not as heavily used as other parts of the bands.

At the January 2001 Annual Meeting, the Board charged ARRL President Jim Haynie, W5JBP, with forming a Committee to investigate "refarming" of these Novice frequencies. The Committee, led by International Affairs Vice President Rod Stafford, W6ROD, recommended in an early session that League members be surveyed on the Members Only web site as to what they think should be done with the frequencies.

For each HF band that includes a Novice subband, the committee offers an option of "no change" as well as other options. Please make any written comments on another sheet of paper. Or, if you prefer, you may send an email to the Committee at **NoviceSurvey@arrl.org**.

Please take a moment of your time to participate in the survey and tell your representatives what you think should be done with the Novice frequencies. Place a mark on the line corresponding to your selection. Your input is solicited!

73, and thanks for your time.

The Novice Spectrum Study Committee
International Affairs Vice President
Rod Stafford, W6ROD, Chairman
Vice President John Kanode, N4MM,
Vice Director Bruce Frahm, K0BJ
Vice Director Twila Greenheck, N0JPH
Vice Director Steve Mendelsohn, W2ML
Vice Director Mike Raisbeck, K1TWF

You may answer one survey only. Please do not submit this survey if you have already answered the survey on the ARRL Members Only Web site.

1 Your name and call sign (answer optional)

_____

2 Approximately what percentage of time do you spend on the air using:

CW?
__ 0
__ 1 to 25 percent
__ 26 - 50 percent
__ 51 - 75 percent
__ 76 - 99 percent
__ 100 percent
__ I am not active on the air

Other digital modes?
__ 0
__ 1 to 25 percent
__ 26 - 50 percent
__ 51 - 75 percent
__ 76 - 99 percent
__ 100 percent
__ I am not active on the air

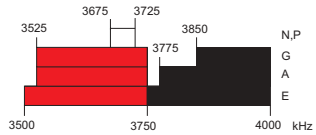
SSB/FM/AM?
__ 0
__ 1 to 25 percent
__ 26 - 50 percent
__ 51 - 75 percent
__ 76 - 99 percent
__ 100 percent
__ I am not active on the air

3 What is your license class?
__ Novice
__ Technician Plus
__ Technician
__ General
__ Advanced
__ Extra
__ I am not licensed

4 Which of these options do you prefer for 80 meters?

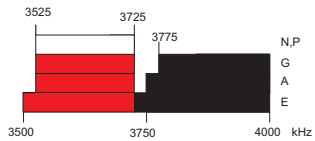
__ No change

Option 1 - No Change



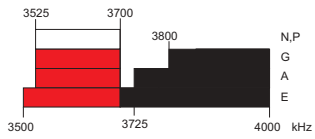
Option 2

__ 3.500 – 3.525 Extra CW
3.525 – 3.725 All license classes (except Technician) CW
3.725 – 3.750 Extra phone
3.750 – 3.775 Extra/Advanced phone
3.775 – 4.000 Extra/Advanced and General phone



Option 3

__ 3.500 – 3.525 Extra CW
3.525 – 3.700 All license classes (except Technician) CW
3.700 – 3.725 Extra Class phone
3.725 – 3.800 Extra/Advanced phone
3.800 – 4.000 Extra/Advanced/General phone

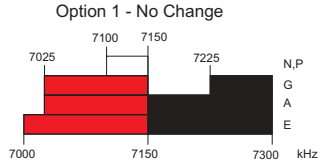


__ Other

5 Which of these options do you prefer for 40 meters?

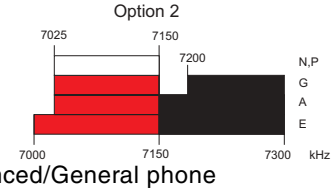
__ No change

Option 1 - No Change



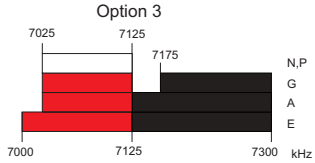
__ 7.000 – 7.025 Extra CW
7.025 – 7.150 All license classes (except Technician) CW
7.150 – 7.200 Extra/ Advanced phone
7.200 – 7.300 Extra/Advanced/General phone

Option 2



__ 7.000 – 7.025 Extra CW
7.025 – 7.125 All license classes (except Technician) CW
7.125 – 7.175 Extra/ Advanced phone
7.175 – 7.300 Extra/Advanced phone

Option 3

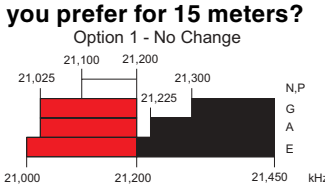


__ Other

6 Which of these options do you prefer for 15 meters?

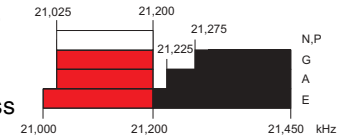
__ No change

Option 1 - No Change



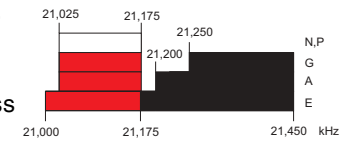
__ 21.000 – 21.025 Extra CW
21.025 – 21.200 All license classes (except Technician) CW
21.200 – 21.225 Extra Class phone
21.225 – 21.275 Extra/Advanced phone
21.275 – 21.450 Extra/Advanced/General phone

Option 2



__ 21.000 – 21.025 Extra CW
21.025 – 21.175 All license classes (except Technician) CW
21.175 – 21.200 Extra Class phone
21.200 – 21.250 Extra/Advanced phone
21.250 – 21.450 Extra/Advanced/General phone

Option 3

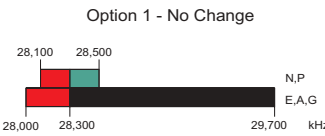


__ Other

7 Which of these options do you prefer for 10 meters?

__ No change

Option 1 - No Change



__ 28.000 – 28.300 All license classes (except Technician) CW
28.300 – 28.500 All license classes (except Technician) phone
28.500 – 29.700 Extra/Advanced/General phone

Option 2

__ Other

8 Are you a resident of the United States? YES or NO (answer required)

___ Yes ___ No

Committee note to survey respondent:

There will continue to be Novice and Technician Plus licensees for the foreseeable future. Therefore, the Committee believes that in order to satisfy its goal of not decreasing privileges for any licensee, any future option will include CW spectrum for Novice/Technician Plus operators (in addition to the phone privileges already in place on 10 meters). On the 80, 40 and 15 meter bands, Novice/Technician Plus CW band restrictions should be changed to match those of General Class CW/ RTTY/Data band segments with the caveat that Novice/Technician Plus operators only use CW with a maximum power of 200 watts in those bands. On 10 meters, CW/RTTY/Data modes are allowed for Novice/Technician Plus licensees.

KEY

= CW, RTTY and data
= CW, phone and image
= CW and phone
= CW only

N = NOVICE
P = TECHNICIAN PLUS
G = GENERAL
A = ADVANCED
E = EXTRA CLASS

By Lew Malchick, N2RQ

School Club Roundup, 2001

The 15th School Club Roundup enjoyed improved propagation conditions February 12-17. Most returning stations increased their scores from last year, and many doubled their score. There were 58 entries involving over 700 operators in this annual event. The comments show the scores are not the whole story. It is the fun of getting on the air that brings the "kids" back for more.

KC7KFF, at Carl Hayden Community HS ARC, returned to lead the high school division with 288,288 points. W7ASU at Arizona State University turned in the overall high score of 348,159. That is not bad for a club in its second year, and still with no permanent operating site!

KB9TYU at Franke Park School ARC lead the elementary schools with 75,262, nearly triple their previous score. The number of these schools was stable at 12 entries. The Junior High/Middle Schools numbered 12 compared to 16 in 2000. The Sacajawea Middle School HRC improved its score to 113,007 to lead.

A significant improvement in participation came from colleges and universities: They went up by 4 to 10. For the first time in many years, W2CXM (Cornell University) and W2CXN (Brooklyn Technical High School) were operating in the same contest. Operators needed to be very careful in listening and logging because of other similar call signs such as W5ASU (Arkansas State University) and W7ASU (Arizona State University).

For more information about the School Club Roundup, try our e-mail reflector. You can subscribe at **www.groups.yahoo.com/group/SCR-L** or by sending an e-mail message to **SCR-L-SUBSCRIBE@yahoogroups.com**. You can also receive information by postal mail. Please send a return address label and two units of First Class postage to Lew Malchick, N2RQ, c/o Brooklyn Technical High School, 29 Fort Greene Pl, Brooklyn, NY 11217.

The 16th SCR will be during the week of February 11-15, 2002.

Soapbox

Three different 6th grade classes participated in SCR 2001 at Jefferson Middle School in Rochester, NY. The activity was well received by the students and teachers. About 40 students participated. They rotated among three activities: 15 minute orientation to short-wave communications, 15 minutes on the air with a control operator, 15 minutes of geography and radio propagation and QSL preparation.—*Peter Fournia, W2SKY, Rochester Amateur Radio Association Radio Coach Program*

Wesley Keisler, KB9YWI, licensed through school.

Once again we had a wonderful time in the SCR! We almost doubled our previous high score. We worked a lot more on 10 meters this year, including a lot of DX. This is a great event. We got a taste of contesting (usually not possible during the school week) and the contest bug bit some students hard. We also had a chance to get a number of students on the air for the first time. The folks we talked to were very nice, and strongly supported the idea of using the SCR to help kids get interested in amateur radio. Thanks again!—*Tom Thompson, KA3WSQ KB3BKW*

Wow, what a year! Our students were highly motivated and had a great time "Working the World." Our biggest hurdle this year was making sure everyone got a turn at the mike, because nobody wanted to relinquish it!

The ham community needs to be commended for their participation this year. We had many pile-ups and their slow exchanges and conversational attitudes helped the students be at ease. It is sometimes difficult to understand younger students over the air and their gentle coaching was valuable and effective. The encouraging words really made our students smile.—*Greg White, N9EYO at KB9TYU*

Highlights from Manchester School Radio Club, KD4RCW: I enjoyed talking to people from Maine to California, literally! The best part of the SCR was on the last day when I worked 26 stations in a little over an hour! The SCR really made me want to upgrade to General! I can't wait until next year to participate as a General Class ham. One of the stations we talked to was the club station at the FBI Academy in Quantico, VA. It was fun talking to a G-man!

Paso Robles High School was back for a second year in the School Club Roundup contest as W6PRB. Ham radio still lures those young people in as they hear their peers talking, real time, with people from all over the country and world. We received great local media coverage, including a front-page article in our school newspaper. Our Superintendent stopped by to observe the kids in action. He was impressed with our list of DX contacts. A great conversation ensued with the kids regarding world geography and radio. The highlight of the contest took place on the last day when we completed our WAS. A freshman operator, Jace, was sitting at the microphone and working the pile up when suddenly he heard Jim, N7SPH, signing his call from Wyoming! That was number 50! The cheers coming from our small radio room sounded as though the school's football team had just won a championship game. I don't think Jace, or the rest of the kids that were present, will soon forget the fun they had with radio throughout the week of SCR 2001. A big thank you goes out to the all the hams who made time in their operations to respond to the many school clubs calling, "CQ CQ CQ School Club Roundup!" See you next year, 73.—*Rob Thoresen, AG6RT, W6PRB Club Trustee*

Pam, KD7LGL, and her friend Merle had the rig by themselves on Tuesday night. They started calling CQ at 3:30 local time. This was their first time on HF and they did a great job of working the BIG pileup. I was nearby but let them handle the crowd. They were pros. About 5:30, Pam looked up at me and said, "How do I stop?" She and Merle worked a two-hour pile-up, non-stop. Welcome to HF!—*Allan Cameron, N7UJJ*

2001 School Club Roundup Scores

Call Sign	Score	Rank	QSOs	States	Countries	Clubs	Schools	Hours	Operators	Club name	School
Elementary School											
KB9TYU	75262	1	311	50	11	3	35	17	10	Franke Park School ARC	Franke Park Elementary
KB3BRT	33823	2	149	31	27	2	33	19	22	Cowanesque Valley School ARC	Westfield Area Elementary
WA2RGV	23322	3	137	38	7	2	24	24	6		Lafayette School
KB2VBU	16324	4	106	32	8	2	22	20	40	Intervale School ARC	
KB2VAP	6110	5	65	24	3	1	13	11	21		Shaker Road Elementary School
N1IFP	5341	6	49	23	4	1	16	9	7	Bean School ARC	James Bean School
KC7OIO	5044	7	45	17	4	3	14	15	22	Lake Washington Ham Club	Franklin Elementary School
KD4RCW	3535	8	35	23	1	1	15	5	2	Manchester School Radio Club	Manchester School
KC2AHK	3024	9	54	13	27	3	2	16	150	Stafford Intermediate School ARC	Stafford Intermediate School
K6LSR	2380	10	28	16	2	6	11	5	4	Nichols Elementary School HRC	Leroy Nichols Elementary School
W7EH	570	11	15	12	1	0	5	7	2		Whiteriver Elementary School
KA4NDY	240	12	8	6	0	2	4	2	6		Village School
Junior High / Middle School											
K7BZN	113007	1	415	49	30	6	36	24	14	Sacajawea Middle School HRC	Sacajawea Middle School
K5ARK	75335	2	304	43	26	9	32	22	28	Dunbar International Magnet ARC	Dunbar Magnet Middle School
WD9ITM	69402	3	269	47	17	2	38	19	29	Memorial Park ARC	Memorial Park MS
AC4RC	51023	4	183	43	10	3	40	20	8		Boys & Girls Homes of North Carolina
AD8B	44265	5	195	42	14	3	33	21	49	Zion ARC	Zion Lutheran School
KC0CXB	40635	6	301	31	9	5	17	22	27	Mt Garfield Middle School ARC	Mt Garfield Middle School
KC7LHG	16940	7	104	32	16	3	20	20	8	Omak Wireless League	Omak Middle School
KC7VWW	12555	8	131	29	17	1	9	15	48	Klamath County Schools ARC	Henley Middle School
KC8KOH	5800	9	54	26	2	1	14	14	7	Ritchie Co Middle School ARC	Ritchie Co Middle School
K4BMS	4386	10	43	17	13	1	14	15	1	Blacksburg Middle School ARC	
K4B	552	11	12	10	1	0	7	4	1		Williston Middle School of Math, Science & Technology
W2SKY	221	12	13	4	8	0	1	3	40	RARA Radio Coaches	Jefferson Middle School
High School											
KC7KFF	288288	1	904	45	51	8	40	24	12	Carl Hayden Community HS ARC	Carl Hayden Community H S
W6PRB	170815	2	609	50	23	8	36	24	12	Paso Robles High School ARC	
K1BBS	140304	3	444	39	30	6	47	24	22	Burr and Burton ARC	Burr and Burton Academy
KB3BKW	95121	4	351	46	36	2	37	22	14	Belle Vernon HS ARC	Belle Vernon High School
W2CXN	21210	5	105	33	20	2	29	11	5	Brooklyn Technical High School ARC&Soc.	Brooklyn Technical High School
W5CHS	16383	6	97	30	9	0	18	8	8	Catholic HS ARC	Catholic High School
KB0SAL	16000	7	80	30	1	2	33	23	8	Waco Amateur Radio Club	Waco Jr-Sr High School
N4LZJ	15360	8	96	30	18	1	22	19	6		Colonial Forge HS
KG4EDK	14700	9	100	28	21	4	18	16	8		Brooke Point High School
KC2AIF	13728	10	88	33	13	0	22	15	6	Pioneer HS ARC	Pioneer High School
KC0ENB	7000	11	56	28	3	2	18	8	4	Russell High School Radio Club	Russell High School
N4ZRA	3600	12	45	16	5	2	11	6	7		North Georgia Christian Home Educators
KC0EPL	1292	13	34	16	5	1	3	12	1		
W2IHA	918	14	17	10	1	0	8	2	3	IHA ARC	Immaculate Heart Academy
WA7PZW	754	15	13	7	1	0	10	5	2	Mazama High School Ham-mers	Mazama High School
DX High School											
VE7HSS	200	1	10	8	2	0	2	3	3		Eric Hamber High School
College/University											
W7ASU	348159	1	813	50	44	17	57	24	7	Amateur Radio Society at Arizona State University	
W5ASU	38925	2	225	36	10	6	23	19	10	Arkansas State Technical Institute ARC	Arkansas State Univ
W9NIU	36024	3	144	35	14	4	36	16	5	NIU College of Engineering Radio Club	Northern Illinois University
N5ZQ	12882	4	113	20	15	2	15	10	2	Oklahoma Christian University	Oklahoma Christian University
W6YRA	8680	5	70	29	1	2	18	2	2	UCLA Amateur Radio Club	Engineering IV 66-147L
K0KSU	7725	6	103	23	1	3	9	12	2	Kansas State University—Salina ARC	Kansas State University—Salina
WB4TOP	7154	7	46	18	14	2	22	14	3	Wake Tech ARC	
AG0EU	6441	8	57	26	3	2	16	7	1	Jack Blizzard ARC	Evangel University
W2CXM	4872	9	58	20	7	1	11	8	5	Cornell University ARC	Cornell University
KC5ZHF	150	10	10	4	1	0	2	2	1	U. T. A. Amateur Radio Club	University of Texas at Arlington
DX College/University											
ON4HTI	13430	1	138	13	35	8	3	19	4		Higher Technical Institute, K. H. B. O.
Club											
K3FBI	38135	1	142	40	6	1	43	14	4	Federal Bureau of Investigation ARA	
Individual											
N2IZM	6105	1	33	22	1	1	32	15	1		
KC2FDQ	4687	2	42	22	3	2	16	7	1		
WO8L	1782	3	18	14	0	0	17	5	1		
KB3AGZ	1472	4	16	12	0	0	16	5	1		
N2TDT	342	5	18	4	3	1	2	5	1		
WB0WG	24	6	2	2	0	0	2	1	1		

By Steve Ewald, WV1X

Tune Up for Emergencies in SET 2001

The Simulated Emergency Test is October 6-7.

ARRL's annual Simulated Emergency Test (SET) is coming up on October 6 and 7, 2001, and that's the first weekend of that month. Will you be ready to take part in this nationwide exercise? The SET involves such groups as the Amateur Radio Emergency Service (ARES), the ARRL National Traffic System (NTS), the Radio Amateur Civil Emergency Service (RACES), SKYWARN and many more as they work through simulated emergency scenarios to test the capability of operators, equipment and the overall response efforts.

The SET is a great opportunity to lay a foundation of cooperation between Amateur Radio operators and community and public service agencies. Simulated emergencies are a ready invitation for served agencies like the American Red Cross, the Salvation Army, the Federal Emergency Management Agencies and the National Weather Service to learn first-hand what Amateur Radio can do to assist in emergency situations. The SET event often captures the attention of the local news media as well, so keep an eye on the chance to provide public awareness.

Annual Tune Up

ARRL Field Organization officials in your section and area are making plans for the SET weekend. Their emergency-like scenarios typically require participants to report to preassigned locations and operation centers with little or no advanced notice. On-the-air nets are also activated to support the communication.

Under the direction of a test coordinator, Amateur Radio equipment and repeaters are often demonstrated with emergency power for a certain period of time. Also, those operators involved will receive on-the-job training on various types of gear, antennas and modes of operation. The SET creates a suitable learning environment to review message-handling (traffic) skills and net procedures. In a real emergency, the situation dictates how the Amateur Radio community must respond. All the experience gained beforehand really proves its value.

Get Involved!

To get involved in this year's SET, contact your local ARRL emergency coordinator (EC) or net manager (NM). Need a little help in finding out whom to contact? Check with your Section Manager (see page 12 of *QST*) or log onto *ARRLWeb* **www.arrl.org/FandES/field/org/smlist.html**. This will lead you to a listing or additional links to the ARRL Field Organization leaders in your vicinity.

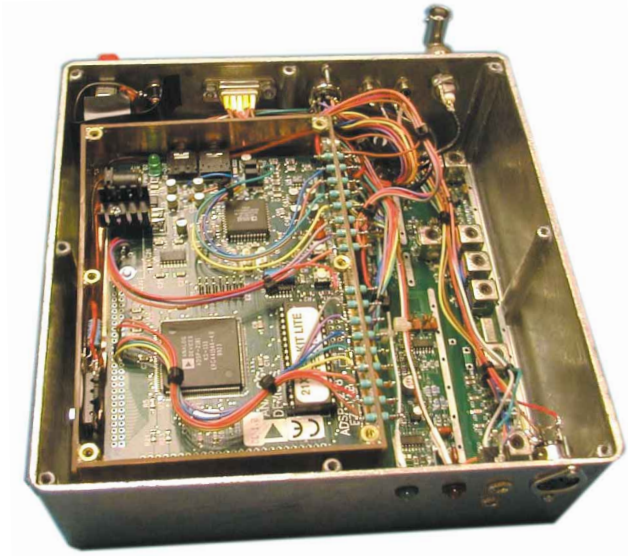
If you're a Field Organization official making plans for SET, you should be receiving SET guidelines and reporting forms either electronically or via the postal service soon. The information will also be posted on *ARRLWeb* at **www.arrl.org/FandES/field/forms/**. Although October 6 and 7 is the focal weekend for the national Simulated Emergency Test, ARRL Field Organization leaders may conduct their exercise

(continued on page 55)

The Humboldt Amateur Radio Club operated this Field Day station, W6ZZK, from the Humboldt County Fairgrounds in Ferndale, California. Field Day is a vivid reminder of the portable and emergency capabilities of Amateur Radio.

The Humboldt Amateur Radio Club, based in Eureka, California, displayed this "Caltrans" communications van during the San Francisco Section and Redwood Coast Amateur Radio Convention that was held on Field Day weekend in Ferndale. "Caltrans" is associated with the California Department of Transportation, and it allows the area's radio amateurs to use this vehicle to set up a mobile command post for emergencies and public service communications.

By Steve Ford, WB8IMY



See You in Cincinnati!

The Queen City plays host to the 2001 ARRL/TAPR Digital Communications Conference.

Software-defined radios like this one are among the hot topics at the Digital Communications Conference.

Most people agree that Amateur Radio should be moving swiftly into the digital age, but is anyone really *doing* anything to advance the process? The answer is "yes," and you'll find these digital pioneers in abundance at the 2001 ARRL/TAPR Digital Communications Conference (DCC) in Cincinnati, Ohio **September 21-23**.

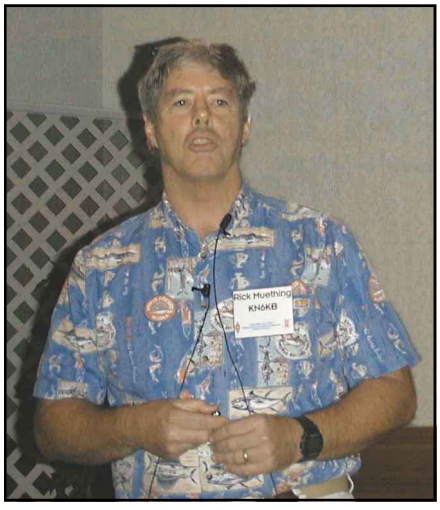
Amateur digital innovators regularly share ideas over the air and by Internet e-mail, but nothing beats the face-to-face intimacy a conference provides. Concepts are explained fully, and there is ample time for reasoned debate. There are also many opportunities to catch up with old friends, and make new ones.

Not Just for the Elite

If you've never attended a Digital Communications Conference before, you probably think it is a gathering restricted to digital gurus. The luminaries of the amateur digital community will indeed be in attendance, but most of the audience is composed of average hams like you. If you have an interest in digital communication, this conference will give you a rare glimpse into the details of this revolutionary technology. The Digital Communications Conference takes place in a setting that encourages discussion; you won't be just an isolated face in the crowd.

Among the many forum topics will be a presentation on the current and future status of APRS—the Automatic Position Reporting System—with Brent Hildebrand, KH2Z (the developer of *APRSPLUS*), Mike Musick, N0QBF (developer of *PocketAPRS*), and other nationally known APRS leaders. This is your chance to gain insight into this fast-growing digital aspect of amateur operations that combines computers, packet radio and GPS (Global Positioning System). You'll also find other helpful forums on topics as diverse as TCP/IP and digital satellite communication.

The DCC banquet will be held Saturday night. There will be a guest speaker after the banquet and a prize drawing will top the evening. The Sunday morn-



Rick Muething, KN6KB, discusses the Winlink 2000 network at DCC 2000.

These APRS car-top trackers debuted in the demo room at DCC 2000.

ing seminar is "Simulating Circuits and Systems with *Serenade SV*" presented by Dave Newkirk, W9VES, of the Ansoft Corporation. Dave will show you how *Serenade SV* is like having a communications lab in your home computer. For more information about *Serenade SV* and a free software download, see **www.ansoft.com**. Also, see Dave's article in the January 2001 *QST*.

Getting There

The conference takes place at Holiday Inn Cincinnati–Airport and Conference Center. A special room rate of $89/single and $89/double per night is available until September 1. Rates will increase after that date, so book your room right away. You can call the hotel at 859-371-2233, or reserve your room on the Web at **www.basshotels.com/hotels/cvgap**.

Greater Cincinnati/Northern Kentucky International Airport is nearby and shuttles to the hotel are available. If you prefer to travel by rail, Amtrak offers service to Cincinnati from New York, Chicago and points west.

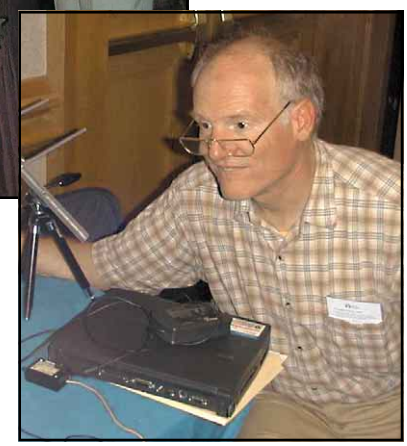
Registration includes conference proceedings, sessions, meetings, and lunch on Saturday.

- Pre-Registration (before Sept 1): $45.
- Registration (after Sept 1) or at the door: $55.
- Saturday evening banquet: $30.

Register Today!

You can register on the Web at **www.tapr.org/dcc/**, or by calling Tucson Amateur Packet Radio (TAPR) at 972-671-8277. Join the future of Amateur Radio in Cincinnati September 21-23!

What's a conference without a Saturday evening banquet?



Bob Bruninga, WB4APR, the inventor of the Automatic Position Reporting System, is a familiar face at the TAPR/ARRL Digital Communications Conferences. QST

(continued from page 53)

any time between September 1 and November 30.

A Real Reason for SET

Jim Metzler, N3BZW, ARRL District Emergency Coordinator for Western Pennsylvania's Zone S-2, shared the importance of last year's SET in Blair County.

Blair County held their SET on September 27, 2000. What was special about this SET was that it dealt with the certification of the new Blair County Emergency Management Agency Director. This meant that all government agencies were present, including PEMA (Pennsylvania Emergency Management Agency), along with local and state police agencies, fire departments, and the American Red Cross. The Blair ARES command center was also the 911 center, so this allowed the Blair ARES to introduce Amateur Radio to all agencies involved.

Amateur Radio became the main focus point during the drill. The government agencies started monitoring the ARES activities and gave supportive comments on ARES effectiveness and how well we performed both as communicators and as a viable source for emergency communications. PEMA requested that the Blair EC help with expanding Amateur Radio in their emergency preparedness.

If you're asking yourself, "So what?" then picture this: Local police, state police, emergency management, county fire departments, Red Cross, National Weather Service, county and local governments all at one location and having the opportunity to watch ARES at work. (For some of the agencies, it was their first time!) These agencies collected information on how to contact the Blair ARES.

We are important and our services are needed! Making and maintaining contacts with county emergency officials is a priority. Don't make the wrong judgment that the yearly SET is trivial. Encourage your ECs, when making monthly reports, to also copy the county's emergency management agency director, the Red Cross or any served agency. Blair has done this, and it has proved to be very helpful.

Addition to 2000 SET Results

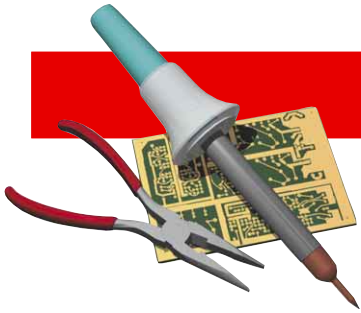
Please note the following addition to the article, *2000 Simulated Emergency Test Results*, in July 2001 *QST*, pp 53-55. This report should have been listed under ARES activity of Eastern New York:

Area	*Reporter*	*Points*
Dutchess Co	KC2DAA	308

A Red Cross/ARES Exercise

In South Carolina, Bob Good, K4BG, reported on how the York County ARES responded to a planned exercise of the local American Red Cross chapter.

The scenario involved a local tornado disaster. Three shelters were opened along with Red Cross headquarters, and a representative of the local emergency operations center (the York County RACES Officer) was present. This drill was held in conjunction with the annual certification of the Red Cross chapter. All locations were staffed by radio amateurs and three disaster assessment teams. During the test, Amateur Radio provided primary communications with emergency power. A mobile HF, VHF, and UHF communications unit was on the scene. A total of twenty York County ARES members participated in the exercise, and all functions of the test were accomplished to the satisfaction of the Red Cross director and personnel. A follow-up critique by the Red Cross was attended by representatives of the involved ARES members. QST



The Doctor is IN

Q When a resistor is connected to a battery, do the electrons flow from the positive terminal of the battery through the resistor to the negative terminal, or vice versa?

A Electrons flow from the negative terminal to the positive terminal of a battery, without question. However, there are two different points of view on the direction of *electrical current* flow, and the division between them is such that you will even find some books written with two different versions to accommodate both points of view.

One camp prefers to discuss electrical current in terms of *hole flow*. So what is hole flow? When an electron leaves an atom, it creates an electron deficit, or "hole," thereby creating what is known as a *positive ion*. This change-of-state progresses from one atom to another in bucket-brigade fashion, which can be considered hole flow. This is most often called *conventional current*.

The opposite view contends that electrons do indeed flow, not holes. The hole-flow proponents counter that free electrons don't travel fast enough in a wire to create the behavior we observe. On the other hand, the propagation of hole states is extraordinarily fast. Therefore, they believe hole flow must be correct.

Valid arguments can be made on both sides as to which concept is "correct." I strongly suggest not taking sides, but instead acknowledging the validity of both points of view and just keep in mind which convention is being used when discussing a particular circuit.

Q Charles, K2MZ, asks, "I'm considering a narrow band CW filter for my transceiver. The manufacturer offers 250 or 500 kHz filters. Do these frequencies refer to the bandwidth of the filter or the frequency of the CW audio tone heard? If it is bandwidth, why would I not want the narrowest possible? Does it matter whether it is in the 9 MHz or 455 kHz IF?"

A The frequencies indicate the width of the filter; the tone heard is the same as the rig's "offset" (typically 700-800 Hz).

The advantage of the 250 Hz filter is selectivity, but the disadvantage is in the increased tuning sensitivity (it makes tuning touchy). Also, many folks find 250 Hz filters impart a hollow sound to the rig's audio. For trying to pick out a signal from a pileup or working a contest in crowded band conditions, however, the narrower width can be really helpful.

If you are only going to install one filter, put it in the higher IF. If you want to be able to pick your selectivity, install a 500 Hz filter in the high IF and a 250 Hz filter in the lower IF.

Q Frank, NI9W, asks, "Is there a simple way to measure the resistive product of a matched antenna? In other words, if the X_L and X_C components cancel, the antenna is resonant, but how about the resistive component to insure that there is a proper, in most cases 50-Ω, resistance?"

A One of the more accurate ways to measure both the resistive and reactive components of an antenna is to use one of the antenna-impedance analyzers. Several companies advertise these in *QST* magazine.

If you know an antenna is resonant, you can use an SWR meter to get an indication of the resistive component. If there is no reactance and the SWR is 2:1, then the resistive component of the antenna would be either 25 Ω, or 100 Ω if the measurement equipment is calibrated for 50 Ω. In the real world, things aren't usually this clean—the point of best SWR may contain some reactance. What really counts, though, is that the SWR on the feedline be low enough that it isn't too lossy (usually about 5:1 for coax is okay, depending on the coax type and length) and that the transmitter sees a reasonable load. Most rigs today will operate into a 1.5:1 to 2:1 load, although some fold back power at SWRs greater than 1.5:1.

Q Mike, K6MKF, asks, "A friend of mine asked when hertz became the nomenclature for frequency. There are all sorts of references on the Web to Heinrich Hertz and that Hz is named for him. I've been licensed since the 1960s and I seem to remember that Hz came into use in the mid-1970s."

A The first reference to the use of hertz in *QST* seems to have been in Correspondence in the September 1930 issue in which the writer, PA0ZK proposes the change. The editor responded saying that *QST* would continue using the old convention until such time as the Committee on Standardization of the Institute of Radio Engineers changed it.

Some advertisers seem to have started using Hz in the September 1966 issue. It is notable that Heath was in the forefront. Both forms continued to appear in *QST* ads for some time.

Another discussion on the subject appeared in *QST* in August 1966 on page 48 with an article titled, "Cycles, Cycles Per Second, or Hertz," which begins, "Recently there has been a move to use 'hertz' as the unit of frequency..."

The next reference I find on the subject is in April 1968 *QST* on page 48 with an article titled, "A Study of Hertz vs. Cycles Per Second."

In May of the same year, I find what may have been one of the first uses of Hz in *QST*. In "League Lines" on page 10, we find, "Studies on revision of Loran service in 1800-2000 kHz have been completed..." On the next page, "Quads and Yagis" may be one of the first articles in *QST* to use Hz. In this issue we note that both hertz and cycles are used in the technical articles depending on the whim of the individual authors and/or editors. It is also interesting to note that in the Table of Contents of this May issue, on page 3, the popular VHF column was still being called, "World Above 50 Mc."

Q Tom, N8EUI, asks, "I recently purchased a used Heath HW-101 and matching HP-23C power supply from a ham friend of mine. Both units are in very good condition and operate like a champ. I purchased an Astatic 10-DA mike with

the T-UP9 stand for the rig. The mike connector on the rig uses two pins, but the Astatic mike cable has five wires (yellow, white, blue, red and black) and a bare wire which must be ground. I'm confused. Can you please tell me the proper way to wire the mike to the connector?"

A The Astatic microphone is designed for modern radios. On most modern rigs, the mike connector has 8 pins and on Ten-Tec rigs there are 4 pins. Of course, some of the pins on both connectors are unused, but on the 8-pin connectors, two pins are used for ground—one for a PTT (push to talk) ground and one for the mike shield. In the Ten-Tec connector, a single pin is used for both.

On the old Heath connectors, the shell of the connector is actually the ground. The two pins are for mike audio and PTT. The pin with the 22-kΩ resistor connected to it (on the back of the connector) is the mike audio pin and the other is PTT.

Although I haven't seen your microphone, I assume it is somewhat similar to the Astatic D-104 from a wiring standpoint. Like the Heath radios, the Astatic mikes are a bit of an oddity. The mike element of a D-104 has separate wires for the high side and the low side (which is not internally grounded) and another wire provides a shield.

Also, in the D-104 the PTT switch is a DPDT affair, much more complex than the simple SPST (normally open) switch that most mikes have. The DPDT PTT switch has a section that is "break before make" and another that is "make before break" (that is to say, the wiper in one section momentarily connects both contacts while transitioning and the other momentarily floats while transitioning). Of course, none of this matters if you want to use the microphone with the Heath rig—it just gives the mike maximum flexibility to be used with all manner of systems (not just radios).

You should be able to get a schematic of the 10-DA from Astatic if you don't already have it. If not, try a Web search on **www.Google.com** for "Astatic 10-DA" and you'll find it there.

From the diagram, you should be able to identify the wires for the mike element, shield and switch sections. On the mike element, you want to connect the low side and shield wires to the ground (shell) of the Heath connector. On the switch, just pick one half, connect the wiper to the same ground and connect the wire for the normally open contact to the Heath pin for PTT.

Q My Radio Shack HTX-202 displays a "PLL Unlock" error occasionally. I have been fixing it by grasping the transceiver in my right hand and tapping it moderately into the palm of my left hand. Usually this fixes it and the radio works just fine. What causes this error?

A Phase-locked-loop (PLL) oscillators operate with a certain amount of frequency drift, over which the PLL stays within a given range, whereas if it goes outside that range, it will tend to stay outside that range. The term for this is "lock" since within the range a PLL tends to stay "locked in."

On computer-controlled rigs, there is a circuit that senses if the PLL is staying in lock. If the PLL unlocks, an error message can be generated. However, I've only seen this on rigs where the allowed tuning range exceeds the guaranteed range; e.g., a 2-meter rig that includes wideband reception to 900 MHz and the tunable frequency range goes up to 999 MHz, but the manufacturer only guarantees 930 MHz. Then, selecting something above 930 MHz might cause a PLL lock error.

Within the rig's normal operating range, this should not happen unless the PLL IC is defective, or there is a bad connection on the circuit board. Given that a mechanical input puts the PLL back in lock in your rig, I suspect the latter is most likely the case.

Another possibility is that the HTX-202 is out of alignment.

Q Dennis, KB9SDS, asks, "Recently a storm passed over and I put the radio end of my coax into a glass jar. Every time a bolt of lightning was about to flash, I could hear popping sounds coming from the connector. After a flash, the sounds would cease. Does the noise mean that static electricity in the atmosphere is discharging?"

A You bet it does!

That was an interesting experiment, but like Benjamin Franklin's kite flying, a bit dangerous. If there had been a direct hit on your antenna you may well have had shards of glass flying about. I strongly recommend that you *not* repeat this experiment!

However, disconnecting the antenna coax from the station is a very prudent thing to do. Although lightning arrestors and such will protect your station from the ground surge caused by a near hit, nothing can protect your station from a direct hit to the antenna system other than separating the system from the station completely. If possible, you should, as the Doctor does, keep your coax, or ladder line, disconnected and well away from the station whenever it is not in use—this will keep a storm from sneaking up on you while you are away from home.

The ideal, although not practical, would be to disconnect the coax and toss it out the window onto the ground. But a good grounding system on the coax, and the connector lying well away from the station, is the next best thing.

A practical solution is to have your coax from the antenna connected to a bulkhead at the window or other entry point using feed-through connectors, and then connect your equipment to the feed-through when in use. It is then very convenient to connect and disconnect the system.

Q Jim, KI7AY, asks, "I have an ICOM IC-706 MkII and I would like to know what I need to interface an Electrovoice Model 664 dynamic cardioid microphone to it."

A With modern rigs, especially mobile rigs, the audio response is often limited by the mike amplifier and modulation circuitry, so there is a limit to what you can do with an external microphone to improve the situation over a stock mike.

If your desire to use the 664 stems from its appearance and feel to the hand, you honestly may well be better off replacing its older internals with a modern electret element.

However, if you really want to use the mike as-is with a modern rig, there are two things you'll need to determine: the mike's impedance and its voltage output. If the impedance is in the neighborhood of 100 kΩ, then you can probably adapt the circuit for the Astatic D-104 that was shown in August 1999 *QST*. As to the voltage, most modern rigs are looking for a maximum of 200-300 mV peak to peak. If the 664 puts out more than that, you'll need to attenuate it to a level in this range to prevent overloading the mike-input circuitry.

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/. Also see, "The Doctor is On-line" at www.arrl.org/members-only/qst/doctor/. QST

PropMan 2000

By Carl Luetzelschwab, K9LA

Rockwell Collins recently released an upgraded version of their HF *Prop*agation Resource *Man*ager software. The new upgrade is called *PropMan 2000*. In a nutshell, *PropMan* identifies and displays the best frequencies for an HF communications link in a user-friendly real-time graphical environment.

My first exposure to the *PropMan* series of propagation prediction software was with Version 3.1 in 1995. This was a *DOS* version that I ran on my old 386 PC. It used *IONCAP* Version PC.25 for its raw data, and presented plots of Signal-to-Noise Ratio (SNR) for the path selected. It was obvious that its heritage was from the military market, as its list of locations (for the receive end and transmit end of the path) was heavily slanted toward military installations and it talked about channels as opposed to frequencies.

New and Improved

So what's new in this upgraded version? *PropMan 2000* is now a *Windows* program, so that makes it easy to print the color-coded screens for a hard copy (that was a real task with the *DOS* version). *PropMan 2000* now uses *VOACAP* Version 99.0708W for its underlying propagation predictions and the raw *VOACAP* data can easily be viewed with a couple of clicks of your mouse. And the list of locations has been revised extensively to move it away from its military slant.

PropMan in Action

I set up *PropMan* for a simple path, and took a look at what it had to offer. Once the proper parameters were entered, *PropMan* immediately ran predictions, and the screen looked like Figure 1.

The path parameters are displayed at the top of the screen. The top left plot area displays one of three plots (selected via the colored plot icons at the right end of the toolbar): Best Channel for Selected Time, Best Frequency versus Time, or Channel SNR versus Time. The bottom left plot area is the Best Channel versus Time. The right plot area is Frequency/SNR versus Time. Any of the five plots can be made to fill the entire screen by double clicking on it.

The Best Channel for Selected Time plot shows the predicted SNR on your selected frequencies in real-time format (which means it'd be nice to have your PC set to the correct time!). The Best Frequency versus Time plot is not dependent on transmit power or antenna gains, which suggests it is more of a plot of which frequency is optimum solely in terms of ionization (more on this later). The Channel SNR versus Time plot gives the SNR for each hour on each selected frequency over a 24-hour period. The Best Channel versus Time plot takes the data from the Channel SNR versus Time plot and shows which frequency is best for each hour during a 24-hour period. The Frequency/SNR versus Time plot shows the SNR for all frequencies from 1 to 30 MHz for each hour for a 24-hour period. This last plot also includes the monthly median MUF as a thick black line for each hour.

PropMan also allows automatic input of space weather data from Internet sources, and this feature provides two additional and unique reports: warnings of ionospheric storms, and a table of percent degradations for each hour to be applied to the predicted MUFs. Although the Help menu discusses using Microsoft Internet Explorer for this Internet feature, I had no problems using Netscape. And it is not out of the question nowadays to have *PropMan* continuously obtain space weather updates on a dedicated Internet line.

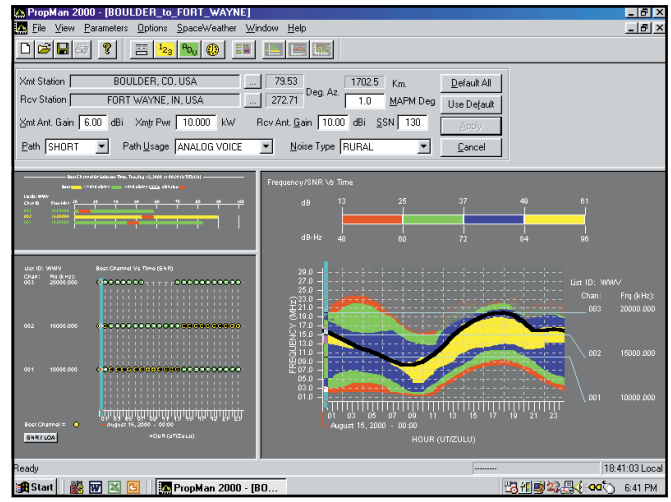


Figure 1—*PropMan 2000* analyzes a path between Boulder, Colorado and Fort Wayne, Indiana.

As you can see from the descriptions of the plots, *PropMan* is heavily slanted toward reporting SNR. SNR (or signal strength) is only one of the outputs of a propagation prediction—the other is mode availability (which *VOACAP* calls "MUFdays"). It appears that the Best Frequency versus Time plot in *PropMan* addresses mode availability, as its values are independent of transmit power and antenna gains and are somewhat less than the median MUF in the Frequency/SNR versus Time plot. This suggests the Best Frequency versus Time plot is somewhat akin to the FOT—the frequency that should be available on 90% of the days of the month.

Conclusion

Overall I found this new version of *PropMan* easy to use in the *Windows* environment. The Help texts and Tutorials are extensive, and should allow you to navigate and use *PropMan* with little trouble. The information presented in all the plots is rather extensive, so some study will be necessary to fully comprehend what you are looking at.

PropMan 2000 is available for $99 US plus tax and shipping and handling. For more information, or for questions regarding *PropMan 2000*, call Rockwell Collins at 319-295-5100 or at 800-321-2223, e-mail **Collins@collins.rockwell.com** or visit their Web site at **www.propman2000.com**. QST

By Andy Pfeiffer, K1KLO

Update on the Pfeiffer Quad System

Andy Pfeiffer, K1KLO, loves small quads. After all, he's got seven of them at his house! He describes here his latest design—the Pfeiffer Maltese Quadruple Cross, a miniature 40-meter quad.

In the March 1994 *QST* I described in some detail how I'd managed to shrink the standard quad using linear loading techniques (see "The Pfeiffer Quad Antenna System," page 28). The object was to make a quad that was more manageable to maintain despite icing and high winds, even hurricanes. I called the resulting designs the "Maltese Quad" and the "Maltese Double-Cross Quad" because the perimeter of the radiating wires resembled a Maltese Cross. See Figures 1 and 2 (from the original article) showing the layout for these two unique element designs.

I mentioned in the original article that my next project was going to be a 40-meter version. Well, here it is: the *Pfeiffer Maltese Quadruple-Cross Quad*. Figure 3 is a photograph showing the 15-meter miniature Double Cross quad on one of my towers. I've been using this miniature antenna for several years now and the performance is very satisfying. The 40-meter version is similar in appearance, but with twice the number of spreaders.

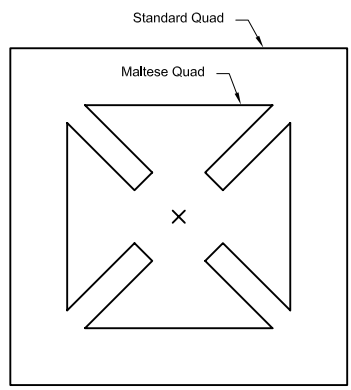


Figure 1—The outer square represents the wire perimeter of a full-sized standard quad driven element. The inner configuration defines the wire perimeter of the driven element for the Maltese Cross quad. It's drawn to the same scale, but has a spreader diagonal only 56% the size of the standard quad element. For example, on the 12-meter band, the standard quad's diagonal spread is 14 feet 2 inches, while the Maltese Cross quad's diagonal spread is 8 feet. For a 40-meter element, the diagonal spread would be 49 feet for a standard quad, and 27 feet 8 inches for the Maltese Cross quad.

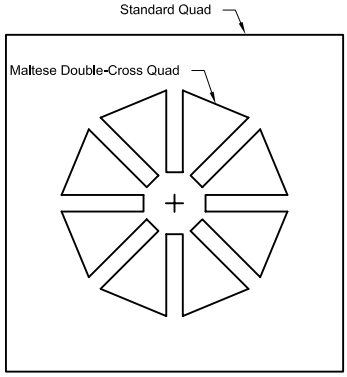


Figure 2—The perimeter wiring of the Maltese Double Cross quad on the inside, compared to a standard-sized quad driven element. Here the extra linear loading reduces the diagonal spread on 40 meter from 49 feet for the standard quad down to 20 feet 3 inches for the Maltese Double Cross.

Let's Look at the Special Spreaders

Like my previous *QST* article, this is not a blow-by-blow description of how to build the 40-meter version. I've got a well-equipped machine shop, and being retired, the time to really fuss over mechanical details. I really do make my antennas to stand up to the elements! This is an *idea article* and should give the dedicated experimenter enough information to get him or her going.

I feel at this point it is imperative that the reader be fully knowledgeable regarding the perimeter wiring of my three basic Maltese designs: the four-spreader Maltese Quad, the eight-spreader Maltese Double-Cross Quad and this new 16-spreader-per-element 40-meter Maltese Quadruple-Cross Quad.

Figure 4 (not drawn to scale) shows a complete four-spreader Maltese Quad driven element. (To maintain drawing clarity, the spreaders have been omitted, but are indicated by the dashed lines.) It shows the path of the 16 separate 14-gauge copper wires that form its perimeter.

The eight-spreader Maltese Double-Cross Quad would have 32 wires in its perimeter, and my 40-meter Maltese Quadruple-Cross Quad would have 64 separate perimeter wires.

Upon completing an element, check with an ohmmeter to be absolutely sure that there is continuity. An open element will not function as a closed loop.

Figure 5 shows the perimeter of a normal quad element. . . all for the same band. Part A shows the relative reduction of the four-spreader Maltese Quad, Part B that of the eight-spreader Maltese Double-Cross Quad and Part C the 16-spreader Maltese Quadruple-Cross Quad for the 40-meter band.

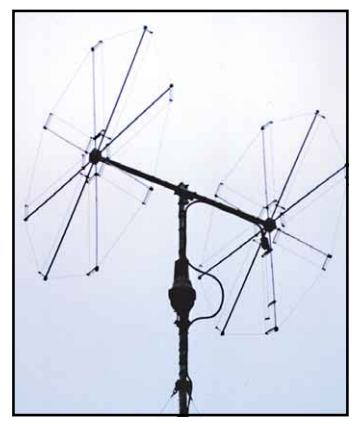


Figure 3—Photo of the Double Cross 15-meter quad at the top of one of K1KLO's towers, about 50 feet high.

Aluminum Tubing for Spreaders

I realized over the last few years since my earlier article in *QST* that one of the linear loading wires could

Table 1
Comparing Standard Quad and Quadruple Cross Quad
(Dimensions shown in feet)

Diameter Standard Quad	*Perimeter Standard Quad*	*Diameter Quadruple Cross*	*Perimeter Quadruple Cross*	*Percentage Difference*
49	139	14	243	75%

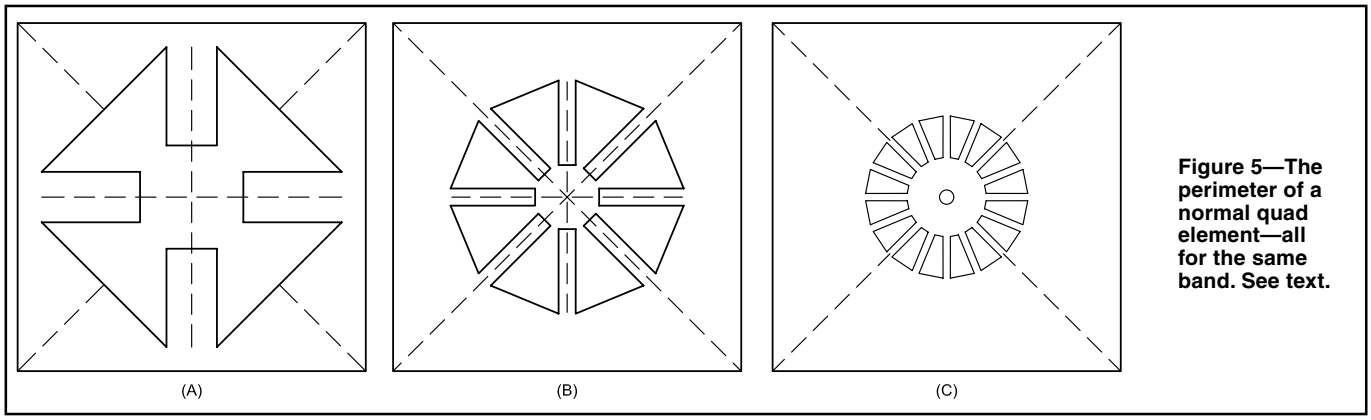


Figure 5—The perimeter of a normal quad element—all for the same band. See text.

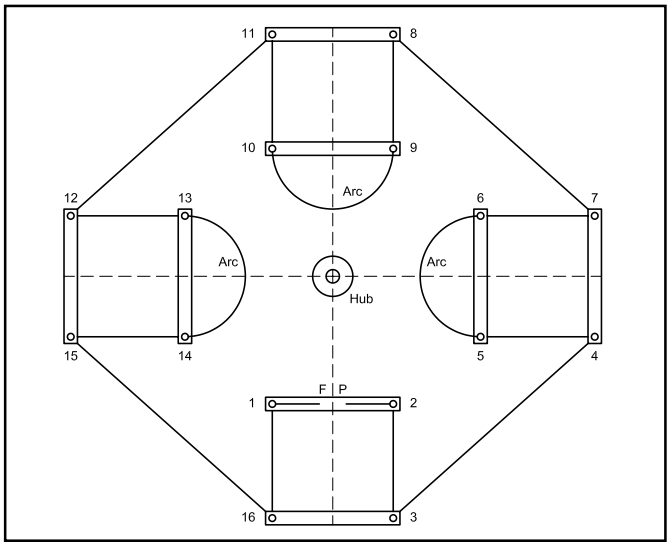


Figure 4—A complete four-spreader Maltese Quad driven element.

be replaced by aluminum tubing. This simplifies the mechanical structure by acting both as a spreader and as part of the linear loading system. Figure 8 shows details of the 40-meter Quadruple Cross driven element and reflector, including the gamma-match system. Note that this drawing is not drawn to scale to aid in clarifying the essential ideas behind the design.

Tuning the Quadruple Cross Quad

I used the wires that bridge the inner yardarm insulators (labeled "Arc" in Figure 8) to fine-tune the driven elements to the correct frequency using a grid-dip meter slaved to a frequency meter. In Figure 8 you will see two terminals labeled "FP" (for feed point). The opening in this "FP" wire is where I insert a half-turn loop for the grid-dip meter. The lengths of the "Arc" wires can be as small as 4 inches, up to a length of about 10 inches when it is formed into the shape of an arc. The total variation for all 16 spreaders is thus $(10 - 4) \times 16 = 96$ inches, more than enough for this job.

Feeding the 40-Meter Quadruple Cross Quad

I use gamma matches for my entire fleet of seven quads. The gamma capacitor needed for 40 meters was approximately 200 µF. The approximate 1:5 SWR bandwidth for the antenna was 200 kHz.

Conclusion

I've been using the Quadruple Cross quad on 40 meters since April 1997. I've made hundreds of contacts with it, including DX contacts with stations in the Caribbean, South America and the South Pacific. I made these contacts running a power output of about 75 W.

Most times people have commented that they rarely, if ever, have worked someone using a rotatable quad on 40 meters. When I tell them my antenna has a "wheel diameter" of only 14 feet they're really surprised and intrigued!

In closing, let me say that many radio amateurs in different parts of the world have built my Maltese series quads. They were determined to construct them after having worked me on the air and experiencing the quads' efficiency first hand. Their individual ingenuity, in design and choice of materials, was most evident in the photographs they mailed me along with their positive descriptions of the performance of these miniature directional quads.

Andrew (Andy) Pfeiffer, K1KLO, figures he's spent some 10 years since retirement developing the Maltese Cross series of small quads. At the age of 83, Andy continues to climb his many towers, mainly experimenting with various versions of the Maltese Cross. Through the years, his consuming interests in Amateur Radio have mainly involved antenna experimentation, design and construction. He jokingly confides that he doesn't "fiddle with computers, since they're the devil's own work." Although Andy is unable to answer written inquiries, he can be reached at 860-434-5621.

Figure 6—The author adjusting an earlier fiberglass version of his 40-meter Quadruple Cross. Center frequency was 7.2 MHz. The "wheel" diameter was only 14 feet. In contrast, a full-size 40-meter quad would require a diameter of 49 feet.

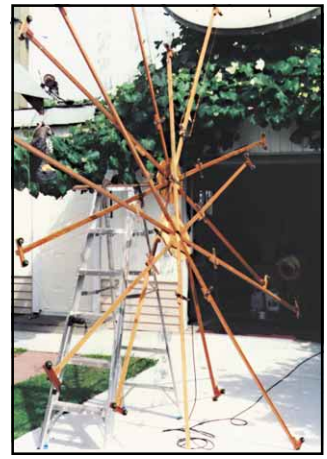


Figure 7—At left, a cedar version of the 20-meter Double Cross quad at VE7FJR just before it was installed. Above, Dave, VE7DWG, assembles the quad elements to the boom.

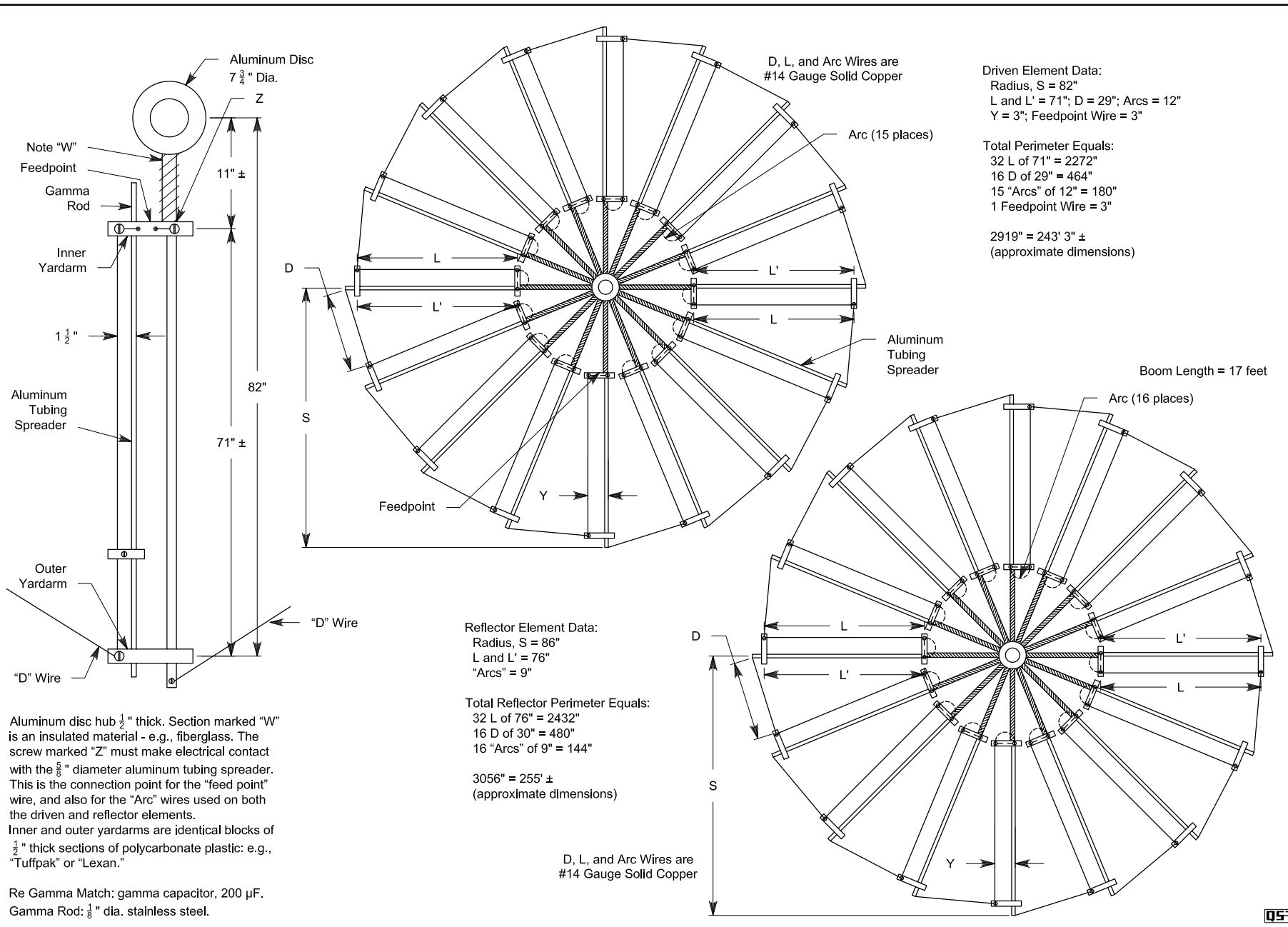


Figure 8—Details of the 40-meter Quadruple Cross quad driven element and reflector. These are not drawn to scale. Note how the aluminum spreaders now function not only as spreaders, but also as part of the linear loading system. #14 solid copper wires connect the aluminum spreaders to form the rest of the perimeter wires for the element.

By H. Ward Silver, N0AX

Test Your Knowledge!

A crash of "symbols."

As technology advances, the vocabulary moves right along with it—not only in terms, but in the symbols that we use on schematics and to describe technology. Test your ability to identify symbols, old and new.

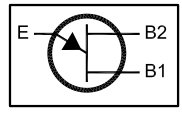
1. Match the transistor symbols and the device type.

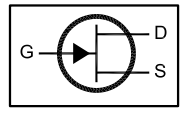
a. N-channel JFET

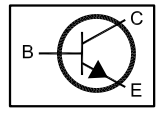
b. P-channel MOSFET

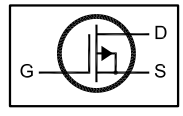
c. NPN bipolar

d. UJT

e. 

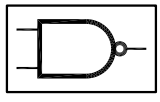
f. 

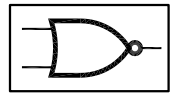
g. 

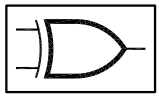
h. 

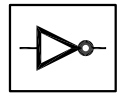
2. Which of the following performs the operation described in the truth table below?

Input 1	*Input 2*	*Output*
0	0	0
1	0	1
0	1	1
1	1	0

a. 

b. 

c. 

d 

3. Match up the vacuum-tube element names and symbols.

a. Anode

b. Cathode

c. Grid

d. Heater

e. 

f. 

g. 

h. 

4. Which of the following diode symbols would you expect to see in a voltage regulator circuit?

a. 

b. 

c. 

d. 

5. Phasing relationships on transformers are indicated by the placement of a…

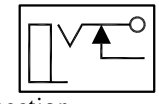
a. plus or minus sign
b. dot
c. arrowhead
d. letter "p"
e. heavy line

6. An op-amp symbol is the shape of a…

a. square
b. hexagon
c. circle
d. triangle

7. On a battery symbol (see illustration) which is the positive terminal—the long or short line?

8. On the phone jack symbol (see illustration) the black arrowhead indicates what function?

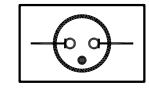


a. earth ground
b. tip connection
c. ring connection
d. sleeve connection
e. break-on-insert connection

9. The circle at the output of a logic gate indicates…

a. Open-collector
b. Don't-care
c. Write-only
d. Inversion

Bonus—Identify the function of the following component...



Total Your Score!

Give yourself one point for each correct answer.

7-9	You probably can read hieroglyphs, too!
4-6	Schematics aren't too challenging for you.
1-3	It's a jumble.

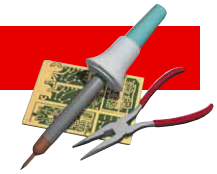
22916 107th Ave SW
Vashon, WA 98070

Answers

1. a-f, b-h, c-g, d-e
2. c—the table describes the Exclusive-OR (XOR) function
3. a-g, b-e, c-h, d-f
4. a—the Zener diode
5. b
6. d
7. long
8. e—when the plug is inserted, the connection opens
9. d—adding the circle makes an AND gate a NAND, an OR a NOR, and so on.

Bonus—This is a neon lamp.

HINTS & KINKS



MORE ON VACUUM-TUBE FILAMENT VOLTAGE

◊ Harmful advice was presented in the Hint and Kinks of July 2001 *QST*. One should *never under any circumstance* reduce the filament voltage of an indirectly heated tube below the tube or equipment manufacturer's minimum recommended operating voltage. Any reduction below that point in a metal-oxide-cathode (MOX) tube can "poison" the cathode and permanently damage the tube.

Secondly, MOX cathode tubes can require inrush limiting and are sometimes as much or more susceptible to damage than directly heated tubes. The indirectly heated cathode has a long thermal lag, causing heater areas in closer contact to the cathode to remain cold for a long time, while areas further away from the cathode instantly heat. This causes hot spots in the heater, where resistance and heater dissipation is much higher than normal. The problem is not the same as in directly heated tubes, where the filament can mechanically distort and short to the grid, but rather one of reduced heater life from opening of the heater.

Some indirectly heated tubes with larger cathodes, like the 3CPX5000 and its little brother, the 8877, have a tendency to maintain high starting current for a very long time, until the heater temperature equalizes along its length.

One of the best guarantees of proper inrush performance is to *not* use "overkill" filament transformers, chokes and wiring. Use the minimum size components necessary, and you will have built-in filament-inrush protection. Many amplifiers, such as the SB-series Heathkits, the Ameritron series with separate transformers, and so on, have no problem with inrush despite not having a filament step-start. Transformer and component resistances limit inrush current without external circuits. It is true that amplifiers using filament windings on large high-voltage transformers are begging for problems unless a step-start is added.

Finally, reducing voltage until CW power drops, then bringing voltage up until full power is just restored is no guarantee that IMD performance will be within specifications. Normal peak emission is several times the average emission current, and so the tube must be *comfortably* above the point where full peak power is reached on the worst-case band. Again, the filaments of indirectly heated cathodes should *never* be reduced in voltage below manufacturer's minimum recommendation.

It is unwise to randomly modify amplifiers based on folklore and popular opinion unless we thoroughly understand what we are really doing. The idea that it's good to reduce filament voltage is most likely a spin-off from commercial applications. There, *nonlinear* class-C PAs with overkill tubes (like 4CX5000As in FM transmitters operating at 20% of their normal rated power) simply don't need the full emission capabilities of the tube. Reducing filament voltage can reduce tube life as well as the emission quality in linear modes. In amateur service, there are very few (if any) tube failures due to voltage-correctable emission life of tubes unless the filament or heater is operated *above* or *below* its rated voltage.—*Tom Rauch, W8JI, 371 Dean Rd, Barnesville, GA 30204;* **w8ji@contesting.com**

This is not the only response I received on this topic. The bottom line is: It's best to follow the manufacturer's recommendations about vacuum-tube operation.—*Ed.*

A BETTER SOLDER-REMOVAL TOOL

◊ I've recently done a lot of component changing on PC-board projects, and this involved a lot of solder removal. In some cases, I haven't had replacement parts for some of the things I was removing, so I couldn't employ the "sacrifice the component" technique (clipping the leads and then just desoldering the remaining stubs).

In any case, I've become very frustrated with the desoldering tools conveniently available to me. Desoldering braid works reasonably well most of the time, but doesn't always get all the solder out of a plated-through hole. "Solder-suckers" provide plenty of vacuum, but you must either remove the iron before applying the suction (so the solder cools some) or put the iron and suction device on opposite sides of the board. (This is somewhat difficult with a PC-board vise, very difficult without one.)

Another common method is a "bulb" type desolderer. These come in two varieties—just the bulb by itself and a version using a hollow-tip pencil soldering iron with a bulb attached. (Such as the RadioShack #64-2060.) Unfortunately, these do not produce very much vacuum, so they don't always get all the solder out of the "nooks and crannies." The second type does get heat and vacuum to the same point, however.

When I was in college, I was lucky enough to have a dedicated desoldering station available. These have heated hollow tips with a motorized vacuum pump. They're very nice indeed, but very expensive—the cheapest one I have seen along these lines is still about $100.

Since I've always been one to take something that needs improvement and tinker with it, I gave a little thought to the problem and came up with a reasonably priced solution that works quite well, too. In essence, I combined two of the above-mentioned devices as you can see in Figure 1. I took a bulb-type desoldering iron, removed the bulb and replaced it with a solder-sucker (such as RadioShack #64-2120) connected via some flexible 1/4-inch plastic tubing (plumbing supply, hardware stores or aquarium shops should have it). I'll be the first to admit that the result looks a little weird. It also makes desoldering a two-handed job. However, it really does work quite well.—*Michael Tracy, KC1SX, ARRL Lab;* **kc1sx@arrl.org**

Figure 1—KC1SX's custom desoldering tool.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

MONEL WIRE FOR A CORROSION-FREE ANTENNA

◊ Will you be the first in your neighborhood to have a new long wire almost totally resistant to corrosion? It is something about which many of us who use wire antennas have long dreamed. It is now possible and within the budget of serious hobbyists.

When I was first licensed in 1947, my station, W2VMX, was located on one of New Jersey's barrier islands, only about a block from the ocean. My station was there for many years, and was at Ocean City for an additional 13 years of struggle with the effects of salt spray. There were also nine years in Linden, a heavy-industry area with much pollution. I spent many hours trying to correct problems caused by these environments and was no stranger to brownish oxidation, greenish corrosion and general deterioration. Half a century after that original license was issued I found a solution.

The solution is wire made of an alloy known as *Monel* metal. The original patent was issued to Ambrose Monell in 1906, and a patent for a modified version went to the International Nickel Company in 1921. Monel is not new: During WW2, when we needed corrosion-resistant materials aboard ships and for use in the tropics, it was a precious and wonderful substitute for the elusive stainless steel. The propellers of the *USS Florida* and *USS North Dakota* were once made of Monel metal. The alloy is a mix of nickel, copper, iron and manganese. "Monel" has come to be an umbrella term for a group of similar alloys: some contain, for example, cobalt, silicon or titanium.

Recently, Monel wire has become readily available. It has a very high tensile strength and is almost totally resistant to corrosion. Stainless-steel wire is also available and less expensive, but it is considerably more difficult to handle. Monel wire is kink-resistant, which is an added benefit for many of us. It is normally sold in rolls of either 300 or 1000 feet, although longer or shorter lengths can be supplied by some sources. You may find that large fishing-tackle distributors are convenient retail outlets.

For fishing purposes, Monel is sold as "trolling wire." It is rated in pounds, an indicator of the load that the wire will hold without breaking. Depending on how your antenna is supported, you might opt for wire rated anywhere from 15 to 200 pounds. The label typically specifies the diameter of the wire in inches: from 0.016 for 15-pound test to 0.050 for 200-pound-test material. Wire gauges are not used: The nearest wire gauge number for 0.016-inch is #26 AWG, and for 0.050 it is #16.

My experience is with 25-pound wire (0.018 inches ≈ #25 AWG) and 60-pound wire (0.028 inches ≈ #21). I inquired locally about soldering the wire, and the responses conflicted: Two electronic shops thought only high-heat silver solder would suffice, and two metalworking places told me that welding or brazing would be required. Not so! I tried a 100/150-W soldering gun with some rosin-core tin/lead solder, and it works fine.

Some practice was necessary to achieve close windings, for example, in connecting a down lead to the main antenna wire. The Monel has more spring than typical copper wire, so winding it tightly with fingers is difficult. The solution is quite easy: Just reach for your long noise pliers. Rotate the pliers in the direction you want to wrap, closing them gently but firmly as you turn. The result can be a true work of art. If you want to solder a stainless connection, it can now be done. Because Monel is hard, it can be a bit inflexible. Handle it with care! I found that the 60-pound wire could easily puncture a finger.

Monel wire is more expensive than copper. A typical 300-foot roll of the 60-pound variety runs about $22 plus shipping and handling. A 1000-foot roll sells for about $65. On a cents-per-foot basis, it is no more costly than many varieties of wire at your local hardware store. Yes, there is one more catch. Some outlets have a minimum order around $75 or even $100. That may put it out of the range of an individual, but certainly, nothing prevents club members from pooling their needs for a single order. Some places will sell a single $15 roll. The handling charges may seem high, but you can get the quantity you want.

I obtained my rolls from Midland Tackle Company, a mail-order fishing-gear supplier.[1] Midland stocks the Mason Company's Monel wire as Silver-Lus Trolling Wire.[2] The owner-operator at Midland was patient with my inquiries and extremely prompt in shipping items ordered.

The telephone spokesperson for Mason gave me the name of the sales representative for my state. If you cannot locate such products locally, perhaps this is a good approach. It is also possible that a local sporting goods store would be willing to special order what you need.

On the Internet, I came across a page for the CBC Metal Supply Company.[3] These folks handle Monel wire in sizes from approximately AWG #30 up to AWG #8. There is a minimum order, but they welcome a pooled order from your local Amateur Radio club.

Okay, now you have the information. Hopefully, you're moved to join those of us with stainless skyhooks!—*Charles L. Wood, W2VMX, 1910 Glendale Ave, Durham, NC 27701-1326*

[Monel metal has much greater loss than copper. Comparing 20-meter λ/2 dipoles of #12 copper and 0.028" Monel at 30 feet, Monel has about 0.6 dB more loss. (I used 0.5 μΩ/meter for Monel and 0.0178 μΩ/meter for copper and compared peak gains as calculated by *EZNEC*.)—*Zack Lau, W1VT, ARRL Lab Engineer*]

DETERMINING TRANSISTOR AND DIODE LEADS WITH AN OHMMETER

◊ This old technique bears repeating: Garden-variety bipolar transistors act like diodes when connected to an ohmmeter, and most modern multimeters have a diode-check function. The diode-check function typically applies a small, current limited voltage to the probes. By repeated tests, you can find which transistor lead is common. (See Figure 2.) This is the base lead. If the meter's positive lead is on the base, the transistor is NPN; if the negative lead is on the base, its PNP. This check can usually be made without unsoldering the transistor from the PC board. A transistor that passes this test is usually good—but not always. —*Bert Kelley, AA4FB, 2307 S Clark Ave, Tampa, FL 33629-5707;* **aa4fb@mindspring.com**

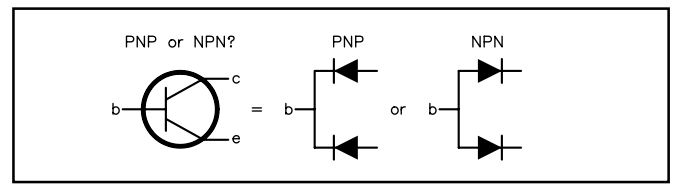


Figure 2—A bipolar transistor appears to an ohmmeter as a pair of diodes.

[1]Midland Tackle Company, 66 Orange Tpke, Sloatsburg, NY 10974-2399; tel 800-521-0146 (orders only), 914-753-5440.
[2]Mason Tackle Company, PO Box 56, 11273 Center St, Otisville, MI 48463.
[3]CBC Metal Supply Company, 2-8 Central Ave, East Orange, NJ 07018; tel 973-672-0500.

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

By Dave Patton, NT1N

ARRL Board Tackles CC&Rs, Requests 5-MHz Allocation

CCR might be an old rock band, but CC&Rs are not music to hams' ears.

CC&Rs

The long simmering issue of CC&Rs seemed to come to a boil at the Second 2001 Meeting of the ARRL Board. With many of the Board members actively working on the issue, combined with the efforts of the ARRL's Legislative Manager, Steve Mansfield, N1MZA, to collect and present over 130 real "horror stories" volunteered by members around the country, the Board was energized to take action. Just before the annual summer gathering of the ARRL's leaders July 20-21, 2001, Bill Cross, W3TN, of the FCC's Wireless Telecommunications Bureau, gave the Board no encouragement that the FCC would be able to help with the CC&R crisis facing Amateur Radio across the country until Congress instructed it to do so. Throughout the Board meeting, ARRL's leaders harkened back to the subject of CC&Rs and discussed various options, tools and approaches available to them.

During this meeting, the Board formally recognized the importance of work on antenna restrictions as equal to that of spectrum protection (Minute 73), and directed Headquarters staff to create a "How-to" guide that will help Amateurs implement state PRB-1 legislation and include examples of language used successfully (Minute 64). The new ARRL publication by Fred Hopengarten, K1VR, *Antenna Zoning for the Radio Amateur*, is another tool that will be of great benefit to those with legal issues related to antennas.

If You Have An Antenna, We Have Lots of Operating News For You

The 160 meter band was a popular topic of conversation at this meeting. After reviewing many hundreds of comments about the way the Gentleman's Band should be used, the 160 Meter Band Plan Ad Hoc Committee (created at the Annual meeting in January 2001) made its recommendations on a band plan to the Board. Here is the band plan as approved (Minute 57):

Recommended ARRL 160 Meter Band Plan (1.8 – 2.0 MHz)

1.800 – 1.810	Digital modes
1.810	CW QRP
1.800 – 2.000	CW
1.843 – 2.000	SSB, SSTV and other wideband modes
1.910	SSB QRP
1.995 – 2.000	Experimental
1.999 – 2.000	Beacons

In addition to the band plan, the Technology Task Force (TTF) recommended that the Board approve a proposed petition to the FCC asking for an experimental license waiver of Part 97 for the use of unattended beacons on 160. These beacons, part of a propagation study, would be located in 1 kHz segments of the band at 1.800-1.801 MHz and 1.999-2.000 MHz running low power. The TTF will also develop guidelines for data collection, storage and analysis to be used for this propagation study (Minute 47).

Summary of Major Board Actions

Minute	*Purpose*	*Disposition*
Organizational		
13	ARRL to vote in favor of Pitcairn Is. ARA admission to IARU	Secretary
22	Petition for allocation at 5.250 – 5.400 MHz	Adopted
25	Logbook of the World electronic awards and confirmation system	Approved
26	One time, non-endorsable QRP DXCC award	Approved
27	Field Day participation extended to all of Region 2	Adopted
39	Bylaw 6	Amended
40	Bylaw 7	Amended
41	Bylaw 37	Amended
47	Petition for unattended beacons on 160 meters	Adopted
54, 55	Preservation of Amateur Radio and ARRL history	Adopted
57	160 meters band plan	Approved
64	"How-to" guide for PRB-1	Adopted
65	30 meter band added to DXCC and DXCC Challenge	Adopted
66	Encourage free admission for kids at ARRL-sanctioned events	Adopted
67	Web site content archiving	Adopted
70	Petition to expand 1×1 call sign program to include 2×1 calls	Adopted
71	Article 1	Amended
72	Study procedures and qualifications for Honorary Vice President	EC
73	Protection from CC&Rs recognized as a major goal	Adopted
Awards and Recognition		
29	Bill Morine, N2COP, McGan Silver Antenna Award	Awarded
30	George Tranos, N2GA, Brier Instructor of the Year Award	Awarded
31	Allan Cameron, N7UJJ, Professional educator of the Year Award	Awarded
32	Richard Flanagan, W6OLD, Excellence in Recruiting Award	Awarded
33	Thaddeus Huff, KC0AQG, Hiram Percy Maxim Award	Awarded
34	Steven Strauss, NY3B, Technical Service Award	Awarded
35	J. P. Martinez, G3PLX, and R. S. Larkin, W7PUA, ARRL Technical Innovation Awards	Awarded
36	Paul Wade, W1GHZ, Microwave Development Award	Awarded
37	Howard Teller, KH6TY, and Dave Benson, K1SWL Doug DeMaw, W1FB, Technical Excellence Awards	Awarded
43	Vice Director Evelyn Gauzens, W4WYR, 22 years of service	Recognized

2000 Awards

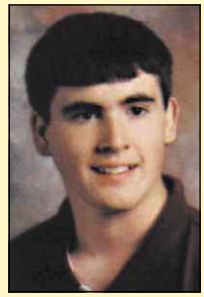
The Philip J. McGan Memorial Silver Antenna Award

William Morine, N2COP, of Wilmington, North Carolina, is the winner of the 2000 Philip J. McGan Memorial Silver Antenna Award. The annual award honors an amateur who demonstrates outstanding volunteer public relations success on behalf of Amateur Radio, and who best exemplifies the volunteer spirit of the award's namesake, journalist Philip J. McGan, WA2MBQ—the first chairman of the ARRL's Public Relations Committee.

As an ARRL Public Information Officer and the PIO for the Azalea Coast Amateur Radio Club, Bill Morine has contributed significantly to raising public awareness about ham radio in his area. Since 1997, he has been racking up the media hits in television, radio and print, including guest appearances on Wilmington's morning news magazine programs. His PR efforts have covered emergency communications, public service, restructuring, training classes, educational opportunities in schools and Amateur Radio in scouting.

A former news writer and producer for WCVB television in Boston, Morine has been licensed for nearly 30 years. Aside from his media relations activities, he is involved with ARES, Jamboree on the Air and the School Club Roundup. He is also a Volunteer Examiner.

Hiram Percy Maxim Memorial Award



A 19-year-old community college student, Thaddeus W. Huff, KC0AQG, of Clarence, Missouri, is the 2000 Hiram Percy Maxim Memorial Award winner. An ARRL member, Thaddeus attends Moberly Area Community College, where he is majoring in criminal justice.

The Hiram Percy Maxim Award goes each year to a radio amateur under the age of 21 whose accomplishments and contributions are of the most exemplary nature within the framework of Amateur Radio activities. The award was established in 1936, and formal nominations come from section managers.

ARRL Missouri Section Manager Dale Bagley, K0KY, had high praise for Thaddeus Huff. "Thaddeus is a bright and hardworking young man and has earned the respect of all who come to know him," he said.

Huff is active in community development and has spearheaded several programs to benefit his community, including an exhibit at the Clarence Community Resources Exposition to demonstrate Amateur Radio and emergency communications. A member of the Amateur Radio Emergency Service, he has organized severe weather spotting courses for Macon and Shelby counties. Perhaps most important, he encourages those attending to become involved with ARES. For the past two years, he's organized and led simulated emergency tests for the past two years in three counties.

In addition to his ARES activities, KC0AQG participates in SKYWARN, and he enjoys ARRL Field Day. He is a member of the Macon County Amateur Radio Club.

While also attending school, Huff holds a part-time job at a local computer store and works on radio electronic projects related to weather satellites and VHF equipment.

The winner of the Hiram Percy Maxim Memorial Award receives a cash award of $1000, an engraved plaque, and travel and accommodation expenses to enable the winner to attend an ARRL convention for a formal presentation.

ARRL Instruction, Education and Recruitment Awards

The ARRL is proud to have three clubs sponsoring awards this year. The Lake County Amateur Radio Club of Crown Point, Indiana, cosponsored the 2000 ARRL Herb S. Brier Instructor of the Year Award. The Lambda Amateur Radio Club of Philadelphia, Pennsylvania, is a cosponsor of the 2000 ARRL Professional Educator of the Year Award. The Carson Valley Radio Club of Minden, Nevada, is the cosponsor of the 2000 ARRL Excellence in Recruiting Award.

Herb S. Brier Instructor of the Year Award

George Tranos, N2GA, of Bellport, New York, is the 2000 Herb S. Brier Instructor of the Year. Tranos has been organizing, recruiting, teaching and demonstrating ham radio since 1992. His hands-on approach to learning even includes pieces of rope to teach the basics of knot-tying and rigging used for Field Day setup, and a laptop PC to demonstrate computerized logging.

Tranos is serving his third term as ARRL Section Manager for the New York City/Long Island Section, a post he's held since April 1998. In this capacity, he has made presentations at local radio clubs and the NYC/LI Section convention. He is also a key player in the success of Ham Radio University, an annual educational convocation that started as a two-day Technician licensing class. Tranos organized the curriculum, classes, publicity, instructors, demonstrations, course materials, amateur examination sessions, and even lunch and snacks.

While working with students either on a one-to-one basis or in a group, his enthusiasm for the hobby is evident to everyone. One past student referred to his "positive attitude, which promotes a you-can-do-it attitude in each student."

ARRL 2000 Educator of the Year

Allan Cameron, N7UJJ, of Chandler, Arizona, is the 2000 ARRL Educator of the Year. A teacher at the Carl Hayden Community High School in Arizona, Cameron co-founded the Carl Hayden Amateur Radio Club nine years ago with Alex Reyes, KC4UFM. This club regularly demonstrates Amateur Radio to students, and many of them become licensed.

The School Club Roundup, held each February, is a favorite activity of the club, which has been the SCR high school champion since 1994. Cameron starts the preparations well in advance of the weeklong event.

From the start, the Carl Hayden ARC has worked ham radio into classrooms at Kyrene de La Paloma Elementary School. An HF station is set up at the school, and all the students in a class talk to a ham in another state or country. After locating their contact on a map, the youngsters design and send QSL cards.

In 1992, Cameron accompanied students for a weekend at the Scottsdale Amateur Radio Club's Field Day site. They did some operating, and enjoyed the fellowship. In 1995, 1996 and 1997, he took the students into the mountains and set up a station. He says the kids were the exclusive operators, and they loved it.

2000 Excellence in Recruitment Award

Dick Flanagan, W6OLD, of Minden, Nevada, is the 2000 Excellence in Recruitment Award winner. An ARRL Assistant Section Manager, Flanagan uses many different methods of recruitment for Amateur Radio classes. In one case, a press release to a local newspaper led to an article in a major regional newspaper. In addition, his ham radio posters are colorful, creative and to the point.

With more people becoming Internet-dependent, one of his ways to recruit students is through the Carson Valley Radio Club's Web site, **www.cvrc.net**. Flanagan is the CVRC Webmaster. From the Web site, individuals, whether newly interested or experienced ham, can find out the latest information on classes, VE sessions, current events, and the ARRL. Flanagan, who helped found the CVRC, also edits the club newsletter.

Flanagan also has had success recruiting new hams through the Carson Valley Radio Club's reflector as well as on regional and local e-mail reflectors. Through these reflectors, hams and potential licensees can keep abreast of urgent or timely news and events.

"What continues to make Dick stand out is his very infectious love of Amateur Radio, of helping others," said a statement from the Carson Valley Radio Club. "He works diligently and hard for the interests and welfare of the amateur community locally and at large. Some may always want recognition or something in return. Dick's greatest gift is to see the success and enjoyment others get from amateur radio."

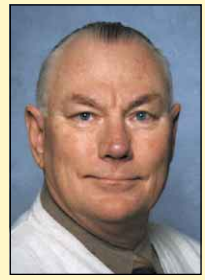
ARRL Professional Instructor of the Year

There were no nominees for the 2000 ARRL Professional Instructor of the Year Award.

ARRL Technical Awards

ARRL Doug DeMaw, W1FB, Technical Excellence Award

Dave Benson, K1SWL and Howard "Skip" Teller, KH6TY, are the winners of the 2000 Doug DeMaw, W1FB, Technical Excellence Award. "A Panoramic Transceiving System for PSK31," in June 2000 *QST*, was the product of their collaboration. The result was a QRP (low-power) dedicated PSK31 transceiver for 20 meters. Known as the PSK20, the transceiver sparked a surge of interest in home and portable QRP operating with PSK31—a digital mode ideally suited for the task.



Skip Teller, KH6TY

Howard "Skip" Teller, KH6TY, became a ham while in junior high school, passing his Novice and General exams, and spending most of his time experimenting with HF and VHF circuitry. After college General Electric's Radio Receiver Department hired him, where he eventually became chief engineer for multiband radio design. After GE, he held radio engineering manager positions for Sylvania, Hoffman Electronics and the Admiral Corporation. In 1970 he established his own radio design consulting company and shortly thereafter won a worldwide competition to design radios for Algerian manufacture.

In 1974, Teller created the original weather alert radio, still sold today at RadioShack stores, and moved to Taiwan to build a factory to manufacture them. Ten years later, he retired to Hawaii and has recently moved back to his hometown in South Carolina. Skip Teller is the holder of four electrical circuit patents, and, when not hamming, enjoys playing tennis and fencing.

Dave Benson, K1SWL

First licensed as WA1GMT in 1967, Dave Benson, K1SWL (ex-NN1G), was an inveterate homebrewer from the start. An electrical engineering graduate of the University of Connecticut, he also did graduate research in ultrasound imaging at UConn.

Benson has lived in the Southwest (as KU7I) and worked as an aerospace design engineer. He contributed a number of digital video and serial-communications designs used on military aircraft. He holds two US patents stemming from that circuit design work. More recently, he served as systems engineer for a helmet-mounted display electronics for the Comanche helicopter program.

Benson founded Small Wonder Labs, an electronics kit company, in 1994 and took his venture full-time in 1996. When not laboring at this, he can be found renovating his recently purchased home. Other activities include volunteer work as a team leader doing home-repair in the Appalachians. He enjoys hiking, gardening and also fancies himself a guitar player. Dave Benson has contributed to a number of QRP-related periodicals and is a member of the QRP "Hall of Fame" as well as a frequent contributor to *QST*.

ARRL 2000 Microwave Development Award

Paul Wade, W1GHZ, of Shirley, Massachusetts, is the winner of the 2000 Microwave Development Award. His work on antennas and parabolic dish feed systems has been documented in *QEX* articles as well as in his own *On-line Microwave Antenna Handbook*. His designs have been successfully reproduced worldwide. Wade also has done extensive propagation work with snow and rain scatter on 10 GHz in the New England area. He is always operational for the ARRL 10 GHz and Above contests, providing numerous contacts and technical assistance for newcomer and old timer alike. Wade also has written numerous programs for the Palm Pilot handheld computer, most notably a grid-square calculation program that allows two stations to calculate six-digit grid squares and distance and bearings between each station. This information is extremely valuable in helping microwave stations to align their antennas for communication.

Wade also is an avid circuit designer. His latest contribution to the amateur microwave community is a compact, state-of-the-art 10 GHz transverter design that can quickly put a multi-mode 2-meter rig on 10 GHz. Wade is among the leading organizers of the North East Weak Signal Group's annual conference. Wade has written numerous technical and operating articles for other conferences, such as the Central States VHF Society and Microwave Update.

ARRL 2000 Technical Innovation Award

Two amateurs were named as winners of the ARRL 2000 Technical Innovation Award. They are Peter Martinez, G3PLX, of England, and Bob Larkin, W7PUA, of Corvallis, Oregon.

Peter Martinez, G3PLX, is well-known today as the father of PSK31, now a popular digital mode that uses phase-shift keying and a unique "varicode" to enable efficient keyboard-to-keyboard conversations within a narrow bandwidth. Although it got off to a quiet start, PSK31 appears here to stay and has proven to be a valuable shot in the arm to the digital side of Amateur Radio.

For some hams, PSK31 has been the gateway to a new world of hamming—where the computer sound card used to encode and decode PSK31 has become as integral a part of an amateur station as the traditional microphone or keyer. PSK31 not only has provided many hams with their first foray into digital radio, it has done so in a way that teaches them that in today's modern radio age, the lines between software and hardware are becoming blurred. Once a ham sets up that station capability, the use of new modes becomes as simple as downloading new software and trying it out. With this software approach to ham radio, the limits of what hams can do have been extended.

Bob Larkin, W7PUA, helped introduce software defined radios, or SDRs, into the Amateur Radio lexicon, with the design and publication in *QST* of the DSP-10 SDR. Pioneering hams have built these units and used them to do unimagined things like making two-way QRP moonbounce contacts. The DSP-10 has provided a means for the ama-

Bob Larkin, W7PUA

teur community to learn about SDRs.

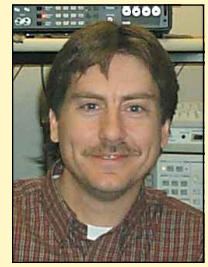
Modern digital signal processing (DSP) technology has made extensive inroads into the domain of hard-wired components. With SDR, software generates radio signals, not a phase-locked loop oscillator, and DSP can generate a signal directly over a surprisingly large frequency range. Software also serves for filtering, automatic gain control and, more importantly, the direct modulation and demodulation of the signals used to communicate.

In the commercial world, SDR can be used over a range of tens of megahertz, with operating modes from "legacy" FM to modern spread spectrum. If a new mode is needed, the SDR can be hooked up to a computer and the new program installed—an instant upgrade! Ham manufacturers are jumping on this bandwagon, too.

TAPR (**www.tapr.org**) has begun offering a DSP-10 kit.

ARRL 2000 Technical Service Award

Steven Strauss, NY3B, of Orefield, Pennsylvania, is the winner of the ARRL 2000 Technical Service Award, which



recognizes the contributions of an amateur who conducts technical forums and demonstrations. Strauss is distinguished member of the Agere Systems technical staff, a past president of the Allentown Works Amateur Radio Club and trustee of K3ME. During his career he has worked in the areas of Integrated Services Digital Networks, audio and video compression, and high-speed digital modem technologies. Currently, he is a systems architect and consultant of DSP and Modem technologies.

Strauss has written several sections of the HomePNA specification and serves as the Study Group Chairman addressing HomePNA to ARRL liaison (RFI) activities. He has written many technical contributions to the ITU-T and TR30 committees in support of home networking initiatives. He has also looked to minimize the affects of RFI egress and ingress to the ARS in high-speed modem technology.

Strauss has more than a dozen patents pending in support of his research and development activities pertaining to high-speed modem and home networking technologies. He's also published 25 technical articles and frequently speaks at various technical and industry conferences throughout the world.

The Board authorized General Counsel Imlay and Executive Vice President Sumner to complete and file a petition to the FCC asking for a secondary domestic allocation at 5.250–5.400 MHz. This band holds a lot of promise for filling in the propagation needs in the US between 40 and 80 meters. There have been active experimental licensees on the band, and those stations have proven the value of this possible new addition (Minute 22).

The Board also officially approved the long-anticipated *Logbook of the World* project. The system will make it much easier for people to participate in all ARRL awards programs (and awards programs of other organizations) through the use of electronic confirmations within a giant database of QSO information maintained at ARRL Headquarters. The system will use digital security methods to help ensure that data will be authentic, and will provide a new alternative to the use of traditional QSL cards, which have to be collected and verified by card checkers for most awards (Minute 25). Logbook of the World will eventually be integrated seamlessly into the DXCC software system to make a wonderful combination that, accessed through *ARRLWeb*, will thoroughly modernize ARRL awards programs. Everyone on the Board and on the HQ staff is looking forward to its implementation.

QRP is hot. The Board, recognizing this rising phenomenon, authorized the creation of a one-time, non-endorsable QRP DXCC award similar to the Millennium award (Minute 26), which will be available early in 2002. Also, the Board authorized the addition of the 30 meter band to the stable of DXCC awards available to DXers. The last band without its own DXCC award, 30 meters will also be added to the DXCC Challenge (Minute 65), but the starting date will be determined later and may not occur for as much as a year, so don't send your cards in yet.

President Haynie continued to stress the importance of getting youth involved in Amateur Radio. He showed the Board a slide presentation of a group of 20 wonderfully talented 7th, 8th and 9th graders who attended an intensive two week Amateur Radio course—Tech Camp, held in the Dallas area at Collin County Community College (**http://ftp.ccccd.edu/techcamp/**). Each youngster passed the Amateur Extra Class license exam at the end of the class! The Board did their part during this meeting by adopting a plan to encourage hamfest sponsors and other Amateur Radio-related events managers to allow free admission for those below the age of 16 (Minute 66).

Delta Division Director Rick Roderick, K5UR, receiving his DXCC Challenge plaque from Dave Sumner, K1ZZ (Minute 63).

Longtime Southeastern Division Vice Director Evelyn Gauzens, W4WYR, receiving a plaque commemorating her service to ARRL from President Haynie (Minute 43).

A very active Historical Committee asked the Board to ensure that the history of Amateur Radio was not forgotten. The Committee counted more than 5000 artifacts at Headquarters alone that need to be catalogued, stored and displayed. With the increasing interest in nostalgia and history throughout all facets of society, Amateur Radio is not alone. The Board recognized this need and authorized staff to take steps to begin this large project (Minutes 54, 55). *ARRLWeb* also has attracted attention as a source of historical information, and the Board directed staff to archive its contents for future archival use (Minute 67).

It was a busy meeting and much was accomplished. Please take a moment to look through the Summary of Major Board Actions to see what else happened. Each item has a reference to the appropriate spot in the Minutes. Copies of the reports of the Board Standing Committees, Ad-Hoc Committees and Advisory Committees will be available soon on *ARRLWeb*. QST

MOVED & SECONDED

2001 SECOND MEETING OF THE ARRL BOARD OF DIRECTORS

July 20-21, 2001

Summary Agenda

1. Roll Call
2. Moment of Silence
3. Consideration of the Agenda for the meeting
4. Approval of the Minutes of the 2001 Annual Meeting
5. Reports by the Officers
6. Receive Reports and Consider Recommendations of the Committees
7. Directors' motions

1. Pursuant to due notice, the Board of Directors of the American Radio Relay League, Inc, met in annual session at the Hartford Marriott/Rocky Hill, Rocky Hill, Connecticut on Friday, July 20, and Saturday, July 21, 2001. The meeting was called to order at 8:35 AM EDT, July 20, with President Jim Haynie, W5JBP, in the Chair and the following Directors present: Bernie Fuller, N3EFN, Atlantic Division; George R. Isely, W9GIG, Central Division; Jay Bellows, K0QB, Dakota Division; Rick Roderick, K5UR, Delta Division; George Race, WB8BGY, Great Lakes Division; Frank Fallon, N2FF, Hudson Division; Wade Walstrom, W0EJ, Midwest Division; Tom Frenaye, K1KI, New England Division; Greg Milnes, W7OZ, Northwestern Division; James Maxwell, W6CF, Pacific Division; Dennis Bodson, W4PWF, Roanoke Division; Walt Stinson, W0CP, Rocky Mountain Division; Frank M. Butler, W4RH, Southeastern Division; Fried Heyn, WA6WZO, Southwestern Division; Coy Day, N5OK, West Gulf Division.

Also present without vote were Joel M. Harrison, W5ZN, First Vice President; Kay C. Craigie, WT3P, Vice President; John Kanode, N4MM, Vice President; Rodney J. Stafford, W6ROD, International Affairs Vice President; James McCobb, W1LLU, Treasurer; David Sumner, K1ZZ, Executive Vice President and Secretary; Chief Operating Officer Mark Wilson, K1RO; and Chief Financial Officer Barry J. Shelley, N1VXY.

Also in attendance at the invitation of the Board as observers were the following Vice Directors: William Edgar, N3LLR, Atlantic Division; Howard Huntington, K9KM, Central Division; Twila Greenheck, N0JPH, Dakota Division; Henry Leggette, WD4Q, Delta Division; Gary Johnston, KI4LA, Great Lakes Division; Stephen Mendelsohn, W2ML, Hudson Division; Bruce Frahm, K0BJ, Midwest Division; Mike Raisbeck, K1TWF, New England Division; James Fenstermaker, K9JF, Northwestern Division; Robert Vallio, W6RGG, Pacific Division; Les Shattuck, K4NK, Roanoke Division; "Rev" Morton, WS7W, Rocky Mountain Division; Evelyn Gauzens, W4WYR, Southeastern Division; Art Goddard, W6XD, Southwestern Division; and David Woolweaver, K5RAV, West Gulf Division. Also present were General Counsel Christopher D. Imlay, W3KD; Membership Services Manager Wayne Mills, N7NG; Field and Educational Services Manager Rosalie White, K1STO; Technical Relations Manager Paul Rinaldo, W4RI; Legislative and Public Affairs Manager Steve Mansfield, N1MZA; and Special Assistant to the Executive Vice President David Patton, NT1N. Present as guests of the Board were Radio Amateurs of Canada (RAC) Vice President Ken Pulfer, VE3PU, and William Cross, W3TN, of the Federal Communications Commission.

2. The assembly observed a moment of silence in recollection of Radio Amateurs who have passed away since the previous Board meting, especially Carl Elwin "Andy" Andersen Sr, W3XE; Andrew A. Andros, W0LTE; Chester B. Atkins, W4CGP; Jack R. Carter, KC6WYX; Walter Davis, WA6ODQ; Edward R. Doubek, N9RF; Vince Farenga, K2HCP; John W. Foster, W0YDX; Ronnie Gann, ex-W1FGF; Jack E. Goforth, K4IBP; Al Gross, W8PAL; Thomas A. Henderson, K4CIH; Hendrik Johannes Jesse, PA0CII; Ed Kracum, WB2COP; Javier Ledesma, EA4AV; Dale Marquis, WA4EZU; Jack A. McCullough, ex-W6CHE; Jake McHendrix, WD4PBF; Bill Orr, W6SAI; Joe C. "Pat" Patterson, W5VY; Thomas Powell, K3YPO; Maurice Ricks, NQ3E; Bob Rose, KW2V; Bob Samuelson, ex-W9RAD; Francis Shepard, W7HAH; Andrew V. Smith, W7JMW; Ross Stevens, W0XJ; Arnold Tamchin, W2HCW; Walter Taylor, K2MLT; George Thurston III, W4MLE; Richard "Rick" Vahan, N4PBF; Joe White, K0CNV; and Taroh Yagi, JH1WIX.

3. On motion of Mr. Heyn, seconded by Mr. Bodson, the agenda of the meeting was ADOPTED as presented.

4. On motion of Mr. Race, seconded by Mr. Milnes, the Minutes of the 2001 Annual Meeting were ADOPTED.

5. Mr. Pulfer conveyed the greetings of the Radio Amateurs of Canada, Inc. He thanked Mr. Haynie for attending the RAC Board meeting earlier in the year. He also reported that RAC's relationship at present with Industry Canada is perhaps the best it has ever been. Mr. Pulfer expressed his concern with growing threats to the lower microwave bands in Canada.

6. Mr. Frenaye conveyed the greetings of the ARRL Foundation. He reported that the Foundation's assets have climbed to the $2.1 million dollar mark, and noted that there is a new fund created by the Boring Amateur Radio Club, the WRTC USA Youth Fund, with the purpose of helping young contesters fund travel to future World Radiosport Team Championship sites.

7. At this point, the officers reported on their activities during the first half of 2001. President Haynie began his report with his impressions of the many Amateur Radio gatherings he has attended during the first six months of this year. He visited seven divisions during this time. Mr. Haynie reported being very impressed with the attendance at many forums especially the ARRL forums at all events. He reported that the meetings in Washington DC with the Washington Watch Group and various legislators and agency staff, have been successful and productive and that he looked forward to future meetings. The ARRL has been invited to organize an "Amateur Radio Day at the FCC" in September.

8. First Vice President Harrison supplemented his written report with comments about the ARRL field organization, his participation in meetings in Washington and the international convention in Friedrichshafen, Germany, and the good news about the operational capabilities of the AO40 satellite.

9. Vice President Craigie commented on the fabulous results shown from a two week intensive Amateur Radio course for kids called "Tech Camp" at a community college near Dallas. Each of the kids in the course passed the Extra Class exam and some attended HamCom. She stressed that all Amateurs must continue to promote the idea that Ham Radio is for all age and socioeconomic groups.

10. Vice President Kanode supplemented his written report with comments about the progress made in the Membership Services Committee, and the status of the Pitcairn Island Amateur Radio Association's application for membership in the IARU.

11. At this point Executive Vice President Sumner presented the new DXCC Challenge plaque, endorsed with 2000 band countries, to Vice President Kanode (Applause.)

12. International Affairs Vice President Stafford supplemented his extensive written report with comments about the operational status of IARU Region 2 and plans for the upcoming Region 2 meeting in Guatemala in October. He also reported that the 40 meter band harmonization is going well in the Region with welcome assistance from CITEL.

13. On motion of Vice President Stafford, seconded by Mr. Fallon, it was unanimously VOTED that the Secretary is instructed to cast a vote on behalf of the ARRL in favor of IARU proposal No. 232, concerning the admission of the Pitcairn Island Amateur Radio Association to the IARU.

14. Treasurer McCobb presented his report on the status of the ARRL's investment portfolio and his observations of the stock market over the last six months. The League's position is down at present due to the decline in the market and planned disbursements. The Board was in recess from 10:05 AM until 10:25 AM.

15. At this point the Chair thanked Mr. Cross for addressing the Board informally on the previous evening. Mr. Cross left the meeting. Executive Vice President Sumner then presented his report with comments on his satisfaction with the functioning of staff after the recent reorganization. He has focused much of his time on advocacy efforts and on the search for a chief development officer.

16. Chief Operating Officer Wilson supplemented his extensive written report with an update on his activities since the headquarters reorganization including the status of the ongoing efforts to complete the remaining staffing requirements.

17. Chief Financial Officer Shelley discussed ARRL's financial condition and related that at this point in the year the organization is slightly ahead of budget projections.

18. At this point the Chair led the Board in a short brainstorming session in order to discuss various issues of concern. The Board was in recess for lunch at 11:51 AM until 1:10 PM reconvening with all persons hereinbefore mentioned except Mr. Cross.

19. Mr. Mansfield, Manager of Legislative and Public Affairs, supplemented his extensive written report and references with a discussion of ARRL's continuing possibilities and strategies to deal with the ever more serious CC&R problems.

20. Mr. Rinaldo, ARRL's Technical Relations Manager, delivered his report on the numerous activities of his office including work for the IARU/ITU, WRC-2003 including 7 MHz broadcasting/Amateur issues, and several ITU groups.

21. General Counsel Imlay's report covered many issues and centered on his work to facilitate the League's interest in getting additional allocations at 135.7–137.8 kHz and 160-190 kHz, a primary allocation at 2400-2402 MHz, and a domestic allocation at 5 MHz. He also discussed more issues surrounding CC&Rs. The Board was in recess from 2:48 PM until 3:07 PM.

22. On motion of Mr. Roderick, seconded by Mr. Milnes, it was unanimously VOTED that the Executive Vice President and General Counsel shall complete the preparation of a petition for rule making proposing the domestic allocation on a secondary basis of the band 5,250-5,400 kHz, and file such petition with the FCC immediately. The petition will include the following operating parameters:

1. Full Amateur operating power.

2. Access to the allocation by licensees holding General, Advanced, or Amateur Extra Class.

3. All emission modes authorized for other

present amateur HF bands, without creation of subbands by regulation.

23. At this point, at 3:14 PM, on motion of Mr. Maxwell, seconded by Mr. Heyn, the Board VOTED to meet as a Committee of the Whole to discuss certain legal matters. At 3:17 PM the Committee of the Whole arose and reported to the Board. On motion of Mr. Harrison, seconded by Mr. Isely, it was VOTED that the report from the Committee of the Whole be accepted.

24. Mr. Fallon, as Chairman, presented the written report of the Membership Services Committee. He reported that the newly implemented Card Checker program is very successful with twenty percent of the DXCC credits presented to the system coming from Card Checkers. Contesting is also increasing in interest and log submissions.

25. On motion of Mr. Fallon, seconded by Mr. Stinson, it was unanimously VOTED that the ARRL proceed with the implementation in 2002 of the Logbook of the World Program to electronically process log data for DXCC and other awards.

26. On motion of Mr. Fallon, seconded by Mr. Roderick, it was unanimously VOTED that a one time non-endorsable DXCC award similar to the DXCC Millennium Award be offered for contacts made using QRP power levels.

27. On motion of Mr. Frenaye, seconded by Mr. Isely, it was unanimously VOTED that the following resolution is ADOPTED:

WHEREAS, emergency communications capabilities are essential to the basis and purpose of amateur radio worldwide,

THEREFORE, BE IT RESOLVED, that ARRL Field Day rules be modified to support the full participation of all Region 2 countries, and that an invitation be extended to all Region 2 radio societies to participate in Field Day beginning in 2002.

28. Mr. Maxwell, as Chairman, presented the extensive written report of the Volunteer Resources Committee, and noted that the committee had spent considerable time reviewing the Rules and Regulations of the ARRL Field Organization.

29. On motion of Mr. Bodson, seconded by Mr. Stinson, it was unanimously VOTED that the ARRL Board of Directors selects Bill Morine, N2COP, as recipient of the 2001 Philip J. McGan Silver Antenna Award. (Applause.)

30. On motion of Mr. Fallon, seconded by Mr. Fuller, it was unanimously VOTED that the ARRL Board of Directors selects George Tranos, N2GA, as the recipient of the 2000 Herb S. Brier Instructor of the Year Award. (Applause.)

31. On motion of Mr. Heyn, seconded by Mr. Maxwell, it was unanimously VOTED that the ARRL Board of Directors selects Allan Cameron, N7UJJ, as the 2000 ARRL Professional Educator of the Year. (Applause.)

32. On motion of Mr. Maxwell, seconded by Mr. Heyn, it was unanimously VOTED that the ARRL Board of Directors selects Richard Flanagan, W6OLD, as the winner of the 2000 ARRL Excellence in Recruiting Award. (Applause.)

33. On motion of Mr. Walstrom, seconded by Mr. Fallon, it was unanimously VOTED that the ARRL Board of Directors selects Thaddeus W. Huff, KC0AQG, as winner of the 2000 ARRL Hiram Percy Maxim Award. (Applause.)

34. On motion of Mr. Fuller, seconded by Mr. Bodson, it was unanimously VOTED that the ARRL Board of Directors selects Steven Strauss, NY3B, as the recipient of the 2000 ARRL Technical Service Award. (Applause.)

35. On motion of Mr. Milnes, seconded by Mr. Stafford, it was unanimously VOTED that the ARRL Board of Directors selects J.P. Martinez, G3PLX, and R.S. Larkin, W7PUA, as winners of the two ARRL Technical Innovation Awards. (Applause.)

36. On motion of Mr. Frenaye, seconded by Mr. Bodson, it was unanimously VOTED that the ARRL Board of Directors selects Paul Wade W1GHZ, as the recipient of the ARRL Microwave Development Award. (Applause.)

37. On motion of Mr. Bodson, seconded by Mr. Frenaye, it was unanimously VOTED that the ARRL Board of Directors selects Howard Teller, KH6TY, and Dave Benson, K1SWL, as the recipients of the 2000 Doug DeMaw, W1FB, Technical Excellence Awards for their article, "A Panoramic Transceiving System for PSK31," which appeared in the June 2000 issue of *QST*. (Applause.) At this point the Board was in recess from 4:11 PM until 4:21 PM.

38. Mr. Stinson, as Chairman, presented an extensive report on the activities of the Administration and Finance Committee. He reported that the installation of the new computer system at Headquarters was moving along satisfactorily. The yearly audit of ARRL revealed no problems. The committee is reviewing program spending throughout the universe of ARRL activities and will submit recommendations at the 2002 Annual Meeting.

39. It was moved by Mr. Stinson, seconded by Mr. Day, that effective October 1, 2001, Bylaw 6 is amended by striking the text and substituting therefor the following:

Bylaw 6. The Executive Vice President may establish a reduced dues rate for Full members who have not reached the age of 22 years, provided that this rate shall not be less than 50% of the rate established in Bylaw 4. This rate shall not be available for Life membership.

A roll call vote being required, the question was decided in the affirmative with 14 Directors voting aye and Mr. Heyn voting nay.

40. It was moved by Mr. Stinson, seconded by Mr. Isely, that effective October 1, 2001, Bylaw 7 is amended by striking the phrase "The special dues rate of $5.00 annually" and substituting therefor: "A special dues rate of 20% of the annual rate established in Bylaw 4, rounded to the nearest dollar." A roll call vote being required, the question was decided in the affirmative with 14 Directors voting aye and Mr. Walstrom voting nay.

41. It was moved by Mr. Stinson, seconded by Mr. Roderick, that Bylaw 37 is amended by inserting a new subparagraph c) reading as follows: "c. The Chief Development Officer, who shall have responsibility for and supervision over any and all matters relating to fundraising, including but not limited to annual and planned giving, endowments, grants, and other gifts. He shall under the general direction of the Executive Vice President, employ such personnel as may be necessary for the effective accomplishment of the duties set forth in the By-Law. He shall perform such other duties as may be assigned to him by the Executive Vice President. His entire time shall be devoted to the duties as set forth above. He shall furnish a bond satisfactory to the Board of Directors, the expense of the same to be borne by the League." A roll call vote being required, the question was decided in the affirmative with all Directors voting aye.

42. Mr. Bellows, as Chairman, presented the report of the Election Committee with the emphasis being on the upcoming Fall elections. The Board was in recess from 5:37 PM, July 20, until 8:35 AM, July 21 reconvening with all persons hereinbefore mentioned, except Mr. Cross, and with Vice Director Gauzens in the Chair.

43. President Haynie returned to the Chair and presented Mrs. Gauzens with a plaque commemorating her 22 years of service to the ARRL as Southeastern Division Vice Director. (Applause.) He then reported briefly for the Executive Committee.

44. Mr. Harrison, as Chairman, presented the extensive written report of the Ad-Hoc Spectrum Strategy Committee. The report outlined the status of several ongoing projects assigned to it by the Board at the 2001 Annual Meeting. Among the major issues under study are the design and implementation of a noise study, the sharing of Amateur spectrum with Part 15 devices, and the use of the Lab for testing various Part 15 devices such as Bluetooth.

45. Mr. Harrison, as Board liaison, gave the report of the SAREX Working Group with the assistance of Ms. White. Ms. White reported that NASA is pleased with the performance of the present Amateur Radio program on the Space Station, and the positive publicity that has been generated thanks to the ARISS QSOs with schools around the world. The Working Group is continuing work to place additional equipment aboard the Space Station.

46. Mr. Harrison, as Chairman, presented the report of the Technology Task Force. The Committee has reviewed its methods for evaluating nominations for ARRL technical awards. The ARRL Technology Working Group on Digital Voice submitted its progress report. Other issues of the TTF included producing background papers regarding high speed Digital Networks and Multimedia (HSMM) and Software Defined Radio (SDR), and identifying and inviting experts in these fields to serve as members of the working groups. The TTF also recommended pursuing an organized procedure for creating a 160 meter band propagation study using low power unattended beacons.

47. On motion of Mr. Harrison, seconded by Mr. Roderick, it was unanimously VOTED that the following resolution is adopted:

WHEREAS, significant experimentation with signal propagation is ongoing in the 160 meter amateur band; and

WHEREAS, beacon operation in that band is permitted pursuant to Section 97.203 of the FCC rules, but only while under local or remote control; and

WHEREAS, automatically controlled beacon operation in the 160 meter band is reasonably necessary for a fixed period of time to gather accurate propagation data; and

WHEREAS, a previous request by radio amateurs active in such propagation research resulted in the ARRL Board directing, at Minute 69 of the 2001 Annual Meeting, the Technology Task Force to study the matter;

NOW, THEREFORE, it is RESOLVED that the General Counsel shall prepare a request for an experimental license or Part 97 waiver, as appropriate, for the ARRL to conduct automatically controlled beacon operations in the 160 meter amateur band. These beacons shall be contained in the frequency segment 1800-1801 kHz and 1999-2000 kHz.

It is further RESOLVED that the Technology Task Force develop standard guidelines for data collection, storage and analysis to be used for this propagation study.

48. At this point, at 9:29 AM, on motion of Mr. Maxwell, seconded by Mr. Harrison, the Board VOTED to meet as a Committee of the Whole to discuss Field Organization personnel matters. At 10:09 AM the Committee arose and reported to the Board.

49. On motion of Mr. Race, seconded by Mr. Roderick, it was VOTED that the report from the Committee of the Whole be accepted. The Board was in recess from 10:11 AM until 10:32 AM.

50. Mr. Bodson, as Chairman, presented details on the activities of the RFI Task Group that included a report on automotive electromagnetic compatibility and the expanded capabilities of the ARRL lab with regard to RFI issues.

51. Mr. Huntington, as Board liaison, gave the report of the RF Safety Committee. He noted that Dr. Greg Lapin, N9GL, was appointed to the FCC's Technological Advisory Council, representing ARRL on that body. The committee continues to monitor the NCI epidemiological study of radio amateurs, and assisting the investigators to maintain the highest level of accuracy.

52. Mr. Johnston, as Board Liaison, reported on the activities of the Public Relations Committee. The Committee under the leadership of Diane Ortiz, K2DO, has come together as a group, with

the main activity in the first half of 2001 being the update of the ARRL public information coordinator/public information officer handbook. The next project is an in-flight magazine article.

53. Mr. Frenaye, as Chairman, supplemented the report of the Historical Committee with the results of the first attempt to determine the actual number of artifacts in need of cataloguing, storage, and/or display—over 5,000 at Headquarters alone. The Committee offered several options for undertaking this effort. At this point Vice Director Shattuck left the meeting.

54. On motion of Mr. Maxwell, seconded by Mr. Harrison, it was unanimously VOTED that the following resolution is adopted:

BE IT RESOLVED: The ARRL Board of Directors believes that the "past is prologue to the future." We acknowledge the linkage between Amateur Radio's long and creative history and the development of modern communications technology. Such technology has made a major contribution to modern life. Therefore, we endorse a firm commitment to preserving the history of Amateur Radio and its connection and contribution to modern technology through the preservation of ARRL archives, historical records and collection of historical objects. By preserving the past, we are looking toward the future. This forward looking commitment is for the benefit of contemporary scientific researchers, experimenters and historians as well as for the Amateur Radio community itself.

55. On motion of Mr. Frenaye, seconded by Mr. Bodson, it was unanimously VOTED that the recommendation in the report of the Historical Committee be adopted as steps towards the preservation and future display of Amateur Radio historical artifacts, documents and photographs.

56. Mr. Bellows, as Chairman, reported on the activities and recommendations of the Ad Hoc Antenna Case Assistance Committee. The Ad Hoc Antenna Case Committee has elected to partially fund the continuing antenna case of Barry and Kathy Gorodetzer, of Fort Lauderdale, Florida. This case, regarding CC&Rs, meets the evaluation criteria of the Committee and if successful stands to benefit Amateurs as a legal precedent setting example. Mr. Harrison assumed the Chair at 11:20 AM.

57. Mr. Roderick, as Chairman, presented the report and recommendations of the 160 Meters Band Plan Ad Hoc Committee. A recommended band plan was created based upon the heavy input of Amateurs responding to the Committee's request. Mr. Haynie returned to the Chair at 11:40 AM. On motion of Mr. Roderick, seconded by Mr. Frenaye, it was VOTED that the following 160 Meters band plan revisions developed by the 160 meters band plan committee after input from hundreds of 160 meters band users be adopted:

Recommended ARRL 160 Meters Band Plan (1.8 – 2.0 MHz)

1.800 – 1.810	Digital modes CW QRP
1.800 – 2.000	CW
1.843 – 2.000	SSB SSTV and other wideband modes SSB QRP
1.995 – 2.000	Experimental
1.999 – 2.000	Beacons

58. Mr. Stafford, as Chairman, summarized the activities and preliminary results of the survey created by the Novice Spectrum Study Committee. The survey will appear in the September, 2001 *QST*.

59. Mr. Goddard, as Chairman, summarized the activities of the ARRL Industry Advisory Council. The highlights of the report included the committee's decision that its proposed connector standards be adopted and presented to the Japan Amateur Radio Industry Association. He also reported that Radio Shack plans to include Ham Radio promotional material in the packaging of scanners and short wave radios. The Board was in recess from lunch at 12:20 PM until 1:12 PM reconvening with all persons hereinbefore mentioned except Mr. Shattuck and Mr. Cross.

60. Mr. Frenaye, as Board Liaison, presented the report of the Contest Advisory Committee, which has worked hard on its task of completely reviewing and recommending any needed changes to the ARRL Club Competition Program. The preliminary report recommends that the CAC continue its work on three subareas of its study—club area definitions, modification of meeting attendance criteria, and allocation of single operator contest scores to more than one club.

61. Mr. Walstrom, as Board Liaison, presented the report of the DX Advisory Committee, and noted that the DXAC has been successful in its work to assist Section Managers to fill vacancies in the Card Checker program. There are presently 15 vacancies remaining and the program is working well—Card Checkers have examined over 20% of the cards submitted in 2001's DXCC program, thus reducing the checking required at Headquarters.

62. Mr. Haynie, on behalf of Joe Moell, K0OV, ARRL ARDF Coordinator, presented a report on the activities involving Amateur Radio Direction Finding. Mr. Haynie plans to attend the upcoming ARDF Championships in Albuquerque.

63. At this point Executive Vice President Sumner presented a DXCC Challenge plaque, endorsed with 2500 band countries, to Mr. Roderick. (Applause.)

64. Before moving to consider Directors' motions, Mr. Haynie opened the floor for general discussion. Following discussion, on motion of Mr. Roderick, seconded by Mr. Isely, it was unanimously VOTED that the Executive Vice President and staff develop and implement a program to assemble, coordinate and disseminate to amateurs information to assist them in their efforts to obtain relief from state and local land use restrictions. This program shall include, but not be limited to:

A "how-to" guide for amateurs seeking to implement state "PRB-1 Legislation;"

Ordinance language samples to exempt amateur antennas from commercial tower ordinances; and

Sample ordinances applicable to amateur antennas and support structures.

65. On motion of Mr. Kanode, seconded by Mr. Frenaye, it was unanimously VOTED that in accordance with IARU Resolution 88-2 as endorsed by IARU Region 2 in 1989, the DXCC program be revised to allow for a single band 30 meters award and 30 meters band inclusion in the DXCC Challenge Award, to be implemented when administrative resources permit.

66. On motion of Mr. Walstrom, seconded by Mr. Fallon, it was unanimously VOTED that the following resolution is adopted.

WHEREAS, young people are the future of Amateur Radio; and

WHEREAS, young people should be encouraged whenever and where ever possible to discover more about Amateur Radio;

THEREFORE RESOLVED, that organizers of hamfests and conventions sanctioned by the ARRL shall be encouraged to provide free admission to such sanctioned events to individuals below the age of 16 years when those individuals are accompanied by an attendee who pays the full price of admission to the event.

67. On motion of Mr. Frenaye, seconded by Mr. Maxwell, it was unanimously VOTED that the following resolution is adopted.

WHEREAS, the amount of valuable news and information available on the ARRL web site has increased rapidly over the past few years,

RESOLVED, that steps be taken to preserve the content for future archived historical purposes.

68. On motion of Mr. Frenaye, seconded by Mr. Milnes, it was unanimously VOTED that the Public Relations Committee review current ARRL materials available for presenting Amateur Radio to the general public and develop a plan for the expansion and improvement of these materials.

69. On motion of Mr. Frenaye, seconded by Mr. Harrison, it was unanimously VOTED that ARRL continue to work with Internet security organizations to develop and improve capabilities to support emergency communications needs of those responsible for ensuring that the Internet has high reliability.

70. On motion of Mr. Stinson, seconded by Mr. Heyn, it was unanimously VOTED that the League shall, at the appropriate time, file a formal request that the FCC modify its 1×1 call sign program to accommodate the issuance of temporary 2×1 callsigns from United States prefixes designating areas which contain no bonafide mailing addresses.

71. It was moved by Mr. Heyn, seconded by Mr. Bellows, that the word "administered" be replaced with "governed" in the last sentence of Article 1 of the ARRL Articles of Association. A roll call vote being required, the question was decided in the affirmative with all Directors voting aye.

72. On motion of Ms. Craigie, seconded by Mr. Kanode, it was unanimously VOTED that the Executive Committee shall study the procedures and qualifications concerning election of Honorary Vice Presidents. They shall report the results of the study, including any recommended changes, at the annual meeting in January 2002.

73. The Board was in recess from 2:58 PM until 3:10 PM, at which time, on motion of Mr. Bellows, seconded by Mr. Isely, it was unanimously VOTED that the following resolution is adopted.

WHEREAS, the ARRL Board of Directors recognizes that private Covenants Conditions and Restrictions (CC&Rs) prohibiting or preventing the use of Amateur Radio Antennas in residential areas effectively ban Amateur Radio in those areas; and

WHEREAS, Covenants, Conditions and Restrictions prohibiting Amateur antennas have proliferated over the past twenty years; and

WHEREAS, Congress has recognized that the ability to erect and use outdoor antennas in areas controlled by CC&Rs is essential to the viability of communications services in residential areas; and

WHEREAS, the ability of Amateurs to erect and use antennas is as essential to the existence of Amateur Radio as the defense of Amateur Radio Spectrum, and

WHEREAS, the resolution of this growing threat to the Amateur Radio Service will require the long term commitment of the ARRL and its members;

NOW, THEREFORE BE IT RESOLVED, that the ARRL Board of Directors identifies and adopts as a major goal of our Advocacy activities legislative action granting the Amateur Radio Service this same level of protection from CC&Rs prohibiting or restricting Amateur Radio antennas as is presently available to other Services, and that a plan of overall strategy be developed by the Executive Committee to direct and focus the efforts of the various entities of the ARRL to achieve that goal.

74. Those present were invited to make informal closing comments.

75. On motion of Mr. Heyn, seconded by the entire assembly, it was unanimously VOTED to thank Lisa Kustosik and staff for their support of the meeting.

76. There being no further business, the Board adjourned *sine die* at 3:50 PM. (Time in session as a Board: 11 hours, 54 minutes; Time in session as a Committee of the Whole: 43 minutes.)

David Sumner, K1ZZ
Secretary

HAPPENINGS

Novice Spectrum Survey Draws Heavy Response

As of late July, more than 1700 ARRL members had expressed their opinions on possible ways to optimize use of the present Novice and Technician Plus allocations on 80, 40, 15 and 10 meters. Survey results ultimately might form the basis of an ARRL petition for rule making before the FCC, and members still have an opportunity to participate. A copy of the Novice Spectrum Study survey appears elsewhere in this issue, and it remains available to members on the ARRL Web site, **www.arrl.org/members-only/NoviceSurvey.html**.

Appointed by President Jim Haynie, W5JBP, the Novice Spectrum Study Committee is chaired by ARRL International Affairs Vice President Rod Stafford, W6ROD. The panel has been examining the status and usage of the present Novice HF bands with an eye toward determining what changes might be needed now that the FCC no longer issues new Novice licenses. The membership survey is part of the ARRL Board's mandate to the committee. The panel presented an interim report at the July ARRL Board meeting. A final report is due at the annual meeting next January.

In addition to the survey responses tallied, several dozen more comments were filed by members and nonmembers alike via e-mail to **novicesurvey@arrl.org**. "The written comments for the most part have been thoughtful and reasoned and are highly appreciated by the committee," said Dave Patton, NT1N, who's Headquarters staff liaison for the panel.

"If you haven't filled out your survey yet, please take a few minutes and do so," Patton urged. "Please make sure to read the entire text of the survey to help understand some of the assumptions made by the committee regarding what questions to ask and what band segments and modes to offer as predefined options."

Generally speaking, the committee's predefined options propose retaining Amateur Extra CW subbands on the affected bands, setting aside expanded CW reserves for all license classes except Technicians who have not passed Element 1, and dividing the remaining spectrum into expanded phone segments for General, Advanced and Extra operators.

Many have offered separate opinions on the process. "Although I operate and prefer CW over phone, I welcome the expansion of the phone bands for Extra class operations, especially on 75 meters," one member wrote.

As another respondent put it, "it seems logical to me to give full CW privileges down to .025 on all bands to anyone who has passed 5 WPM. This gives the Novice/Tech Plus operators space to practice and improve, as well as the ability to operate where there is more activity."

Other comments recommended no change or expansion in privileges for Novice or Technician Plus operators on the affected bands—an option that the survey provides. Not all commenters were happy. "By handing Novices significant amounts of additional bandwidth 'free of charge' you remove one of the key motivators to upgrading, namely access to additional bandwidth!" one said about the predefined choices.

The Novice Spectrum Committee has said no license class would lose privileges under any of the proposed refarming schemes. The Committee has suggested that Novice/Tech Plus CW band restrictions on 80, 40, 15 and 10 meters be changed to match those of the General class CW/RTTY/data band segments, with the caveat that Novice/Tech Plus operators only run CW on 80, 40, and 15 at up to 200 W. Novices already may operate RTTY and data on 10 meters. Novice refarming also would restore full privileges to higher-class operators in the 80, 40, and 15-meter Novice bands, where all license classes now are limited to 200 W output.

Susan Helms Thrills Field Day Ops From Space

Astronaut Susan Helms, KC7NHZ, took time out aboard the International Space Station in late June to join in the ARRL Field Day fray. It was believed to be the first Field Day operation from space.

As NA1SS, Helms worked several dozen stations as the ISS passed over the US. ARRL Contest Branch Manager Dan Henderson, N1ND, said the contacts will count for Field Day credit but not for satellite bonus points.

To recognize her FD effort as well as her outstanding participation in a series of Amateur Radio on the International Space Station school contacts, ARISS surprised Helms with an ARRL Field Day 2001 pin. The token was ferried up to the ISS on the July shuttle *Atlantis* mission and presented to Helms by shuttle crew member Jim Reilly.

"We were so impressed with Susan's abilities on the air that we wanted to give her a little recognition for her efforts," said ARISS International Board Chairman Frank Bauer, KA3HDO. A formal letter of presentation accompanied the pin. "Your pioneering efforts as a Field Day contester set a high standard for future crews who will participate in this annual June event," it read in part.

NASA

Astronaut Susan Helms, KC7NHZ, proudly wears her ARRL Field Day pin. The ARISS ham transceiver is at the upper left.

The NA1SS Field Day operation infused a lot of enthusiasm into the occasion. "This Field Day is the one I'll remember the most, even after doing FD for 40 years," said Jim Romelfanger, K9ZZ, of Wisconsin, who worked NA1SS as part of the WB9FDZ Yellow Thunder Amateur Radio Club Field Day crew.

At the Federal Way Amateur Radio Club's WA7FW operation in Washington, Dave Swartz, KC7RRH, also snagged NA1SS. Swartz said he was "very psyched" about working Helms but disappointed not to get the bonus points.

Henderson said the ISS contacts will not count for bonus points because the ISS is not an "Amateur Radio satellite," as rule 7.3.7 specifies. But, he added, Helms' ISS Field Day entry will end up "in a class by itself."

Rick Lindquist, N1RL ♦ Senior News Editor

ARISS IS ON A ROLL!

During their somewhat extended stay in space, ISS Expedition 2 crew members Jim Voss and Susan Helms, KC7NHZ, have had a busy time participating in the Amateur Radio on the International Space Station—ARISS—program. Sponsored by ARRL, NASA and AMSAT, ARISS has put dozens of youngsters in direct contact with the ISS crew members via Amateur Radio. In the course of it all, Voss also was able to greet his college alma mater, and Helms got to say hello to her parents.

But most important were the many youngsters who spoke to the crew on ham radio, becoming a part of space history in the process.

On June 21, Voss took questions from eight students who attended several schools in the Boulder, Colorado, area. Participants ranged from elementary school age through college, including one who attends the University of Colorado in Boulder, Voss' alma mater. The students gathered at the home station of Bill McCaa, K0RZ, for the linkup.

In response to one high schooler's question Voss explained that the body adapts very quickly to space, "and you feel like you're right at home, whether you're upside down or right side up."

Voss told the students that the view of Earth from the ISS "is truly beautiful!" Seeing Earth from space for the first time was "a very emotional experience," he said.

Helms took the opportunity to say "hi" to her parents during a June 27 ARISS contact with youngsters visiting the New Mexico Museum of Natural History and Science in Albuquerque. The contact was arranged at Helms' request. Patrick and Doris Helms are museum volunteers.

Seven third, fourth and fifth-graders enrolled in the museum's Space and Astronomy Day Camp stood by with their questions in hand. Given a tardy start and a mid-QSO change in frequency, not all of them had a chance to ask them, however. Elementary pupils from a nearby school also were on hand as visitors. Gerry Schmitt, KK5YY, handled the earthbound setup and answered youngsters' questions following the contact.

Helms told the youngsters that the astronauts are able to spot large physical features on Earth. "You can see the Grand Canyon and the Great Wall of China with no problem," she said.

Helms also took to the air as RS0ISS on July 4 to speak with students at the St Petersburg, Russia, Junior Technical Centre, RZ1AWO. This marked the first European school contact arranged under ARISS. Two young hams were among the students.

Wielding the NA1SS microphone July 12, Helms fielded 16 questions from the fourth-graders at Peebles Elementary School in Bourne, Massachusetts. Helms told the youngsters that, today, there are more opportunities than ever for both men and women to become a part of the space program. "There are going to be many many more astronauts, and you could be one of them," she said.

Helms said that being aboard the ISS—without a TV, a telephone or the Internet—made for a very peaceful and pleasant environment. "I'm a little worried about coming back to Earth and hearing all the noise," she conceded.

Helms, Voss and Russian cosmonaut Yuri Usachev, RW3FU, were scheduled to return to Earth in mid-August. The Expedition 3 crew is headed by US astronaut Frank Culbertson, KD5OPQ. He'll be joined by Russian cosmonauts Mikhail Turin and Vladimir Dezhurov.

Visit the ARISS Web site at **ariss.gsfc.nasa.gov**.

AMATEUR LF SIGNAL SPANS THE PACIFIC!

A signal transmitted on 184 kHz from ZL6QH—the Wellington, New Zealand, Amateur Radio Club's Quartz Hill station—has spanned the Pacific. The transmission, part of a series of announced transpacific tests, was received on June 30 by Steve McDonald, VE7SL, of British Columbia, Canada.

"A claim is made for the confirmed reception of ZL6QH by VE7SL, on 184.4 kHz, over a path of 11,709 km," said Bob Vernall, ZL2CA, who organized the transpacific tests. Vernall said that on June 30, seven New Zealand stations—including ZL6QH—and one Australian transmitted test signals in the 160-190 kHz band for the transpacific tests.

McDonald used *Argo* spectrographic software to capture the ZL6QH signal. The reception occurred right around the time of sunrise in British Columbia.

ZL6QH transmitted dual-frequency CW with two-minute elements, one frequency representing dits, the other dahs. The ZL6QH station was running approximately 100 W into a longwire antenna.

Amateurs spanned the Atlantic in both directions earlier this year on 136 kHz.

The ARRL has petitioned the FCC to authorize Amateur Radio allocations at 136 kHz and in the 160-190 kHz band. The petition is pending.

AO-40 NOW IN LONG-TERM "SAFE" ORBIT

AO-40's new orbit should be good for at least the next 20 years, according to AMSAT-DL President Peter Guelzow, DB2OS, who heads the satellite's ground team. Following maneuvers in June and July to shift the satellite's orbit, Guelzow said AO-40's perigee was "oscillating in a safe range between 810 and 1260 km."

The AO-40 ground team was analyzing whether the higher perigee would eliminate the effects of what's been described as "a mysterious force" that alters the satellite's attitude when it comes through perigee.

AO-40's height at apogee—58,971 km—was unaffected by the orbital shift. The satellite's transponders remained off as ground controllers reoriented the spacecraft but were turned on again in mid-July. Still in question was whether ground controllers would be able to deploy the satellite's solar panels.

Ground controllers were able to change AO-40's orbit through successive "cold" firings of the onboard arcjet motor—using only ammonia gas but not energizing the arcjet. Initial plans called for raising the perigee to around 500 km. The move raised AO-40 some 300 km higher than predicted, however, and unexpectedly depleted the spacecraft's ammonia supply.

Stacey Mills, W4SM, of the ground team said it's "quite possible" that an ammonia leak accounted for the unexpected depletion of fuel. "If we did have a slow leak, it is very fortunate we did not wait any longer to use the remaining fuel," he said. Mills said that AO-40's old orbital configuration, while stable, was too close for comfort at perigee.

"I sincerely hope that nothing else malfunctions for a long, long time, but this is, after all, rocket science," Mills said. "Nothing is guaranteed."

Ground controllers plan to thoroughly test AO-40's momentum wheels before making any decision to deploy the solar panels. The momentum wheels provide three-axis control of the spacecraft.

ARRL WELCOMES NEW HQ STAFFERS

Jan Carman, K5MA, John Phillips, K2QAI, and Mark Simcik, WA1VVB, have joined the ARRL Headquarters staff.

Carman, of W Falmouth, Massachusetts, is the new supervisor of the ARRL Book Team. He replaces Joel Kleinman, N1BKE, now *QST* managing editor.

ARRL

Jan Carman, K5MA

Carman's career has spanned the fields of aerospace, oil-field equipment, industrial control and instrumentation, underwater acoustics, communication systems, manufacturing automation and consulting. He holds bachelor's and master's degrees in electrical engineering from the University of Pennsylvania. His Amateur Radio interests include contesting, DXing and VHF/UHF weak-signal work.

Phillips, of Winsted, Connecticut, has assumed a position as radio frequency interference/electromagnetic interference engineer in the ARRL Lab. A native of Brooklyn, New York, Phillips holds a degree in electrical engineering and has worked in a number of RFI/EMI related positions, mainly in the military electronics field. He'll focus on assisting members with solutions to RFI problems and improving ARRL's RFI/EMI information capabilities. An Amateur Extra licensee, Phillips enjoys CW.

ARRL

John Phillips, K2QAI

Simcik, of Bloomfield, Connecticut, has joined the Electronic Publications Branch as a Web applications programmer. His career has been in the field of embedded software engineering and transaction processing. He's a University of Connecticut graduate with a degree in cognitive science—an interdisciplinary degree in computer science, linguistics and psychology.

ARRL

Mark Simcik, WA1VVB

Simcik recently upgraded to General class and now serves as the president of the Bloomfield Amateur Radio Club. He is an ARRL Life Member.

In Brief

• **Vote on *QST* Cover Plaque Award:** The winners of the *QST* Cover Plaque Award for June were Wes Hayward, W7ZOI, and Bob Larkin, W7PUA, for their article "Simple RF-Power Measurement." The winner of the *QST* Cover Plaque Award for July was Ed Krome, K9EK, for his article "Getting Started with AMSAT-OSCAR 40." Congratulations! 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.

• **Dayton attendance down slightly:** Dayton Hamvention General Chairman Jim Graver, KB8PSO, reports the official attendance at the 2001 Dayton Hamvention—the 50th event—was 26,151, down roughly 9% from last year's 28,804. Hamvention attendance peaked at 33,669 in 1993, before the change in date from April to May in 1996. Graver blamed rainy weather on the opening day of the event and high gasoline prices for the attendance drop. Graver also will chair next year's Dayton Hamvention.

• **DXCC announces 12 meter DXCC:** The ARRL DXCC Desk has announced the addition of the 12-Meter Single Band DXCC. Applications will be accepted starting July 2, 2001. The 12-Meter DXCC certificates will be dated but not numbered. Twelve-meter credits will not count toward the DeSoto Cup competition until October 1, 2001, but they will be included in the DXCC Challenge totals. For more information, see the ARRL Web site or e-mail **dxcc@arrl.org**.

• **Outgoing QSL Service tops one million cards for 2001:** The ARRL's Outgoing QSL Service Manager Martin Cook, N1FOC, reports that as of June 29, 2001, the service had shipped 1,041,316 QSL cards. This includes cards going to US incoming bureaus and cards sorted and mailed by contractor. "This is 135,456—15%—more cards than we had mailed at this time last year," Cook said. The Outgoing QSL Service handled 1,868,895 cards in 2000. For more information, visit the ARRL Outgoing QSL Service Web site, **www.arrl.org/qsl/qslout.html**.

• **KC8BFD is *Newsline's* 2001 Young Ham of the Year:** Patrick Clark, KC8BFD, a 17-year-old ARRL member from Elkview, West Virginia, has been named the 2001 *Amateur Radio Newsline* Young Ham of the Year. Award Administrator Bill Pasternak, WA6ITF, said Clark is heavily involved in public service, emergency communications and youth recruitment. The Young Ham of the Year Award is presented each year to a radio amateur 18 or younger who has provided outstanding service nationally or locally or has contributed to the betterment of the state of the art in communication through Amateur Radio. A licensee since age 10, Clark comes from an all-ham family. Among those supporting Patrick Clark's nomination was ARRL West Virginia Section Emergency Coordinator Mac McMillian, W8XF, who said he believes the future of ham radio is in good hands with amateurs like Patrick Clark, KC8BFD. The Young Ham of the Year Award is presented each year at the Huntsville Hamfest in Alabama.

• **ARRL member wins $100,000 design competition:** ARRL member Indranil "Kitchu" Majumdar, VU2KFR, of Calcutta, India, was the overall winner of the Texas Instruments Analog Design Challenge. A member of the Calcutta VHF Amateur Radio Society, Majumdar won the $100,000 top prize for designing a railway collision-avoidance system. The competition called on engineers to come up with real-world designs that utilized TI devices. VU2KFR's design incorporated a variety of Texas Instruments' power-management, interface, RF, logic and microcontroller products. Licensed since 1984, Majumdar has been an ARRL member since 1989. He's also a member of the Amateur Radio Society of India and of IEEE. VU2KFR was active during the Orissa cyclone disaster operation in 1999 and took part in the Sagar mobile operation last year, described by his brother, VU2HFR, in May 2001 *QST*.

"Mister Guitar," Chet Atkins, W4CGP, SK

One of the entertainment world's better-known radio amateurs—guitar picker, music legend and Amateur Radio operator Chester B. "Chet" Atkins, W4CGP, of Nashville—died June 30. He was 77. Atkins reportedly died of cancer.

Known as "Mister Guitar," Atkins—from East Tennessee—began his musical career in the 1930s playing fiddle. He earned his reputation as a guitarist, however, and went on to become the most-recorded solo instrumental musician in history. Formerly WA4CZD, Atkins, a General licensee, obtained the vanity call sign W4CGP—"certified guitar picker"—in 1998. He was an ARRL member.

To Gary Atkins, W0CGR, Chet Atkins was "Uncle Chester," and he was never as active on ham radio as he wanted to be. "He got his ticket about the time his career as a record producer became legend. He was extremely busy," Atkins said. "He always wanted to be a 'hot op' on CW but never found the time to really pursue it before he became seriously ill," Atkins said, adding that his uncle never upgraded for the same reason.

Atkins said his uncle's rig was installed in the kitchen, where he was able to tune the bands at breakfast and dinner. "He loved to listen in to the banter on 160 SSB," Gary Atkins said.

Chet Atkins won 14 Grammy awards during his career and was elevated to the Country Music Hall of Fame in 1973. He was presented with a Lifetime Achievement Award in 1993 by the National Academy of Recording Arts and Sciences. He had more than 100 albums to his credit.

In addition to his own success as a performer, Atkins helped launch the careers of other notable performers. He produced recording sessions for everyone from Elvis Presley to Perry Como as well as recording an album or two of his own work each year. He is given primary credit for developing the uptown "Nashville Sound" that helped country music to compete with pop music.

The late Chet Atkins, W4CGP (left) and his nephew, Gary Atkins, W0CGR, at a Chet Atkins Appreciation Society gathering in the mid-1990s.

In his later years, he sometimes paired up with musicians from the pop and jazz worlds and was a frequent guest on the radio program "A Prairie Home Companion."

A funeral service for Chet Atkins was held July 3 in Nashville's Ryman Auditorium, the former home of The Grand Ole Opry where Atkins performed for many years.

FCC News

FCC REVOKES HAM TICKET, FINES ALLEGED RADIO PIRATE

The FCC has revoked the Amateur and General Mobile Radio Service licenses of reputed pirate broadcaster Leslie D. "Doug" Brewer of Tampa, Florida, and fined him $11,000—the maximum possible forfeiture—for "willful and repeated violation" of the Communications Act. Brewer already owes the US government $11,000 in forfeitures assessed previously for similar alleged violations.

"Operating unlicensed radio facilities in deliberate and brazen defiance of our rules cannot and will not be tolerated," the FCC said in its *Order of Revocation and of Forfeiture*, released June 26. The FCC said that based on its considerable evidence, Brewer "lacks the basic character qualifications to be and remain a Commission licensee."

FCC and other sources say Brewer operated "The Party Pirate" on 102.1 MHz from his home. He was among those caught up in a November 1997 sweep by federal agents to shut down unlicensed broadcasting operations in Tampa. The FCC charges that he subsequently resumed unlicensed broadcasting and also sold unauthorized FM broadcast transmitting equipment.

Earlier this year, the FCC suspended Brewer's ham ticket, KC4HAZ, for the rest of its term while it initiated revocation proceedings. Brewer also held the GMRS call sign KAE1170.

Brewer, 46, runs a two-way radio and electronics shop. He's been the trustee of several Amateur Radio repeaters in Tampa and is well-known within the Tampa amateur community.

He was given 30 days to pay the fine or file a petition for reconsideration.

Amateur Enforcement:

♦ **FCC probes discrepancies at ARRL VEC exam session:** The FCC is auditing a May 10 ARRL VEC Amateur Radio examination session after viewing documents that FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth said "reflect several alarming discrepancies in testing procedures." The session was held in Trumbull, Connecticut. The ARRL VEC referred the test documents to the FCC as part of its responsibilities as a Volunteer Examiner Coordinator.

Ten volunteer examiners listed on the Test Session Report as having participated in the Trumbull session were suspended at least for the duration of the FCC inquiry. The suspensions are standard procedure in such cases, said ARRL VEC Manager Bart Jahnke, W9JJ.

In a June 28 letter addressed to the 10 VEs, Hollingsworth focused on discrepancies in documents submitted on behalf of one applicant, Elvis Mendez, KB1GPY, a Technician licensee from Revere, Massachusetts, who attempted to upgrade to Extra at the May 10 session. "It appears that Mendez, either before or during the examination, may have had access to the answer key used by VEs for grading Morse code examinations," Hollingsworth wrote. "In the alternative, his answer sheet may have been completed prior to the examination."

Hollingsworth also noted "a significant number of erasures" on the answer sheet, to VE grading marks and to the score of Mendez' Extra class written exam. "When correctly graded, Mendez score was 36 out of 50 rather than 40 out of 50 to which you certified," Hollingsworth said.

Mendez' Extra exam has been invalidated as a result of the discrepancies, Hollingsworth said. The FCC also has requested that the ARRL VEC maintain the VE suspensions until it completes its probe.

The FCC letter was sent to Kevin W. Cellini, N1KGM; Allen H. Silberstein, N1RWE; Andres A. Rosado, KB1FKJ; Peter J. Keyes, N1GOJ; Arthur L. Cartier III, N1VGT; Glenn J. Krieger, N1HAW; Freddy Martin, KB1FKI; Robert E. Moreland, KA1ZMF; Donald W. Stowe, N1VNM; and Kenneth A. Frissora, N1JKA. All are Amateur Extra licensees.

Hollingsworth has asked the VEs to explain in detail their role in the May 10 exam session. He also asked each VE to explain the discrepancies he outlined in his letter. QST

Ten-Tec Model 416 Titan II HF Amplifier

Reviewed by Dave Patton, NT1N

When Ten-Tec discontinued production of its Model 425 Titan amplifier in January 1997, it wasn't clear whether or not the well-known American amateur equipment manufacturer would replace it with another legal limit amp. The original Titan employed a pair of 3CX800A7 triodes in a desk-top RF deck (the power supply was in a separate enclosure) to help it secure its place in the high power HF world. That amp easily delivered 1500 W of RF output power on all of the HF bands with just 50 to 70 W of drive power.

The only concern brought up when we reviewed the previous version of the Titan (see "Product Review," *QST*, Apr 1986) was that the input drive power needed to be carefully monitored and controlled so as not to overdrive—and possibly damage—the tubes. This was not surprising, and the manual included just that precaution. With a couple of very popular 200-W output transceivers on the market at that time, the Titan was definitely subject to unintentional abuse. Would the new Titan II require the user to be as cautious?

The Titan II uses a single Svetlana 4CX1600B—a beefy, Russian-made tetrode—to easily deliver 1500 W of RF power output at input drive levels similar to those required by the Titan's pair of 3CX800A7s. Compared with the cost of the pair of 3CX800A7s (around $500 in 1986 and closer to $900 now), the 4CX1600B certainly offers some savings (it's priced in the $375 range) for both Ten-Tec and its customers.

Out of the Boxes and Into Your Station

The Titan II is shipped in two cartons, one containing the transformer—a 46-lb standard EI lamination unit that's custom-built for Ten-Tec—and the other the amplifier itself. Ten-Tec ships the unit with 11 of the 19 screws that secure the top cover removed. This makes the installation process a little easier. The transformer's mounting bolts come in a packing kit along with the remainder of the cabinet screws (and it is these bolts that should be used to install the transformer in the chassis, not the bolts that secure the transformer to its shipping pallet).

Transformer installation is straightforward. Once assembled, this is a big, heavy amplifier—84 lbs—so it does require intelligent handling techniques to safely wrestle it into its final operating position.

For purchasers who send in a copy of their General Class or above amateur license, Ten-Tec will supply a separate 10/12-meter band "input matching board" that replaces a similar circuit board that's factory installed in the unit. The existing board is unplugged and the new board is substituted. A mechanical stop must also be removed from the bandswitch that prevents it from turning into the 10- and 12-meter positions. This operation involves removing the bottom cover of the amplifier to change out the boards, and then replacing it and removing the top cover to gain access to the bandswitch. It's a relatively simple operation, but there are more than 30 screws used to secure the two covers!

At this point, all that's needed to be ready for "fire testing" is to attach a 20 A/240 V plug to the end of the ac line cord. (This amplifier is not designed for operation from 120 V ac.)

Bottom Line

The Titan II amplifier harnesses the capabilities of a single beefy Russian tetrode to effortlessly deliver up to 1500 W of HF RF power.

The instructions in the *Operator's Manual* are easy to follow. Interconnecting my Kenwood TS-930S to the amp was relatively simple—although at first I was a little confused with the section regarding the CW keying hookups. There are two sets of CW connection instructions: one for Ten-Tec transceivers and another for transceivers from the other manufacturers.

For QSK operation with non-Ten-Tec transceivers, the keying device must be connected to the amplifier's phono-type **KEY IN** jack. This is to ensure proper amplifier/exciter sequencing. Cables are installed between the amp's **KEY OUT** jack and the radio's "key" jack, and from the amp's **PTT/VOX** jack to the radio's normally open T/R relay connection points. Most Ten-Tec rigs have a pair of jacks for making the QSK connections to this amplifier—the keying device plugs into the transceiver and the sequencing is handled within the radio.

Some of the current Yaesu transceivers are also set up for this type of full-break-in amp keying. You wire these rigs similarly to the Ten-Tec gear. This allows you to use the radio's built-in keyer and CW memories—again, the sequencing is handled inside these radios. You can't do this with the majority of the other transceivers, though. To operate QSK with those rigs, a straight key, an external CW keyer or the keying line from your station computer must be connected directly to the **KEY IN** phono jack on the amp.

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1
Ten-Tec Titan II, serial number 02C10070

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency Range (US units): 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[1], 28-29.7[1] MHz.	As specified.
Power output: 1500 W continuous in SSB, CW, AMTOR/PACTOR (50% duty cycle or less); 1500 W RTTY/SSTV up to 10 minutes (160-15 meters only). 1000 W continuous key-down, all modes and bands.	As specified for SSB and CW.
Driving power required: 80 W (typical).	Typically 60 W (band dependent).
Input SWR: <2:1.	Typically 1.0:1.
Spurious signal and harmonic suppression: meets or exceeds FCC requirements.	43 dB. Meets FCC requirements.
Intermodulation distortion (IMD): Not specified.	See Figure 1.
Primary power requirements: 216-252 V ac.	
Size (HWD): 8.5×17×20 inches; weight, 84 lb.	

[1]As shipped from the factory, operation on 12 and 10 meters is disabled (see text).

As I do not run QSK, I also tried hooking up the keying line from the T/R relay of the radio directly to the **PTT/VOX** jack on the back of the amp—as I've done with my other amplifiers—and operated CW with the amp in the PTT/VOX mode. This worked fine for non-QSK CW operation.

An ALC jack is also provided on the rear panel. ALC connections are not necessary when using this amplifier with most solid-state transceivers, but if you are driving the Titan II with tube-type transceivers or transmitters, you'll probably want to take advantage of this capability.

The front panel of the amp offers a good deal of metering. The first thing I noticed was that the analog meter on the left side of the front panel is unlabeled. The manual revealed that this meter always displays the plate current. The other analog meter has three scales and indicates screen grid current, plate voltage and forward or reflected power. A four-position rotary switch controls the meter's function.

There's also an LED bargraph that indicates the RF output power. This proved to be very handy during tune-up and standard operating.

Three rocker switches labeled **ON/OFF**, **OPERATE/STANDBY** and **QSK/PTT/VOX** are positioned in the lower left portion of the front panel. The power and operate switches have internal lamps that indicate their state.

The bandswitch—located just to the right of the analog meters—is an eight-position rotary switch. There are two positions each for 40 and 160 meters. Thirty meters is tuned in one of the 40-meter positions. Seventeen and 12 meters are tuned in the 15- and 10-meter positions, respectively. The remaining front panel controls are two large vernier dials that control the tuning and loading capacitors.

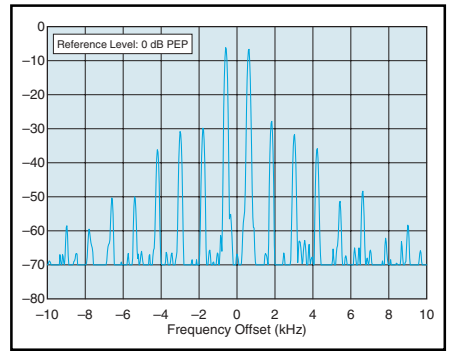


Figure 1—Worst-case spectral display of the Ten-Tec Titan II amplifier during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 29 dB below PEP output, and the worst-case fifth-order product is approximately 31 dB down. The amplifier was being operated at 1500 W at 14.020 MHz. The level of the third- and fifth-order IMD products are higher than those we have observed on other recently reviewed amplifiers.

Control Circuits

As with the original Titan, the Titan II is loaded with safety and control circuits to help prevent you from blowing up your beautiful new amp! A three-minute timer is engaged upon power-up. A red **WAIT** LED on the front panel is lit during the warm up period. Other red LEDs on the front panel indicate if there is a dangerous overcurrent condition on either or both of the grid or screen. Overcurrent detection circuitry will automatically trip and take the amp off-line—thereby protecting the tube. Reset is performed with the **OPERATE/STANDBY** rocker switch.

Tuning

During my initial attempt to follow the instructions and tune this amplifier, I felt as if I needed three sets of eyes to keep track of everything. The plate voltage registered 3 kV—exactly as it should—so I switched the meter to read grid current. There are several warnings in the manual not to exceed 55 mA of grid current. With that thought fresh in my mind, I proceeded to follow the directions.

I began the tuning procedure with about 15 W of drive. Nothing seemed to happen with the amp, so I increased the input power to about 25 W. At that point the plate current started to increase. The basic idea is to adjust the **TUNE** capacitor for both maximum plate current and maximum forward power while adjusting the **LOAD** capacitor for minimum screen grid current. It was easy to achieve 1500 W output with about 80 W of drive while coming nowhere near the 55 mA grid current limit.

Moving through the bands and retuning was a snap. At first I was worried that I would have to expend a great deal of effort while retuning—as the knobs seem rather small and the vernier-style controls require a considerable amount of cranking to move the capacitor plates through 180 degrees of rotation. What I soon discovered was that each band has its power peak in control positions that were similar to those of the other bands, so the settings of those controls don't need to be varied over large ranges.

I never neared 55 mA of grid current on any band with only minor adjustments of the input power. Moving across all of 10 meters, I found it quite simple to repeak

the tuning by watching the bar graph while leaving the switchable analog meter reading grid current. This operation is very similar to that of the original Titan—which I have enjoyed greatly.

It's a good idea to make a chart of the load and tune settings for each band segment, and there's a log sheet included in the manual for this purpose. The vernier drives turn numbered skirts, so there are no moving pointers to use for adding your own index marks directly on the face of the front panel (a fairly popular marking method on other amps).

Operation

I used the Titan II casually for DXing and in the ARRL 160-Meter Contest. I use a tuner for my 160-meter antenna and it was interesting to watch the amplifier's bargraph power meter while I moved through the band. When I saw the power drop below about 1200 W I knew it was time to adjust the tuner. I usually did not have to readjust the amplifier's tuning once I had lowered the SWR, but I was only operating from 1.8 up to about 1.87 MHz.

The tube is cooled with forced air that exhausts through a chimney on the rear right top of the cabinet. The air intake is underneath, but the manual says that it is okay to operate the amplifier without the bail extended (the bail lifts the amp up a couple of inches). The cooling system is quite loud. The blower really lets you know it is working to keep the tube and cabinet cool. It does a good job—I could barely detect heat during the contest.

This is an excellent, large amplifier. I don't feel a bit squeamish about using it. It is metered well and will put out 1500 W while running cool. The Svetlana 4CX1600B should last many, many years and—if there is a problem—Svetlana warrantees the tube based on its time in service. In the event of a failure within the first 500 hours, the tube will be replaced free. Between 501 and 5000 hours (or 2 years—whichever comes first), the price of a replacement tube will be prorated based on time used. According to Scott Robbins, W4PA, of Ten-Tec, Svetlana claims to have a method for determining length of service by analyzing the tube itself, but this warranty has yet to be exercised. Ten-Tec has always supplied excellent customer service and—with the Titan II—has put itself solidly back into the legal limit amplifier market.

Manufacturer: Ten-Tec, 1185 Dolly Parton Parkway, Sevierville, TN 37862; 865-453-7172, fax 865-428-4483; **sales@tentec.com**; **www.tentec.com**. Price: $2990.

AOR TDF-370 DSP Multi-Media Terminal

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

What the heck is *a "multi-media terminal"?* Good question!

The AOR TDF-370 is an Amateur Radio station accessory that defies classification. It can serve as an external audio DSP filter box, but it's much more than just that. It will decode and display RTTY and PSK31 text (and encode these modes when connected to a PC or "dumb terminal"), but it's not quite a multimode TNC. Add in microphone equalization, SSTV interface capabilities, a receive audio recording system and the ability to simulate "stereo" sound on phone and CW signals, and you can begin to appreciate how difficult it would be to pigeonhole this piece of gear in an existing amateur product category. I've come to think of it as a Cuisinart for audio signals.

The Center of Attention

The TDF-370 is packaged in a compact desktop console. It's designed to sit out in the middle of your operating table where you'll have ready access to the top-mounted controls and a clear view of the sloping $^5/_8 \times 2^3/_8$-inch LCD window. The 2-line by 16-field dot matrix display is capable of portraying any alphanumeric character. A few of the '370's features make use of these same display segments to depict bargraphs and scales.

The controls on the unit include a pair of knobs. One is for volume, the second—**ADJ1**—takes on several different assignments. The keys on its membrane-type keypad are organized into groups. A five-button set controls voice-mode related systems; a three-button set handles CW duties; a two-button set commands digital mode and SSTV operation; a five-button set takes care of input source and level considerations; and a pair are used to work the audio record and playback system. A second button-operated multi-function control—labeled **ADJ2**—is also included.

Just above the keypad is a row of five LED indicators. Three of these serve as a level indicator for adjusting the input signal, the fourth identifies the input source (up to two can be connected), and the fifth—marked "CUE"—lights when the recording feature is active.

Bottom Line

A Cuisinart for the ham shack! The AOR TDF-370 Multi-Media Terminal is an audio signal processor, a data mode controller, a digital recorder and a microphone equalizer all rolled into one.

Stringing the Laces

The TDF-370 works all of its magic at audio, so—much like the arrangement used for TNC or computer sound card interconnection—the unit interfaces to your transceiver via its receive audio output, microphone audio input and PTT lines. Power is supplied by either four internal AA batteries or an external dc source.

Fully integrating the device into your station for transceive operation will require some custom-built cabling, but all of the receive-related capabilities—the DSP filters; the record feature; the "stereo" reception mode; and PSK31 and RTTY decode—can be explored with just a simple connection to your radio's audio output. You can use your rig's external speaker or headphone jack, or a fixed-level receive audio source (usually available from rear-panel "accessory" jacks). Let's take a look at the receive operations first then we'll turn our attention to the setup and operation of the microphone equalizer and digital mode transmit capabilities.

Digital Processing for the Voice Modes

For voice modes, the '370 offers two types of DSP noise reduction, along with bandpass filtering and simulated stereo. The *Instruction Manual* states that the DSP noise-reduction algorithms employed by the brains of this device—a Hitachi SH7034 20 MHz 32-bit microcomputer—are based on the "FFT" (*Fast*

Table 2
AOR TDF-370 DSP Multi-Media Terminal

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Power requirement: 4 AA batteries or 11-14 V external dc, 0.6 A (maximum).	0.36 A. Tested at 13.8 V.
LMS noise reduction: Not specified.	CW, >20 dB; Voice, 30 dB.
LMS notch depth: Not specified.	>35 dB.
Voice passband: 300-2400 Hz.	69-2090 Hz.
Size (HWD): 1.3×4.3×6.2 inches; weight, 12.3 ounces.	

Fourier Transform) and "LMS" (*Least Mean Square*) digital signal processing techniques.

FFT

The TDF-370's "FFT" mode reduces the high-frequency hiss associated with typical band noise and will also help diminish interference from more transient interference such as static crashes. Press the **FTT** button, and the top line of the LCD shows "FTTadaptive." An audio spectrum scope appears on the second line. The **ADJ1** knob is then used to control the amount of noise reduction.

I found this system to be very effective on band noise and pretty good on some consumer-electronics generated hash (computer RFI in my case), but you do have to carefully strike a balance between the amount of noise reduction applied and the resultant degradation in speech intelligibility. If you increase the noise reduction too far, the processed speech will begin to take on a choppy sounding quality. If the level of the interfering noise is particularly high, mid-level noise reduction settings will convert it into a noise floor of rapidly changing low-level tones—a sound that I can only describe as "the music of processing." In many instances, careful adjustment of the audio input level—with the unit's **LEVEL** control and/or **ATT**enuator button—can help enhance the performance of this feature.

LMS

A press of the **LMS** button in the **VOICE** group brings up an "LMS(voice)" message in the display. This feature—as is the case with FFT—works well to reduce band noise, and worked better at handling my flavor of consumer electronics hash. The level of the LMS noise reduction is controlled with the **ADJ1** knob. Again though, if you apply too much noise reduction you'll experience a decrease in voice clarity.

This feature also includes an "Auto Notch" system that does a respectable job of tracking and eliminating constant tones, such as AM carriers and tuning stations. The level of notch attenuation can be varied with the **ADJ2** buttons and is represented on a bargraph scale in the second line of the display. The highest setting invariably worked best for me, but even then the notching performance was not quite as effective as the automatic notch filter that's built into my mid-priced HF transceiver.

Hi Fi

The TDF-370 has the ability to employ its signal processing power to simulate a "stereo" effect on both phone and CW signals. Stereo headphones—or amplified stereo speakers plugged into the '370's **PHONES** jack—are required equipment ("ear bud"-type stereo earphones are included with the unit). The resulting audio is considerably more pleasant to listen to than unprocessed audio—band noise and desired signals sound spatially separated and the noise component is slightly reduced in amplitude and sounds as if it's pushed into the background. The **ADJ1** and **ADJ2** can be used to refine the stereo separation. A **BYPASS** button (that works in all of the unit's audio processing modes) makes it easy to compare the processed and unprocessed signal.

The effect of this feature is pretty dramatic, and was responsible for attracting a steady stream of curious hams to a TDF-370 demonstration set up at the AOR booth at this year's Dayton Hamvention.

BPF

Pushing the **BPF** button in the **VOICE** group brings up a "BPF(voice)" indication in the display and activates a DSP-based audio bandpass filter. The *Instruction Manual* indicates that the **ADJ1** knob serves as a high/low frequency slope control and the **ADJ2** control sets the low cut frequency. In operation though, it seems as if the **ADJ1** behaves more like a high cut control and **ADJ2** acts as a low cut control.

This feature works well for rejecting interference from nearby band activity. You can adjust the passband to favor the lower frequency portion of the desired audio signal to reduce interference from on high, and/or the upper portion to fight off any "alligators" that may be lurking down below.

Digital Processing for CW

For CW connoisseurs, the TDF-370 serves up two varieties of DSP filters and a combination stereo/bandpass filter.

BPF

Tap the **BPF** button in the **CW** group, and "BPF(CW)" appears in the top line of the display. The second line indicates the filter's center frequency and the filter bandwidth. The center frequency is adjustable in 50 Hz steps from 450 to 800 Hz. Filter bandwidths of 300, 200 and 100 Hz are supported. The **ADJ1** knob is used to select the desired center frequency; the **ADJ2** buttons are used to step through the three filter bandwidths.

Typically, you'll want to match the center frequency to your transceiver's CW sidetone offset frequency, tune in a target signal, and then crank down the filter bandwidth. In some instances, however—particularly when the desired signal is reasonably strong—sliding the center frequency up or down slightly can be an effective tool for further reducing interference from nearby signals.

LMS

The CW version of the LMS filter behaves much like the one that's provided for the voice modes. It's very effective on QRN, and—fortunately—the sound of the CW signal isn't significantly changed by the higher level settings of the noise reduction control. The automatic notch filter—for obvious reasons—is not included in the CW mode implementation of this filter.

Stereo CW

The stereo mode for CW operation is combined with the DSP CW bandpass feature described above. The stereo effect on this mode is not as pronounced as that observed with the voice mode version of this feature, but it is noticeable. It is particularly evident when you are tuning across a signal—you'll hear the individual signals you encounter slide

from one side of your headphones or speakers to the other as you crank on by.

Digital Recorder

The TDF-370 can record and play back receive audio. An especially interesting aspect of this system is that the captured audio clip will begin 6.4 seconds *before* you hit the record button (the TDF-370 does have to be parked in the record standby mode during that period of time in order to pull this stunt off, though). The system will temporarily hold a total of 102 seconds of audio in up to eight memories.

This feature does have some limitations. If you are going to record multiple message banks, you have to do so during a single recording session. Once you've entered the playback mode, switching back into the record mode—or switching into one of the unit's other features—erases all of the recorded audio. Memories are also lost when the power is shut off.

The TDF-370 is not designed to serve as a contest voice keyer. There are no specific arrangements for replaying recorded audio over the air. The recording system is primarily intended for capturing snippets of audio off the air for immediate analysis.

Digital Mode Receive Capabilities

The '370 can decode PSK31 and RTTY signals, and will display the text directly on its LCD display.

For PSK31, both the BPSK and the QPSK modes are supported. There are two filter bandwidths available: 75 and 220 Hz. In order to capture a signal, you've got to tune very slowly across the PSK31 warbles (a transceiver that provides fine tuning steps is a must). When the system detects a signal and begins to lock onto it, you'll hear a series of tones that are generated internally in the '370. Once this begins to happen, the top line of the display will show the direction and frequency amount—"–020Hz" for example—that you will need to tune in order to zero beat the signal.

Acquiring a knack for tuning in PSK signals using this arrangement takes practice. Those of us who have been spoiled by the put-the-cursor-on-the-signal-and-click sound card PSK31 programs will likely initially experience some frustration. (But hey, at least *we* know what a PSK31 signal sounds like!)

Once the system is properly locked on, copy will appear in the second line of the two-line display. Upper and lower case letters and all of the usual symbols and numbers can be depicted by the dot-matrix display.

One familiar PSK31 characteristic that is not supported—on the built-in display, anyway—is the backspace feature. There's also no way to scroll back through the message contents, so be sure to keep a pencil and paper handy.

For RTTY operation, baud rates of 45, 50 and 75 and shift frequencies of 170, 425 and 850 Hz are available. Tuning in RTTY signals involves listening in stereo headphones or speakers and tuning back and forth across the signal until the RTTY signal can be heard on both the left and right channel. Once you are close to the target signal, you can again use the frequency offset magnitude and direction that's shown in the top line of the display—and the message text—to lock on. Tuning in RTTY signals is relatively easy.

Plug in Your Iron

The receive capabilities of the AOR TDF-370 are pretty neat, but if you want to take full advantage of what this accessory has to offer, you're going to have to melt some solder.

AOR supplies an eight-pin microphone jack and plug and two 3.5-mm stereo plugs for making up cables to connect your transceiver's stock microphone to the unit's **MIC** input, and the '370's **AUX** output to the rig's microphone jack. You'll need to supply a few feet of shielded wire.

The pin-outs for the TDF-370's jacks are provided in the manual. Refer to your transceiver's owner's manual for the microphone connector pin-outs. Pay particular attention to the ground connections. Mike grounds and PTT grounds will need to be kept separate, and this will require making some connections directly between the two eight-pin connectors.

It would be extremely helpful if AOR included specific wiring diagrams for a few of the major transceivers in the documentation that they pack with this device.

The Microphone Equalizer

The Microphone Equalizer mode delivers an eight-band graphic equalizer, a DSP-based background noise reduction feature and a microphone level adjustment. There's even a built-in monitor for evaluating the effect as you change the settings.

The center frequency for each band can be dialed up in the display by using the **ADJ1** knob. The **ADJ2** buttons are then used to vary the individual compensation levels. The manual states that the compensation levels for each band can be varied between –6 and +6 dB. The ARRL Lab measured this range as closer to –10 to +4 dB. The numbers that appear in the display range from –30 to +6 dB in the bands below 1000 Hz and –30 to +12 dB in the bands above. Bottom line: There's plenty of adjustment latitude—use the displayed numbers as a relative level indication only.

The background noise reduction level and microphone gain adjustments are also made with the **ADJ1** and **ADJ2** controls. All of these settings are retained in the TDF-370's memory, so you won't have to reset these values each time you turn the unit on.

Digital Mode Transceive Capabilities

In order to use the AOR TDF-370 for transceiving in PSK31 and RTTY, you'll need to connect it to a "dumb terminal" or a PC running terminal software. AOR supplies a cable that will connect to either a DB9 or DB25 COM port. The manual suggests that you try *Windows HyperTerminal* software, and provides the communications parameters for configuring the port. The transmit audio and PTT connections are made through the cables described above.

Once the TDF-370 is wired up and properly configured, operation is essentially identical to that of a multimode TNC. A "command" mode is used to set up the various operating parameters, and then control key combinations (Ctrl+T for transmit, for example) are used to operate the system. Both transmit and received text will be displayed on the monitor screen, and received text will also appear in the '370's display window.

SSTV?

I was unable to explore the slow scan television transmit and receive features of the TDF-370. Operation on SSTV requires a special computer software package that has not yet been released. AOR reports that the software should be available very soon, and will be downloadable from their Web site.

Information in the manual indicates that this feature will support all of the popular SSTV modes.

Conclusion

With a single audio connection to your radio's audio output, the AOR TDF-370 multi-media terminal delivers a nice variety of receive audio signal processing features, along with stand-alone digital mode reception for two of the most popular digital modes. Build up some adapter cables and position the unit in line between your transceiver's microphone and microphone input jack, and you'll add flexible transmit audio tailoring and DSP-based station background noise reduction. Cable it up to a PC (or "dumb terminal") with the included COM port cable, fire up some terminal software, and you'll enjoy full transceive capabilities on PSK31 and RTTY. SSTV should be coming soon!

Manufacturer: AOR USA Inc, 20655 S Western Ave—Suite 112, Torrance, CA 90501; 310-787-8615, fax 310-787-8619; **www.aorusa.com**. Manufacturer's suggested list price: $329.95. Typical current street price: $325.

June Contest Was Full of Surprises

The ARRL June VHF Contest is scheduled to take advantage of sporadic-E propagation. Few June contests have been totally devoid of 6-meter E-skip, while some have been quite spectacular, with hours of coast-to-coast activity. On a few occasions, sporadic-E has even reached 144 MHz during a June contest. When things are slow, meteor scatter is always available, especially in the early morning hours. Other propagation modes have also made their appearance during the annual June events, including tropospheric ducting and aurora.

The 2001 June VHF Contest had its own unique surprise. Over the past several years, a handful of US stations have worked a European or two on 6 meters during the contest. More often, Europeans have complained that they heard North Americans, but they could not gain their attention. This was probably the first June contest in which there was a significant European opening, resulting in hundreds of transatlantic contacts for alert East Coast stations, primarily from Maryland to North Carolina. In addition, several dozen 6-meter contacts were completed between the Pacific Northwest and Western Europe—an all-time first.

Aurora and Early Morning Sporadic-E

The contest started slowly in most parts of the country. Sporadic-E seemed fickle and some operators reported few E-skip contacts through much of Saturday afternoon and into the evening. Those along the northern tier of US states and southern Canada found a weak aurora in the early evening, but many stations seemed completely oblivious to the new opportunity for making contacts and adding to grid totals, especially on the higher bands.

Activity, which was not high in most parts of the country through the early evening, slowed further as local midnight approached. Many operators called it quits for the night, hoping Sunday would bring something better. This was a premature decision. Around 0500 UTC or so, 6 meters opened across much of the country for strong single and then double-hop contacts. The band stayed open until nearly 1100. Several East Coast stations that stayed up to take advantage of the unusual post-midnight sporadic-E opening made several hundred contacts and added 50 or more grids.

East Coast Works Europeans

The early morning opening died out about the time the early risers were turning their rigs back on. The usual midmorning openings were slow to appear, but a few East Coast operators probed northeast from time to time, just in case Europeans might just come through. Then it happened. Within a few minutes of 1355, widely scattered stations, including K1SIX (FN43), W3EP (FN31), W3BO (FN20), W4MYA (FM07) and K8GP (FM09), began working Spanish stations. EH7GTF was among the most prominent, quickly picking off one US contest station after another with a steady signal. A few Portuguese stations also made an early appearance.

For most W1 and W2 call area stations, that was the extent of Europeans. NT1N (FN31) heard two Italians more than an hour later, but was unable to work them. European propagation clearly began to favor those further south. By 1430, W4MYA, K8GP, K3ZO and other well-situated contest stations in Maryland, Virginia and West Virginia were in the thick of western Europeans. W3BO in eastern Pennsylvania worked three Spanish and two French stations, but heard more than half a dozen other I, ON, HB and G prefixes.

From there, the opening seemed to spread south (or perhaps southern contesters were slower to realize what was taking place). K4QI (FM06) was running Europeans by 1515, KN4SM (FM16) got into the fray around 1550, and by 1600, AA4ZZ (EM96) in the mountains of North Carolina had found them. Gene Zimmerman, W3ZZ, noted that K8GP worked almost all their Europeans on CW because signals were weak. Most of the other US stations had much the same experience. KN4SM found Europeans strong enough to work on SSB, but the pileup was quite difficult to manage.

Sometime after 1800, activity began to slow and by 1830, the opening had ended. The midatlantic contesters had made several hundred contacts into at least 15 western European countries, including EH, CT, GI, GW, G, GU, ON, PA, F, OZ, SM, DL, I, 9A and S5. The results for mountaintoppers K8GP and AA4ZZ, who were a considerable distance from the coast, were impressive. Typical distances from the mountaintop stations to the Netherlands and Germany were 6500 to 6900 km, near the limits of three-hop propagation. Nothing like this had ever taken place during a June contest. Table 1 provides a summary of reporting stations from north to south.

This Month

Aug 31-Sep 2	Eastern VHF/UHF Conference (Enfield, Connecticut)
Sep 8-9	ARRL September VHF QSO Party
Sep 15-16	ARRL 10-GHz Cumulative Contest
Sep 16	Excellent EME conditions, but new Moon
Sep 21	Transequatorial propagation peaks ±2 weeks
Sep 21-23	Western States Weak Signal Society (Ventura, California)
Sep 27-30	Microwave Update 2001 (Sunnyvale, California)

Table 1
East Coast to Europe, June 10, 1355-1830

Call (grid)	*Time*	*QSOs*	*Grids*	*Countries*
K1SIX (FN43)	1353-	3	—	2
W3BO (FN20)	1408-1700	5	—	2
K8GP (FM09)	1358-1703	31	26	7
K3ZO (FM18)	1430-	27	21	—
W4MYA (FM07)	1400-1800	85	52	11
KN4SM (FM16)	1550-1833	101	37	10
K4QI (FM06)	1515-1820	90	37	13
AA4ZZ (EM96)	1600-1800	64	—	10

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Europeans into the Pacific Northwest

From the European point of view, that was not the end of the opening. As early as 1722, while the W4s were still running western Europeans, DF9CY (JO54) heard and then called K7RAT (CN75), who was just then chasing VE6s and had no inkling that Europeans were hearing him. The pair were not able to complete the 8100-km four-hop contact (perhaps because DF9CY was running just 10 W to his six-element Yagi), but Tree (N6TR), the K7RAT operator, was suddenly alerted. Tree began working Europeans, as DF9CY went on to copy KB7WW (CN85) and VE7XF (CN89).

K7RAT had the opening all to himself before others in the area began to learn what was going on. K7RWT (CN85) and VE7XF soon heard K7RAT working what sounded like Europeans and could not believe their ears. Others thought the packet spots were some sort of contest humor, but they soon found it was true. Europeans were actually coming into the Pacific Northwest—the first time that had ever happened. VE7XF quickly called his buddies VE7SL and VE7AGG, who also immediately began calling CQ toward Europe. By then, 20 minutes had passed since K7RAT made his first contacts.

Eventually, eight alert contesters in British Columbia, Washington and Oregon were able to complete 27 contacts with unique European stations in Wales, England, France, Belgium and the Netherlands during the hour the band was open for them. ON4ANT and ON4GG, who share the same station (four nine-element Yagis at 80 feet and 200 W) worked all eight of those who made it across the Atlantic. In addition, F2YT (JO10), G0LCS (IO91) and G4FUF (JO01) also completed more than one contact. Ten others, mostly in the Netherlands, made one QSO each, all but one with K7RAT.

Table 2 summarizes all confirmed two-ways between 1720 and 1820. ON4ANT and ON4GG are counted as a single contact in the table, even if a station worked both calls. Likewise, duplicate contacts are not included. In total, more than three-dozen QSOs were completed and many other heard-only or partial contacts were reported. Perhaps the most interesting was OE3KLU (JN88), who heard K7RAT over an impressive 8800 km path.

Most signals were from the noise level to 559 and most (perhaps all) contacts were made on CW. The great-circle path between the Pacific Northwest and Western Europe skirts the southern portion of the auroral zone as it traverses Hudson Bay and southern Greenland. Some of the American stations reported that signals had a bit of a rough auroral-like note, typical of HF signals that cross the polar region, but most did not notice anything special. The propagation was undoubtedly multipath sporadic-E, probably via four or perhaps five hops. The possible influence of the aurora the evening before cannot be ignored, but it was the wrong time of day for typical auroral-E propagation.

Other clues can be gleaned from what else stations heard or worked at about the same time. Tree mentioned that he did not know the East Coast had been working Europeans and did not hear any East Coast stations at the time. K7RAT worked VE6SV (DO33), just one short 1250-km hop away, just prior to his European run. On the other side, PA3DOL (JO22) heard TF3GC (HP49) in the midst of the opening to the Pacific Northwest over a 2650-km path, presumably via two short hops. If those same hops existed on the ends of the full path from Washington to the Netherlands, then two long hops across the southern auroral zone must have been necessary to fill in the missing 4300-km segment in the middle.

Whether by coincidence or a related event, both the Pacific Northwest and Europe worked Japan via sporadic-E over the following two days! (Details are below.) These openings were also over northerly latitudes and in the 7800 to 9400-km range, similar to the distance between the Pacific Northwest and Europe. Can this happen again? Well, of course it can. Now that both Europeans and those in the Pacific Northwest are believers, such openings are less likely to be overlooked in the future.

Table 2
Pacific Northwest to Europe, June 10, 1720-1820

Call (grid)	*Time*	*QSOs*	*Countries*
K7RAT (CN75)	1721-1747	12	G, ON, PA, F, GW
VE7SL (CN89)	1740-1755	2	ON, PA
KB7WW (CN85)	1741-1750	3	PA, F, G
VE7AGG (CN89)	1743-1810	2	ON, F
VE7XF (CN89)	1745-1807	5	ON, PA, F, G
NN7J (CN85)	1802-1811	1	ON
K7OFT (CN87)	1807	1	ON
VE7DXG (CN88)	1813	1	ON

ON THE BANDS

Sporadic-E dominated on-the-air activities for June, as might be expected. In addition to almost daily single-hop openings, there were numerous multihop events across the continent, the Atlantic and Pacific. Sporadic-E propagation reached 144 MHz on at least three days somewhere in the US. In contrast, there was only one weak radio aurora (during the June contest) and no reports of unusual tropospheric ducting or anything else out of the ordinary.

Dates and times are all UTC. In addition to those mentioned in the summaries, thanks go to K1TEO, K1TOL, W2ODH, WB2AMU, W3ZZ, K5SW, N5JHV, K7ICW, K7QXA, W7NBH, K9AKS, N9USZ, KA9CFD, C6AGN, G4UPS, WP4LNY, YV4DDK, the *50 MHz DX Bulletin*, along with the WWW-based DX Summit and the UKSMG Announcement Page, for their contributions.

Domestic 50 MHz

It was difficult to find a single day on which E-skip did not appear on 6 meters somewhere across the country. Double-hop transcontinental conditions turned up on the evenings of June 21-22, 24-25 and 28, along with the afternoon of June 25. The opening of June 21-22 was especially noteworthy for the duration of transcontinental propagation (2300-0230, at least) and widespread coverage. Those in the West, from the Canadian to the Mexican borders, worked all along the East Coast with generally strong signals. Many modest stations running 10 W and simple antennas were able to make it across the continent.

Several mobile and portable stations in the West handed out rare grids that evening, including K7XC. Tim heard the band open from his truck while driving home near Fallon, Nevada (DM09), and decided to drive north into the largely uninhabited DN00. From a hilltop at 6000 feet, K7XC/m made 38 contacts over a two-hour period, as far eastward as Nova Scotia (FN74) to Florida (EL95). Tim was using his IC-706-IIG and a loop antenna mounted on the cab.

Six-meter operators scattered through the western states also worked Hawaii and Alaska on several evenings, mostly via double-hop. Washington and Oregon stations reported Hawaii on June 8, from 0530 to 0600, at least. Several Alaskans worked into the Pacific Northwest the following evening about the same time. KL9A (BP51) also worked W5OZI (EM00) and K0GU (DN70) after 2010 on the eighth. KL7NO (BP64) and W6OMF (CM98) hooked up on June 27 around 2210. No doubt others participated in these openings.

50-MHz Sporadic-E DX

The consistent nature of 6-meter transatlantic summer sporadic-E openings over the past decade has been astonishing. These annual openings have generated more activity between North America and Europe than F-layer propagation, and while they may be highly variable, they do not seem to be affected by the 11-year solar cycle. Until recently, many 6-meter operators assumed that

the Canadian Maritime and New England were the prime locations for spanning the Atlantic via sporadic-E, but the most recent experience suggests that this view needs to be modified.

The run of openings this past June may not be so atypical as they first appear. Sure, New England operators reported some kind of transatlantic activity on a dozen days during the month, but those scattered throughout the South, especially in Florida, found Europeans on five days when the Northeast was entirely shut out of transatlantic propagation. Six-meter operators from Ohio, Kentucky, North Carolina and other states have also been discovering that Europeans are not so rare as they once seemed. Certainly, the four-hour opening during the June contest, which favored Maryland to North Carolina and included the Pacific Northwest for the first time, also demonstrated that New England has no monopoly over such paths.

New England is closer to Europe than other parts of the US, and that may provide some advantage in spanning the Atlantic, but it is not the full story. Sporadic-E occurs somewhat more frequently over southern latitudes than northern in the North American region, perhaps by as much as a factor of two. This may tend to give stations in the southeastern US an advantage that at least partially compensates for their longer distances to Europe.

In addition, certain path lengths are more likely than others. Single-hop distances near the maximum for sporadic-E, say 1800 to 2200 km, are more likely to appear than shorter spans. When multiplied by the three or four hops necessary to span the Atlantic, 5400 to 6600 and 7200 to 8800 km may, over the long run, be statistically more common than other distances. When these more probable ranges are fit between North America and Europe, and further considered in light of average sporadic-E occurrence, certain areas of both continents are likely to be favored. New England may not necessarily be the best location from which to work all parts of Europe, for example.

In addition to the natural constraints of sporadic-E propagation, there is a human factor. A few keen operators with well equipped stations in the Northeast (such as VE1YX, K1TOL, W1RA, K2ZD, K2MUB, W3JO and others) have been monitoring their radios closely every day for years during the summer months for signs of transatlantic propagation. It should not be surprising that they have reported the bulk of the openings as a result. Until recently, few operators in other parts of the country have been so assiduous, largely perhaps because it was widely assumed that no one would work Europeans until the W1s reported the band was open.

That clearly is not the case. This past season, K2RTH/4 and others in Florida have been just as persistent, and they too have gotten amazing results. Often those in the Northeast have had to cool their heels listening to W4s make transatlantic runs, while hearing nothing from Europe themselves. Six-meter aficionados in Missouri, New Mexico and other states have sometimes reported European TV video (at 48.250 and 49.750 MHz) and even worked across the Atlantic on 6 meters when there were no signs at all on the East Coast. The point should be clear. Trans-Atlantic E-skip is not just for the Northeast anymore.

Caribbean, Central and South America

US stations in nearly every part of the country (including the Pacific Northwest) had many opportunities to work into Bermuda, the Caribbean and Central America during June. Among those calls mentioned among the reports for the month were C6AIE, C6AGN, CO2OJ, FG5FR, HI8ROX, HP2CWB, HR1BY, HR2KOS, several KP4, P43JB, PZ5RA, several TI, V31TE, VP2VI, VP9ID, VP9KK, YN9HAU, YS1AG, YS1RR, ZF1DC and ZF2MU. Needless to mention, quite a few US operators found new countries during the June openings.

Many of the Caribbean and Central American stations are within single-hop range from much of the US, but quite a number of contacts required two or even three hops. WX7R (CN85), for example, completed with WP4KJJ (FK68) on June 22 at 0017 over a 5900-km path. That required at least three sporadic hops and was about the same distance as New England to Western Europe.

Europe and Africa

Transatlantic 6-meter propagation appeared on more than half the days of the month, as shown in Table 3, although a majority of the openings have become routine for the most active of the East Coast and Western European participants. Signals were often weak and inconsistent, making it difficult for all but the best-equipped stations on both sides of the Atlantic to make contacts. Only the June 10 opening stood out for its duration (more than four hours total), geographic extent in both North America and Europe and its often strong signals.

Even so, there were some surprises. Bruce Silverstein, K2RTH/4 (EL95), was plugging away on most days from his Miami home and probably had the most to show for his persistence. In addition to the usual run of Western Europeans (apologies to all of you west of the Appalachians, but CT, EH, G, F, ON and PA are the usual run from the East Coast), Bruce nabbed LZ1ZP and 4X1RF on the afternoon of June 20. Roger Webb, W4MW, was also able to pull out a unique string of Europeans on the afternoon of June 17 from his new mountain house near Boone, North Carolina (EM96). He made a dozen contacts with ON, SM, DL, OK and SP stations. Not a single other American station reported contacts during that time.

The largest portion of the summaries in Table 3 are based on the reports of just a handful of stations, including K1SIX (New Hampshire), W3EP (Connecticut), W3BO (Maryland), N4GN (Kentucky) and K2RTH (Florida). It is doubtful that significant events are missing, but the geographic diversity of reporting stations does suggest that many of the openings may have been more widespread than the table indicates. The table shows the widest extent of each opening, but not all US and Canadian call areas worked all the European prefixes indicated. Specific states are shown for large call areas, and prefixes in brackets indicate stations that were only heard.

Alaska, Japan, the Pacific and Asia

Six-meter activity across the Pacific and Asia quieted down considerably during June, but it still had some interesting openings. On June 4 between 0515 and 0602, KL7IKV and NL7Z worked VK6JQ over a most unusual

Table 3
Transatlantic 50 MHz Activity in June

Date	*Time*	*North America*—Europe and Africa***
2	1900-2030	W1, W4 (KY)—EH8
3	1310-1355	W1—CU3
	2030-2310	VE3, 9, W1, 2, 4 (KY)—EH8, EH
5	1520-1630	W4 (FL), W5 (LA)—EH
	2125-2230	W4 (GA, FL)—GI, G, ON
6	1125-1330	W1, 3—CU3, EH8, CN, CT, EH, ON
10	1350-1820	W1-4, 8—CU3, CT, EH, F, GU, GI, GW, G, ON, PA, OZ, SM, [HB], DL, I, 9A, S5
	1720-1825	VE7, W7 (OR, WA)—GW, G, ON, PA, F, [DL]
11	2210-2250	W1—CU3, EH8
12	2110-2350	VE3, W1, 2, 4 (KY)—CU3, EH8, CH, G
14	1045-1050	W1, 2—CT, DL, [4X]
	1335-1345	W1—GW
	1455-1515	W1—F, G
	2050-2140	W1—DL, I, 9H, S5
16	2000-2200	W1, 3, 4 (KY, NC)—F, DL, I, 9H,
	2320-0000	W3—[CU3], [CT]
17	1720-1800	W4 (NC)—ON, SM, DL, OK, SP
	2130	W1, W4 (NC)—EH, [I]
18	2100-2105	W1—I
20	1300	W4 (FL)—EH
	2040-2245	W4 (FL)—CT, GM, [9H], S5, LZ, 4X
22	1240	W2, 4 (FL)—PA
23	1535-1545	W1—[CU3]
	2205-2250	W1, W4 (NC)—EH8, [CT], EH
24	2350	W3—[CU3]
25	1310	W4 (FL)—EH
27	1315-1510	VE1, W1—CU3, EH8, EH

*Letters in parentheses are US state abbreviations
**Country prefixes in brackets indicate countries that were only heard

path for late spring. KL7IKV went on to add VK6LSZ and VK6AO, while VK6JQ in turn found K7RAT and VE7AGG. These quite unprecedented contacts are difficult to explain. The possibilities—sporadic-E, ordinary F layer, and transequatorial field aligned irregularities (TEP)—all have some difficulties on their own. Some combination of propagation modes seems more likely.

A more familiar sporadic-E opening between Japan and the West Coast, from British Columbia to Southern California, took place on June 12. Between 0425 and 0610, W7NBH (CN96) and N7DB (CN85), among others, worked central Japan in the JA1-3 and JA0 call areas. K7JA (DM03) reported a lone JA7 contact late in the opening. Typical distances were 7800 to 8800 km, or at least four sporadic-E hops. On June 23 about 2300, N7DB reported a much shorter duration opening to Japan.

Six-meter operators in southern Japan had more excitement than working North America. On June 14, 1200-1300, JA4-6 call area stations worked European prefixes 9A, HB9, OK, SP and DL. Distances were in the 8300 to 9400-km range. That's exciting enough for sporadic-E, but Hatsuo Yoshida, JA1VOK, believes the last time this happened was in July 1992. This sporadic-E path is probably as rare as that from the Pacific Northwest to Europe!

David Butler, G4ASR, reported in his September *Practical Wireless* column, that Europeans also worked Australia on two days, nearly unheard of during the summer months. On June 11 at 0915, stations in Eastern Europe heard VK6JQ (PH12) in Western Australia and by 0945, the Australians were working into Germany, Belgium and southern England. A similar opening took place on the morning of June 29. GM6NX (a club station operated by GM4DGT) heard a weak VK6JQ calling CQ at 1056 and contact was made shortly afterward amid considerable in-band video interference. Distances during both openings were at in the 12,000 to 13,000-km range—incredible. Sporadic-E undoubtedly played a role in these unusual events, but as in the Australia to Pacific Northwest case, it is not clear whether other propagation modes were also involved.

144-MHz Sporadic-E

Summertime propagation would not be complete without at least a few 2-meter E-skip events, and this June did not disappoint alert VHFers. Three substantial openings across different parts of the US took place on the late afternoons of June 16, 27 and 28, as summarized in Table 4. Signals got extremely strong at times (as they often do during such events), even for modest stations. Ken Reecy, AC4TO (EM70) made his initial contact with W5SFW (DM95) in northern Texas while mobile, running 20 W to a quarter-wave whip. When he got home, he continued making contacts into Oklahoma, Nebraska and Arkansas. Just for the fun of it, Ken sent a CQ on 146.520 FM and was answered by KC5TTY/m (EM04), who was waiting for a train to pass at a road crossing.

Strong sporadic-E openings are often immediately followed by field-aligned irregularities (FAI), which behave much like aurora. Stations must direct their antennas northward toward centers of dying sporadic-E centers. Like aurora, FAI paths are skewed. K0GU (DN70) in Colorado found K6AAW (CN80), N7YM (CM88) and KJ6KO (CM98), all in northern California, via FAI just after 0355 on June 28. He had just finished making 17 E-skip contacts on 2 meters into Washington and Oregon, so he was aware of the FAI possibilities.

Table 4
144 MHz Sporadic-E Openings in June

Date	*Time*	*Path by States*
16	2145-2220	IL, KY—ME, NH, NY, CT
27	2115-2220	TX, OK, KS, NE, IA, AR—NC, FL, MS
28	0110-0415	WA, OR, CA, ID—WY, CO, KS, NE, IA

NOTES FROM ALL OVER

QRP on 6 Meters

When K2RTH is not chasing DX on 6 meters, you may find him trying to snag anyone while running no more than 4 mW of power. Bruce is particular about how this is done. To make it a fair test (mainly of the receiving operator's ability to hear his signal!), he claims only contacts that are entirely random and initiated while running his milliwatt rig. There are no schedules and no use of high power to attract attention. Of course, Bruce picks especially strong stations during sporadic-E openings for these attempts.

K2RTH/4 (EL95) has already made a number of contacts this way. One of the more interesting was on June 20, when N3DB (FM18) answered Bruce's CW on the first call. The contact was over a 1458-km path. Bruce calculates his power was just 90 µW at the time—4 mW through a 16-dB attenuator, surely one of the lowest-power contacts over a similar distance ever reported. Bruce made a similar contact over a somewhat longer distance the next day with W3CMP (FN10), who was running just 5 W himself.

The rules for many contests and awards commonly define low power (QRP) as less than 5 or 10 W. QRP stations running this much power, even with simple antennas, can make E-skip contacts with comparative ease. If you want a challenge, try running no more than 1 W. A number of 6-meter operators have been pursuing VUCC and WAS while running very low power. Even if QRP operating is not quite your style, you can join in the fun by answering those weak signals.

European 2-Meter Sporadic-E Page

Europe seems to get more 144-MHz sporadic-E each summer than North America. Not every such opening is reported in this column, but PE2KP maintains a Web site that does report them all. Check "Sp-E News" at **home.planet.nl/~vhf-uhf-shf/vhfspe.htm** for up-to-date news of European 2-meter sporadic-E openings, with informative color-coded maps for each event.

Meteor Scatter from Costa Rica

Carlos Diez, TI5KD, believes that his May 24 QSO with HC8N on 6 meters (reported last month) was the first-ever meteor-scatter contact from Costa Rica. Since then, Carlos has completed a 2-meter meteor-scatter contact with W4WHN (EL94) in Florida on June 10. Congratulations. It is always encouraging to hear about new activity on the VHF bands. Only a few other 2-meter operators in the Caribbean and Central America, most notably the Bahamas (C6), have made similar contacts in recent years.

Knife-Edge Diffraction by Tree Leaves?

Bill Seabreeze, W3IY, made a 35-km contact on 24 GHz with Terry Price, K8ISK, in June, while running 250 mW to a 0.5-meter dish. K8ISK ran 500 mW with a similar antenna, but he was hampered by a thick cover of 100-foot trees. Even so, such a contact is not unusual, but K8ISK did notice that signals were about 10 dB stronger when he tilted his own 0.5-meter dish up 45°. He speculated that the tree leaves made fair knife-edge diffractors when the antenna was pointed at the proper angle. Has anyone else noticed microwave diffraction from leaves? Perhaps this phenomenon might have some practical use.

Another Aurora Beacon

Glen Lee, VA3ARC, reports that VA3MBB/b (EN93de) transmits on 144.279 MHz with 10 W to a turnstile antenna. He suggests that it is also a potential indicator for aurora, so it should be added to the list of aurora beacons that appeared in the March column.

VHF/UHF/MICROWAVE NEWS

Six on Six Award

Bob Mobile, K1SIX, offers a unique certificate for working six stations on 6 meters with "SIX" in the suffix of their calls, such as W8SIX, KE4SIX and XQ3SIX. More than three dozen such stations are active on the band. Endorsements are offered for every six additional calls. More than a dozen numbered certificates have already been issued. For details, go to **www.conknet.com/~b_mobile/SSOS.html**.

Extra-Terrestrial Century Club

The Search for Extra-Terrestrial Intelligence (SETI) League sponsors the ETCC award for reception of distinct extra-terrestrial radio emissions, including natural, human, Moonbounce and alien. The initial certificate is awarded for confirmed reception of five unique extra-terrestrial sources. Complete rules and regulations appear on the SETI League Web page at **www.setileague.org/awards/etcc.htm**. QST

NTS Area Staff Chairs Meet in Denver

Over the Memorial Day weekend, the ARRL National Traffic System Area Staff Chairs met near Denver, Colorado, to discuss several issues. Meeting participants included Pacific Area Staff Chair Rob Griffin, K6YR, Eastern Area Staff Chair Marcia Forde, KW1U, and Lynn Hyndman, W9FC, Manager of the Ninth Region Net, Cycle 4. Lynn was representing Central Area Staff Chair Jim Leist, KB5W. Steve Ewald, WV1X, Public Service Specialist in the Field and Educational Services, represented ARRL Headquarters. The group was also joined by several invited guests including NTS Pacific Area Staff members Jerry VerDuft, AD0A (Transcontinental Corps Director for Pacific Area, Cycle 4) and Mike Stansberry, K0TER (who is also the Colorado Section Traffic Manager). Betsey Doane, K1EIC, ARRL Connecticut Section Manager, and Jeff Ryan, N0WPA, Assistant Section Manager of Colorado, were at the meeting as well.

The Chairs adopted an interim NTS Digital Guidance document that has been developed by the Area Digital Coordinators. The three Area Staffs will be reviewing and offering comments and additional ideas on the digital guidance before anything is finalized.

The Chairs also recommended that the NTS Terms of Reference document be amended to return the Assistant Digital Coordinator position as a formal staff member (thereby reducing the Members-at-Large from three to two). Again, the NTS Area Staff members will have a chance to discuss this matter.

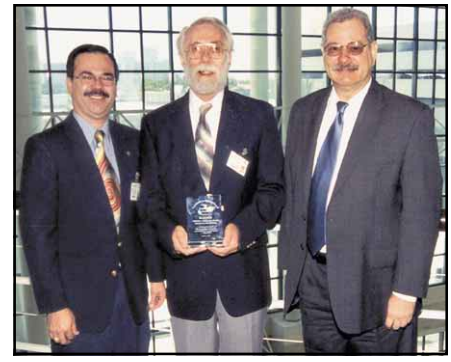
Other topics of discussion included updates to the *Public Service Communications Manual* that would address in some detail the proper way to originate and relay book messages. Potential guidelines for originating bulk/book traffic were also discussed. *The Public Service Communications Manual* may be found on *ARRL Web*, **www.arrl.org/FandES/field/pscm/**.

"The afternoon session was dedicated to some serious deliberations on our vision for the future of NTS," Rob Griffin said in a memo to his Pacific Area Staff members. "Jeff Ryan, N0WPA, did a splendid job facilitating this session."

Rob, who is also the Manager of the Pacific Area Net, Cycle 4, and Santa Barbara Section Manager, concluded his comments by saying, "It was a very productive meeting, and the participants worked constructively to achieve consensus on some important planning, policy and practices issues."

AD0A

Left to Right (back row): Lynn Hyndman, W9FC; Marcia Forde, KW1U; Jeff Ryan, N0WPA; Rob Griffin, K6YR; Mike Stansberry, K0TER. Front Row: Steve Ewald, WV1X; Betsey Doane, K1EIC.



Left to Right: Julio Ripoll, WD4JR; John McHugh, KU4GY, and Joel Kandel, KI4T.

WV1X

Jerry VerDuft, AD0A (left), received his NTS appointment certificate for his new position as TCC Director, Cycle 4, in the Pacific Area. Pacific Area Chair Rob Griffin, K6YR, made the presentation at the NTS Chairs' Summit in Denver.

The South Florida Hurricane Conference presented this Volunteer Award to W4EHW.

W4EHW VOLUNTEERS HONORED AT CONFERENCE

By John McHugh, KU4GY

On June 1, the Amateur Radio operators of National Hurricane Center station W4EHW received the Volunteer of the Year award at the South Florida Hurricane Conference. The amateurs were recognized for 22 years of dedicated service at the National Hurricane Center by collecting weather and damage data for NHC forecasters when tropical storms or hurricanes are within 300 miles of any land mass.

Accepting the award on behalf of the many amateur volunteers were John McHugh, KU4GY, current Amateur Radio Coordinator, Julio Ripoll, WD4JR, Assistant Coordinator, and Joel Kandel, KI4T, volunteer operator and former Miami-Dade County RACES Officer. Both WD4JR and KI4T are founding members of the station.

The conference, held for the seventh year at the Broward County Convention Center in Ft Lauderdale, is sponsored by the emergency management and public safety agencies of Monroe, Miami-Dade, Broward, Palm Beach, Collier, and Lee Counties. It addresses many hurricane preparedness and response issues of particular concern to the South Florida area. More than 600 attended the conference's luncheon and award ceremony propitiously held on the first day of hurricane season in the Atlantic. More information about W4EHW and related programs may be found on their Web site, **www.fiu.edu/orgs/w4ehw/**.

CHECK THIS OUT

By Denny Rybicke, K9LGU,
ARRL Wisconsin Section Traffic Manager

If you participated in Field Day this past

Steve Ewald, WV1X ♦ Public Service Specialist

summer, or if you have prepared for ARES disaster work, or if you just need to organize your daily activities, you may have worked from a checklist. Here's a checklist to check your traffic handling.

- ✔ Have you checked into a section net or two this month?
- ✔ Should you check the meaning of some QN signals or voice prosigns?
- ✔ Do you include the "check" on each message for practice?
- ✔ Have you originated at least one piece of traffic this month?
- ✔ Do you have your list of ARRL Numbered Radiogram texts handy?
- ✔ Are you aware of which communities you can call toll-free?
- ✔ Could you assume Net Control Station (NCS) duties if needed?
- ✔ Have you checked into a CW net lately?
- ✔ Can your local ARES net depend on your weekly check-in?
- ✔ When sending traffic with voice, do you use phonetics only when necessary?
- ✔ Do those you usually communicate with on packet know that you handle traffic?
- ✔ Would you know how to handle welfare traffic?
- ✔ Do you know how to pace yourself when sending traffic by voice?
- ✔ Have you practiced copying under poor conditions—just for training?
- ✔ Do you know where your pink card (ARRL Form FSD-218) is?
- ✔ Are you able to volunteer to be an occasional region net liaison?
- ✔ Did you send your monthly activity report to the Section Traffic Manager?
- ✔ Have you considered a program on the National Traffic System for your local club?
- ✔ Can you identify your county's Emergency Coordinator?
- ✔ Do you answer questions about traffic for those new to the hobby?

If you checked all of the above, you are a dedicated traffic operator. Check?

The traffic system only works if we work it. Let's do that as much as we can.

Thank you, Denny, for your traffic handler's checklist. If you log onto ARRLWeb *for Amateur Radio Public Service,* **www.arrl.org/FandES/field/pubservice.html**, *you'll find links to various references that will help you find the answers to many of these questions. For example,* **www.arrl.org/FandES/field/forms/** *has links to operating and reporting forms. The on-line* Net Directory *is at* **www.arrl.org/FandES/field/nets/**, *and the* Public Service Communications Manual *is at* **www.arrl.org/FandES/field/pscm/**. *Many of these referenced items are also available in ARRL publications and in printed form.*

ARKANSAS RADIO AMATEURS ASSIST IN SEARCH

By Don Jackson, AE5K

On Sunday, April 29, 2001, a six-year-old girl hiking with grandparents and several others became lost in the Ozark National Forest near Boxley, Arkansas—about a hour's drive southwest of Harrison. The area is a heavily forested, beautiful wilderness near the headwaters of the Buffalo National River. The county sheriff's office responded immediately and set off perhaps the largest search-and-rescue operation in Arkansas. At least 38 agencies were involved in the search, including the Harrison chapter of the American Red Cross.

Using the North Arkansas Amateur Radio Society repeater for communications, James Coats, N0ZJX, a disaster relief worker for the Red Cross, organized the request for supplies needed to support the search. Coats' wife, Terri, N0ZJW, was at the Red Cross field site in the search area. Terri Coats relates the situation:

"Back in Harrison, James began making phone calls to individuals for help. An employee of KHOZ radio was in our office at that moment and suggested calling the station manager to see if they could help. The request went out over the airwaves and the donations began pouring in."

It was KB0PHM who had the honor of announcing "the find"—over the repeater—at 4:25 PM on Tuesday. Two "unofficial" searchers, William Villine and Lytle James, found Haley at about 2:30 PM on Tuesday as they searched the area by mule.

Young Haley rode out of the woods on the back of Ole Momma, Villine's mule. However, it was about three hours before the word got out, since it took that long to transport the girl on muleback to the search-and-rescue headquarters.

Thanks to The Heterodyne, *the monthly newsletter of the North Arkansas Amateur Radio Society,* **www.qsl.net/wb5cyx**.

Field Organization Reports

Public Service Honor Roll
June 2001

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. Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ on written notification of qualifying months to the Public Service Branch at HQ.

923
NM1K
486
K9JPS
423
WA4GQS
321
KV4AP
317
N5NAV
303
N9VE
287
W9RCW
273
WD8V
270
W7TVA
238
KC5OZT
234
KA2ZNZ
226
W5ZX
224
N2LTC

217
KK3F
216
W1GMF
214
WA4QXT
209
K5NHJ
207
WA9VND
202
N8IO
200
KB2RTZ
199
KB1DSB
198
W4ZJY
N5IKN
AG4DL
193
NN7H
WA5I
192
WB2UVB
189
W8YS

182
WA2MWT
181
W6DOB
180
W4EAT
179
KA4FZI
178
K9FHI
173
K0IBS
174
W3HK
172
K2UL
171
W6IVV
169
KA2GJV
168
WN0Y
166
AC4CS
165
WB4GM
162
KB2KLH

WB5NKD
161
K4IWW
159
NZ1D
KB5WY
N2OPJ
N2RPI
158
AA3SB
157
WB2GTG
153
N0SU
N2CCN
152
N5OUJ
N8OD
151
W0OYH
W6QZ
150
W7ZIW
149
KW1U
N9KNJ
148
WA1FNM

WA5OUV
K4DMH
147
K4SCL
146
N8BV
K2DN
144
KG4FQG
NR2F
143
AF4QZ
WA2YL
WB5NKC
KC4ZHF
K4RBR
142
W2MTA
141
W5GKH
W0LAW
AF4NS
KB5TCH
140
K5IQZ
K8PJ
139
KE4JHJ
WA4DOX

W3BBQ
W3YVQ
KC8CON
N9BDL
138
K3JL
W7GB
W9CBE
KD4GR
137
KA1GWE
W0WWR
136
NC4ML
K4YVX
KK1A
K2BCL
N3YSI
W9YCV
135
WD4JJ
K5DPG
WD0GUF
WX4H
134
WD9HII
K9LGU
133
AD4XV
N4TAB
N7CEU
132
W1PEX
KJ9J
N9TVT
130
W1ALE
KC2EOT
NN2H
131
WB4TVY
130
KA4UIV
W7GHT
129
KE4PAP
N3RB
WA0TFC
N3EFW
KC6SKK
128
N7YSS
WD8DHC
N7YSS

127
N3WAV
KG4FXG
KF4KSN
126
WA2GUP
125
KF4WIJ
124
KD1LE
KB0DTI
KB2VRO
W4WXA
KA4HHE
123
N8DD
K7GXZ
AG9G
122
N1IST
KC7SRL
N2GJ
WB2QIX
WD9FLJ
AA4HT
121
W4CAC
AA2SV
WA1JVV
120
K9GBR
W3IPX
W2GUT
N7AIK
119
W4DGH
N7DRP
N2AKZ
WB4GGS
KA2DBD
WI2G
118
KI4YV
K4MTX
W1QU
W4CKS
K2DBK
K0PIZ
KA8WNO
K0PIZ
W5AYX
W7LG
K7MQF
W7QM
N9MN

117
K4BEH
W5MEN
116
N3WKE
K2PB
AC5Z
115
KB0RUU
K4WKT
114
KA4LRM
KC8KYP
113
K4BG
KB2KOJ
112
W3OKN
111
WA4EIC
KG4EZQ
N3SW
110
W1JX
KC4VNO
KA2BCE
KG2D
109
K3CSX
KT4TD
108
W7VSE
WA8SSI
AF2K
KC6OIF
KJ7SI
107
KC7ZZB
K1FP
KB2WII
106
WB2LEZ
105
WB4UHC
K1JPG
104
WD5AAH
102
W4NTI
AB2IZ
101
N3ZKP
KE4JFS

WA2YOW
KB2ETO
W3NNL
KE4WBI
99
AE4MR
98
K5MC
W3CB
97
AA4YW
W4XI
KC2ANN
W6JPH
96
KA2ZKM
KA2CQX
95
WA2CUW
WB4PAM
KF5A
94
KE4GYR
WA4GLS
W4CC
WA1QAA
KC8HTP
WD4GDB
93
W1JTH
KC3Y
WB7VYH
W8IM
92
KG5GE
WA7UVX
91
WB4ZNB
KC6NBI
90
AA3GV
W2PII
KM4WC
89
KA1VED
W2CC
KF4OPT
88
WD4BUH
NC1X
KM5YL
W0FCL
K2VX
87
KD4HGU

KA7TTY
86
WD4MIS
KD1SM
W2LC
WA4CSQ
KE4VBA
85
N2VQA
84
K1SEC
K8SH
WB4BIK
K6IUI
WB9GIU
83
K1STV
K4ZC
82
N0JL
KO4OL
KA8VWE
KA2YDW
KG9B
80
W4QAT
KF4INJ
78
KD4FUN
77
K8QIP
AA4BN
76
KC7SGM
75
KE3FL
WJ2F
74
W5PY
73
KF4NJP
W7EP
N8NMA
W4AUN
KM5VA
KE4DNO
71
WB9OFG
K8LEN
70
W4MWC
WA4EYU

The following stations qualified for PSHR during the month indicated, but were not previously recognized in this column: (May) N4TAB 97, KE4WBI 90, K6IUI 71.

Section Traffic Manager Reports
June 2001

The following ARRL Section Traffic Managers reported: AL, AR, AZ, CT, DE, EMA, EPA, EWA, GA, IA, ID, IL, KS, KY, ME, MN, MO, NC, NFL, NH, NLI, NNJ, NTX, NV, OH, OK, OR, ORG, SBAR, SFL, SC, SD, SFL, SNJ, STX, TN, VA, VT, WCF, WI, WMA, WNY, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports
June 2001

The following ARRL Section Emergency Coordinators reported: AZ, CT, EWA, IN, KS, KY, LA, MDC, MI, NFL, NLI, SD, SFL, STX, SV, WCF, WMA, WNY,

Brass Pounders League
June 2001

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

Call	*Orig*	*Rcvd*	*Sent*	*Dlvd*	*Total*
KK3F	25	1000	956	44	2025
W5SEG	0	992	977	0	1969
WX4H	23	611	1004	6	1644
N2LTC	3	795	810	33	1641
W1GMF	16	248	1127	62	1453
NM1K	813	250	940	6	1279
W1PEX	0	130	843	18	991
N6IKN	0	473	120	353	946
K9JPS	0	422	31	414	867
WB5ZED	8	432	321	11	772
KW1U	1	412	342	10	765
W4EAT	0	381	296	2	679
KB5W	2	309	323	2	636
WB2GTG	29	255	340	10	634
W6DOB	10	192	379	23	604
W9YPY	0	226	283	0	589
KA1VED	4	289	289	0	578
WA9VND	32	295	190	7	524
KA2ZNZ	21	235	173	75	504

BPL for 100 or more originations plus deliveries: W7TVA 142, W9RCW 222, WD9GNK 203, K9GU 134, W3HK 124.

PIARA Announces DXpedition to Ducie Island

By Kan Mizoguchi, JA1BK

The Pitcairn Island Amateur Radio Association announces that it will undertake an IOTA DXpedition to Ducie Island, with operations to begin at 0000 UTC on November 16, 2001. This operation will utilize three stations operating around the clock, with emphasis on providing contacts to as many different individual stations as possible.

The leader of the DXpedition is well known operator Tom Christian, VP6TC, president of PIARA. Other DXpedition members are VP6DB, JA1BK/VP6BK, JA1SLS/VP6BB, JF1IST, and three other operators to be named later. This international DXpedition will be attempting to provide worldwide coverage for this rare IOTA, OC-182. The team plans satellite log checking.

Ducie Island is located 360 km from Henderson Island, the nearest land, and surrounded by waters of 3000 meters in depth. It is the easternmost atoll in Oceania, and rarely visited. Because of its remoteness, conventional transportation is not available, and an adequate size boat is needed to make the journey. Arrangements have already been made for a charter, and landing permission has already been obtained for the date selected. Because of ecological concerns, only one group may be on the island at one time.

The Pitcairn Island Amateur Radio Association has filed an application for membership in the IARU. Region III has approved this application, and the application has been forwarded to the full membership of the IARU for final approval.

Support for this DXpedition is being provided by Yaesu (Vertex Standard), Create Design and Suzuki Motors. The QSL Manager will be Garth Hamilton, VE3HO, and the Pilot station will be Dr Bill Avery, K6GNX. Further information will be provided as the date approaches. Keep an eye on your favorite DX bulletin for the latest news.

HAM-COM 2001 DXTRAVAGANZA IS A HUGE SUCCESS

"The most successful DX program in the history of Ham-Com," agreed Bill, W5SJ, Chief Director of the Lone Star DX Association (LSDXA) and Maury, W5BGP, general Chairman of Ham-Com 2001, held in early June at Arlington, Texas.

Bill said "the LSDXA board made the commitment last year to make the DX program at Ham-Com something really special and with a lot of hard work by K5AT, K5HW and W5AH along with WW5L (who obtained a record number of door prizes) and W5AX and our members, plus the tremendous support of Ham-Com, we did it!" Martti Laine, OH2BH, was the featured speaker at the Saturday luncheon packed with DXers of every age, including students of the DeGolyer School, the pilot school for the ARRL's Big Project. Martti spoke on the evolution of DXpeditions from fun to missionary status.

W5SJ PHOTOS

Members of the Lone Star DX Association spent many months preparing for DXtravaganza at Ham-Com. Here they are at one of the many planning meetings. Left to right: W5SJ, WW5L, W5AX, K5HW, W5AH and K5AT.

Featured lunch speaker Martti Laine, OH2BH, told the attendees, "Every potential script has been tried but one," referring to a full-scale DXpedition to North Korea. Martti is shown receiving an honorary LSDXA membership and polo shirt from K5HW as W5SJ looks on.

Each night the LSDXA sponsored a hospitality suite. W5SJ, W3UR and ON4UN are shown talking about what else but low-band DXing.

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

The daylong program of DX subjects was also a first and included an excellent program by John, ON4UN, whose book, *Low Band DXing*, was most popular at the LSDXA exhibit booth. His program was also packed in the meeting rooms at Ham-Com, as were presentations by W5GAI, Getting Started in DX; N5TJ, Breaking contest records from EA8BH; W5BOS-N5UR-AD5A, IOTA; N7NG, DXCC update; K7BV, WRTC 2002 report; ON4UN, 160 meter antenna/radial systems; and, W3WL, D68C operation.

LSDXA also had a hospitality suite two nights to allow DXers to mingle with each other and the guest speakers. Herb, K5AT, LSDXA information director said, "We were fortunate to have financial support from area DX clubs which really made the difference in the success of our DXtravaganza, including ADXA, OKDXA, NTCC, CTDXCC and Alamo DX Amigos."

5R—MADAGASCAR

Jack, F6BUM, plans to be on holiday in Madagascar from September 9 to 27. He'll have an IC-706 and a R7 vertical. Jack will also make a stop on IOTA AF-090 from September 3-7 and on IOTA AF-057 from September 23-26. Look for him mostly on CW. No call was mentioned. QSL via F6BUM.

A6—UNITED ARAB EMIRATES

A little bird told me that Ali's, A61AJ, station will once again be QRV during this year's CQ World Wide RTTY Contest at the end of September. Final details had not been worked out at press time, but it is expected to be a multi-op effort. QSL via W3UR.

DXCC ANNOUNCES NEW 12 METER AWARD

DXCC is pleased to announce the addition of the 12-Meter Single Band DXCC award. Applications for this award will be accepted beginning July 2, 2001. 12 Meter DXCC certificates will be dated but not numbered. 12-meter credits will not count toward the DeSoto Cup competition until October 1, 2001, but they will be included in the DXCC Challenge totals. If you do not know what credits you have on 12 meters, you may contact DXCC for a copy of your record. Note: The 12-meter band was added to the printout on January 1, 2001. If you received a copy since then, you already have a copy of your 12-meter credits. This will help avoid duplicates and additional costs. If you have Web access and can handle ADOBE (.PDF) files, contact DXCC at **dxcc@arrl.org** for a copy of your record. If you do not have Web access, please send a note to DXCC along with $2 for postage and handling. For further information, please contact DXCC at **dxcc@arrl.org**.

DX CLUBS

DX clubs are a great resource for DXers. Only about 31% of the readers of "How's DX?" are members of a DX club. It's a wonderful place to meet other Amateur Radio operators who have the same interests as you, DX! Most clubs meet once a month and have programs about DXing and talk DX. For a listing of DX clubs around the world check out **www.dailydx.com/clubs.htm**. If your club is not listed send an e-mail to **clubs@dailydx.com**.

DX CONVENTIONS

The 49th annual W9DXCC DX Convention and Banquet will be held on September 15, 2001. Make your plans now, as this is sure to be one you won't want to miss. Scheduled on the program are 9M0M, YJ0PD, 4W/K7BV, PW0S, YK9A and many more. For complete details check out the W9DXCC web page at **www.qth.com/w9dxcc** or send an e-mail to Bill Smith, W9VA, at **w9va@aol.com**.

The Russian Robinson Club has announced their 7th annual Russian IOTA/DX Conference for September 27-30 near Lipetsk. Visit **rrc.sc.ru/eng/eng.htm** for more info.

The 23rd annual Clipperton DX Club (CDXC) Convention will be in Tours, France on September 22. Programs include VP6BR, CE0Z, D68BT/D68WL and ZF1/F6BUM. For more information contact Jean-Louis Dupoirier, F9DK, 11 rue Henri Barbusse 78114, Magny Les Hameaux, France, or check out the CDXC Web site at **cdxc.free.fr**.

The RSGB's annual International HF & IOTA Convention will be held this year at the Beaumont Training & Conference Centre in Windsor, Berkshire, England on October 12, 13 and 14. As of press time D68C, VP8SDX, ZD7K and ZD8K are expected to be presenting. For more information contact the RSGB Commercial Department by telephone +44 1707 659015 or by fax +44 1707 645105. You can also check out their Web page at **www.rsgb.org/hfc2001/**.

KH1—BAKER & HOWLAND ISLANDS

The team that brought you Conway Reef 2001 (3D2CI) plans to operate from KH1, Baker and Howland Islands, during September-October, 2001, led by YT1AD, Hrane.

February-March 2002 is the backup timeframe. Watch your favorite DX bulletin for more details.

S2—BANGLADESH

Look for John Core, KX7YT to be going back to Dhaka, Bangladesh from September 8 to 20. He plans to be QRV as S21YV on 15 and 20 meters SSB and PSK31. Best time to seek him will be from 1400 to 1800 daily. QSL via KX7XY.

SOUTH PACIFIC TRAVELS

South Pacific DXpeditioner Gerard, PA3AXU, announced he would once again head to the islands in September. First stop is Tarawa, West Kiribati where he will be QRV as T30XU starting September 4. Next it's on to Nauru beginning on September 11 as C21XU. The final stop will be on September 20 as 3D2XU in the Fiji Islands until September 28. Plans are to be active on SSB, CW, RTTY, SSTV, PSK31 and Hell. Gerard has set up a Web page at **www.qsl.net/pa3axu/2001**.

TI—COSTA RICA

Bill, AK0A, says he will be going to Costa Rica for the CQ World Wide RTTY Contest in September and the TARA PSK31 Rumble in October. Plans have been made to head south of the border on September 25 and stay until October 9. Bill expects to pick up his call sign upon arrival.

VK ISLANDS—INDIAN & PACIFIC OCEANS

World traveler Bert vd Berg, PA3GIO, will be active from the Indian and Pacific Oceans throughout September and early October. First stop will be from Christmas Island (OC-002) as VK9XV from September 6 to 13. From September 14 to 20 he'll be active as VK9CQ on Cocos Keeling (OC-003). Bert's next stop will be for two weeks as VK6GIO possibly from Kangaroo Island (OC-139) some time between September 22 and October 8. And if that is not enough he will also operate as VK9LO on Lord Howe Island (OC-004) from October 9-15. Burt plans to be QRV on SSB only on 10, 12, 15, 17, 20, 40 and 80 meters with 100 watts and a doublet with open feed line. Check out Bert's Web page at **www.pa3gio.nl/**. QSL (preferably by the Bureau) to PA3GIO.

ZK1—NORTH AND SOUTH COOK ISLANDS

Five members of the Western Washington DX Club (WWDXC) will operate the CQ World Wide SSB DX Contest from Manihiki (OC-014) North Cooks as ZK1CG. Before and after the contest, from about October 22-30, members will operate as ZK1CG, ZK1VVV, ZK1ASQ, ZK1APM and ZK1AKX. They expect to do all bands from 6 through 160 meters both SSB and CW. Ralph, VE7XF, will be monitoring 6 on or about 50.106 as ZK1AKX outside the contest with a 6-element beam. After the contest the group plans to operate from Rarotonga (OC-013), in the South Cook Islands. Look for them here from November 1 to 13. QSLs for ZK1CG must go direct to CBA, as there is no effective bureau in ZK1. Cards that arrive there will never be seen so they will not get answered. The other calls will take bureau cards if they arrive at the W7 QSL bureau for ZK1VVV (W7VV), ZK1ASQ (W7TSQ) and ZK1APM (AA7PM). ZK1AKX go to VE7XF and must come via the VE7 QSL bureau. Cards will be printed after the trip so expect some delay in receiving responses. Direct requests will of course get direct responses (if postage cost is covered) and then bureau cards will be done.

WRAP UP

That's all for this month. Keep sending your pictures, stories, DX news and club newsletters. Thanks this month go to AK0A, DXCC Desk, F6BUM, JA1BK, PA3AXU, PA3GIO, W5SJ, W7TSQ and YT1AD. Until next month, see you in the pileups!—*Bernie, W3UR* QST

License Renewal, Changes of Address and other Concerns

ARRL HQ receives many questions on all sorts of regulatory topics, particularly those on license renewal, changes of address and related licensing questions. This used to be a simple procedure—you sent the FCC a Form 610 and the license was renewed or the address changed. It's still a simple process, especially for ARRL members. With the implementation of the Universal Licensing System, amateurs have more choices in filing applications. Amateur applications can be filed manually using paper forms or electronically over the Internet. In all cases, you must first be registered with the FCC. Eventually, the Commission Registration System (CORES) will replace ULS.

What is ULS registration?

All stations must register under ULS in order to take advantage of FCC services, like renewing your license, changing your address, upgrading your license and so on.

Registration in ULS is the process of identifying your Taxpayer Information Number, generally your Social Security Number, your name, address and call sign. The FCC will not process applications unless an amateur is registered. When you register, you will be given a License Identification Number consisting of an eight digit number preceded by the letter "L." To file electronically on the Internet, go to **www.fcc.gov/wtb/uls** and click on "TIN/Call Sign Registration." Important: You must have Netscape version 4.3 or later as a Web browser. You can also register manually by completing an FCC Form 606 and mailing it to the FCC in Gettysburg.

How can I check to see if I am already registered?

Some amateurs may not realize that they are already registered if they have recently obtained a new license or upgraded through a VEC. VECs register amateurs, but you will need to independently specify a password to use FCC on-line services. An easy way to determine if you are registered is to visit the FCC ULS Web site at **www.fcc.gov/wtb/uls**, click on Search Licenses, General, Continue, and then enter your call sign. If you are registered under ULS, your License Identification Number will appear on your FCC record.

I registered manually under ULS. How do I specify a password so I can file on-line?

If you registered manually or via a VEC, call the ULS Technical Support Staff (202-414-1250; e-mail **ulscomm@fcc.gov**) to specify a ULS password.

What form(s) must I use when filing an application manually?

All of the Forms mentioned can be found on the ARRL Web page. See **www.arrl.org/fcc/forms.html**. See Table 1 for an overview of various forms used in the Amateur Service.

What is the difference between the NCVEC Form 605 and the FCC Form 605?

If you've taken an amateur exam lately, you'll be familiar with the NCVEC Form 605 since that is the form used by all VECs for every amateur who obtains a new license or upgrades. Though it is not an FCC form, it is similar to the old Form 610 and it is designed to be used specifically for Amateur Radio purposes. For ARRL member renewals or license modifications, the ARRL VEC will process this as a free membership service.

FCC Form 605, a different form, must be processed by the FCC. It is a multipurpose form and can be used in the Amateur, Restricted and Commercial Operator and General Mobile Radio Services. Because it is a multipurpose form, it is not quite as "user friendly" for amateurs as the NCVEC Form 605. This form must be mailed to the FCC.

Several months ago, I received a letter from the FCC that gave me my Federal Registration Number related to CORES. What should I do with it?

Keep that letter! You will need it when the FCC implements CORES in the Amateur Service.

If applying manually, where do I send the form(s)?

Send the FCC Form 605 (excluding vanity applications) to FCC, 1270 Fairfield Rd, Gettysburg, PA 17325-7245. Send non-electronically filed vanity applications, which must include FCC Form 605 plus the Schedule D and FCC Form 159 with the $14 fee, to FCC, Wireless Bureau Applications, PO Box 358130, Pittsburgh, PA 15251. Send the FCC Form 159 along with the $14 when the application is filed electronically to FCC, Wireless Bureau Applications, PO Box 358994, Pittsburgh, PA 15251-5994. In both cases, the payment type code for the Form 159 is **WAVR**. The Form 159 Lockbox Number is the PO Box you are mailing the forms to (eg, for non-electronically filed applications, the Lockbox is "358130"; for electronically filed applications, the Lockbox is "358994").

Send the NCVEC Form 605 to a VEC. For free processing as a membership service, ARRL members can send it to the ARRL VEC, 225 Main St, Newington, CT 06111.

Table 1
Forms Used in the Amateur Service

Amateur Purpose:	Form	Plus Supplements:
Pay Vanity Fee	FCC 159	605—main form and Schedule D
Renew or Modify an amateur license	FCC 605	—
Apply for a Systematic Call Sign Change	FCC 605	Schedule D
Apply for a Vanity Call	FCC 605	Schedule D and Form 159
Obtain a Duplicate License	FCC 605	—
Register under ULS	FCC 606	—
New License, Upgrade, Change Address or Name, Systematic Call Change	NCVEC 605	—
New or Modified Club and Military-Recreation Station License	NCVEC 605	—

John C. Hennessee, N1KB ♦ Regulatory Information Specialist

What else do I need to know about renewing my license or changing my address?

You can renew your license no sooner than 90 days before it expires—or up to two years after it has expired. If you are outside that window, your application can not be acted upon.

How do I complete the NCVEC Form 605?

You only need to complete Section 1, regardless of the purpose of the form. Enter your name, address, type of application (Individual or Amateur Club), Social Security Number or FCC License Identification Number, and use for the form. Uses include:

- Examination for a *new* license (at a VE session)
- Examination for a license upgrade (at a VE session)
- Change a name
- Change mailing address
- Change your call sign systematically
- Renew the license

Finally, date and sign the form. Your signature certifies that you agree to the six statements listed.

How do I complete a FCC Form 605?

The FCC Form 605 is long and not all of the items apply to the Amateur Service because this form is used for other services too. It is critical that amateurs use the correct application codes on the Form 605.

Here are quick instructions on completing the form:

For Address Changes and Name Changes:

Complete Items 1-27

Under "Radio Service Code" (#1), write code **HA**

Under "Application Purpose" (#2), write code **AU**

If filing manually, remember to date and sign the back of the form

License Renewal and Reinstatement (if expired less than 2 years):

Complete FCC Form 605 by completing Items 1-27;

Under "Radio Service Code (#1), write code **HA;**

Under "Application Purpose" (#2), write code **RO** to Renew Only or write code **RM** for Renewal *and* Modification of the license*;*

For Systematic or Vanity Call Sign Changes

Complete FCC form 605 by completing Items 1-27;

Under "Purpose" write code **MD** for modification.

If filing manually, remember to sign and date the back of the form.

Amateurs may renew their license no sooner than 90 days prior to the expiration of the license. License renewal applications submitted prematurely will be returned without action.

If the license has been expired more than 2 years, the individual usually must be retested. (Some exam grandfather credit may be available—contact your local VEs for information.)

License Lost or Destroyed:

Complete the FCC Form 605 by completing Items 1-27;

Under "Radio Service Code" (#1), write code **HA;**

Under "Application Purpose" (#2), write code **DU;**

If filing manually, remember to sign and date the back of the form.

You can find detailed instructions on completing the FCC Form 605 at **www.fcc.gov/Forms/Form605/605main.pdf**.

I checked the status of my application on the FCC Web page at www.fcc.gov/wtb/uls and found that it was "Pending Level 1." What does that mean?

Here is what the various FCC status codes mean:

1 (Pending Level 1)—Application has been filed but has not begun FCC processing

2 (Pending Level 2)—Application is currently under review by the FCC

D (Dismissed)—Application was dismissed by the FCC

G (Granted)—Application was granted by the FCC

I (Inactive)—An Amendment application has been filed for an application, thus rendering the original application inactive

K (Killed)—Application filed manually has been found to contain errors or duplicate information

R (Returned)—The FCC returned the application to the applicant

T (Terminated)—Application was terminated by the FCC

W (Withdrawn)—Application was withdrawn by the applicant

I sent the FCC in Gettysburg an FCC Form 605 and received a letter stating that my application was dismissed and that I was to "cease and desist" operations! All I wanted to do was renew my license!

This is the FCC's standard letter dismissing an application that was filed improperly. You may have used the wrong application code or applied to renew your license when you were outside the 90 day period for renewal. If you read the letter carefully, you will realize that the "cease and desist" part applies only if your license was about to expire or had expired and if the application was to renew it. If the application was filed improperly, you would need to file another application.

What is a "systematic" call sign change?

This is a call sign assigned randomly by the FCC computer to reflect your current class of license and FCC call sign district. This is *not* a call of choice. There is no charge for this, but once the request is made, the only way to obtain your former call sign is through the Vanity Call Sign Program. All of the systematically assigned 1×3 format calls have been assigned in the continental US, so if you are a Technician or General, the only way to obtain a call other than a 2×3 call is through the Vanity Call Sign Program.

I recently upgraded and received my license in the mail from the FCC, yet it carries the same renewal date as my other license. I thought that the FCC renewed licenses when any modification was made.

This was the case until mid-1994, but since that time, licenses have been assigned only for 10-year terms. You must renew your license every 10 years regardless of any other changes that you made to the license in the meantime. You can check your license renewal date at **www.fcc.gov/wtb/uls** and click on License Search. You will find the expiration date of your license. You can also check **www.arrl.org/fcc/fcclook.php3** or call the FCC at 1-888-CALL FCC.

I need to change the address on our club station license. How can I do that?

Both the trustee and another member of the club *must* complete and sign the NCVEC Form 605, as the club call sign program was privatized effective January 22, 2001. This replaces the FCC Form 610-B. The club will need to obtain an Assigned Taxpayer Identification Number from FCC Technical Support, 202-414-0250 or **ulscomm@fcc.gov**. The NCVEC Form 605 must be sent to a Club Station Call Sign Administrator (the ARRL VEC is one). There is no charge for filing the application.

The FCC says that trustees and custodians of club, military recreation, and RACES licenses should *not* use their personal Social Security Number as the TIN for these licenses. Club station trustees and applicants should contact ULS Technical Support (202-414-1250 or **ulscomm@fcc.gov**) to obtain a FCC-generated identification number. QST

Don't Be a Target

"Hey, Rich, Paul just drove in from North Carolina, why don't you drop by and say hello. I immediately recognized Fran Slavinski's, KA3WTF, voice on the other end of the phone.

"Sure. Let me take care of some loose ends here and I'll be over in a few minutes," I replied, hanging up the phone.

About 20 minutes later, I pulled the truck into Fran's driveway, grabbed the Sony digital camera and bailed out of the cab. Paul, AA4XX, and Fran met me on the porch, where we immediately began talking QRP.

After kicking various topics around until around 2220 EST, Paul said he wanted to see my K1, which I use for QRP mobile operations, so we wandered out to the truck.

Opening the cab door, I immediately smelled a strong odor of cigarette smoke, which instantly alerted me that someone other than the three of us had been inside my truck. I grabbed the MagLite and looked around the cab. Gone was my Elecraft K1, a small Tee-Nee-Kee paddle set by NE8KE and the POQET palmtop computer (sorry, Rod) that I used for portable/logging. In street slang, I'd been "boosted"!

The three of us immediately grabbed flashlights and started combing the area. After wandering around for 30 minutes, we met back at Fran's house where I called the local police. Within 10 minutes a Larksville squad car pulled up and the officer took the report. His parting words were, "I'd like to tell you that we have a good success rate of recovering stolen property, but that is just not true. You'll probably never see your radio gear again, but a report will be on file at the station, should your insurance company need it for reimbursement."

I make my living by teaching VoEd electronics at the State Correctional Institution–Dallas, a medium/maximum state prison near Dallas, Pennsylvania. My two classes consist of 42 incarcerated male inmates. It occurred to me that some of them could offer a unique insight into this situation. Here are a few suggestions from "those who *really* know," about how to protect your radio gear at home and on the road.

Thinking like a crook.....

First of all, *LOCK YOUR VEHICLE !!!* As stupid and obvious as that sounds, we all get complacent, which is *exactly* the opening criminals are looking for. One moment's inattention to detail (i.e., forgetting to lock the vehicle or house) and you are a target. Conversely, about 10 years ago I had my locked Toyota van broken into by thieves. They popped the passenger side window with a spring-loaded center punch and stole my 2-meter rig while the van was parked beside my house. The K1 disappeared from my unlocked truck parked within 15 feet of Fran's porch, in a densely populated, low crime area of Larksville. Had I taken the time to lock the cab, I'd still have my gear. Less than 10 seconds—that's all it would have taken to lock my truck. Stupid Rich.....stupid, stupid Rich!

All my "professional help" agreed that the less obvious your vehicle is, the less likely you will become the target of a thief. If you have a large HF antenna on your vehicle, remove it when you are not actually on the air. Same goes for your VHF antennas. Don't advertise your gear! Believe it or not, vanity call sign plates also attract unwanted attention. We all like to advertise the fact we are radio amateurs, but it does have a down side.

When you park, use a windshield sun screen that obstructs the view of your vehicle's interior (and your radio gear), further reducing the possibility of becoming a target. If you can't tint the windows, cover your gear with a dark cloth to reduce visibility. If a thief can't see anything readily accessible to turn into instant cash for drugs or booze, chances are he'll move along in search of a more tempting target.

Are You Feeling Vulnerable Yet?

Alarms just don't work all that well. How many times have we walked by a car in a parking lot with its alarm system blaring loudly, and no one comes to investigate? Alarms give a false sense of security. My "professionals" confirmed that *any* alarm system can be defeated within a matter of seconds, provided the thief knows his trade.

Get the serial numbers, model numbers and any unique identifying information on *ALL* your gear at home and in the mobile. File them with your important papers as you'll need this information in the event you need to make a police report and subsequent insurance claim. Several years ago it was thought that engraving your name and SSN on valuables would deter theft. Not so. Today's thief doesn't care. They're after money for drugs. Besides, if you give someone your SSN you are asking for trouble from today's cyber-criminal element.

Insurance: Getting What You Pay For

Now a word about insurance. Many times your vehicle insurance *won't* cover "two-way radio," cell phone and aftermarket stereo equipment installed in your vehicle. Your homeowner's insurance normally won't cover anything inside your vehicle. Check your insurance coverage to avoid any surprises. Several companies offer insurance for ham gear; they have a pretty healthy deductible, however, and, if I remember correctly, you have to replace the gear and turn the receipt for the new equipment into the insurance company prior to them issuing any reimbursement.[1]

Common Sense

Common sense is your best defense. Be observant and alert regarding your surroundings and maintain a low profile. As an exercise, put yourself in the place of the thief. Look for vulnerabilities in your mobile and home security. Take the time to rectify these potential problem areas. Thieves want quick and easy access to your valuables. This goes for the car as well as the house. Make the thief's job hard. Lock all doors and windows. A dog in or around your dwelling/property is a big help. (I don't have a 135 pound Alaskan Malamute living in my yard for nothing!) Their senses of smell and hearing are hundreds of times more sensitive than ours and they will make noise, lots of noise, when someone they don't know comes a callin'. Criminals rely on stealth and speed. *And*, they are cowards. The absolutely last thing they want is a confrontation, especially by an irate victim. Deprive the criminal of either stealth or speed and you'll not become a victim.

I'd like to offer some "thank yous" to the following "professionals": The Grizz, Poncho, Mickey the Squirrel, Ashman, Sleezy Easy, Two-Tone, Fast Eddie, Saint Francis the Sissy, Sammy the Fish, and Master Rapper A-Plus, without whose help this column wouldn't exist.

Until next time, be safe, be observant and "check six."

[1]For information on the ARRL-sponsored Ham Radio Equipment Insurance Plan (featuring a low deductible), see *ARRLWeb* (**www.arrl.org/FandES/field/regulations/insurance/equipment.html**), or contact the Administrator, Seabury and Smith, at 1-800-503-9230. QST

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My Postcard from Dayton

Having a great time; wish you were here!

Another great Dayton Hamvention has come and gone. I renewed old acquaintances and made new ones. I saw old equipment in the flea market and new equipment in the Hara Arena.

New equipment that held my attention included the W7PUA DSP-10 2-meter software-defined transceiver, which I wrote about here in May and July and saw for the first time in the flesh at the TAPR booth. Also holding my attention were the packet-radio goodies displayed by a German company named SYMEK.

SYMEK sells TNCs and data transceivers. At Dayton, they were proudly showing off a variety of equipment and the following items caught my eye.

Dual Modem TNC

The TNC3S is SYMEK's high-speed dual-modem packet-radio controller featuring simultaneous two-modem operation, 16-bit CPU, up to 2 Mbytes of RAM and Flash-EPROM. The price range of the TNC3S is $245 to $365 depending on modem options.

There are two slots in the TNC3S for plug-in modems. The slots accept SYMEK's 1200-baud AFSK and 9600-baud FSK (G3RUH-type) modems in any combination and the TNC can access both modems simultaneously. If the TNC's RS-232 port is not needed (for example, when used as a remote digipeater), a third modem may be configured with the TNC.

The TNC3 uses 16/32-bit Motorola MC68000 microprocessor. The data bus to EPROM and RAM is 16 bits wide to speed up data transfer. The processor includes a RISC-based communications controller that transfers complete AX.25 packets directly to the RAM without the intervention of the CPU. SYMEK claims that this makes the TNC3S approximately 100 times faster than the TNC2 (where every byte caused an interrupt and had to be transferred individually to the RAM). The CPU is capable of processing serial data on three channels simultaneously at a peak baud rate of 1.6 Mbaud per channel full-duplex.

The TNC firmware is compatible with the WA8DED Host Mode. It also includes a mailbox, and "intelligent" digipeat and gateway operation. Since the TNC3 has two radio ports, digipeating may occur via the same port or across ports. The TNC3 stores a long list of stations received (the MH list) in memory, so it is possible to permit the TNC to determine which port outputs the digipeated data. The TNC accomplishes this by searching through its MH list to see on which port a specific call was last heard. Using this information, the TNC determines if the packets are to be digipeated on the same port or the other port. Since the baud rates of the two ports may differ, the TNC can act as an intelligent gateway between two frequencies or two baud rates (1200 and 9600). The TNC also uses this information for intelligent connections. You command it to connect to a specific station and the TNC knows which port to use to make that connection.

TNC31S/SX are SYMEK's high-speed packet radio controllers, featuring 16-bit CPUs, up to 512 kbytes of RAM and Flash-EPROM. They have similar features as the TNCÎ3 except the TNC31s accept only one modem and have less memory. The price range of the TNC31S/SX is $185 to $263 depending on RAM and modem options.

High-Speed Data Transceivers

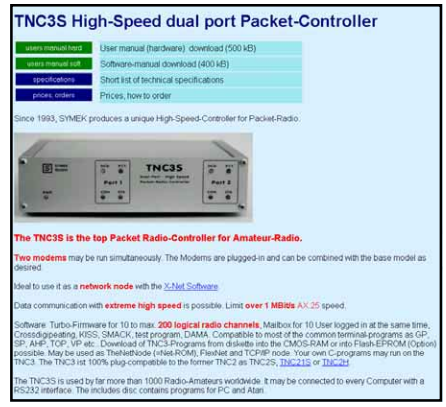
The TRX2S and TRX4S are SYMEK's 145 and 435-MHz high-speed data transceivers featuring 25-W output at up to 153,600 bauds, remote programmability and fast transmit-receive switching. The TRX2S and TRX4S cost $1180 and $920, respectively.

The TRX2S and TRX4S transceivers are built for speed! They have an incredibly short transmit-receive switching delay of only 1 ms in both duplex and simplex modes. They are also capable of incredibly large data rates. SYMEK claims they can transmit and receive signals with up to 153,600-baud data rates without any limitations!

The radios also feature a modulator response of 5 to 10 kHz at 9600 baud and 75 kHz at 153,600 baud without distortion. The IF filter bandwidth is 30 kHz with flat group delay at 19,200 baud and 250 kHz with flat group delay at 153,600 baud.

The size of the radio is a mere 3.9×6.3×1.1 inches (minus the heat sink). It requires 12 V dc at 0.3 A to receive and 6 A to transmit.

The SYMEK crew has so much to offer for state-of-the-art RF data communications. Please go to their Web site (**symek.com**), select the *English language* link and see what I mean. You will be amazed!



At the SYMEK Web site (symek.com), you can view the state-of-art RF data communications hardware and software sold by this German company.

Cool New APRS Internet Application

Steve Dimse, K4HG, has done it again. His latest APRS Internet application is so cool. And it is useful, too! His newest handiwork displays the National Weather Service Doppler radar image for the area surrounding a specified APRS station. (The displayed area represents approximately a 150-mile radius around the specified station.)

Use the following Web site, **www.findu.com/cgi-bin/radar-find.cgi?call=** with the call sign and SSID of an APRS station appended to the URL, and the weather radar image for the specified area appears. For example, if I want to view the weather radar image for the area surrounding my APRS digipeater (WA1LOU-15), I go to **www.findu.com/cgi-bin/radar-find.cgi?call=wa1lou-15**. Another example...to display the weather radar image for the area surrounding both my digipeater and the APRS station in my land barge, I use **www.findu/com/cgi-bin/radar-find.cgi?call=wa1lou***.

To decipher the information displayed by the radar weather image, browse to the National Weather Service Radar Information Web page (**www.wrh.noaa.gov/radar/radinfo.html#color**). The page describes the signifance of the colors displayed by their radar images as well as a lot of other useful and interesting information about their radar system. QST

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COMING CONVENTIONS

W9DXCC CONVENTION
September 14-15, Rolling Meadows, IL

The W9DXCC Convention, sponsored by the Northern Illinois DX Assn, will be held at the Holiday Inn "Holidome," 3405 Algonquin Rd; I-90 N to Rte 53 to Algonquin Rd Exit, left at light, hotel on right. Doors are open for registration at 8 AM, convention begins at 9 AM. Features include DXpedition presentations, programs, antennas, ARRL forum, DXCC QSL card checking, hospitality suites (Friday and Saturday), banquet (7 PM, guest speaker Bob Allphin, K4UEE). Talk-in on 147.36. Admission is $50 in advance (before Sep 7), $55 at the door (convention and banquet); $28 in advance, $30 at the door (convention only). Contact Bill Smith, W9VA, 1345 Linden Ave, Deerfield, IL 60015; 847-945-1564; **w9va@aol.com**; **www.qth.com/w9dxcc**.

ILLINOIS STATE CONVENTION
September 14-16, Peoria

The Illinois State Convention (Peoria Superfest 2001), sponsored by the Peoria Area ARC, will be held at the Exposition Gardens, 1601 W Northmoor Rd; I-74 to Exit 91 B, N on University, 3.8 miles to Northmoor Rd, left to gate. Doors are open for flea market setup on Friday at 10 AM, Saturday and Sunday 6 AM; indoor commercial vendor setup Friday 2-9 PM, Saturday 6:30 AM, Sunday 7:30 AM; gates are open to the public on Friday from 3 PM until dark for flea market preview, Saturday and Sunday 6 AM; commercial buildings are open Saturday 8 AM to 4:30 PM, Sunday 8 AM to 3 PM. Features include Amateur Radio/Computer/Electronics Show, flea market (reserve space in advance, $5 plus $5 admission; **w9uvi@arrl.net**), commercial dealers, manufacturer reps, new and used equipment and accessories, computers and software, electronic parts and components, forums, DXCC card checking (Saturday only, at the ARRL booth in the Youth Building), VE sessions (Sunday only, 10 AM to 1 PM), acres of free parking, refreshments. Talk-in on 147.075. Admission is $5 in advance (2 stubs), $7 at the door (1 stub); good for the weekend. Contact John Coker, N9FAM, c/o Peoria Superfest, Box 3508, Peoria, IL 61612-3508; 309-694-3917; **n9fam@bwsys.net**; **www.w9uvi.org**.

ARKANSAS STATE CONVENTION
September 15, North Little Rock

The Arkansas State Convention ("All-Arkansas Hamfest"), sponsored by the Central Arkansas Radio Emergency Net (CAREN), will be held at the North Little Rock Community Center, 2700 Willow St and Pershing Blvd; Exit 153A off I-40, S to Pershing Blvd, W on Pershing to Willow St. Doors are open 8 AM. Features include flea market, dealers, forums, VE sessions, refreshments. Talk-in on 146.94. Admission is $5. Tables are $20. Contact Scott Derden, K5SCD, Box 2893, Little Rock, AR 72203; 501-837-7888; **k5scd@arrl.net**; **www.carenclub.com**.

VIRGINIA STATE CONVENTION
September 22-23, Virginia Beach

The Virginia State Convention, sponsored by Tidewater Radio Conventions, will be held at the Virginia Beach Pavilion, 19th St; end of Hwy 264. Doors are open for setup Friday noon to 10 PM, Saturday 6 AM; public Saturday 9 AM to 5 PM, Sunday 9 AM to 2 PM. Features include hamfest and electronics flea market; commercial dealer booths ($150); major manufacturers and dealers; special guest speaker Riley Hollingsworth, K4ZDH; tailgating ($20, advance registration recommended); VE sessions (Saturday, 2:30-5 PM; pre-registration by Thursday afternoon, Sep 20, Ed Brummer, W4RTZ, 757-898-8031); forums; field checking for ARRL and CQ DX awards; free parking. Talk-in on 146.97. Admission is $6, under 12 free. Tables are $30 (8-ft, good both days; electrical outlet $40 for both days). Contact Art Thiemens, AA4AT, 2836 Greenwood Rd, Chesapeake, VA 23321; 757-484-2857 or 757-426-3378; fax 757-486-0757; **thiemens@pinn.net** or **hamfest@exis.net**; **www.vahamfest.com**.

CONNECTICUT STATE CONVENTION
October 7, Wallingford

The Connecticut State Convention, sponsored by the Nutmeg Hamfest Alliance, will be held at Mountainside, High Hill Rd; I-91, Exit 15, E on Rte 68, left on Research Pkwy, right on Carpenter Ave, left on High Hill Rd to Mountainside. Doors are open for setup at 6 AM; public 9 AM to 3 PM. Features include hamfest/computer show; large flea market; major vendors; seminars and lectures; special guest speaker Riley Hollingsworth, K4ZDH; demonstrations; VE sessions (Joel Curneal, N1JEO, 203-235-6932); ample free parking; refreshments. Talk-in on 147.36. Admission is $7. Tables are $30 ($25 if reserved and paid for by Sep 1), outside space $20. Contact Mark Mokoski, WA1ZEK, 944 Killingworth Rd, Higganum, CT 06441; 860-808-1275; **wa1zek@arrl.net** or **nutmeghamfest@qsl.net**; **www.qsl.net/nutmeghamfest**.

August 25
Missouri State, Columbia*
West Virginia State, Weston*

August 25-26
New Mexico State, Rio Rancho*

September 1-2
Eastern VHF/UHF Conference, Enfield, CT*

September 7-9
Southwestern Division, Riverside, CA*

September 8
Kentucky State, Louisville*

September 9
Western Pennsylvania Section, Butler*

October 13
Hawaii State, Honolulu

October 19-21
Pacific Division, Concord, CA

*** See August *QST* for details.**

Attention Hamfest and Convention Sponsors:
ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262. **Note:** Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. QST

HAMFEST CALENDAR

Attention: The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **September 1** to be listed in the **November** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

†Alabama (Mobile)—Sep 14-15; Friday 5-9 PM, Saturday 8 AM to 2 PM. *Spr:* Mobile ARC. Elks Lodge 108, 2671 Dauphin Island Pkwy; from I-10 take Exit 22 S, go 2 miles, hamfest on left. *TI:* 146.82. *Adm:* $5, under 12 free. Tables: $20. Larry Early, WB4YOR, Box 8404, Mobile, AL 36689-0404; 334-342-7601; fax 334-342-6908; **wb4yor@aol.com**; **www.angelfire.com/al/marc3/festham.html**.

†Alaska (Fairbanks)—Sep 16, 8 AM to 4 PM. *Spr:* Arctic ARC. Auto Service Co, 3285 S Cushman St; turn S off Airport Rd onto Cushman St, go 16 blocks S. Swap 'n Sell ham gear, electronics, computers, vendor displays, operating HF and VHF stations, Arctic ARC Annual Meeting (1:30 PM), VE sessions, FCC commercial exams will be available if needed, hidden transmitter hunt (Saturday, Sep 15, 3:30 PM), banquet (7:30 PM, River's Edge Resort), special guests Gordon West, WB6NOA (will conduct license classes) and ARRL Northwestern Division Vice Director Jim Fenstermaker, K9JF (will conduct ARRL forum on Monday, Sep 17, 11:30 AM at the River's Edge Resort), special events and tours of local ham stations (including KL7RA's contest station). *TI:* 146.28/146.88 (103.5 Hz), 444.8/449.8 (103.5 Hz). *Adm:* Free (optional donation of a can of food for the Food Bank). Tables: $10 (reserve). Jim Movius, KL7JM, Box 83992, Fairbanks, AK 99708; 907-452-6347; fax 907-452-6349; **ajmovius@gci.net**; **www.mosquitonet.com/~fbrown/01hamfest.htm**.

†Arizona (Kingman)—Sep 29; set up 6 AM

†ARRL Hamfest

Gail Iannone ♦ Convention Program Manager

public 7 AM to 3 PM. *Sprs:* Hualapai ARC and Dolan Springs RC. Mohave Community College parking lot, 1971 Jagerson Ave; I-40 to Exit 51 (Stockton Hill Rd), N to Jagerson Ave, go E on Jagerson to College. Flea market, dealers, tailgating, VE sessions, ARCA meeting, refreshments. *TI:* 146.76 (131.8 Hz). *Adm:* Free. Bill Beaman, KA0IYS, 2028 Atlantic Ave, Kingman, AZ 86401; 520-753-2293.

Arkansas (North Little Rock)—Sep 15, Arkansas State Convention. See "Coming Conventions."

Arkansas (Siloam Springs)—Sep 15. Matt Hyde, N5UYK, 501-524-4797.

†California (Santa Rosa)—Sep 22; sellers 6:30 AM, buyers 7:30 AM to 1:30 PM. *Spr:* Sonoma County Radio Amateurs. Lewis Adult Education Center, corner of Lewis Rd and Lomitas Ave; Hwy 101 to Steele Ln, go E 8 blocks to corner of Lewis and Lomitas. Vendors (double parking spaces $10 each), VE sessions (9 AM to noon), refreshments. *TI:* 146.73 (88.5 Hz). *Adm:* Free. Rick Reiner, K6ZWB, c/o SCRA, Box 116, Santa Rosa, CA 95402; 707-575-4455; **k6zwb@cds1.net**; **www.cds1.net/scra**.

California (Sunnyvale)—Sep 27-30. "Microwave Update 2001," Will Jensby, W0EOM, 408-296-6071.

†Connecticut (Newtown)—Sep 16; set up 7 AM; public 9 AM to 2 PM. *Spr:* Candlewood ARA. Edmond Town Hall, Rte 6; Exit 10 off I-84, follow signs. Flea market, new equipment dealers, computers, electronics, tailgating ($6, includes 1 admission), handicapped accessible, ample parking, refreshments. *TI:* 146.67 (100 Hz). *Adm:* $4, under 12 free. Tables: $10 (includes 1 admission). Ken Weith, KD1DD, 8A Hoyt Rd, Bethel, CT 06801; 203-743-9181; **weithranch@snet.net**; **www.danbury.org/cara**.

Connecticut (Wallingford)—Oct 7, Connecticut State Convention ("Nutmeg Hamfest"). See "Coming Conventions."

†Florida (Melbourne)—Sep 8; set up Friday noon (parking lot), 6-8:30 PM (indoor); public Saturday 9 AM to 5 PM. *Spr:* Platinum Coast ARS. Melbourne Auditorium, 625 E Hibiscus Blvd; from I-95 take US 192 E to US 1, N to Hibiscus Blvd, turn left. Large outdoor tailgating area ($15 per spot, includes 1 admission; first-come, first-served), indoor tables, commercial booths. *TI:* 146.85. *Adm:* $5. Tables: $25 (swap), $80 (commercial). Tim Madden, KI4TG, 1450 Creel Rd NE, Palm Bay, FL 32905-3857; 321-724-9339; **hamfest@pcars.org**; **www.pcars.org**.

Georgia (Dallas)—Sep 15. Bill Houston, WD4LUQ, 770-445-9191.

†Illinois (Grayslake/Chicago)—Sep 22-23; Saturday 8 AM to 4 PM, Sunday 8 AM to 3 PM. *Spr:* Chicago FM Club. Lake County Fairgrounds, Rtes 45 and 120; I-294 N to Rte 120, W to Rte 45. Huge outdoor flea market, indoor vendors, forums, VE sessions (both days), free parking. *TI:* 146.76 (114.8 Hz). *Adm:* advance $6, door $8. Tables: $20. Gerald Spearman, W9EG, 348 W Natoma Ave, Addison, IL 60101; 630-628-1501; **geraldspearman@msn.com**; **www.chicagofmclub.org**.

Illinois (Peoria)—Sep 14-16, Illinois State Convention. See "Coming Conventions."

Illinois (Rolling Meadows)—Sep 14-15, W9DXCC Convention. See "Coming Conventions."

†Indiana (Bedford)—Oct 7; set up Saturday 8 AM to midnight; public Sunday 6 AM to 3 PM. *Spr:* Hoosier Hills Ham Club. Lawrence County 4-H Fairgrounds, US 50 W; from Bedford take SR 37 S to US 50 W, turn W (left) onto US 50, 1 1/2 miles to entrance on right. Vendors, VE sessions, forums, foxhunt, free chili supper, camping, free parking, refreshments. *TI:* 145.31. *Adm:* $7. Jerome Kutche, N9LYA, 342 Wade St, Mitchell, IN 47446; 812-849-0095; **n9lya@blueriver.net**; **www.hoosierhillshamfest.org**.

†Iowa (West Liberty)—Sep 30, 7 AM to 1 PM. *Sprs:* Muscatine and Iowa City ARCs. Muscatine County Fairgrounds; 17 miles NW of Muscatine, 15 miles E of Iowa City; from I-80 take Exit 259 S 10 miles, follow signs. Flea market, commercial vendors, computer dealers with new equipment and software, overnight parking, Saturday evening prehamfest Wiener Roast (6 PM), VE sessions (Tom Kramer, K0VSV, 563-264-3259), refreshments. *TI:* 146.91, 146.85, 146.52. *Adm:* $5. Tables: $8 (8-ft). Mike Hayden, KB0TFT, 1215 Lincoln Blvd, Muscatine, IA 52761; 319-262-8790; **kb0tft@arrl.net**; **www.qsl.net/kc0aqs/hamfest.html**.

†Maryland (Bowie)—Sep 30; tailgate 6 AM to 3 PM, indoor 8 AM to 3 PM. *Spr:* Foundation for Amateur Radio. Prince George's Stadium, 1/2 mile S of US Rte 50 on Rte 301; 15 miles E of Washington, DC and 20 miles S of Baltimore. Commercial vendors, tailgating ($10 plus admission), VE sessions, special-event station, equipment testing table. *TI:* 147.105. *Adm:* $5. Tables: $25. Dan Blasberg, KA8YPY, 8800 Rhode Island Ave, College Park, MD 20740; 301-345-7381; **blasberg@bellatlantic.net**; **www.amateurradio-far.org**.

†Maryland (West Friendship)—Sep 23; set up 6 AM; public 8 AM to 3:30 PM. *Spr:* Columbia ARA. Howard County Fairgrounds, off MD Rte 144; take I-70 to MD 32 Exit to MD Rte 144; Fairgrounds 1 block W from 32/144 intersection. Hamfest/Computerfest, giant flea market, large indoor display area, tailgating ($10, includes admission), vendors, electronic equipment, antennas, VE sessions, handicapped accessible, free parking, refreshments. *TI:* 147.135. *Adm:* $5, nonham spouses and children free. Tables: $20 (for 1-4 tables), $18 (for 5 or more tables). John King, KB3WK, c/o CARA, Box 911, Columbia, MD 21044; 410-465-6324; **kb3wk@arrl.net**; **www.qsl.net/cara**.

Massachusetts (Cambridge)—Sep 16. Nick Altenbernd, KA1MQX, 617-253-3776.

†Michigan (Adrian)—Sep 16. *Spr:* Adrian ARC. Lenawee County Fairgrounds. VE sessions. *TI:* 145.37. *Adm:* $5. Tables: $10. Ted Rachwal, K8AQM, 1600 Wolf Creek Hwy, Adrian, MI 49221; 517-263-0615; **tjrachwal@home.com**; **users.aix.cc/w8tqe**.

†Michigan (Caledonia/Grand Rapids)—Sep 15; set up 6 AM; public 8 AM. *Sprs:* Grand Rapids ARA, Lowell ARC, and Michigan AR Alliance. Caledonia High School, 9757 Duncan Lake Ave SE; US 131, E on 100th St to High School. Electronic/Computer/Ham Radio Equipment Swap and Shop, flea market, VE sessions, overnight self-contained camping (Friday, no hookups). *TI:* 147.26 (94.8 Hz), 146.52. *Adm:* $6, under 13 free. Tables: $10 (8-ft), $5 (9-ft×18-ft outdoor space). Ed Novakowski, N8UXN, Box 3282, Grand Rapids, MI 49501-3282; 616-458-9029; **hamfest@w8dc.org**; **www.w8dc.org**.

Nebraska (Omaha)—Sep 8. Bill Newman, K0NSA, **k0nsa@arrl.net**.

†New Hampshire (Hopkinton)—Oct 5-6; Friday 9 AM ("G" gate) to end of event on Saturday. *Spr:* HOSSTRADERS. Hopkinton State Fairgrounds, off I-89, Exit 7. VE sessions (Saturday morning). *Adm:* $10 (Friday, 9 AM to 3 PM), $5 (Friday, 3 PM until end of event). Sellers space: $10 (no advanced registration). Joe Demaso, K1RQG, HC 78, Box 126E, Bucksport, ME 04416-9611; 207-469-3492; **k1rqg@aol.com**; **www.qsl.net/k1rqg**.

†New Jersey (North Crosswicks/Hamilton Township)—Sep 23; set up 6:30 AM; public 8 AM. *Spr:* Delaware Valley RA. Tall Cedars of Lebanon Picnic Grove, Sawmill Rd (Robbinsville); Exit 2 off I-195, follow S Broad St for 1.6 miles, at Yardville Bank bear right towards Crosswicks, at stop sign (3.5 miles from I-195) go straight through, bear left onto Old York Rd, take first right onto Sawmill Rd, site is 1.1 miles on right. Hamfest/Computerfest, flea market, Amateur Radio and computer equipment, tailgating ($10), free parking, refreshments. *TI:* 146.67 (131.9 Hz). *Adm:* $6, nonham spouses and children free. Tables: $15 (8-ft, covered). Glenn Costello, N2RPM, 4 Marlow Ct, Hamilton, NJ 08610; 609-882-2240; **abbott0903@aol.com**; **www.w2zq.com/**.

†New Jersey (Tinton Falls)—Sep 16, 8 AM to 2 PM. *Spr:* Garden State ARA. American Red Cross Jersey Coast Chapter, 1540 W Park Ave; Garden State Pkwy, Exit 105, right onto Hope Rd, right to Wyckoff Rd which becomes Shafto Rd, follow Shafto Rd to W Park Ave, turn left, building on right. First indoor "rain free" tailgating area, VE sessions. *TI:* 147.045, 145.11. *Adm:* advance $5, door $6. Tables: $10 (first table), $8 (second table); drive-in vehicle space $15 (station wagon), $20 (larger trucks). J. Ray Lett, W2NXG, 69 Northland Dr, Aberdeen, NJ 07747; 732-583-1809; **cpuryear@exit109.com**.

†New York (Horseheads)—Sep 29, 6 AM to 3 PM. *Spr:* ARA of the Southern Tier. Chemung County Fairgrounds; in Horseheads on Rte 17, at 2nd light turn S on Grand Central Ave, proceed 1/2 mile to Fairgrounds. Hamfest/Computerfest, large flea market area, dealer displays of new equipment, VE sessions (9 AM, walk-ins accepted; John, 607-565-4020), camping, pancake breakfast and lunch served on premises, free parking, refreshments. *TI:* 146.7, 147.36. *Adm:* advance $5, door $6. Randy Viele, N2SYT, Box 44, Elmira, NY 14902-0044; 607-625-5893 (days) or 607-738-6857 (eves); **n2syt@arast.org**; **www.arast.org**.

†New York (Medford)—Aug 19, 9 AM to noon. *Spr:* Suffolk County RC. Horseblock Rd; approximately 1/2 mile S of Rte 112. Outdoor tailgate hamfest. *TI:* 145.21 (136.5 Hz). *Adm:* $5. Les Quackenbush, KB2ZHF, 63 W Parkview Dr, Shirley, NY 11967; 631-399-4041; **leskb2zhf@aol.com**.

†Ohio (Cincinnati)—Sep 16, 8 AM to 4 PM. *Spr:* Greater Cincinnati ARA. Scarlet Oaks Career Development Campus, 3254 E Kemper Rd; from I-275 N of Cincinnati, exit OH SR 42 S (Exit 46), go S on Rte 42 to Kemper Rd W, right on Kemper, 1 mile to Great Oaks sign, right to hamfest. Flea market, commercial exhibits, dealers, vendors, forums, hidden transmitter hunts, VE sessions, free parking, refreshments. *TI:* 146.88. *Adm:* advance $5, door $6 (under 13 free). Tables: indoor $35, outdoor $8. Jim Weaver, K8JE, 5065 Bethany Rd, Mason, OH 45040; 513-459-0142; **k8je@arrl.net**; **cincinnatiamateurradio.com**.

†Ohio (Cleveland)—Sep 23, 8 AM to 2 PM. *Spr:* Hamfest Assn of Cleveland. Cuyahoga County Fairgrounds; 1 1/2 miles W of I-71 and Bagley Exit 235, 1/2 mile S on Eastland Rd. ARRL forum, VE sessions, card checking, refreshments. *TI:* 146.73 (110.9 Hz). *Adm:* $5. Tables: $15. Ed Santavicca, AA8TV, 1259 Edwards Ave, Lakewood, OH 44107; 800-CLE-FEST; **info@hac.org**; **www.hac.org**.

†Ohio (Medina)—Oct 7, 8 AM to 2 PM. *Spr:* Medina Two Meter Group. Ohio National Guard Armory, 920 W Lafayette Rd (State Rte 42); take SR 42, 2 miles S of downtown Medina; Armory on left side of road. VE sessions, refreshments. *TI:* 147.03. *Adm:* advance $4, door $5. Tables: $10. Mike Rubaszewski, N8TZY, 4264 Alpine Hill Ct, Brunswick, OH 44212; 330-273-1519; **n8tzy@m3net.net**; **www.qsl.net/m2m**.

†Pennsylvania (Schnecksville)—Sep 15, 7 AM. *Spr:* Delaware Lehigh ARC. Schnecksville Fire Company Grounds, on Rte 309; 4.3 Miles N of Rte 22. Tailgating ($7), ham equipment, computers, equipment test area, refreshments. *TI:* 146.7 (151.4 Hz), 444.9 (151.4). *Adm:* $5, nonham spouses and under 12 free. Tables: $11 (indoor). Carl Seier, AA3IX, 5234 Plata Dr, Coplay, PA 18037-2565; 610-261-1121; **aa3ix@arrl.net**; **www.dlarc.org**.

Pennsylvania (Uniontown)—Sep 1. Carl Chuprinko, WA3HQK, 304-594-3779.

†Pennsylvania (York)—Sep 15-16; Saturday 1-8 PM, Sunday 8 AM to 4 PM. *Spr:* York Hamfest Foundation. York County Area Vocational Technical School, 2179 S Queen St; Exit 6 E off I-83, go S 1 block to Pauline Dr, E on Pauline Dr to first entrance on right. Vendors, seminars (both days), VE sessions (both days), tailgating (Sunday only). *TI:* 146.52. *Adm:* $5. Tables: advance $15 (1st and 2nd; additional $12 each), door $20. John Shaffer, W3SST, Box 351, Dover, PA 17315; 717-764-8193; **w3sst@yorkhamfest.org**; **yorkhamfest.org**.

Rhode Island (Forestdale/North Smithfield)—Sep 15. Rick Fairweather, K1KYI, 401-725-7507 (7-8 PM only).

†**Tennessee (Sevierville)—Sep 28-29;** Friday 5-9 PM, Saturday 9 AM to 3 PM. *Spr:* Ten-Tec. Ten-Tec Factory, 1185 Dolly Parton Pkwy, 2 miles E of Sevierville on Hwy 411 N. *TI:* 146.94. *Adm:* Free. Tables: bring your own for tailgating. Stan Brock, WD0BGS, 312 Rolling Meadows Dr, New Market, TN 37820; 865-453-7172; **sales@tentec.com**; **www.tentec.com**.

Virginia (Virginia Beach)—Sep 22-23, Virginia State Convention. See "Coming Conventions."

†**Washington (Chehalis)—Sep 30,** 9 AM to 3 PM. *Spr:* Chehalis Valley ARS. Lewis County Fairgrounds, 255 N National Ave; from I-5 take Exit 79, from N turn left, from S turn right onto Chamber Way, turn left on National Ave, National becomes Kresky, go 1 mile then turn left onto Exhibitor Rd, turn left onto N National Ave. VE sessions (by reservation). *TI:* 147.06, 146.46. *Adm:* $3. Tables: 6-ft, advance $10 (without power), $15 (with power); after Sep 17 $15 (without power), $20 (with power). Bill Harwell, KC7QHJ, 362 SW Chehalis Ave, Chehalis, WA 98532; 360-748-8086; **kc7qhj@arrl.net**; **www.cvars.org**.

Wyoming (Laramie)—Sep 7-9. Jay Ostrem, W7CW, 307-682-7839.

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NEW BOOKS

SHORT RANGE WIRELESS COMMUNICATION

By Alan Bensky

Published by LLH Technology Publishing, 3578 Old Rail Rd, Eagle Rock, VA 24085. tel 540-567-2000, Fax 540-567-2539; **www.LLH-Publishing.com**. *First edition, 2000, 282 pages including the index, paperback 9¼ × 7¼ inches, many B&W illustrations, CD-ROM included. ISBN 1-878707-53-1. $49.95*

Reviewed by Paul Danzer, N1II
ARRL Technical Advisor

This book defines short range as "unlicensed radio communication" and "several kilometers at the very most." In fact, the entire concept seems to have a common ancestor of the VHF or UHF garage door opener in the 1970s, with its nifty (and cheap!) L-C oscillator and superregenerative receiver. Most of the devices discussed in the book have an effective range of 5 to 50 feet—not exactly DX!

In addition to containing a very good summary of basic communication technologies, and some interesting softwareæ more about that lateræthere is another good reason why you might be interested in this book, or at least the technology it discusses. If you are a ham, and expect to be a ham for the next 5,10 or 20 years, you are going to see some very interesting changes. As an example, take a look at computer mice. They are starting to go wireless, and wireless connections between your rig and your mike have already appeared on the market.

Anyone who has tried to set up a wireless link—or "short-range wireless communication"—knows there are many issues and problems, including mutual interference, range limits, multipath, false signals and others. This is exactly what this book deals with.

Chapter 1 is a general introduction, and outside of some US government patent applications, it is also one of the few places you can see a brief discussion of RFIDs or radio-frequency identification devices. These are the little passive (no battery) cards and tags that are used for both retail store merchandise identification and as passes to allow people to go into restricted areas in industry. The table included in the chapter points out that short-range devices are currently using parts of the spectrum from 300 MHz to 2.4 GHz. Talk about the chances for interference and noise!

VHF, UHF and microwave fans will be interested in the propagation chapter. The mechanism of combining direct and reflected signals is shown, as is knife-edge propagation. Ever wonder why you can hear the repeater behind that high hill? The author points out that this effect also occurs when the knife-edge is at ground level, providing some interesting (and perhaps unexpected) effects.

One highlight of the Antennas and Transmission Lines chapter is the description of a patch antenna. While commonly used in inexpensive wireless gadgets, because it can be made by etching on the same printed board as the transmitter circuit, this antenna is not often used in ham radio. However hams with an interest in aircraft could well consider the patch as the choice for a minimally protruding antenna on the outside surface of a private airplane. Design details of this antenna are included on the CD-ROM.

If you want to know how several of these short-range devices keep from interfering with each other, and stay relatively immune to high-power standard transmitters, the chapter on communication protocols and modulation has a wide variety of examples. For ham purposes, it is strictly a tutorial, but maybe someone reading this chapter will get an idea for yet another digital mode!

Glancing through the chapters on transmitters, receivers and systems, you might get the impression that they are a combination of 1935 and 2001 technology. The simplicity of some of the examples suggest the past, but the high technology of their construction—often single-chip with a minimum of external components—definitely puts the designs into today. I don't think there is a single construction-minded ham who could look at the Motorola MC13150 or the Philips UAA3201T chips with out saying, "Hmm, what if I ...." The material here is not inclusive enough to design from, but does show a good cross section of what might be used. A quick glance could well give you a few ideas.

I found chapter 9, Regulations and Standards, fascinating. Not that I am fond of reading governmenteese, but I have often wondered "just how much power does that remote control for my car locks use? The UHF garage door opener—why is it allowed to operate on the same frequency as a local TV channel?"

The CD-ROM included with the book contains a number of *Mathcad* worksheets for various designs and formulas in the book. The Mathcad Explorer is available as a free download from Mathsoft at their Web site, **www.mathsoft.com/mathcad/explorer**. A word of warning—the download is 12,418 kB (that's 12.4 MB), so be prepared to wait a while, or go out for a pizza, or whatever. Worksheets included cover the design of helical antennas, microstrip transmission lines, patch antennas, loop antennas, propagation (short range, of course!) and other handy areas. Expect, however, to put some effort into using these worksheets and *Mathcad* effectively.

The book includes a short introduction to information theory. It is not necessary to read or understand this subject to make use of the earlier chapters of the book. At the end of the book is both an extensive set of references, a bibliography and a brief discussion of new developments in the field. These include *Bluetooth*, which has been the main topic of many computer industry magazines recently, as more and more companies decide if they want to make their wired communication products wireless. (Does anyone expect higher noise levels on the ham bands as more and more devices go wireless with ultra-wideband frequency hopping?)

If you want to learn what is going on now, and what you will be seeing in the future, this book is a good way to get a glimpse. Perhaps you will not be able to do any design directly from the material here, but you will get a number of ideas and maybe consider a new and interesting project! QST

Thordarson 1938 100-W Transmitter

Transformer companies made their money by selling transformers. Early on they found that providing schematics of well-designed transmitters using their products increased sales. Thordarson Electric Mfg Co was one of the most successful. Starting in 1934 they provided a giveaway publication called the *Transmitter Guide*. It was loaded with great photos of ham stations and transmitters. It also contained articles, parts lists and schematics of transmitters from 20 W all the way up to 1-kW.

Thordarson's introduction of a "new" 100-W transmitter, "designed specifically for Ham requirements," in the September 1938 issue of *QST* caught everyone's attention. Their two-page ad was followed with 12 additional ads from many of the ham stores. Harvey Radio's ad said in part, "[It] is available in "Foundation Unit" form with complete instructions for assembly and operation. Chassis, panels and chassis brackets are supplied completely punched for easy assembly.... Approximate price complete including Cabinet, but less Tubes and Crystals is $139.50."

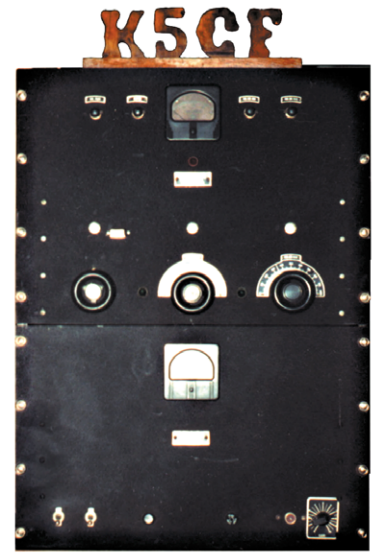
The RF tube line-up is 6L6, 6L6, to a Taylor TZ-40. The modulator line-up is a 6J7, 6F6, 6F6, driving two 6L6s in push-pull. It was designed as two self-contained units, each with a built-in power supply. The transmitter section could be used alone for CW or as an exciter. The modulator could be added later, saving an initial outlay of cash. The modulator could also be used with other transmitters.

Recently Vance Gildersleeve, K5CF, found a 100-W transmitter in need of a complete restoration. It had belonged to Louie McMurray, WA5MDK of Plainview, Texas and was given by his son to Ed Mickle, KE5OB. Ed passed it on to Vance.

It was really dirty from years of sitting around. Vance cleaned it using Naval Jelly on the rust spots, and with a lot of scrubbing using damp cloths and Q-tips it started looking good again. He spray painted the rust spots and the cabinet, replaced the rusty hardware and installed the missing 300 mA meter in the modulator. Next he went through the components and replaced all the defective ones.

Now operational again, Vance uses it primarily on CW in the Antique Wireless Association's Old Timer contests. He says it works great with either crystal or VFO control.

Thordarson 100-W transmitter as found.



Thordarson 100-W transmitter after restoration.

For more information on K5CF and this transmitter, including schematics, please visit my Web page at **www.eht.com/oldradio/arrl/index.html**.

Collector Profile K5CF Vance Gildersleeve

Vance says, "I first became interested in radio while still in grammar school. I still have the little crystal set that my father bought me. In high school I became a Boy Scout and learned the Morse code. I bought a Gross CW25 kit and put it together. My original receiver was a Hallicrafters Super 7.

"After graduating from high school in May of 1937, I went immediately to Port Arthur College, in Port Arthur, Texas. There I studied radio/electronic theory to obtain a 1st Class Radiotelephone License and a 2nd Class Radiotelegraph License."

He was first licensed as W5GST on October 12, 1937 and has held numerous other calls since then, having moved around the country. In 1940 he worked as a broadcast engineer at KTEM, his first job. This picture was taken there, where he was rooming with a family in Temple, Texas.

Now retired, Vance had an interesting career in radio. From 1941 to 1949 he was a Flight Radio Officer with Pan American World Airways, flying out of Brownsville, Texas, New Orleans, Los Angeles and San Francisco. He was a Broadcast Engineer at KRON-TV, later with Eimac as an Electronic Technician, and retired after 18 years with Ampex Corporation as a Senior Field Service Engineer and Office Manager.

1940 station of W5GST. The 40-20-10 meter RF section at the top of the rack was built around the Gross CW25 chassis. It consisted of a 6V6G tritet crystal oscillator, an 807 buffer/doubler and a Taylor T40 final. It ran 100 W on CW and about 75 W on phone. His receiver was a Hallicrafters SX 16.

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

2001: A Successful Scholarship Odyssey

Your generous contributions have once again helped fund scholarship awards for the best and brightest that hamdom offers. Whether it's a recent high school graduate or a career-changing parent seeking a new vocation, students must work as hard as ever to find funding to complete their studies. Let's meet the diligent students whose educational odysseys you've helped aid in a small way:

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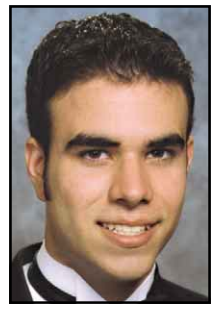

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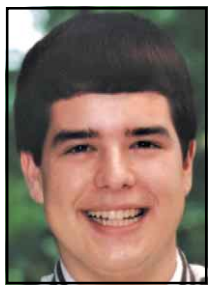

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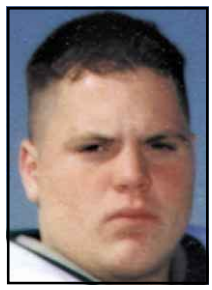
The Charles Clarke Cordle Memorial Scholarship—$1000



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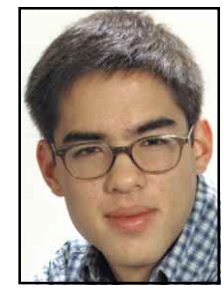
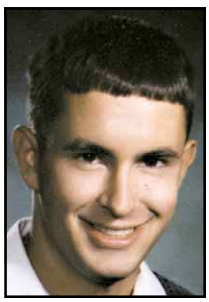


Andrew K. Mui, K2TJ
Rochester, NY
The General Fund Scholarship—$1000



Timothy R. Garrett, AA0ZB
Lansing, KS
The General Fund Scholarship—$1000

Kirk F. Williams, KC5EXM
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The Francis Walton Memorial Scholarship—$500

Shawn M. Burkhardt, AC5JZ
San Antonio, TX
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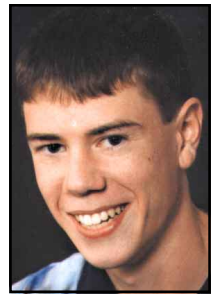


Andrew A. Knitt, KB9JOZ
Rhinelander, WI
The Chicago FM Club Scholarship—$500

Scholarships were also awarded to the following students not shown: **Robert P. Kim, KB3BZX**, Wexford, PA—You've Got a Friend in Pennsylvania—$1000; **Trent E. Drenon, KF6BUY**, Burney, CA—The Charles N. Fisher Memorial Scholarship—$1000; **Lucas A. Haag, KC0BJB**, Bartley, NE—The PHD-ARA Scholarship—$1000; **Cari A. Blind, N8LIG**, Alger, MI—The General Fund Scholarship—$1000; **Christopher J. Holley, N1YVP**, Malden, MA—The New England FEMARA Scholarship—$600; **Kristopher D. Machado, KB1FIR**, Fall River, MA—The New England FEMARA Scholarship—$600; **Ryan P. McGaver, N9ARS**, Cudahy, WI—The Edmond A. Metzger Scholarship—$500; **Will D. Hamilton, KD5LQG**, Ellisville, MS—The Mississippi Scholarship—$500; **David E. Roof, N9WSR**, West Chicago, IL—The Six Meter Club of Chicago Scholarship—$500; **James C. Fletcher, KG4FGL**, Columbus, GA—The Eugene Sallee, W4YFR Memorial Scholarship—$500; **Geneva J. Madrid, KC5RYZ**, Hernandez, NM—The Albuquerque ARC Scholarship—$500; and, **Michael D. Macino, KB9IHS**, Columbia City, IN—The IDEA Scholarship—$500.

To apply for Year 2002 scholarships, download our application at **www.arrl.org/arrlf** or write to *The ARRL Foundation, Inc, 225 Main St, Newington, CT 06111.*

Deadline for applications with transcripts affixed is **February 1, 2002**. QST

Contributor's Corner

We wish to thank the following for their generous contributions to:

Victor C. Clark Youth Incentive Program Fund
Lew & Terry Gordon, K4VX & NS0Z
  In fond memory of Ross Stevens, W0XJ
Robert K. Grebe, W3ZZX
  In fond memory of
  Thomas K. Doench, N7LLV
Jackson County ARC (Mississippi)
  In fond memory of
  Claude C. McCoy, K5TPR
Randy Rysavy, N0FDH
  In loving memory of
  Justin Spinler, K0GNH

The Eugene "Gene" Sallee, W4YFR Scholarship Fund
Kennehoochee ARC, Inc. (Georgia)

WRTC–USA Youth Fund (NEW)
Tom Frenaye, K1KI
Larry Tyree, N6TR

The General Fund
Montgomery County RACES/ARES (Pennsylvania)
Lois and Edward Feldman
  In loving memory of
  Eugene Langberg, WA3AKK
John D. Donald, W7OIQ
Ian A. Elliot, W7JMX
  In loving memory of
  Bea Clousing, K7CZQ
Audrey F. Wejmar
  In loving memory of
  Richard A. Wejmar, AF6T
Richard L. Rutledge, N8FQI
  In loving memory of
  Harry E. Rutledge, W8BCW
Peninsula ARC (Virginia)
  In fond memory of
  Alvah M. Blake, Jr., KE4WLW
North Jersey DX Association (New Jersey)
  In fond memory of Eileen Holmes, K2AGJ; Orion M. Arnold, W2HN; James P. Wood, W2NZG; Ted Marks, W2FG; and T. Edward Berzin, W2MIG
Michigan Wolverine Single Sideband Net (Michigan)
  In fond memory of
  Leon J. Clancy, N8MJC
Marguerite Beyer
  In fond memory of
  Herman Neuliep, N9TUH
Bruce J. Frahm, K0BJ
  In fond memory of Ross Stevens, W0XJ
Anthony A. Immorlica, Jr., KC2TV
  In fond memory of
  Joseph H. Swaney, W3QVX

As received and acknowledged during the months of **May and June**.

STRAYS

DO YOU HAVE YOUR "EXTRA" CERTIFICATE?

◊ Reminiscent of the original FCC Amateur Extra license certificate (no longer available), the ARRL Amateur Extra certificate is the perfect replacement for hams who want to proudly announce their achievement. This beautifully crafted document indicates the name and call sign of the operator, as well as the date he or she achieved this top grade. To order one for your station, simply send your name, address and a copy of your Amateur Extra license indicating the year you received it along with $7.50 ($10 for non-League members) to the Awards Branch at ARRL HQ, 225 Main St, Newington, CT 06111.

Next Strays

Pick a Pack of HF

QRP Pedestrian-To-Pedestrian Record Trumped

That headline in the *ARRL Letter* really grabbed my attention. A 17,500+ mile QSO between Max, ZL1BK, and Demetre, SV1UY, on foot, with no towers, beams, satellites, smoke or mirrors? Yes, it's possible! And you can do it too, as part of the fast-growing movement known as HFpack.

What is HFpack?

HF operation in remote areas, away from commercial mains, isn't new. And, the omnipresent HT has made portable operation on VHF/UHF as easy as push-to-talk. But talk and walk on HF has been somewhat rare, until now. Taking advantage of a crop of rugged and compact low-power rigs and mixing in some good-old fashioned ham ingenuity, portable HF operators are pushing the envelope, looking for new ways and places to be QRV. Couple that with the power of the Internet and the boundless energy of Bonnie Crystal, KQ6XA, and you have the e-group known as *HFpack*.

Bonnie explains:

I started the HFpack group in mid-November, 2000. I've been an active backpack HF enthusiast since the '60s, and it seemed that activity among hams for lightweight portable, bicycle, and backpack HF operation was starting to gather steam. The main focus of HFpack has been towards on-the-air practical operation. Part of that is the constant development of techniques by HFpackers using homebrew and off-the-shelf gear to make their HFpacks lighter, smaller, and more effective. The term Pedestrian Mobile (/PM) applies to human carried in-motion or motion-capable HF systems. HFpack has also introduced the term Human Powered Mobile (/HPM), which applies to bicycle, kayak, and other types of "vehicles" that are human powered. There are many QRP enthusiasts in the HFpack group; however, it is not our primary focus. SSB is one of the things that differentiates HFpack's focus from the "QRP only" crowd. The HFpack on-the-air skeds are a mix of CW and SSB on the same frequency.

When I first started the group, I thought it might reach maybe 50 to 100 people at some point in the future. [Membership now numbers nearly 1000. —*WF4N*] Needless to say, its popularity has made it a runaway success. Now we have registered the **HFpack.com/net/org** domains and are currently putting together a fairly extensive Web site/system seamlessly integrated with the e-mail list. I originally ran the group as a "benevolent dictator," as one of my friends put it, but now a core group of active HFpackers basically forms the ad-hoc behind-the-scenes informal committee for bouncing ideas and formulating the growth of the group. We formed the HFpack Hall of Fame in response to the group's desire to keep a record of long distance and other portable achievements. Since then, many HFpackers have endeavored to set records and some have been very successful. The Hall of Fame will be expanding to include other types of records and awards. It will become one of the highlights of the new Web site. The use of e-QSLs, and a section devoted to them on HFpack, has become a very interesting part of the culture of HFpackers.

The development of an on-the-air schedule happened after a few schedules with some of the more active HFpackers developed on 15 and 10 m. The original schedule developed into a worldwide schedule, and calling frequencies were added for the major HF bands to bring HFpackers together. Since then, the HFpack frequencies have become a watering hole for portable users, especially those using the Yaesu FT-817. Operating /PM or /HPM has become part of HFpack's culture very rapidly, and there is a focus on QSO activity within the group. Some interesting innovations in gear and methods have developed through the synergy of so many active operators talking about their experimental stuff. I'd have to say that HFpack has been a fairly successful group, and it certainly looks like it is continuing to grow. Who knows what is in store? One thing I do know...it is fun and exciting.

Mike, K9JRI, ready for HF bicycle mobile action.

HFpack Frequencies (kHz)

Calling: 18,157; Alternate: 14,342.5
Worldwide: ±5; CW +1
14,342.5/18,157/21,437/24,977/28,337 USB
Regional: 3688/7088, 3998/7248 LSB
Data: 10,137/14,097/18,107/21,107/24,927/28,107

Demetre, SV1UY, working 15 meters on a Greek island beach with daughter Sophie.

Be A Part!

What can I add? Simply, if you've ever considered portable or Pedestrian Mobile HF operation, you should check out the HFpack e-group at **groups.yahoo.com/group/hfpack/**. After a simple registration, you'll be able to browse the messages, check out photos of HFpack operators, read about modifications for some of the popular portable HF radios, even learn where the best spots are to operate /PM at some airports! You'll also be able to post questions, schedule contacts or just chat with other 'packers. Even if you don't have Internet access, you can still be part of the fun by tuning to one of the listed frequencies and giving a call.

Re: July Radios To Go

Inquiring minds wonder what antennas Wade Biggs, WA7DE, is using. Credit Comet for the roof-mount dual-bander and Hustler for the HF antenna. Thanks to George, KR5C, et al, for pointing out the omission. QST

Roger Burch, WF4N ♦ Box 100, Island, KY 42350 ♦ wf4n@arrl.org

SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

W1ARE, Dan Smith, Barefoot Bay, FL
W1COU, Martyn E. Meservey, Oxford, MA
KA1DRQ, George W. Christoph, Windsor, CT
K1HAM, Robert I. Curtis, Fairfield, CT
KA1ISI, Edward E. Ford, New Gloucester, ME
KA1UHF, George Mannix, Harwich, MA
W2AS, William H. Kennedy, Sunrise, FL
KC2BTS, Harold J. Abbott, New York City, NY
*W2EUP, Gilbert L. Boelke, West Seneca, NY
*W2JBI, Seymour Krevsky, Little Silver, NJ
K2KJT, Gerald A. Bellina, Califon, NJ
W2KNB, Ken Beckman, Bayside, NY
KE2LD, Daniel R. Hunter, Cheektowaga, NY
W2NXW, Virgil K. Lewis, Delran, NJ
N2PLK, Ronald A. Hardesty, Smithtown, NY
W2SXR, David B. Mehnert, Edinburg, NY
KA3FKK, Jerry Troxell, Tyrone, PA
KD3FM, Carole Hetzler, Hudson, MA
WA3GAL, Jean L. Strickland, Saint Petersburg, FL
W3GFZ, William F. Alexander, Poultney, VT
K3PSY, Harry L. Sands, Tucson, AZ
W3SQ, Michael Mrvosh, Pittsburgh, PA
KZ3U, Tay K. Tambolas, Mechanicsburg, PA
K4APG, Clifford A. St John, Montgomery, AL
K4BO, Jared S. Smith, New Smyrna Beach, FL
*WA4CEC, Alfred H. Mebane, Chapel Hill, NC
W4CGP, Chet Atkins, Nashville, TN
K4CSG, George S. Brown, Lexington, KY
W4EBL, Charles J. Ward, Andalusia, AL
W4EQR, Harvey Campbell, Pensacola, FL
W4GFF, Hubert C. Ellis, Palm Bay, FL
W4HUF, Ethel Kanoy, Winston-Salem, NC
KA4ILY, John R. Nolen, Franklin, NC
K4IUH, Charles H. Taylor, Mossy Head, FL
KD4IYS, Frances A. Cole, Rockford, AL
KB4MVF, Shirley K. Fulton, Maysville, KY
W4OPC, Theodore O. Brigham, Venice, FL
*WA4PMU, Thomas F. Brown, Pensacola, FL
KO4QH, Lynn O. Pitegoff, Raleigh, NC
WB4SQN, William D. Underwood, Pt. St. Joe, FL
N4SRP, Ed Pater, Columbus, GA
W4TAJ, John E. Maddox, Johnson City, TN
KA4TCQ, Philip R. Eversoll, Spring Hill, FL
KL4T, Roy C. Gould, Anchorage, AK
*W4TMK, Ross A. Pinson, Buena Vista, GA
K4TSN, Hannis L. Kennedy, Dickinson, AL
KE4WLW, Alvah M. Blake, Hampton, VA
W4WU, Charles R. Hendrix, Signal Mountain, TN
N4WWA, Denver Eadens, Bowling Green, KY
*N4YZ, William J. Bradley, Wilsonville, AL
W5EEF, Charles P. Chilton, Oklahoma City, OK
W5GBV, William J. Ragsdale, Pampa, TX
K5GFD, J. R. Schuneman, Pampa, TX
W5GR, Guy R. Reed, Evergreen, CO
W5IJQ, Herman Whatley, Pampa, TX
KD5KQG, Gary A. Bowers, Crossett, AR
N5OYY, Bob Golitz, Anguilla, MS
*W5SWS, Isaac J. Savoie, Houma, LA
WR5X, Hugh G. Glasson, Seguin, TX
KA6AQS, Michael J. Gimblett, Sebastopol, CA
*W6BR, R. E. "Ed" Dodero, San Diego, CA
WA6CUZ, Warren E. Reid, Visalia, CA
KE6DDR, A. T. Parker, Los Angeles, CA
K6EWK, Earl W. Knight, Crescent City, CA
*K6HIW, Jack P. Holland, Long Beach, CA
WA6JIT, George A. Lambert, Roseville, CA
KF6JYO, Beth A. Thompson, Hemet, CA
KE6KOE, Mark J. Thompson, Hemet, CA
WA6OUC, Warren C. Tucker, Vallejo, CA
K6SWD, Julian R. Besel, Pasadena, CA
*AF6T, Richard A. Wejmar, Stockton, CA
*W6TWG, Arden D. Connick, Foresthill, CA
WA6WNL, Daniel M. Hegarty, Cupertino, CA
KH6ZT, Albert S. Morgan, Kapaa Kauai, HI
W7CEC, Eugene Sobczyk, Bremerton, WA
W7EPE, Ned E. Johnson, Tacoma, WA
W7FBA, Leonard Kearney, Eugene, OR
W7GTU, Richard M. Nelson, Portland, OR
KB7KOE, Barney C. Fagan, Phoenix, AZ
N7LLV, Thomas K. Doench, Scottsdale, AZ
KC7MHH, Dennis J. Fryer, Kalispell, MT
W7OR, Karl C. Bowersox, Portland, OR
W7QV, Kingsley M. Morrison, Port Angeles, WA
WB7SUL, George D. Hicks, Carson City, NV
K7VO, Paul L. Miller, Shady Cove, OR
WZ7V, Barry N. Norrgran, Tomahawk, WI
KE7WT, Albert D. Lamb, Sun City, AZ
KJ7XK, Elmer J. Robertson, Orofino, ID
KE7YO, Anthony San Angelo, Tucson, AZ
W7ZRS, Terry E. Holm, Oregon City, OR
W8BCW, Harry E. Rutledge, Olmsted Falls, OH
W8BDR, Orville D. Underwood, Green Valley, AZ
N8BY, Gilbert Whittier, Saginaw, MI
W8CUJ, Robert Montgomery, Englewood, OH
WA8GPQ, Jene C. Gaible, Cincinnati, OH
W8HCI, Dale L. Vesper, Troy, OH
W8HKO, Chalmers C. Boring, Vermilion, OH
K8JCV, Joseph S. Braund, Salem, OH
W8JMH, William R. Talbott, Houston, TX
K8OHL, Anthony J. Kaluza, Conneaut, OH
*WB8ORE, Harry L. Cook, San Antonio, TX
K8POD, W. Merle Burroughs, Delta, OH
WA8WFB, Thomas J. McNamara, Lansing, MI
N8WJI, John S. Kelker, Springfield, OH
N8ZOF, John G. Lyons, Kettering, OH
WB8ZQX, Sam M. Simon, Youngstown, OH
WB9AUD, Lawrence A. Wusler, Milwaukee, WI
KC9DQ, Dennis D. Welty, Willisville, IL
N9EVL, John R. Novotny, Breckenridge, CO
N9GMD, Billie R. Uncapher, Hartford City, IN
*WB9IRX, Gerald A. Kozak, Schererville, IN
K9JSK, J. P. Wurtz, Evansville, IN
W9NPL, Melvin P. Thurlow, Wabash, IN
W9PRV, Floyd J. Sakemiller, Hudson, IL
W9QLA, Seymour G. Passen, Northbrook, IL
W9SNH, William A. Hauk, Cassville, WI
K9SU, Paul Conley, Lincoln City, OR
N9TUH, Herman C. Neuliep, Merrillville, IN
K0BWV, Orville J. Carlisle, Nebraska City, NE
W0EHF, Robert E. Rosenquist, Omaha, NE
N0EIO, Philip C. Jackson, Bloomington, MN
K0GNH, Justin E. Spinler, Owatonna, MN
W0GUR, Ralph G. DeCanniere, Parsons, KS
WA0HFS, Antone J. Fortunato, Grand Lake, CO
K0IPT, William D. Hewitt, Council Bluffs, IA
W0IXB, Jack C. Miller, Nebraska City, NE
KB0JTS, Bill Bennett, Akeley, MN
*W0LC, Frank C. Mullaney, Saint Paul, MN
ex-W0LUS, Jack Windle, Nebraska City, NE
N0MUI, Charles G. Schilling, Princeton, MO
N0OHD, A. Ralph Boxell, Clinton, MO
K0SXQ, George F. Lehmkuhl, Mountain Home, AR
K0TTP, Darold D. Sewing, Council Bluffs, IA
W0XJ, Ross W. Stevens, Ellsworth, KS
VE6EO, William R. Savage, Lethbridge, AB

*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

NEW PRODUCTS

CE DISTRIBUTION OFFERS FIRST WHOLESALE CATALOG

◊ CE Distribution's first wholesale dealer catalog features a full line of guitar and audio amplifier parts. Although aimed squarely at instrument dealers and repair shops, hams and audiophiles may be able to take advantage of the vacuum tubes, transformers, how-to books and other hard-to-find parts offered for sale. CE Distribution is a sister company to Antique Electronic Supply, which has been serving the ham radio market for almost 20 years. For more information, contact CE Distribution, located in Tempe, Arizona, at 480-755-4712 or point your browser to **www.cedist.com**.

TWO NEW KEYS FROM VIBROPLEX

◊ Venerable key maker Vibroplex has added two hand-crafted keys to its extensive line of Amateur Radio keys, paddles and bugs. The Venus Key features bright chrome parts on a heavy, engraved chrome base. This iambic paddle incorporates magnetic tension adjusters, red paddles and an attached cord. Weighing in at a hefty 2.4 pounds, these limited edition units must be custom ordered.

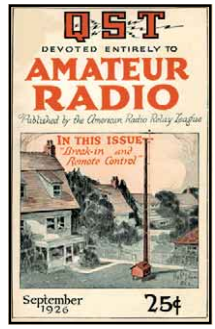
The Code Mite is a straight key mounted on a 3 × 1.5-inch engraved plastic base. The 2.6-ounce key has chromed upper parts and a black knob.

For more information, contact The Vibroplex Company at 11 Midtown Park East, Mobile, AL 36606; tel 800-840-8873; fax 334-476-0465, e-mail **catalog@vibroplex.com**. QST

Next New Products

75, 50 AND 25 YEARS AGO

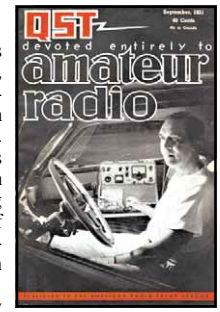
September 1926



◊ Clyde Darr, 8ZZ, uses his cover art to show a backyard vertical antenna—a wooden pole supporting a wire antenna. The editorial reports that "Government regulation of radio broadcasting has now broken down completely." Congress did not manage to pass new legislation, so "the ancient 1912 law" is all that exists to regulate radio broadcasters.

John Clayton reports on "Break-In and Remote Control" for the amateur. Stephen Gilchrist tells about comparing receiver circuits, in "Four Tuners in One." In "Converting the ET3619," Harold Westman describes how to convert a popular low-frequency receiver to some of the short-wave bands. "Easy Tuner Design" presents graphical aids for designing your own tuners and wavemeter circuits. As radio comes of age, the advantages of shielding circuits has become apparent, and William Henderson tells us about "Multi-Purpose Shielded Units." Detailed information on the new vacuum tube, the "Radiotron Model UX210," is presented. Although CW is becoming more popular, some hams still stick with spark, and Frank Wilburn tells about his "Spark Coil Portable Transmitter." The article "Transmitters in Kit Form" describes transmitter and power supply kits that are available for purchase from Radio Engineering Laboratories, in New York City. "I.A.R.U. News," in response to many inquiries from newcomers, summarizes the best times and best bands to use to work various DX stations.

September 1951



◊ The cover photo shows Myron Hexter, W9FKC, at the wheel of his 40-meter CW mobile, soon to be featured in *QST*. The editorial admonishes hams to be careful with high-voltage, following several recent deaths of amateurs who were electrocuted by their own equipment.

"The Yagi-Dagi," by A.J.F. Clement, W6KPC, tells about his array of four 3-element Yagis for 10 meters, arranged in the shape of a vertical diamond. Now that the Novice license has come to pass, Fred Myers relates the story of his Novice studies and testing, in "QRI? QSD? QRS! de WN2???" Warren Chase, W1QNM, provides details on "Converting RCA M1-7800 Police Transmitters for 28-Mc. Mobile Use." Ed Hayward, W1PH, describes "The Coffee-Can VFO Sr." Phil Rand, W1DBM; Art Riley, W1MGX; and J. J. Lamb tell about "Curing Industrial TVI" from high-power industrial RF heaters. Ed Tilton, W1HDQ, and Vern Chambers, W1JEQ, collaborate on "Using the 6BQ7 on 220 and 144 Mc." Dick Smith, W1FTX, describes his converter for 28 and 50 Mc., in "A Mobile Converter for Civil Defense."

September 1976

◊ The cover photo shows K2UYH at the focus of his 28-foot dish, with the caption exclaiming, "WAC on 432 MHz!!! First-of-its-kind achieved by K2UYH via moonbounce." The editorial, "The Pursuit of Happiness," recalls our nation's recent bicentennial celebration, and goes on to urge League members "to keep the spirit of amateur radio hale and hearty…."

Doug DeMaw, W1CER, presents a 40-meter receiver project that costs $18, "The Mini-Miser's Dream Receiver." Hal Steinman, K1FHN, reminds the reader about potential interference problems, in "RFI Grows Up." Amateur Radio was at the dedication of the Smithsonian's new National Air and Space Museum, as described in the article "OSCARs Help Dedicate New Air and Space Museum, by Joel Kleinman [later licensed as N1BKE," and now *QST*'s Managing Editor—Ed.]. "California to Hawaii on 2 Meters—1976 Edition," by Wayne Overbeck, K6YNB, provides details on the band opening that allowed hams to make contact on 220 MHz between Hawaii and California for the first time in 14 years. "A Fist from the Sky," by Len Withington, KH6CKJ; Pat Corrigan, KH6GQW; Gary Belcher, KH6GMP; and Bob Halprin, WA1WEM, tells how important Amateur Radio was after supertyphoon Pamela assaulted Guam. "Radio Scouting at NORDJAMB-75," by Don Wibel, K9ECE, reports on Amateur Radio at the recent World Scout Jamboree in Norway. James Morris, KH6HQG, tells the story of "K2UYH—Moonbounce WAC." "Happenings" reports that Dave Sumner, K1ZND, has been named as HQ's Assistant General Manager for Membership Operations. 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. Send a 9×12-inch SASE for a certificate, or a business-size SASE for an endorsement.

♦ **Teleprinter transmissions:**

Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

♦ **Voice transmissions:**

Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

♦ **Miscellanea:**

On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day. QST

Satellites from San Cristobal

Jon Jones, N0JK
12400 Meadow
Wichita, KS 67206
n0jk@arrl.net

I visited San Cristobal Island in the Galapagos last May and operated with the HC8N group in the CQ WPX CW contest. I brought along equipment and antennas to operate the Fuji satellites (OSCARs 20 and 29) and AO-10. The HC8N satellite station consisted of an ICOM IC-706 transceiver, ICOM IC-490A 70-cm transceiver, 4-element 2-meter Yagi antenna and an 8-element 70-cm quagi beam.

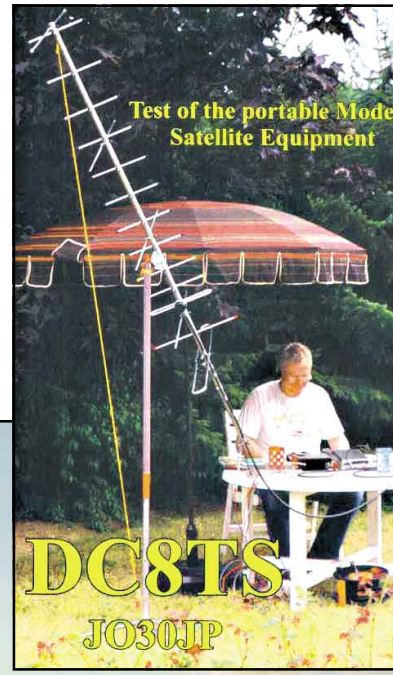
I was active during the morning FO-20/29 passes May 24-27. K6YK, W6SF, WA6BXI, K9CIS, K5OE and XE2AT were logged. K6YK was there on almost every pass with a good signal.

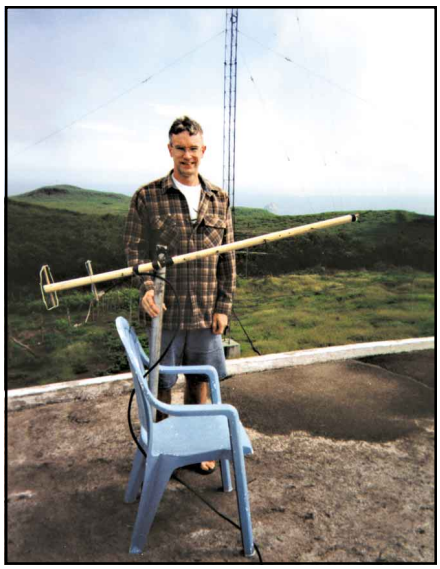
Due to all the pre-contest preparations and my operating duties in the WPX contest I almost didn't have time to try AO-10. I was not optimistic that 10 W on 70 cm and the quagi would be enough for the uplink. But early Sunday morning May 27 (4 AM our time!), I took a break from the contest and tried to reach AO-10. To my astonishment, my signal was quite clear. In the next 10 minutes as AO-10 set in the east I worked six German stations including DC8TS, and several in Switzerland and Finland. This is the first known AO-10 activity from the Galapagos, says DC8TS, and the European hams were very happy to work me. I am amazed a simple station could perform so well.

Trey Garlough, N5KO, believes this is the second-ever satellite operation from HC8. He made a few QSOs on one of the RS satellites on a prior visit to the Galapagos. My satellite activity impressed the other operators and there may be more satellite signals in the future from HC8N. DXpeditions may wish to consider adding a satellite station given the results I had on AO-10 from HC8N. QST

A close-up view of the homebrew quagi used for the HC8N satellite uplink.

From one portable satellite station to another! DC8TS sent this QSL for his contact with San Cristobal.





The author and the quagi uplink antenna (aimed at OSCAR 10). The blue chair is the official "stabilization unit."

Steve Ford, WB8IMY ♦ QST Editor

CONTEST CORRAL

Feedback

W5JOV in the **2000 ARRL November Phone Sweepstakes** should be Class B. **VE2MAB** was mistakenly entered as a VE3. The Roanoke Division Multioperator Plaque winner should be listed as **W4DC**. The log of **VE5GC** has been reclassified as a checklog. The log of **KW7N** was omitted, and should show a score of 63,180, 405 QSOs and 78 multipliers in the Single Op Low Power category from the ID section.

In the **ARRL 2000 160 Meter Contest**, the multiplier total for **W8JI/W4AN** should be 111.

In the **2001 January VHF Sweepstakes**, **KF3DT** should be shown in the EPA section with a score of 12,578 with 212 QSOs and 38 multipliers on bands ABCDEI. **K6OUE (+KF6YYV)** should be listed as a Rover in the Southwestern Division with a score of 12,530 with 269 QSOs and 35 multipliers on bands ABCD.

W1AW Qualifying Runs are 10 PM EDT, Tuesday, September 4, and 7 PM EDT, Wednesday, September 19. The K6YR West Coast Qualifying Run will be at 9 PM PDT on Wednesday, September 5. Check the W1AW schedule for details.

September

1-2

All-Asian DX Contest, phone. See June *QST*, p 108.

8-10

ARRL September VHF QSO Party. See July *QST*, p 112.

Worked All Europe Contest, phone. See Aug *QST*, p 111.

North American Sprint, CW, sponsored by NCJ, 0000-0400Z Sep 9 (local time, Sep 8); phone is 0000-0400Z Sep 16 (local time, Sep 15). Sprints are separate. 80, 40, 20 only. North American stations work everyone; others work NA stations only. Exchange other station's call, your call, serial no., name, and state/province/DXCC entity. 3.540 3.850 7.040 7.225 14.040 14.275. Work stations once per band. QSY rule: Stations calling CQ, QRZ, etc, may only work one station in response to that call; they must then move at least 1 kHz before working another station or 5 kHz before soliciting another call. Once you are required to QSY, you may not make a new QSO on the previous frequency until you have made a contact at least 1 or 5 kHz (as required) away. Team competition. Awards. Electronic entries accepted. Send CW logs to Mark Obermann, AG9A, 6713 Forestview Ln, Niles, IL 60714; **cwsprint@ncjweb.com**; phone logs go to Rick Niswander, Box 2701, Greenville, NC 27836; **ssbsprint@ncjweb.com**, no later than 30 days after the end of the contest. **www.ncjweb.com/**

End of Summer PSK-31 Sprint, sponsored by QRP ARCI, PSK-31 only, 2000-2359Z Sep 19, 20 meters only, work stations once. Categories single op, multi-op, and DX. Exchange RST, State/Province/Country (SPC), ARCI number or power for non-members. Count 5 points for members, 4 points for non-member different continent and 2 points for non-member same continent. Multipliers are SPC. Power multiplier is >5 W=×1; 1-5 W=×7; 250 mW-1 W×10; <250 mW=×15. Final score is QSO points × total SPCs × Power Multiplier. Suggested frequency is 14070.15. Send log within 30 days to Randy Foltz, 809 Leith St, Moscow, ID 83843; **rfoltz@turbonet.com**; **personal.palouse.net/rfoltz/arci/psk31.htm**.

15-16

ARRL 10 GHz and Up Cumulative Contest. See July *QST*, p 120.

North American Sprint, phone, see Sep 8-10.

Washington State Salmon Run, sponsored by Western Washington DX Club. 1600Z Sep 15 to 0700Z Sep 16 and 1600-2400Z Sep 16. 160 80 40 20 15 10 6 meters; classes CW, SSB or mixed mode; QRP, low power (less than 200 W) and high power, Single or multi-op single transmitter, Washington Club Station, Mobile, Washington County DXpedition, SWL RS(T) and county for WA stations; RS(T) and state, province, or DXCC entity for stations outside WA. 2 pts/SSB QSO, 4/CW QSO. Work stations on each band and mode. Portables and mobiles may be worked for QSOs and multiplier credits in different counties. Multipliers for WA stations is States, Provinces, DX entities and WA counties; for others it is Washington Counties. Count multipliers once regardless of band or mode. Special bonus station a QSO with W7DX will add a 500 point bonus for each mode—total 1000 points. Scoring: QSO points from all bandsxtotal multipliers plus bonus points. Awards. Send logs by Oct 31 to Western Washington DX Club, PO Box 395, Mercer Island, WA 98040, **salmonrun@wwdxc.org**; **www.wwdxc.org/salmonrun**.

Scandinavian Activity Contest, CW, sponsored by SSA, 1200Z Sep 15 to 1200Z Sep 16 (phone, 1200Z Sep 22 to 1200Z Sep 23). Single op all bands; single op low power (100 watts or less) single op QRP; multi-single; SWL. 80, 40, 20, 15, 10. Send RS(T) and serial no. No cross-mode contacts. European stations score 1 pt/QSO with Scandinavian stations on all bands. Non-European stations score 1 pt/QSO with Scandinavian stations on 20, 15, 10, and 3 pts/QSO on 80, 40. Multipliers are Scandinavian call areas (eg, SM3, OJ0, OX3, TF2) per band. Final score is QSO pts × multipliers. Awards. Send logs by Oct 31 to NRRL HF Contest Manager, Jan Almedal, LA9HW, Tunet, NO-1825 Tomter, Norway; **sac@contesting.com**; **www.sk3bg.se/contest/text/sacnsc.txt**.

Tennessee QSO Party, sponsored by the Tennessee Contest Group, 1800Z Sep 16 to 0100Z Sep 17. All bands excluding 30, 17 and 12 meters. Send RS(T) and state/province/DXCC entity (TN stations send county). TN stations work anyone; others work only TN stations. No repeater or packet robot contacts. Score 2 pts HF phone, 3 pts HF CW or digital, 4 pts VHF/UHF phone, 6 pts VHF/UHF CW QSO. Multipliers are TN counties (95 max); TN stations, total of states/provinces/DXCC entities. You may claim an additional multiplier for each 5 QSOs you make with the same TN county. 100/pts for working K4TCG on each band/mode. TN mobile stations get 500 pts for each TN county from which 15 or more QSOs are made. CW, 3.540 7.040 14.040 21.040 28.040; phone, 3.900 7.240 14.280 21.390 28.390; Novice/Tech, 3.700 7.130 21.140 228.140 28.390 50.195 144.195 146.550 223.50 446.000. Awards. Send logs postmarked by Nov 12 to Tennessee QSO Party, c/o Douglas Smith, W9WI, 1385 Old Clarksville Pike, Pleasant View, TN 37146-8098; **w9wi@bellsouth.net**; **www.k4ro.net/tcg.htm/**.

22-23

Scandinavian Activity Contest, SSB, see Sep 15-16.

CQ WW RTTY Contest, sponsored by *CQ* magazine, 0000Z Sep 22 to 2400Z Sep 23. 80, 40, 20 15, 10 meters. Single op all band high or low power; single op single band; single op assisted; multi-single high or low power; multi-multi. W/VE stations send RST, state/province, and CQ Zone number; others send RST and CQ Zone number. Work stations once per band. Score 1 pt/QSO with own country, 2 pts/QSO same continent, 3 pts/QSO different continent. Multipliers are states (48), provinces (13), DXCC/WAE entities and CQ Zones per band. Final score is QSO points × multipliers. Awards. All entries must be postmarked no later than Dec 1. CQ RTTY DX Contest, 25 Newbridge Rd, Hicksville, NY 11801 USA; **cqwwrtty@kkn.net**.

Radio Club Panama XXX Anniversary Contest, sponsored by Radio Club Panama, 1200-2359Z Sep 23. Phone, PSK31 and CW, Single op only, 40 20 meters. Send RS and serial no. Score 2 pts/QSO with HP stations who are RCP members and 1 pt/QSO with other stations. Multiply by DXCC entities worked. Send logs to Radio Club Panama, Box 10745, Panama 4, Panama; **hp1rcp@qsl.net**; **www.radioclubdepanama.org**.

29-30

Louisiana QSO Party, sponsored by the Twin City Hams ARC, 1400Z Sep 29 to 0200Z Sep 30 and from 1400-2000Z Sep 30. 80, 40, 20, 15, 10, 6, and 2 meters. LA stations work anyone; others work only LA stations. Single Operator (9 categories): QRP Mixed (Phone and CW), QRP Phone, QRP CW; Low Power Mixed, LP Phone, LP CW; High Power Mixed, HP Phone, and HP CW. Multi-operator, Single Transmitter (3 categories): QRP Mixed, LP Mixed, and HP Mixed. Exchange RST and state/province/Maritime region/DX entity (LA stations send parish). 2 pts/phone QSO, 3 pts/CW QSO. Multipliers (Count per band): Louisiana parishes (64 max/band); LA stations, US states/Canadian provinces/Maritime regions (63 max/band). No repeater contacts allowed. Awards to high score in each category. LA QSO Party Participation Certificates will be awarded to entries with 75 HF QSOs or 10 VHF QSOs. Send summary sheet and log sheet by Oct 31 to TCHC Contest Committee, PO Box 1871, West Monroe, LA 70291; **laqp@tchams.org**; **www.tchams.org/users/contest/laqp**.

Texas QSO Party, sponsored by the Northwest Amateur Radio Society, 1400Z Sep 29 to 0200z Sep 30, and 1400Z-2000Z Sep 30. All modes and all bands except 30 17 12 meters. Categories: Single Op, Multi-Single, Multi-Multi, QRP-SO, QRP-MM, CW Only QSO, CW Only MM, Texas Mobile SO, Texas Mobile MM, and Club Aggregate. Stations may be worked once per band/mode. Texas mobiles may be worked once per band/mode from each county. Exchange RST and state/province/country/maritime region (Texas stations send RST and county). Multipliers: TX Stations—states, TX counties, Canadian provinces and DXCC entities (excluding USA, Canada, Alaska and Hawaii); Non-TX stations—TX counties worked (max 254). Count 2 pts/phone QSO and 3 pts/CW or digital QSO. Bonus points: Add 500 points for each Texas Mobile worked in 5 different counties. Texas mobiles add 5000 points for every five counties covered with at least five contacts per county. Final score is QSO points × multipliers+bonus points. Send logs (and dupe sheets if over 200 QSOs) by Oct 31, to TQP Committee, 17007 Hillview Ln, Spring, TX 77379. **k5vuu@arrl.net**; **www.k5vuu.com/tqp/**.

Alabama QSO Party, sponsored by the Central Alabama HF/VHF Contesting Club, 1800-0000Z Sep 29, All bands except 30 17 12 meters. Categories Single Op, Multi-op and Rover, QRP(< 5 watts PEP), Low power(< 200 watts PEP) and High power(> 200 watts PEP). Exchange RST and QTH, No repeater contacts; repeaters may not be used to solicit contacts. Use of non-amateur means to solicit contacts during the contest period is not allowed. Requesting packet/cluster spotting violates the spirit of the contest. No cross-band contacts are allowed. Scoring: Alabama stations add up the total number of (states+counties+DXCC entities) worked on each band. The final score is this total number (states+counties+entities) multiplied times the total number of contacts. SSB, CW, and FM contacts count separately. Rover stations can be worked for additional credit once they change counties. Rovers can earn a bonus of 500 points for each county in which a minimum of 10 QSOs are made; non-Alabama Stations add up the total number of AL counties worked on each band. The final score is this total number of counties multiplied times the total number of AL stations contacted. A special award will be offered to anyone who manages to work all 67 counties. Send logs to The Alabama QSO Party, 4525 Eastern Hills Ln, Cottondale, AL 35453; **dxcc@dbtech.net**; **web.dbtech.net/~dxcc/rules1.htm**. QST

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SPECIAL EVENTS

Paradise, AZ: Cochise ARA, K7RDG, 1800Z **Sept 1** to 1800Z **Sept 3**, operating from the ghost town of Paradise, 7.040 14.305 18.140 28.490. Certificate. Cochise ARA, PO Box 1855, Sierra Vista, AZ 85636-1855.

Hebron, CT: NARL / BEARS, W1H, 0700Z **Sept 6** to 1900Z **Sept 9**, promoting Amateur Radio, 28.430 18.130 14.280 7.250. Certificate. Ted Ferreira, 40 Hillside St, B-5, E Hartford, CT 06108.

Riverside, CA: Inland Empire Council of Amateur Radio Organizations, W1AW/6, 1900Z **Sept 7** to 1900Z **Sept 9**, at the ARRL Southwestern Division Convention, 28.450 21.350 14.250 7.030. QSL. Fred Roberts, W6TKV, 5464 Peacock Ln, Riverside, CA 92505.

Boulder, CO: The Boulder Amateur Radio Club Youth Auxiliary, W0W, 1700Z to 2200Z **Sept 8**, celebrating Boulder area youth in Amateur Radio, 14.275 29.300. Certificate. Richard Weingarten, 1133 Northridge Dr, Erie, CO 80516.

Louisville, KY: Greater Louisville Hamfest Assn, KU4VG, 1400Z to 1800Z **Sept 8**, celebrating many years of commitment to Amateur Radio, 14.260 14.300 7.220 7.240. Certificate. Greater Louisville Hamfest Assn, 1312 Holsworth Ln, Louisville, KY 40222.

Henri-Chapelle, Belgium: GDV Group ON5PL, ON4USA, 0800Z **Sept 8** to 1600Z **Sept 9**, honoring the memory of all GIs who gave their lives, 14.044 14.210 21.044 28.044. QSL. ON4USA, Post Office Box 11, Verviers 1, BE, B-4800, Belgium.

Flat Rock, MI: Motor City Radio Club, W8MRM, 1400Z **Sept 8** to 2300Z **Sept 9**, for the Annual Flat Rock Riverfest, 7.044 7.244 14.044 14.244. Certificate. Motor City Radio Club, Riverfest, PO Box 337, Wyandotte, MI 48192.

North Judson, IN: Starke County Amateur Radio Club, W9JOZ, 1500 to 2100Z **Sept 8**, Hoosier Valley RR Museum Annual Open House, 7.240 7.290 14.240 14.290. QSL. Starke County Amateur Radio Club, 405 W Jackson St, Knox IN 46534.

Big Rock, IL: De Kalb County ARES Group, W9P, 1400Z **Sept 12** to 2200Z **Sept 16**, commemorating the 107th Annual Big Rock Plowing Match, 7.108 7.275 14.275 28.390. Certificate. Bob Yurs, W9ICU, 1107 Commercial St, Sycamore, IL 60178.

Slidell, LA: Ozone Amateur Radio Club, W5SLA, 1500 to 2300Z **Sept 15**, celebrating 37 years of community service, 14.250 7.280. QSL. Michael White, 404 Holmes Dr, Slidell, LA 70460.

East Providence, RI: ARASNE, Association of Radio Amateurs of Southern New England, W1AQ, 1400Z **Sept 15** to 2300Z **Sept 16**, for the 75th anniversary of ARASNE, 28.360 21.260 14.260 7.260. Certificate. W1AQ, 54 Kelley Ave, E Providence, RI 02916.

Benton Harbor, MI: Blossomland Amateur Radio Association, W8KIT, 1400Z **Sept 15** to 2400Z **Sept 16**, celebrating the 75th anniversary of Heathkit, 7.250 14.260 21.360. QSL. Heathkit Educational Systems, 455 Riverview Dr - Bldg 2, Benton Harbor, MI 49022.

Waterloo, AL: Muscle Shoals Amateur Radio Club, W4T, 1400Z to 2359Z **Sept 15**, during the Trail of Tears Commemorative Motorcycle Ride, 7.250 14.250 21.350 28.350. Certificate. Muscle Shoals Amateur Radio Club, 3412 18th Ave, Sheffield, AL 35660.

Pierre, SD: Pierre Amateur Radio Club, W0PIR, 1500 to 2300Z **Sept 15**, for the South Dakota World War II Memorial Dedication, 28.390 14.245 3.870. Certificate. Gary Wallace, PO Box 1261, Pierre, SD 57501-1261.

Fort Wayne, IN: Allen County Amateur Radio Technical Society, KB9IBW, 1400 to 2300Z **Sept 15**, operating from the traveling Vietnam Wall Memorial at the Highland Park Cemetery, 7.226 14.226 144.390 146.880. Certificate. Emery McClendon Sr, 6116 Graymoor, Fort Wayne, IN 46835.

Atlantic City, NJ: Southern Counties Amateur Radio Association, K2BR, 1400Z **Sept 17** to 0400Z **Sept 23**, during the Miss America Pageant, 7.250 14.250 21.325 28.325. QSL. SCARA, PO Box 121, Linwood, NJ 08221.

Freedom Township, OH: Portage Amateur Radio Club, KB8UUZ, 1800Z **Sept 21** to 0300Z **Sept 24**, for National POW/MIA Awareness week from Freedom Township, 14.270 15 meters 10 meters 40 meters. Certificate. Tom Parkinson, 9992 State Route 700, Mantua, OH 44255.

Corona, CA: Corona Norco Amateur Radio Club, W6PWT, 1600 to 2400Z **Sept 22**, Barney Oldfield Day commemorating the 1912-14 Circle City Races, 7.250 14.250 21.380 28.450. QSL. Fred Roberts, W6TKV, 5464 Peacock Ln, Riverside, CA 92505.

Greenport, NY: Peconic ARC, W2AMC, 1400 to 2000Z **Sept 22**, Greenport Maritime Festival, 7.270 14.270. Certificate. Peconic ARC, PO Box 113, Peconic, NY 11958.

Galion, OH: Crawford County Amateur Radio Club, W8BAE, 1300Z **Sept 22** to 0100Z **Sept 23**, celebrating its 40th anniversary, 3.870 14.235 28.465 50.165. Certificate. Keith Moore, N8LIS, 331 S Market, Galion, OH 44833.

Berlin, PA: Somerset County ARC, K3SMT, 1700Z **Sept 22** to 1700Z **Sept 23**, during the 8th annual Berlin Whiskey Rebellion Days, 80 meters 40 meters 20 meters 28.325. Certificate. SCARC c/o NJ3T J. Crowley, 135 Baxter Dr, Somerset, PA 15501.

Milton, ON: Mississauga Amateur Radio Club, VE3MIS, 1400Z-2000Z **Sept 22** to **Sept 23**, at the Halton Radial Railway Museum, 7.230 14.240 28.340. Certificate. MARC, c/o Michael Brickell, 2801 Bucklepost Cres, Mississauga, ON L5N 1X6, Canada.

Beecher, IL: The Hams of Monee, W9B, 1600 to 2300Z **Sept 22**, Welcome Home Beecher Train Depot, 7.270 14.040 14.270 28.340. Certificate. Gene Backlin, 26811 Greenbriar Dr, Monee, IL 60449.

Eldon, MO: Lake of the Ozarks ARC, W0NA, 1600 to 2200Z **Sept 22**, for the Early Days Gas Engine and Tractor Show, 7.240 14.240 21.340 28.440. Certificate. John Baremore, KC0CRO, 182 Bear Paw Cir, Camdenton, MO 65020.

Statesville, NC: Iredell County Amateur Radio Society, KQ4O, 1930 to 2200Z **Sept 23**, for the 25th anniversary of ICARS Foundation, 146.685 147.045 28.468 14.310. Certificate. Matthew O'Malley, 1101 Radio Rd, Statesville, NC 28677.

Fort Prospect, KwaZula Natal, South Africa: Midlands Amateur Radio Club, ZS100ABW, 1400Z **Sept 22** to 1400Z **Sept 23**, commemorating the Centenary of the Anglo Boer South African War, 40 20 meters. Certificate. Midlands ARC, PO Box 100220, Scottsville, 3209, South Africa.

Parsippany, NJ: Parsippany RACES, WA2UEM, 1600-2200Z **Sept 23**, celebrating the third Kiwanis Club of Parsippany Fall Festival. 28.475, 14.325. QSL. Barry Schaeffer, WA2UEM, PO Box 5157, Parsippany, NJ 07054-6157.

Belleville, MI: Yankee Air Museum, W8YAF, 1200 to 2000Z **Sept 23**, commemorating the YAF Founder's Day open house. 7.270. Certificate. Frank A. Nagy, N8BIB, 24315 Waltz Rd, New Boston, MI 48164-9167.

Kingwood, WV: Preston County ARC, W8B, 1400Z **Sept 27** to 0200Z **Sept 30**, celebrating the 60th annual Buckwheat Festival, 40 meters 20 meters 10 meters 147.000. Certificate. Richard Wolfe, KA8UEU, PO Box 512, Kingwood, WV 26537.

Fairmount, IN: Grant County Amateur Radio Club, W9EBN, 1500 to 2200Z **Sept 29**, celebrating "James Dean Country Where Cool Was Born," 7.255 14.255 28.410 146.79. Certificate. L. B. Nickerson, K9NQW, 517 N Hendricks Ave, Marion, IN 46952.

Hilton, NY: BARK / RDXA / RVHG / RARA, K2A, 1230Z **Sept 29** to 2100Z **Sept 30**, for the 21st Annual Hilton Apple Fest, 7.250 14.250 21.350 28.450. Certificate. Dave Wright, 173 South Ave, Hilton, NY 14468.

Austin, TX: University of Texas Amateur Radio Club, K5T, 1400Z **Sept 29** to 2400Z **Oct 7**, celebrating 80 Years of Amateur Radio at the University of Texas at Austin, 14.250 21.325 28.425. QSL. UT Amateur Radio Club, SOC #73, 100-C W Dean Keeton St, Austin, TX 78712. QST

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STRAYS

SATELLITE WORKSHOP SET FOR SOUTHWESTERN DIVISION CONVENTION

◊ The ARRL Southwestern Division Convention will feature a satellite workshop led by Steve Bible, N7HPR, and Larry Brown, W7LB. The convention takes place September 7-9, at Riverside, California. The workshop takes place Friday, September 7.

The five-hour workshop will cover all 16 satellites now in orbit. Topic areas will include digital satellites; FM satellites you can work with a hand-held transceiver and hand-held antenna; low-earth orbit SSB/CW "Easy Sats" on 2, 10 and 15 meters; high-altitude DX satellites, such as AO-40 and AO-10; and Amateur Radio on the International Space Station.

Those attending will learn how to get on AO-40, how to track satellites with your PC, operating protocols for each satellite, and sources of information, such as AMSAT, ARRL and the Web. All-day participants will earn 0.5 Continuing Education Units.

The workshop fee is $25 for ARRL members and $35 for non-members.

For more information, contact Linda Mullally, 860-594-0292, at ARRL Headquarters. The fee includes all required course materials, but the instructors suggest that participants have a copy of *The Radio Amateur's Satellite Handbook*, published by ARRL, for reference. (ARRL item #6583, $22 plus $6 UPS shipping/handling from ARRL HQ; also available from many dealers). QST

Previous Strays

2001 ARRL International EME Competition Rules

1. Object: Two-way communications via the earth-moon-earth path on any authorized amateur frequency above 50 MHz.

2. Date and Contest Period: Two full weekend 48-hour periods (0000 UTC on Saturday through 2359 UTC Sunday). **The 2001 dates will be the weekends of October 13-14, 2001 and November 10-11, 2001.**

3. Entry Categories:

3.1. Single Operator: One person performs all operating and logging functions, equipment adjustment and antenna alignment.

3.1.1. Multiband.

3.1.2. Single Band: Single-band entries on 50, 144, 222, 432, 902 and 1296-and-up categories will be recognized in awards offered. Contacts may be made on any and all bands without jeopardizing single-band entry status. Such additional contacts are encouraged and should be reported. Also see Rule 8, Awards.

3.2. Multioperator: Two or more persons participate; includes neighboring amateurs within one call area, but with EME facilities for different bands on different team members' premises, as long as no two are more than 50 km (30 miles) apart. Multioperator neighborhood groups may use the same call signs at each location if permissible under national licensing rules and regulations. If not permissible, separate call signs may be used for the multioperator neighborhood entry. **When operating under this neighborhood provision, all logs must be submitted together in a single envelope or e-mail with a single summary sheet showing the combined operation, designating the principal call sign for the entry.** All multioperator call-signs will be shown in the results.

3.3 Commercial equipment: Stations using equipment that is not amateur (such as a dish antenna for lab equipment owned by an institution or government agency) will have their scores listed separately.

3.4 Only one log may be submitted per call sign.

4. Exchange: For a valid contact to occur, each station must send and receive both call signs and a signal report in any mutually understood format, plus a complete acknowledgment of the calls and report. Partial or incomplete QSOs should be indicated on your log, but not counted for contest credit. Stations may be worked once per band for credit.

5. Scoring:

5.1. QSO Points: Count 100 points for each complete EME contact.

5.2. Multiplier: Each US and Canadian call area, plus each DXCC country (not US/Canada) worked via EME on each band.

5.3. Final Score: Multiply QSO points by sum of multipliers worked on each band for your final score.

6. Miscellaneous:

6.1. Fixed or portable operation is permitted. Stations operating outside traditional call areas must indicate so, identifying the call area of the operating site.

6.2. Contacts may be on CW or SSB. Only one signal per band is permitted.

6.3. A transmitter, receiver or antenna used to contact one or more stations under one call sign may not be used subsequently under any other call sign during the contest. An exception is made for family stations where more than one call has been issued, and then only if the second call sign is used by a different operator.

6.4. There is no specified minimum terrestrial distance for contacts, but all communications must be copied over the moonbounce path, regardless of how strong (or weak) a nearby station's terrestrial signal may be.

7. Reporting: Entries must be postmarked no later than December 11, 2001 (30 days after the contest) and must include complete log data as well as a complete summary sheet. Official forms are available on *ARRLWeb* (**www.arrl.org/contests**) or for an SASE request to the Contest Branch. Your summary sheet should show a band-by-band breakdown of QSOs and multipliers, and include details of your station setup and a photo. **Cabrillo format is not required for electronic submission in the EME Contest, provided the entry includes the log file and a fully completed standard summary sheet.** E-mail entries should be submitted to **EMEcontest@arrl.org** and paper/diskette entries should be submitted to EME Contest, ARRL, 225 Main St, Newington, CT 06111.

8. Awards:

8.1. Certificates will be issued to the top five stations worldwide in each of the entry categories: single operator multiband; single operator single band (separate awards for each band); and multioperator.

8.2. Additional awards will be issued where significant achievement or competition is evident. In addition, each station that successfully completes at least one EME contact during the contest period will receive a certificate commemorating that achievement.

9. Other: See "General Rules for All ARRL Contests" in November 2000 *QST*.

Is Your Entry Complete?

One of the biggest problems that arises in accurately reporting scores for ARRL Contests is that participants submit incomplete or outdated summary sheets. Remember: A complete entry must include an accurate summary sheet with all information provided. If you are using copies of older summary sheets, it is easy to obtain the latest versions. Official entry forms and complete rules for the 2001 ARRL International EME Competition are available electronically.

Forms and rules for all ARRL contests may be downloaded in either ASCII or Adobe PDF format from *ARRLWeb*, **www.arrl.org/contests/forms/**. If you don't currently have the Adobe program, it may be downloaded for free from a link at the Contest Form page. If you aren't online, you may drop an SASE with two units of postage and a note requesting the specific forms you need to ARRL, Contest Form Request, 225 Main St, Newington, CT 06111.

If you are using one of the commercial logging programs, please make certain that your version includes all of the required summary sheet information. Some older versions of the commercial programs provide incomplete information. A quick check by you to verify that all required information is on your summary sheet will help ensure that your entry is accurately recorded and reported in *QST*. Please help the Contest Branch better serve you by making sure you are using the latest summary sheets and required log file formats. If you need additional information, please contact **contests@arrl.org** or tel 860-594-0232.

FEEDBACK

◊ Recently, Artur, CT2HNI, alerted me to an error in Figure 2 of my article, "The Spot Grabber" (*QST*, June 2001, page 30). Capacitor C6 is shown upside down; it should have its negative lead connected to pin 2 of U3. If you use the PC board available from FAR Circuits, this discrepancy may go unnoticed, since the component-placement artwork is correct.—*Paulo N. Jorge, CT1EFL*

◊ A few errors have crept into both the schematic and parts list for the WBR Receiver (August 2001 *QST*, Figure 1, page 35). In the parts list, Q1 is a 2N3904, and C14, C15 and C18 are all 2.2-µF, 16-V electrolytic capacitors. C22 is 0.1 µF. In the schematic diagram, C19 (connected between R14 and pin 5 of U2) should be 0.01 µF. This is the first occurrence of C19. The second occurrence of C19 between R15 and ground should be C20. The value is correct. R17 should be R7. In addition, Z1 should have been drawn as a $^1/_8$-inch wide × $^1/_2$-inch long strip connected to the center tap of L1 and grounded with a standard wire. The antenna should be connected at the midpoint of Z1, again with standard wire. —*Dan Wissell, N1BYT*

By Dan Henderson, N1ND
Contest Branch Manager

2001 ARRL RTTY Roundup Results

"Like sands through the hour glass..."

No account of the pop culture of the Twentieth Century would be complete without a mention of the phenomenon known as the television soap opera (or daytime dramas for the aficionado of the art form). We are well into a second and third generation of Americans (and not just the stay-at-home moms) that thrive on a daily dose of the latest antics of their favorite stars. Can you guess why the latest VCRs in our living rooms have a "record M-F at this time" button of some kind as a basic feature?

While its avid following is not as big, the annual ARRL RTTY Roundup may sometimes resemble many of the best soaps. Key participants are still around, many from the earliest days of the event, joining in with bright, new stars on the horizon. This combination made the 2001 RTTY Roundup the largest ever, with a total of 691 entries being received representing a total of 803 participants.

When you couple record participation with near-perfect band conditions, you would expect to find lots of records fall. This is exactly what happened, as all four US overall category records, one DX category record and 30 ARRL/RAC division records were broken in what one participant termed as the "best conditions for RTTY ever."

When it comes to RTTY contesting, the Macdonald Carey of the sport may well be Don, AA5AU. Like Carey (who won honors for his movie and TV acting), Don has been winning honors as a RTTY contester for years. In the first RTTY Roundup of the new millennium, he proved once again that he still has what it takes. All Don did in 2001 was shatter the previous record for the Single Operator Low Power category while becoming the first SOLP entrant to top the 200k point barrier with his Delta Division record score of 205,239. Special honors also should go to Bruce, WT4I, whose 156,480 point total managed to break the old mark by several thousand while setting a new Southeastern Division record. Division records were also set by N9CK (Central), N3SL (Midwest), N6OJ (Pacific), KA4RRU (Roanoke), and K0ZU (Rocky Mountain).

One of the popular categories for Soap Opera awards is "Outstanding Newcomer," which has been won by such notable stars as Anne Heche and Patrick Muldoon. After a few "walk-on" appearances in RTTY contesting Randy, K5ZD, made a huge splash in what he called his first serious effort into this part of the hobby. Having demonstrated his prowess on other modes, Randy went for it all in 2001. His final score of 225,125 not only took top honors in the Single Operator High Power category, but also set a new overall scoring record (as well as setting the New England Division record). Finishing in second place with a strong showing was Mark, K1RO. Also setting new Division scoring records in this category were W0DC (Dakota), K5YG (Delta), ND5S (Great Lakes), K2NJ (Hudson), W7NN (Northwestern), K4GMH (Roanoke), W7CT (Rocky Mountain), and K6LL (Southwestern).

No Soap would be complete without its cast of "supporting" actors and actresses. While the multioperator categories in the RTTY Roundup do not attract large number of entries (only 7.5% of all entries), what they lack in quantity they definitely make up for in quality, as 14 of them established new division scoring records. Leading the way in the Multioperator Low Power category was the outstanding effort from the N5ZM station. Not only did they set a new Delta Division record, but also their score of 116,765 set a new overall category mark. Finishing second, while setting a new Pacific Division record was W6YX with a score of 96,495. Also setting new division records were the "supporting cast" of operators at AA9RR (Central), N8LRG (Great Lakes), KG0QG (Midwest), WV7Y (Northwestern), and N7PWZ (Southwestern).

The entire ensemble—cast, crew, production staff—manage to pull together to make your favorite soaps happen. From "Days of our Lives" and "General Hospital" to "As the World Turns," it

Top Ten Scores

Single Operator

W/VE—Low Power

AA5AU	205,239
WT4I	156,480
KA4RRU	135,318
N3SL	114,359
N6OJ	111,588
KI6DY	109,200
W4/KL7Q	101,304
N9CK	97,699
VE4COZ	87,954
K0ZU	87,203

W/VE—High Power

K5ZD	225,125
K1RO	172,692
W7NN	154,128
VE6JY	140,634
K4GMH	140,283
W1ZT	133,836
W0DC	133,637
K5YG	128,136
N2WK	126,840
NE3H	124,371

DX—Low Power

PY2MNL	94,374
LV5V	89,540
CT1AOZ	82,768
ON4AME	80,520
LY1DS	69,871
PW2A	68,090
UY8IF	66,976
EU1DX	60,840
UZ7U	56,385
YU7AM	55,432

DX—High Power

UW8I	146,304
VP5RY	134,415
DJ7AA	126,873
PJ2/ON4CFD	124,865
9A5W	107,463
JH4UYB	104,880
S54E	104,832
UP5P	102,924
G5G	94,380
DJ5JK	89,548

Multioperator

W/VE—Low Power

N5ZM	116,765
W6YX	96,495
W4MR	82,518
WV7Y	76,720
AA9RR	74,336
KG0QG	68,276
N8LRG	61,464
W5VZF	52,560
K8VT	49,305
N0IU	44,426

W/VE—High Power

K9NS	177,970
K5DJ	165,816
W0SD	159,268
K1AM	145,180
K4WW	116,661
NN6NN	113,313
W7TI	112,090
KJ7TH	105,380
N8NR	98,900
N0NI	92,660

DX—Low Power

S53S	69,642
YL7C	69,156
9A7P	62,192
UT0H	14,950

DX—High Power

MW2I	143,385
UT9F	104,780
LT1F	94,128
OL5Q	92,019
KL7FH	89,301
SP5ZCC	70,180
RW9C	68,377
SN7N	46,920
A52YL	24,674
KH7V	23,350

takes all of those involved to make a show a success. The Multioperator High Power category mirrored the work needed to be a success. Seven division record setting scores were received from participants, including the crew at K9NS. Their score of 177,970 is a new Overall category score, besides being a new Central Division record. They edged out the ops at K5DJ (who makes frequent starring appearances in the single operator categories) who managed to set a new West Gulf Division score. Round out the top W/VE division scoring record setting efforts were the cast found at W0SD (Dakota), N0NI (Midwest), K1AM (New England), K4WW (Pacific) and W7TI (Southwestern).

If you travel overseas and turn on the television in your hotel room, you are pretty well assured to find at least a nighttime soap, such as reruns of "Dallas" or "Knot's Landing" (as the genre is not uniquely American). Congratulations are in order to Wanderly, PY2MNL, who took "best foreign performer" honors in the Single Operator Low Power category with a score of 94,374. He edged out second place finisher Jorge, LU5VV, operating as LV5V, by less than 5000 points.

UW8I, with Nick, UT2IZ, operating took top honors in the Single Operator High Power category with a score of 146.304. VP5RY, with John, WA9ALS, as the operator, took second in the category. DX entries accounted for nearly 40% of all entries in this year's contest—the most in recent years.

The operators at MW2I not only won the Multioperator High Power category, but managed to set the only overall category record among DX participants. The final tally of 143,385 easily outdistanced the UT9F effort by almost 40k points. Rounding out the DX winners were the ops at S53S. They edged out YL7C in the Multioperator Low Power category 69,642 to 69,156 in the closest finish in any category.

We observed a rise in the use of PSK31 during this year's contest. The special PSK31 plaques, for the best submitted PSK31 score, was won by Barry, W2UP with a final score of 26,796. Congratulations to all who participated in this special "contest within the contest."

The 2001 Roundup was the first time the ARRL employed electronic log checking for a RTTY contest, and it seems to have worked well. We will broaden its scope in coming years, adding in individual log check reports in the future. Thanks to those volunteers that worked hard to process logs and write software, and actually ran the logs to produce the results for publication.

Comparing soap operas and the ARRL RTTY Roundup really amounts to comparing apples and oranges. Soap opera enthusiasts need only turn on their TV or VCR to experience the thrills that popular medium can instill. RTTY aficionados have only limited opportunities, as they get their kicks live, and only a few times a year. The 2002 ARRL RTTY Roundup will be contested January 5-6. Get the station ready and test out the new software. Oh, and make sure if you are hooked on the soaps, you have the VCR timer set, so you don't miss out on any of your RTTY operating time. After all, the soaps on tape can be viewed later—the Roundup doesn't wait!

2001 Plaque Winners

These are the sponsored plaques awarded to winners. Some plaques are awarded to overall high score single operator in the Division. Others are awarded to Division high score single operator by power level based upon the sponsor's designation. Plaque winners marked with an asterisk (*) indicate that the second place finisher has been awarded a sponsored plaque where the winner won an overall category award. Unsponsored plaques for Division winners may be purchased from the ARRL Contest Branch at a cost of $60 each. Contact **contests@arrl.org** for details.

Category	*Winner*	*Sponsor*
W/VE Single Operator Low Power NM7M Memorial	AA5AU	Wayne Matlock, K7WM
W/VE Single Operator High Power W7RM Plaque	K5ZD	Frank Fallon, N2FF
DX Multi-Single Low Power	S53S	Doug Faunt, N6TQS
DX Multi-Single High Power	MW2I	Daniel & Faith Senie, N1JEB & N1JIT
Atlantic Division Single Operator Low Power	W1TY	Daniel Senie, N1JEB
Atlantic Division Single Operator High Power	N2WK	Rochester DX Associaton
Dakota Division Single Operator High Score	W0DC	Lawrence Gandy, AH8LG
Delta Division Single Operator High Score	K5YG*	Great Lakes Dx/Contest Club K9PXV
Great Lakes Division Single Operator High Score	ND5S	Amateur Radio Transmitting Society, W4CN
Hudson Division Single Operator High Score	K2NJ	Frank Fallon, N2FF
Pacific Division Single Operator High Score	N6OJ	Lawrence Gandy, AH8LG
Southeastern Division Single Operator High Score	WT4I	Jim Mortensen, N2HOS
Southwestern Division Single Operator High Power	K6LL	TG9VT Memorial
West Gulf Division Single Operator High Score	N5XUS	Glenn Vinson, W6OTC
Canadian Single Operator High Score	VE6JY	Foothills Amateur Radio Teleprinting Society
PSK 31 Top Score	W2UP	

Region Leaders

Boxes list call sign, score, class (S = Single Operator, M = Multioperator), and power (A = Low Power, B = High Power).

Northeast Region
(New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

WA1EHK	79,920	S	A
AD1C	79,640	S	A
W1TY	78,309	S	A
K1PY	64,288	S	A
N3FR	62,469	S	A
K5ZD	225,125	S	B
K1RO	172,692	S	B
W1ZT	133,836	S	B
N2WK	126,840	S	B
NE3H	124,371	S	B
N3RN	22,407	M	A
N2UM	4,752	M	A
KD3TB	1,530	M	A
K1AM	145,180	M	B

Southeast Region
(Delta, Roanoke and Southeastern Divisions)

AA5AU	205,239	S	A
WT4I	156,480	S	A
KA4RRU	135,318	S	A
W4/KL7Q	101,304	S	A
KG8WB	54,964	S	A
K4GMH	140,283	S	B
K5YG	128,136	S	B
N4IQ	98,010	S	B
W4OX	81,290	S	B
W4UK	63,600	S	B
N5ZM	116,765	M	A
W4MR	82,518	M	A
W5VZF	52,560	M	A
W5YM	23,256	M	A
AG4W	50,400	M	B
WB4DAH	8,235	M	B

Central Region
(Central and Great Lakes Divisions; Ontario Section)

N9CK	97,699	S	A
NI8Z	83,376	S	A
W4LC	63,856	S	A
AA9PB	48,705	S	A
W8EB	45,315	S	A
ND5S	102,350	S	B
KG9X	98,784	S	B
K9DJ	51,507	S	B
N2BJ	50,568	S	B
N9PQU	45,192	S	B
AA9RR	74,336	M	A
N8LRG	61,464	M	A
K8VT	49,305	M	A
WB8YTZ	37,145	M	A
K9WJU	25,317	M	A
K9NS	177,970	M	B
N8NR	98,900	M	B
AE9D	84,840	M	B
K8AA	49,086	M	B

Midwest Region
(Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)

N3SL	114,359	S	A
KI6DY	109,200	S	A
VE4COZ	87,954	S	A
K0ZU	87,203	S	A
W0LSD	75,130	S	A
W0DC	133,637	S	B
VE5CPU	96,726	S	B
W7CT	91,900	S	B
WA0SXV	84,072	S	B
KB5BOB	51,510	S	B
KG0QG	68,276	M	A
N0IU	44,426	M	A
WV7T	7,215	M	A
KD5KZG	4,100	M	A
K5DJ	165,816	M	B
W0SD	159,268	M	B
N0NI	92,660	M	B
K5PI	33,321	M	B
K0BX	17,600	M	B

West Coast Region
(Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)

N6OJ	111,588	S	A
VE6RAJ	77,169	S	A
N7UJJ	68,377	S	A
W7LD	63,279	S	A
VA6MM	58,117	S	A
W7NN	154,128	S	B
VE6JY	140,634	S	B
K6LL	122,148	S	B
WW7OR	118,832	S	B
W7WW	105,872	S	B
W6YX	96,495	M	A
WV7Y	76,720	M	A
N7PWZ	24,928	M	A
K4WW	116,661	M	B
NN6NN	113,313	M	B
W7TI	112,090	M	B
KJ7TH	105,380	M	B
KR6E	91,140	M	B

Scores

Scores are listed by DXCC Countries and ARRL/RAC Sections. Line scores list call sign, score, QSOs, multipliers, hours, and power (A = Low Power, B = High Power). Multioperator stations are shown with operator calls or +packet assistance.

Africa

Maldives

8Q7DV (UA9CLB, op)	49,296	632	78	B

Canary Islands

EA8/DJ1OJ	17,784	228	78	A

Asia

Israel

4Z5CP	42,624	592	72	A

Cyprus

5B4AGW	29,900	460	65	A

Singapore

9V1XE (VK3DXI, op)	1,404	78	18	A

Bhutan

A52YL (+A52MJ,A52GL)	24,674	338	73	B

Taiwan

BV2WM	7,540	145	52	A

Japan

JA7EMH	27,720	308	90	A
7L4IOU	27,492	316	87	A
JA1SJV	25,578	294	87	A
JH3SIF	20,210	235	86	A
JL6HKJ	16,206	222	73	A
JH8KYU/1	15,470	221	70	A
JR4GPA	14,965	205	73	A
JR3RIY	12,395	185	67	A
JA1NLX	8,662	142	61	A
JA1BUI	5,400	108	50	A
JR1KSK	5,049	99	51	A
JH1VES	3,760	80	47	A
JF2SKV	3,720	93	40	A
JA6BIF	3,040	76	40	A
JA2UJ	2,880	64	45	A
JF1GUQ	2,314	89	26	A
JE3UHV	1,488	48	31	A
JA8AGI/1	252	18	14	A
JH1TUX	112	14	8	A
JO1VRL	99	11	9	A
JH4UYB	104,880	912	115	B
JA1BWA	27,000	300	90	B
JA2AXB	10,758	163	66	B
JH4NMT	2,769	71	39	B

Mongolia

JT1BG	390	30	13	A

Turkey

TA7J/9	5,580	180	31	A

Asiatic Russia

RX9JM	23,177	301	77	A
RA9XF	13,294	289	46	A
RA0ANO	7,742	158	49	A
UA9AX	5,875	125	47	A
RU0AT	3,528	98	36	A
RX9SR	53,417	587	91	B
UA0FZ	32,568	354	92	B
RA0FU	25,174	307	82	B
UA0AGI	17,500	350	50	B
RV9BB	14,994	238	63	B
UA9CI	6,834	134	51	B
RW9C (UA9CGA,RW9CF,RV9COX,ops)	68,377	677	101	B

Kazakhstan

UP5P (UN5PR,op)	102,924	953	108	B

Europe

Croatia

9A7R	29,430	327	90	A
9A3CY	7,946	137	58	A
9A5W	107,463	951	113	B
9A7P (9A6XX,9A5AEI,ops)	62,192	598	104	A

Portugal

CT1AOZ	82,768	739	112	A
CT1BNW	5,508	102	54	A
CT4MS	3,198	78	41	A
CT1CWF	1,863	69	27	A

Fed. Rep. of Germany

DL4RCK	32,536	392	83	A
DK3ML	16,353	237	69	A
DM5GI	15,540	222	70	A
DK3GI	14,640	183	80	A
DK8EY	10,292	166	62	A
DL6CNG	5,974	103	58	A
DL4SDT	5,684	116	49	A
DK4IO	4,800	96	50	A
DF3IAL	3,726	81	46	A
DJ6TK	2,960	74	40	A
DL2YCA	1,750	50	35	A
DL9ST	1,728	48	36	A
DH7DJ	1,683	51	33	A
DL5JWL	1,551	47	33	A
DL2RTJ	320	20	16	A
DJ7AA	126,873	999	127	B
DJ5JK	89,548	734	122	B
DF0KU	39,010	415	94	B

Spain

EA7FTR	29,766	363	82	A
EA4OI	23,370	285	82	A
EA4AZJ	14,884	244	61	A
EC3AHT	11,388	156	73	A
EA1HF	11,352	172	66	A

Ireland

EI4DW	22,304	272	82	A

Moldova

ER6A (ER1LW,op)	19,564	292	67	A
ER5OK	8,858	206	43	A

Estonia

ES1RF	22,932	294	78	A

Belarus

EU1DX	60,840	585	104	A
EW1EA	40,068	477	84	A
EU1SA	16,632	198	84	B
EU1MM	13,120	205	64	B

France

F6AUS	37,976	404	94	A
F6IRG	5,236	119	44	A

England

G0KRL	49,401	499	99	A
G0NWY	16,380	210	78	A
G0URR	6,148	116	53	A
M0CFV	224	16	14	A
G5G (G0LII,op)	94,380	858	110	B

Northern Ireland

GI4KSH	34,853	383	91	B

Scotland

MM0BYC	37,350	450	83	A
MM0BQI	5,136	107	48	A

Guernsey

GU0SUP	24,056	248	97	A

Wales

GW4KHQ	69,319	673	103	B
MW2I (WW2R,GW5NF,GW4JBQ, G4VXE,ops)	143,385	1185	121	B

Hungary

HA3VAM	16,872	228	74	A
HA3LI	55,998	549	102	B

Switzerland

HB9DCM	38,600	386	100	B

Italy

IV3IIM	28,028	308	91	A
IV3ARJ	25,200	280	90	A
I7PXV	16,344	227	72	A
IT9RZR	16,170	231	70	A
IT9JOF	14,457	183	79	A
IT9NVA	10,400	200	52	A
IK2BCP	9,798	142	69	A
IK1GPG	9,204	156	59	A
IV3KSE	6,600	120	55	A
IK2WYI	6,441	113	57	A
IK2NCF	6,272	128	49	A
IK5EEL	5,217	141	37	A
I8BVW	1,632	48	34	A
IK1NEM	558	31	18	A
IK5WGK	143	13	11	A
I1COB	71,808	704	102	B
IK2RZP	67,095	639	105	B
IK6SNQ	51,557	473	109	B
IK1HSR	30,186	351	86	B
IK4WMH	28,179	303	93	B

Sardinia

IS0VBH	9,265	109	85	A

Norway

LA7CL	33,580	365	92	A
LA5TFA	2,716	97	28	A

Lithuania

LY1DS	69,871	653	107	A
LY2CG	14,365	221	65	A
LY3BH	10,080	160	63	B

Bulgaria

LZ2PL	40,890	470	87	A
LZ2PI	29,799	387	77	A
LZ2MP	6,138	99	62	A

Finland

OH7MN	45,724	497	92	A
OH3KOK	14,405	215	67	A
OH5KUY	12,528	216	58	A
OH7JJT	7,100	142	50	A
OH1MM	2,812	76	37	A
OH1UP	88	11	8	A
OH2LU	50,537	521	97	B
OH2GI	41,194	479	86	B

Czech Republic

OK2WO	20,619	237	87	A
OK1JN	20,358	261	78	A
OK2WH	18,343	221	83	A
OK2VP	7,252	148	49	A
OK2SG	6,760	104	65	A
OK2FD	87,846	726	121	B
OK1FM	10,224	142	72	B
OL5Q (OK1FFU,OK1HRA,OK1VSL, OK1AYE,OK1FLC,ops)	92,019	829	111	B

Slovakia

OM1II	12,528	232	54	A
OM3PR	12,928	202	64	B

Belgium

ON4AME	80,520	732	110	A
ON6NL	36,096	384	94	A
ON4BG	2,576	56	46	A

Denmark

OZ9AG	15,836	214	74	A

Netherlands

PA3HCF	23,124	282	82	A
PA3BGQ	20,999	253	83	A
PA0EHF	18,720	240	78	A
PA3GIR	7,497	119	63	A
PA3HGL	4,140	92	45	A

Slovenia

S57U	36,358	371	98	A
S57AW	20,664	252	82	A
S50R	17,724	211	84	A
S54A	13,400	200	67	A
S54E	104,832	896	117	B
S56A	5,382	117	46	B
S53S (S50N,S57IIO,S57LWG, S57MTX,ops)	69,642	657	106	A

Sweden

SM6BSK	35,541	359	99	A
SM6SRW	32,702	394	83	A
SM3ETC	24,010	343	70	A
SM5UFB	22,831	289	79	A
8S5W(SM5IMO,op)	21,680	271	80	A
SM7BJW	20,999	253	83	A
SM7GXR	20,320	254	80	A
SM5LNS	12,483	219	57	A
SM7ATL	11,584	181	64	A
SM7BGE	9,860	170	58	A
SM5NBE	5,336	92	58	A
SM7FTG	3,440	80	43	A
SM4RLD	1,045	55	19	A
SM4RGD	81,075	705	115	B
SM6WQB	35,712	384	93	B
SM4GVR	24,928	304	82	B
SM7BHM	18,432	288	64	B

Poland

SP2EWQ	43,225	455	95	A
SN8A	25,795	335	77	A
SP9BBH	21,138	271	78	A
SP2EXE	15,876	189	84	A
SP9LKS	14,003	209	67	A
SP6CZ	13,024	176	74	A
SP3NUN	10,064	148	68	A
SP2HPD	9,686	167	58	A
SP3XR	8,410	145	58	A
SP8FHJ	8,250	150	55	A
SP3JHR	6,392	136	47	A
SP7DQR	6,264	108	58	A
SP4GHL	5,559	109	51	A
SP3RBG	4,444	101	44	A
SP3GRQ	3,600	80	45	A
SP6NVK	1,408	44	32	A
SP2AQP	37,248	384	97	B
SP5ZCC (SP5UAF,SQ5BPM, SP5TAT,ops)	70,180	638	110	B
SN7N (+packet)	46,920	460	102	B

Greece

SV1DKL	20,519	289	71	A
SV2AEL	8,493	149	57	A
SV/OK1YM	16,830	255	66	B

Bosnia-Herzegovina

T94MZ	80,878	763	106	B

Kaliningrad

RA2FB	9,308	179	52	A

European Russia

RA4CTR	29,548	356	83	A
RV3QX	21,973	301	73	A
RZ3PS	12,804	194	66	A
RX3DTN	12,096	192	63	A
UA4WNH	9,100	182	50	A
RU3WR	7,527	193	39	A
RN2FA	5,074	118	43	A
RW3LB	3,927	77	51	A
RA4AFZ	1,690	65	26	A
RX3RZ	1,375	55	25	A
RU3RQ	1,325	53	25	A
RZ1ZR	1,066	41	26	A
UA3MLU	416	26	16	A
RA3WA	56,745	585	97	B
RU3AT	24,486	318	77	B
RN3OA	24,360	290	84	B
RZ1AZ	15,360	256	60	B
RV1CC	11,269	191	59	B
RD4M (UA4LU,op)	4,836	124	39	B
RX3VM/4	1,953	63	31	B
RX3VM	1,953	63	31	B

Ukraine

UY8IF	66,976	728	92	A
UZ7U (UT3UA,op)	56,385	537	105	A
UT2IO	43,432	488	89	A
UR5FFC	26,925	359	75	A
EO6F	25,025	325	77	A
UT2II	15,540	259	60	A
UT5HA	13,910	214	65	A
UX3MR	5,782	118	49	A
UU9JQ	4,455	99	45	A
UT2IM	3,456	72	48	A
UZ4E	228	19	12	A
UW8I (UT2IZ,op)	146,304	1143	128	B
US9QA	30,090	354	85	B
UX1IL	512	32	16	B
UT0H (UT1HT,logger,ops)	14,950	230	65	A
UT9F (UT9FJ,UT4FJ,UR5FEO, logger,ops)	104,780	806	130	B

Latvia

YL3FW	22,599	279	81	A
YL2GC	21,252	308	69	A
YL2NN	20,803	293	71	A
YL2PM	14,840	212	70	A
YL7A	49,179	507	97	B
YL2KF	29,610	329	90	B
YL7C (YL2MD,YL2GQT,YL2RQ,ops)	69,156	678	102	A

Romania

YO3APJ	10,800	144	75	A
YO3III	2,340	65	36	A

Yugoslavia

YU7AM	55,432	533	104	A
YU7YG	79,461	729	109	B
YU7AE	42,036	452	93	B

Macedonia

Z31JA	4,368	91	48	A

North America

Barbados

8P6SH	32,325	431	75	A

Cuba

CO8LY	2,720	68	40	A

Honduras

HR1/N0UEP	621	27	23	A

Alaska

AL7BB	51,708	556	93	A
KL7WP	7,344	144	51	A
KL7FH (+KL9A)	89,301	867	103	B

Puerto Rico

KP4VP	3,108	74	42	A

St Kitts & Nevis

V47SS (DF2SS,op)	35,992	409	88	A

Turks & Caicos Islands

VP5RY (WA9ALS,op)	134,415	1305	103	B

Mexico

XE1KK	16,616	248	67	A

Oceania

Hawaii

AH6OZ	61,194	658	93	B
KH7V (+N6HC,KA6DOW,WH7K,AH6P, AH6TM,NH7YL,AH7MI)	23,350	467	50	B

Marshall Islands

V73UX	14,016	219	64	A

Australia

VK4UC	46,035	465	99	A

Indonesia

YB5QZ	7,296	192	38	A

New Zealand

ZL2BR	29,830	314	95	A
ZL2AMI	58,300	583	100	B

South America

Argentina

LV5V (LU5VV,op)	89,540	814	110	A
LT1F (LU3FZW,LU1FKR,LU5FHM,ops)	94,128	848	111	B

Netherland Antilles

PJ2/ON4CFD	124,865	1105	113	B

Brazil

PY2MNL	94,374	882	107	A
PW2A (PT2BW,op)	68,090	619	110	A
PR7AR	552	23	24	A

Venezuela

YV5AAX	35,530	374	95	A

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Connecticut

WA1EHK	79,920	720	111	A
WB8IMY/1	7,620	127	60	A
KA1IXG	1,995	57	35	A
K1RO	172,692	1404	123	B
N8WXQ	51,058	521	98	B
W1AW (N4QX,op)	31,347	387	81	B
KD1J	24,600	300	82	B

Eastern Massachusetts

AD1C	79,640	724	110	A
WZ1Q	28,466	331	86	A
WA6ILT/1	18,634	242	77	A
W1TW	1,260	45	28	A
W1ZT	133,836	1174	114	B
W1CC	17,479	227	77	B

Maine

W1VXV	27,778	323	86	A
K1US	22,161	267	83	A
NY1S	7,946	137	58	A
AC1O	114,696	1062	108	B
NS1Z	4,320	90	48	B

New Hampshire

AA1KL	48,864	509	96	A
AA1QD	11,900	170	70	A
W1LZ	4,100	100	41	A
WB6BIG	17,381	191	91	B

Rhode Island

AC6DR	45,969	597	77	A
K1AM (+packet)	145,180	1220	119	B

Vermont

AA1SU	53,244	612	87	A

Western Massachusetts

N1VX	22,880	286	80	A
N1MGO	22,792	296	77	A
W1TO	15,096	204	74	A
K5ZD	225,125	1801	125	B

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Eastern New York

NA2M	39,615	417	95	B

NYC-Long Island

N2LEB	16,511	209	79	A
NY2M	56	8	7	A
N2FF	71,585	695	103	B

Northern New Jersey

K2YG	31,152	354	88	A
WA2LXE	30,711	353	87	A
KF2XF	26,505	279	95	A
NA2AA	25,994	317	82	A
KO2OK	24,297	273	89	A
KF2QS	14,184	197	72	A
ND2K	11,376	158	72	A
K2AMI	2,666	62	43	A
WA2VTV	1,400	50	28	A
K2NJ	109,278	934	117	B
NO2T	98,700	940	105	B
N2ED	28,536	348	82	B
W2LE	1,000	40	25	B

Northern New York

NS2P	2,232	72	31	A

Southern New Jersey

KC2SZ	10,230	165	62	A
W5KI	616	28	22	A

Western New York

W1TY	78,309	791	99	A
K1PY	64,288	656	98	A
WA2EYA	21,024	288	73	A
K2YEH	19,598	239	82	A
WB2WPM	17,172	212	81	A
K2CF	5,635	115	49	A
K2CDJ	5,292	98	54	A
KF2VX	3,612	86	42	A
KA2MGE	2,553	69	37	A
KA2WYE	2,368	64	37	A
N2WK	126,840	1057	120	B
N2UM (+packet)	4,752	99	48	A

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Eastern Pennsylvania

W3MEL	43,498	478	91	A
K3OK	9,870	141	70	A
N3NZ	8,058	158	51	A
N3RM	7,560	140	54	A
K3SV	5,772	148	39	A
N3JIX	2,145	65	33	A
NE3H	124,371	1063	117	B
W3MF	101,898	918	111	B
KB3TS	48,288	503	96	B
W3FV	37,380	445	84	B
W2UP	26,796	348	77	B
K3QIA	26,244	324	81	B
K3WW	11,956	196	61	B
N3RN (+KA3EEO,KA3ZHT)	22,407	291	77	A
KD3TB (+packet)	1,530	51	30	A

Maryland-DC

AF3D	36,491	401	91	A
N3UN	20,500	250	82	A
N4LF	4,641	91	51	A
W3BUI	3,735	83	45	A
4U1WB (AJ3M,op)	16,705	257	65	B
WB4ZHO	3,920	98	40	B
N3LH	3,700	100	37	B

Western Pennsylvania

N3FR	62,469	631	99	A
N3UE	46,545	535	87	A
K3FH	17,956	268	67	A
WA3GPP	13,356	212	63	A
KC3LV	9,450	150	63	A
N3RDV	782	34	23	A
WA3IIA	27,590	310	89	B

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Alabama

W4/KL7Q	101,304	938	108	A
WA8RPK	34,888	356	98	A
KE4KWE	34,200	450	76	A
W4WB	3,654	87	42	A
AG4W (+packet)	50,400	480	105	B

Georgia

W4AO	6,554	113	58	A

Kentucky

W4LC	63,856	614	104	A
K4SET	11,160	186	60	A
WA4KY	4,950	110	45	B

North Carolina

W4UEF	50,641	569	89	A
K4MA	27,710	326	85	A
WB4MSG	8,640	144	60	A
AE4EC	2,760	69	40	A
N5FPW	1,769	61	29	A
N4CW	49,698	502	99	B
NW6S/4	30,150	335	90	B
WB7OND	2,310	77	30	B
W4MR (AA4NC,W4CC,ops)	82,518	809	102	A

Northern Florida

WB4IHI	11,163	183	61	A

South Carolina

K6DGW	10,492	172	61	A
N4IQ	98,010	891	110	B
W4UK	63,600	636	100	B

Southern Florida

WT4I	156,480	1304	120	A
K8IJ	12,988	191	68	A
VE3BUC/W4	7,308	126	58	A
KF4SIR	4,992	96	52	A
KU4OS	726	33	22	A
W4OX	81,290	739	110	B
KC4HW	53,300	533	100	B
W9KEN	40,420	470	86	B
AF4RK	18,403	239	77	B
W4JZZ	1,634	43	38	B
WB4DAH (+logger)	8,235	135	61	B

Tennessee

W4CZ	33,000	375	88	A
W4AUI	18,576	258	72	A
KC4SAW	12,936	196	66	A
WB9BSH	7,995	123	65	A
KE4DX	2,368	64	37	A

KA4HMV	1,650	55	30	A
W4CBX	36,190	385	94	B
W5BEN	30,976	352	88	B

Virginia

KA4RRU	135,318	1187	114	A
W2YE	45,790	482	95	A
K4PZC	23,800	280	85	A
W0YR/4	21,746	262	83	A
N3MA	15,544	232	67	A
N6MW	15,120	216	70	A
WE4V	14,432	176	82	A
W4JLS	13,132	196	67	A
K4FPF	3,256	74	44	A
W4XDX (W1KCD,op)	2,272	71	32	A
WY4D	2,170	62	35	A
K4GMH	140,283	1199	117	B
W6IHG	15,840	198	80	B

West Central Florida

KR4U	11,895	183	65	A
WC4E	10,230	155	66	A
W4TIJ	5,995	109	55	A
KT4TD	3,956	92	43	B

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Arkansas

KG5RM	17,984	281	64	A
W5JE	8,415	153	55	B
N5ZM (+N5RN)	116,765	965	121	A
W5YM (W6JVE,KC8ATF,ops)	23,256	323	72	A

Louisiana

AA5AU	205,239	1591	129	A
K5CZD	11,100	185	60	A
KD5CFB	640	32	20	A

Mississippi

AC5SU	45,590	470	97	A
N5JGK	11,284	182	62	A
KJ5RC	2,331	63	37	A
K5YG	128,136	1124	114	B
W5VZF (+WA4DDE,KB4HB)	52,560	584	90	A

New Mexico

WB1GSO	25,487	331	77	A
K4KIY	3,315	85	39	A
KD5JAA	2,553	69	37	A
WA0SXV	84,072	904	93	B
K5AM	31,374	378	83	B

North Texas

N5JR	43,584	454	96	A
W5FR	17,834	241	74	A
AE5P	14,606	218	67	A
WK5K	3,010	86	35	A
KC5NT	1,680	56	30	A
KD5KZG (+KD5LDV,K5WI)	4,100	100	41	A

Oklahoma

K5KA	24,624	304	81	A
K0CIE	21,316	292	73	A
N5PMP	4,557	93	49	A
KB5BOB	51,510	505	102	B
N5RXF	30,338	394	77	B
WA9AFM	12,896	208	62	B
N5NA	5,547	129	43	B

South Texas

N5XUS	60,630	645	94	A
AC5AA	20,377	287	71	A
N5NXS	6,370	130	49	A
AJ4F	5,704	124	46	A
KK5CA	3,977	97	41	A
K5NZ	18,648	296	63	B
K5DJ (+RA3ANI)	165,816	1316	126	B
K5PI (+packet)	33,321	383	87	B

West Texas

KE5OG	26,980	355	76	A
WR5O	13,332	202	66	A
WB5QLR	5,520	138	40	A
N5LUL	3,256	74	44	A

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East Bay

N6TQS	23,712	312	76	A
K6BIR	16,048	272	59	A
KE6QR	4,212	108	39	A

Los Angeles

W3SE	53,690	590	91	A
WA6BOB	14,805	235	63	A
KC6G	11,661	169	69	A
WO6M	9,261	147	63	A
AD6PC	2,204	58	38	A
AD6KA	40,152	478	84	B
KR6E (+KE6YTT,KE6YTW)	91,140	930	98	B

Orange

KK6T	30,959	373	83	A
KI6X	7,738	146	53	A
AC6TK	1,440	45	32	A
W7TI (+KD7LS)	112,090	1019	110	B

Santa Barbara

W6KNB	5,504	128	43	B

Santa Clara Valley

AC6JT	35,728	464	77	A
N6RJB	9,360	144	65	A
N2ALE/6	1,952	61	32	A
W6IT	1,334	46	29	A
NQ6C	48,384	576	84	B
W6ISO	33,938	478	71	B
W6YX (K6ENT,N6DE,ops)	96,495	919	105	A

San Diego

N6PC	4,250	85	50	A
AK6R	300	20	15	A
N6QEK	26,980	355	76	B
W6IWO	15,477	201	77	B

San Francisco

N6OJ	111,588	1094	102	A
W6JOX	19,053	261	73	B

San Joaquin Valley

NT6K	26,781	339	79	A
KA6BIM	28,728	342	84	B
NN6NN (N6EE,W6XK,ops)	113,313	1059	107	B

Sacramento Valley

NA6E	47,724	582	82	A

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Arizona

N7UJJ	68,377	677	101	A
K7ON	17,360	280	62	A
KG7YQ	8,768	137	64	A
KI7NW	6,850	137	50	A
K6LL	122,148	1131	108	B
W7WW	105,872	1018	104	B
K7WM	101,844	943	108	B
AA7A	64,220	676	95	B
KC7V	51,042	543	94	B
N7PWZ (+KE7YEB)	24,928	304	82	A

Eastern Washington

K7UK	21,873	317	69	A
KC7ITP	12,272	208	59	A
WV7Y (+WS7I)	76,720	685	112	A

Idaho

N7UVH	51,030	567	90	A
N6YIH/7	2,436	84	29	A
K7ZO	17,111	241	71	B
KJ7TH (+KW7N)	105,380	958	110	B

Nevada

N7ON	19,074	289	66	A
KG7Q	14,516	191	76	A
WB7QBQ	9,246	138	67	B
K4WW (+G0AZT,W7VI)	116,661	1051	111	B

Oregon

AA6TY	34,000	400	85	A
AA7CP	26,134	358	73	A
AA7IH	8,662	142	61	A
WW7OR (W7GG,op)	118,832	1061	112	B
K7ZUM	62,040	705	88	B

Utah

NB7B	8,610	205	42	A
AA7TR	6,321	147	43	A
W7CT	91,900	919	100	B

Western Washington

W7LD	63,279	801	79	A
KB7N	37,212	443	84	A
KD7HNS	7,644	156	49	A
N7CKP	690	30	23	A
W7NN	154,128	1352	114	B
N7VGO	43,430	505	86	B
W7DPW	26,520	390	68	B
N5LPI	7,809	137	57	B

Wyoming

WG7Y	41,934	482	87	B

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Michigan

W8EB	45,315	477	95	A
W8HCS	16,354	221	74	A
K4DLS	14,832	206	72	A
N8HEM	6,902	119	58	A
K8CPA	2,145	65	33	A
ND5S	102,350	890	115	B
W8KX	28,483	313	91	B
K8YE	28,179	303	93	B
WA8IHI	5,040	112	45	B
K8VT (+WA8RTP,KC8MCP)	49,305	519	95	A
K8AA (+packet)	49,086	486	101	B

Ohio

NI8Z	83,376	772	108	A
W8DN	36,284	386	94	A
K8AB	20,500	250	82	A
N8BJQ	17,009	233	73	A
WB8IEA	11,580	193	60	A
W8WTS	9,263	157	59	A
W8IDM	7,874	127	62	A
KE8FP	6,954	114	61	A
N8KM	6,325	115	55	A
KB8KIK	4,800	100	48	A
K8RJW	2,856	68	42	A
AF8C	1,989	51	39	A
N8RPA	1,550	50	31	A
AB8IS	49	7	7	A
AB8K	44,640	465	96	B
N8LRG (+KB8TCF,KA8ZNY)	61,464	591	104	A
WB8YTZ (+KF8UN)	37,145	391	95	A
N8NR (+N8TPS,N9AG)	98,900	860	115	B

West Virginia

KG8WB	54,964	604	91	A
N8YYS	38,548	419	92	A
W8PT	16,517	199	83	B

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Illinois

W9IL	33,580	365	92	A
K9BJM	30,082	338	89	A
W9RM	25,875	345	75	A
N9QQK	23,700	300	79	A
W9ILY	14,007	203	69	A
N9LYE	10,787	161	67	A
WD9HSH	4,900	98	50	A
W9AX	3,485	85	41	A
W9YS	2,788	68	41	A
KA9TQO	1,674	54	31	A
N9BU	1,166	53	22	A
KG9X	98,784	882	112	B
N2BJ	50,568	516	98	B
K9NU	32,472	369	88	B
K9WJU	25,317	291	87	A
K9NS (K9HMB,K9PW,K9RO,KS9W, N9NCX,ops)	177,970	1369	130	B
AE9D (+logger)	84,840	840	101	B

Indiana

W9HLY	24,186	278	87	B
WD9GMK (+packet)	14,112	196	72	A

Wisconsin

N9CK	97,699	821	119	A
AA9PB	48,705	573	85	A
WD9GWH	8,280	138	60	A
KB9Q	5,512	106	52	A
WN8VIX	3,528	84	42	A
W9ISC	2,183	59	37	A
W9AKS	408	24	17	A
K9DJ	51,507	531	97	B
N9PQU	45,192	538	84	B
W9PVD	9,180	180	51	B
AA9RR (+KB9WSN)	74,336	736	101	A

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Colorado

K0ZU	87,203	899	97	A
W0LSD	75,130	683	110	A
N0CDA	59,799	643	93	A
WD0E	45,320	515	88	A
N0ISE	35,200	440	80	A
N0IBT	24,057	297	81	A
N5RR	2,310	66	35	A
WV7T (+N0QJS)	7,215	111	65	A

Iowa

N3SL	114,359	961	119	A
W0ETC	8,964	166	54	A
K0SRL	2,220	60	37	A
N0NI (+N0AC,WO0V)	92,660	820	113	B

Kansas

KI6DY	109,200	1040	105	A
AK0A	34,228	398	86	A
WD0BNC	20,240	253	80	A
K0BJ	2,485	71	35	A

Minnesota

W2JGR/0	18,630	270	69	A
K0TG	8,370	155	54	A
KE0WW	6,390	142	45	A
WODC (@ W0BV)	133,637	1123	119	B
W0HW	18,000	240	75	B

Missouri

NW0L	65,892	646	102	A
NM0X	47,790	531	90	A
KE0LY	41,850	450	93	A
KS0M	19,197	243	79	A
WA0WIK	14,952	178	84	A
N0AJ	31,428	388	81	B
KG0QG (+KI0IV)	68,276	676	101	A
N0IU (+KO0Z,NF0Q)	44,426	458	97	A
K0BX (+packet)	17,600	220	80	B

North Dakota

K0UD	7,645	139	55	A

Nebraska

K0IDT	35,490	390	91	A
K0XU	14,348	211	68	A

South Dakota

WB0ULX	5,100	100	51	A
WA0PNB	2,720	68	40	A
W0SD (+W0OE,N0ABE,WB0YQT, W7XU)	159,268	1373	116	B

VE

Maritime-Newfoundland

VE9TTY	16,800	224	75	A
VE1AOE	8,932	203	44	A
VY2SS	121,905	1161	105	B

Quebec

VE2OWL	36,888	424	87	A
VA2FB	32,680	380	86	A
VA2BF	31,324	382	82	A
VE2AXO	12,348	196	63	A

Ontario

VE3IAY	38,250	425	90	A
VA3SX	18,170	230	79	A
VA3SB	14,504	196	74	A
VA3HL	13,200	200	66	A
VA3XRZ	1,225	49	25	A
VE3GLA	39,897	429	93	B
VA3KA	39,668	422	94	B
VE3RZ	21,812	266	82	B

Manitoba

VE4COZ	87,954	822	107	A

Saskatchewan

VE5CPU	96,726	987	98	B

Alberta

VE6RAJ	77,169	887	87	A
VA6MM	58,117	653	89	A
VA6RA	44,003	557	79	A
VE6YR	22,916	337	68	A
VE6RRD	15,189	249	61	A
VE6JY (VE6WQ,op)	140,634	1202	117	B
VE6AO (+packet)	77,080	820	94	B

British Columbia

VE7YC	28,776	436	66	A
VA7BM	4,550	91	50	A
VE7BTO	57,716	614	94	B
VE7QO	21,798	346	63	B

Checklogs

9A2Q, AL7BB, EI6FR, HA2VB, IK2QCF, JG3EVI, JH4NMT, KA6BIM, KB1CJ, KC7WUE, MM0BYC, OK2BHD, OZ6TL, PA3HGF, RK9AD, RX3DTN, SM0/4S7AB, SM6LJP, SP2UUU, SP6TRX, SQ4CUM, UA0CW, UX5HY, YU1KT, ZP5YW

NEW PRODUCTS

HAM RADIO CLIPART CD

◊ TK5NN has produced Version 3 of *Ham Radio ClipArt*. This CD contains a "bank" of 1364 high-resolution images in black and white and color. The images, in both vectorial (EPS) and bitmap (TIF) file formats, include many electronic components, three styles of numbers and alphabets, and printable logs for contesting and normal operating. Also included are several QSL response templates, and many images and logos from Amateur Radio organizations around the world. Another more humorous section contains images that would be appropriate for newsletters, coloring pages, QSL cards or publicity fliers or certificates. The images are easy to "cut and paste," resize and format to your needs.

The image resolution has been fixed at 400 dpi, and then compressed. The CD-ROM works on both Macintosh and PC computers. The user must provide the software necessary for drawing or publishing, such as Adobe Illustrator, CorelDraw, Microsoft Paint and Imaging for Windows.

TK5NN's Web site, **tk5nn.free.fr/en/index.html**, offers a few free graphic samples and a selection of Frequently Asked Questions. The cost of the CD, including shipping and handling, is $30. It can be ordered by e-mail, fax or postal mail.—*Jean Wolfgang, WB3IOS, ARRL Educational Programs Coordinator*

Previous New Products

By Dan Henderson, N1ND
Contest Branch Manager

2000 ARRL 10-Meter Contest Results

Do you remember the early part of December 2000? It will be a long time before most of us forget chad—hanging, dimpled or pregnant—or the detailed and captivating look at a unique moment in American history. For weeks the US and the world waited to see how the drama of the presidential election would play out. On Monday, December 12, 2000 the US Supreme Court issued its decision, which resolved the immediate crisis.

How did you spend those anxious days that led up to an historic moment for our nation? Many avid amateurs kept one eye on the TV screen but escaped from the drama by participating in the 2000 ARRL 10-Meter Contest. Great propagation worldwide seemed to surpass the great electoral decision as a record 2875 logs were received—surpassing the 1999 contest as the largest ARRL contest ever. These logs represented a total of over 3300 participants and came from all 50 states, each ARRL/RAC section, and from 108 DXCC entities.

Great conditions and record participation brought record-breaking performances. All-time record scores were set in four of the ten categories. There were also a total of 39 new ARRL/RAC division records set during the event.

I4UFH was constantly reminded by the certificates on the wall in front of him of the task of excellence for which he was striving, and responded by taking the CT8T station to another first-place DX finish.

Top Ten, W/VE

Mixed Mode, QRP

N6MU	884,510
NA4CW	491,062
VE3KZ	475,610
WA8RCN	405,594
K0OU	396,100
K6XX	365,944
W3PP	365,928
WA6FGV	297,838
W4DEC	290,550
WT3W	288,144

Mixed Mode, Low Power

K1RO	1,476,984
KG9X	1,327,104
NA2U	1,189,524
W3EP	1,159,152
N0AT	1,040,736
WD5K	1,004,850
N7LOX	947,968
K6RO	938,956
K0TT	932,062
K0OB	828,240

Mixed Mode, High Power

KQ2M	2,747,164
WC4E	2,472,804
W2GG	2,430,912
W4MYA	2,087,784
K9NW	2,049,822
K3ZO	1,918,848
N8OO	1,915,812
VE6JY (VE7CC,op)	1,830,168
N4ZC (K4ZA,op)	1,742,034
W0SD (W0DB,op)	1,725,498

Phone Only, QRP

N2NHN	112,860
KD2UF	109,868
VE3BUC	90,800
W4TD	89,232
NY6DX	88,000
KI0II	75,848
N8MWK	68,704
N1LW	66,640
AB2IW	61,060
N3ELK	61,000

Phone Only, Low Power

N4OX	418,112
KK2ED	359,452
KT0DX	350,000
AC0W	344,760
N1IR	333,940
ND8DX	306,240
N1SV	303,134
AA5FJ	291,868
K4UCF (KD4RWN,op)	277,704
KS2G	269,276

Phone Only, High Power

W5PR	1,035,702
K4XS	1,003,932
K5TR	955,638
W9RE	907,200
K1AM	857,308
WB9Z	763,464
K6LL	758,608
K3EST	743,204
K7RI	738,948
K6IF	714,168

CW Only, QRP

KG5U	402,144
K5AM	278,200
K9AY	276,860
N0UR	266,832
K7ED (WA0RJY,op)	262,200
VA3RU	247,044
VA3EU	241,500
WO2N	232,288
AA1CA	216,140
N9UC (WO9S,op)	213,796

CW Only, Low Power

K1TO	1,094,616
WE1USA	911,232
K1VUT	873,600
W5TM (W5AO,op)	796,960
WD4AHZ	745,740
WQ5W	711,808
N5DO	684,472
K4AO	670,208
N4ZI	668,160
W1WAI	661,436

CW Only, High Power

W4ZV	1,433,952
W4AN (W4PA,op)	1,331,712
K2VV	1,278,668
N4BP	1,271,808
VO1MP	1,118,880
N4ZZ	1,114,260
K1PT	1,076,896
W6EEN (N6RT,op)	1,049,472
N7KU	1,002,520
K2LE	964,540

Multioperator

KC1XX	3,181,272
K9NS	2,813,658
NX5M	2,433,380
W4KZ	2,344,216
N2NT	2,316,328
N5YA	2,233,246
KV0Q	2,198,560
K4JA	2,186,574
K1SE	2,129,930
N6IG	2,070,774

Top Ten, DX

Mixed Mode, QRP

JA1YNE (JP1OGL,op)	326,360
LZ1UQ	311,540
PA3ELD	234,768
9A2EY	183,400
RK9KWB	180,576
Z32AF	117,602
SP2EWQ	108,750
G0OGN	104,218
JL1IHE	81,436
JA7ERJ	71,894

Mixed Mode, Low Power

WP2Z (AG8L,op)	2,301,240
LP1F	1,343,816
SU9ZZ	1,329,300
YU1AU	904,264
JN3PYQ	880,152
JR4PMX	863,720
YU7CB	792,792
LU5VV	752,972
OM6T	703,948
RU3QW	641,650

Mixed Mode, High Power

ZS6Z (JM1CAX,op)	2,932,224
TK5EP	2,273,020
CX5BW	1,964,476
H2G (5B4AGC,op)	1,920,604
OK1RI	1,786,400
JH4UYB	1,423,240
HA6NF	1,419,024
EM3J (UU2JZ,op)	1,407,648
PY0FF	1,356,272
LU2FA	1,319,472

Phone Only, QRP

KP2/WA0QII	286,790
LU3VD	175,208
YU1KN	93,526
NP2B	75,296
LU1VK	55,242
OK1GW	49,140
OK2ZAW	41,168
LU5EVK	38,880
JA3LFK	36,778
LU2HNP	32,980

Phone Only, Low Power

ZX2B (PY2MNL,op)	423,280
LU4DX	408,002
G0AEV	344,960
IK2ZVU	344,660
F5TDK	336,824
9A2RD	325,464
TI1Z (TI4ZM,op)	285,360
CO2II	281,736
AY0N	281,154
LW7EIC	274,512

Phone Only, High Power

CT8T (I4UFH,op)	948,660
F6CTT	775,656
S57AW	696,960
GM4YXI	673,904
LU1HF	670,026
F6KBI	620,768
F6KRC (F6GLH,op)	618,944
J37K	598,000
I2PJA	584,652
CT3IA	560,960

CW Only, QRP

KP2/N3IQ (ND3F,op)	791,120
ZF2NT	713,160
G4EDG	238,336
UP6F (UN7FZ,op)	204,204
YU1KR	202,776
9A0C (9A2HI,op)	190,376
F6OIE	155,232
OM0TT	154,336
LZ2RS	151,240
OK2PYA	112,104

CW Only, Low Power

NP3G	1,080,624
ZV8O	741,840
V26JT	717,824
IK4UPB	714,816
5B4AGN	680,504
9A3VM	612,648
LU1EWL	461,648
CX9AU	451,572
LZ2PL	444,600
JH9VSF	436,632

CW Only, High Power

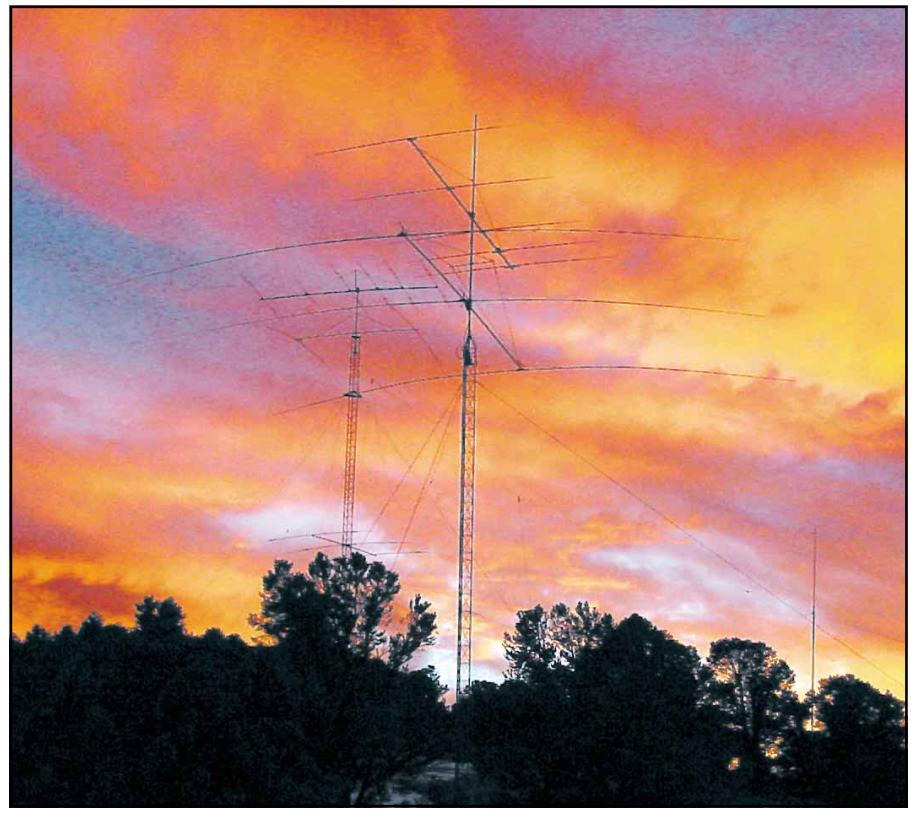
J38DX (K1KI,op)	2,045,440
KH6ND	1,303,680
OD5/OK1MU	1,226,136
NP4Z (NP3A,op)	1,148,712
RM4W	1,038,162
PY2KC	983,412
S59A	965,328
SP7GIQ	888,592
S58A	868,552
EA1DAV	841,784

Multioperator

VP5K	4,091,778
8P9Z	3,496,262
VP5DX	3,128,488
YV4A	2,917,488
KH0A	2,012,350
VP5Q	1,949,706
OT0T	1,947,240
RM6A	1,889,694
S50C	1,886,820
M5X	1,886,738

Affiliated Club Competition

	Score	Entries
Unlimited Category		
Potomac Valley Radio Club	35,787,298	66
Society of Midwest Contesters	28,946,170	113
Yankee Clipper Contest Club	21,095,582	52
Medium Category		
Florida Contest Group	18,824,194	31
Frankford Radio Club	18,587,022	28
Northern California Contest Club	11,741,580	26
Minnesota Wireless Assn	8,681,022	26
Southern California Contest Club	7,101,938	16
Mad River Radio Club	6,712,248	16
Tennessee Contest Group	6,466,550	22
South East Contest Club	6,119,554	8
Willamette Valley DX Club	5,574,580	8
Western Washington DX Club	4,209,216	12
Texas DX Society	3,673,124	7
Central Texas DX and Contest	3,220,716	8
Ozark Contest Club	3,135,160	5
Order of Boiled Owls of New	3,111,910	6
North Texas Contest Club	2,856,566	8
Kansas City DX Club	2,838,296	5
Grand Mesa Contesters	2,763,888	6
Southwest Ohio DX Assn	2,362,538	3
Lincoln ARC	2,180,200	4
Oklahoma DX Assn	2,164,216	5
Rochester (NY) DX Assn	1,883,032	9
North Coast Contesters	1,670,450	6
Kentucky Contest Group	1,621,004	3
Carolina DX Assn	1,345,898	8
Central Arizona DX Assn	1,071,996	5
Southern California DX Club	1,013,536	3
Bergen ARA	943,282	13
Radio Amateurs of Northern	860,114	3
Bay Area Wireless Assn	800,592	4
AK-SAR-BEN	588,630	3
Mother Lode DX/Contest Club	549,768	5
Green River Valley ARS	517,060	4
West Park Radiops	480,916	6
South Jersey Radio Assn	431,052	5
Holiday City ARC	425,610	7
Six Meter Club of Chicago	337,696	12
Northrop Grumman Radio Club	285,392	4
West Allis RAC	252,816	4
Worldradio Staff ARC	167,748	3
Local Category		
River City Contesters	5,968,456	6
Hudson Valley Contesters & DXers	4,629,564	5
Redmond Top Key Contest Club	2,545,000	6
West Valley ARA	1,409,102	7
Loudoun ARG	872,634	7
ARA of Southwest Florida	855,464	4
American Red Cross Emergency	506,844	5
Hickory Withe DX Club	473,434	3
Columbia-Montour ARC	443,536	6
Southwest Idaho Contest Club	434,456	3
Athens County ARA	407,202	7
Northern New York Contest Club	181,080	3
10-70 Repeater Assn	42,646	3



Oh, yes, the antennas at the K5RC station include (background: KT34XA at 80 feet, 2 elements at 40 meters at 70 feet, a Classic 33 at 40 feet and [foreground]: 5 elements at 55 feet, 3 elements on 40 meters at 45 feet—but with a spectacular scene such as this, who would notice?

This year's contest served to highlight the continued emergence of QRP contesting worldwide. All-time record high scores were set in two or three worldwide single-operator QRP classifications. John, N6MU, and operating from N6NB, emerged as the new record holder of the Mixed Mode Single Operator QRP category with an outstanding score of 884,510. The top DX participant in the category was Akio, JP1OGL, operating as JA1YNE with a score of 326,360. Eight different DXCC entities placed in the top ten for DX in this category. A total of 50 entries were received global for this category.

From among the 110 logs submitted for the CW Only Single Operator QRP competition Brian, ND3F, took off to KP2-land and broke the old world record with a score of 791,120. Entries from five entities broke into the DX top ten for the category. Top W/VE finisher was Dale, KG5U, who took top domestic honors in the category with a score of 402,144.

Leading the way among W/VE entrants in the Phone Only Single Operator QRP categories were Jack, N2NHN, with a score of 112,860 while Rod, KP2/WA0QII took top honors among DX participants with a score of 286,790. Seventy-three logs were submitted for this classification. A total of 233 logs (8.1%) for the contest were submitted by single operator QRP stations.

Fifty four percent (1506) of all entries came from Single Operator Low Power stations. Leading the way among the Mixed Mode participants in this power class was the record-breaking performance by Dave, AG8L, who was the operator for WP2Z. Dave's 2,301,240 points led the way in a top ten box that featured participants from seven DXCC entities. The W/VE high score was posted by Mark, K1RO, who led the way with a score of 1,476,984. Four hundred eight logs were received for this class/power combination.

Though not a record-setting finish, there was a tight race between top DX category entrant Wanderly, ZX2B, with PY2MNL as the operator, and high scorer among W/VE stations Jay, N4OX for the highest Phone Only Single Operator Low Power overall first-place finisher. In the end, once the logs were checked, Wanderly held on to edge Jay by a score of 423,280 to 418,112. Nine different entities are found in the DX top ten box.

The CW Only Single Operator Low Power category saw a tight race before Dan, K1TO, the top W/VE scorer pulled ahead to edge out top DX participant Terry NP3G by 13,992 points (1,094,616 to 1,080,624). Working each of the top ten DX finishers would have netted you 10 multipliers, as each hailed from a different DXCC entity.

High QSO totals and high scores were seen throughout all three of the Single Operator High Power categories. However, a new world-record did not emerge from any of the 725 entries across the three classifications. The Mixed Mode Single Operator High Power winner was ZS6Z, with Koji, JM1CAX, as the operator. His score of 2,932,224 beat out top W/VE finisher Bob, KQ2M, who posted a final checked score of 2,747,164. Again a clean sweep of working the DX top ten in this category would have netted you 10 multipliers.

Slugging it to win the Phone Only Single Operator High Power category was Chuck, W5PR, who took top W/VE honors with a score of 1,035,702. The top

Region Leaders

Boxes list call sign, score, class (A = Mixed Mode, B = Phone only, C = CW only, D = Multioperator), and power (A = QRP, B = Low Power, C = High Power).

Northeast Region

(New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

W3PP	365,928	A	A
WT3W	288,144	A	A
WB2AMU	180,880	A	A
K1RO	1,476,984	A	B
NA2U	1,189,524	A	B
W3EP	1,159,152	A	B
KQ2M	2,747,164	A	C
W2GG	2,430,912	A	C
K3ZO	1,918,848	A	C
N2NHN	112,860	B	A
KD2UF	109,868	B	A
NY6DX	88,000	B	A
KK2ED	359,452	B	B
N1IR	333,940	B	B
N1SV	303,134	B	B
K1AM	857,308	B	C
W1SJ	675,410	B	C
N2FF	531,216	B	C
WO2N	232,288	C	A
AA1CA	216,140	C	A
K2SM	180,940	C	A
WE1USA	911,232	C	B
K1VUT	873,600	C	B
W1WAI	661,436	C	B
VO1MP	1,118,880	C	C
K2LE	964,540	C	C
KR1G	933,984	C	C
KC1XX	3,181,272	D	
N2NT	2,316,328	D	
N2IX	2,041,170	D	

Southeast Region

(Delta, Roanoke and Southeastern Divisions)

NA4CW	491,062	A	A
W4DEC	290,550	A	A
N4IG	794,200	A	B
W4UM	702,572	A	B
N4YDU	661,932	A	B
WC4E	2,472,804	A	C
W4MYA	2,087,784	A	C
N8OO	1,915,812	A	C
W4TD	89,232	B	A
N5FPW	50,676	B	A
KS4GW	49,280	B	A
N4OX	418,112	B	B
AA5FJ	291,868	B	B
K4UCF (KD4RWN,op)	277,704	B	B
K4XS	1,003,932	B	C
WA4TII	437,360	B	C
W2JJC	437,320	B	C
K9AY	276,860	C	A
WA8WV	199,800	C	A
W4FMS	168,780	C	A
K1TO	1,094,616	C	B
WD4AHZ	745,740	C	B
N4ZI	668,160	C	B
W4ZV	1,433,952	C	C
W4AN (W4PA,op)	1,331,712	C	C
N4BP	1,271,808	C	C
W4KZ	2,344,216	D	
K4JA	2,186,574	D	
K1SE	2,129,930	D	

Central Region

(Central and Great Lakes Divisions; Ontario Section)

VE3KZ	475,610	A	A
WA8RCN	405,594	A	A
W9UR	67,368	A	A
KG9X	1,327,104	A	B
KJ9C	803,292	A	B
VE3ZT	795,408	A	B
K9NW	2,049,822	A	C
K9XD (K9PG,op)	1,646,054	A	C
W9XT	1,491,456	A	C
VE3BUC	90,800	B	A
N8MWK	68,704	B	A
W9HL	25,986	B	A
ND8DX	306,240	B	B
N9PQU	219,456	B	B
VE3SRE	217,750	B	B
W9RE	907,200	B	C
WB9Z	763,464	B	C
N2BJ	697,774	B	C
VA3RU	247,044	C	A
VA3EU	241,500	C	A
N9UC (WO9S,op)	213,796	C	A
K4AO	670,208	C	B
KB9S	611,520	C	B
K9BG	401,448	C	B
N8DCJ	927,964	C	C
N4GN	924,352	C	C
W8AV	857,888	C	C
K9NS	2,813,658	D	
N8NR	1,551,240	D	
KI9A	1,479,744	D	

Midwest Region

(Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)

K0OU	396,100	A	A
K0PC	234,500	A	A
WA8ZBT	211,344	A	A
N0AT	1,040,736	A	B
WD5K	1,004,850	A	B
K0TT	932,062	A	B
W0SD (W0DB,op)	1,725,498	A	C
K5XR (W5ASP,op)	1,167,696	A	C
K5NZ	976,048	A	C
KI0II	75,848	B	A
KK0Q	53,820	B	A
WA0VBW	36,820	B	A
KT0DX	350,000	B	B
AC0W	344,760	B	B
N5XD	241,098	B	B
W5PR	1,035,702	B	C
K5TR	955,638	B	C
VA5DX	580,832	B	C
KG5U	402,144	C	A
K5AM	278,200	C	A
N0UR	266,832	C	A
W5TM (W5AO,op)	796,960	C	B
WQ5W	711,808	C	B
N5DO	684,472	C	B
K2VV	1,278,668	C	C
AD5Q	961,848	C	C
K5PI	927,360	C	C
NX5M	2,433,380	D	
N5YA	2,233,246	D	
KV0Q	2,198,560	D	

West Coast Region

(Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)

N6MU	884,510	A	A
K6XX	365,944	A	A
WA6FGV	297,838	A	A
N7LOX	947,968	A	B
K6RO	938,956	A	B
WN6K	610,450	A	B
VE6JY (VE7CC,op)	1,830,168	A	C
K6LA	1,460,800	A	C
K7MI	1,320,894	A	C
W6CN	53,544	B	A
WR6WR	52,404	B	A
WK6I	44,380	B	A
VE7NF	250,824	B	B
AB6GS	237,286	B	B
VE7IN	199,894	B	B
K6LL	758,608	B	C
K3EST	743,204	B	C
K7RI	738,948	B	C
K7ED (WA0RJY,op)	262,200	C	A
W7/JR1NKN	170,100	C	A
VE6BF	152,944	C	A
N7OU	516,120	C	B
VE6EX	370,576	C	B
N7WA	301,728	C	B
W6EEN (N6RT,op)	1,049,472	C	C
N7KU	1,002,520	C	C
K6KM (K2KW,op)	891,280	C	C
N6IG	2,070,774	D	
W6YX	2,002,932	D	
WT6G	1,606,706	D	

Africa

SU9ZZ	1,329,300	A	B
ZS6Z (JM1CAX,op)	2,932,224	A	C
EC8AUZ	72,600	B	B
EA8AD	65,570	B	B
CT3IA	560,960	B	C
ZS6HO	1,804	B	C
EA8/DJ1OJ	367,536	C	B
CN8YR	195,040	C	B
ZS5RON	84,208	C	B
TZ6DX	723,840	C	C
ZS6BRZ	459,160	C	C
EA8KL	85,902	C	C
3V8BB	280,686	D	

Asia

JA1YNE	326,360	A	A
RK9KWB	180,576	A	A
JL1IHE	81,436	A	A
JN3PYQ	880,152	A	B
JR4PMX	863,720	A	B
JH8KYU	513,268	A	B
H2G (5B4AGC,op)	1,920,604	A	C
JH4UYB	1,423,240	A	C
JH5FXP	1,103,520	A	C
JA3LFK	36,778	B	A
JA1WC	12,480	B	A
RZ9IB	6,944	B	A
UP5P (UN5PR,op)	249,260	B	B
JH0BDK	235,170	B	B
JL3VUL	131,300	B	B
JH4UTP	288,408	B	C
RS0F (UA0FZ,op)	263,942	B	C
JA2ZJW	231,072	B	C
UP6F (UN7FZ,op)	204,204	C	A
JA2IU	106,140	C	A
RV9COI	16,592	C	A
5B4AGN	680,504	C	B
JH9VSF	436,632	C	B
JF1SQC	415,152	C	B
OD5/OK1MU	1,226,136	C	C
VR2BG	833,184	C	C
JH3AIU	743,400	C	C
UP0L	1,308,096	D	
JJ3YBB	1,213,070	D	
JR1ZTT	883,446	D	

Europe

LZ1UQ	311,540	A	A
PA3ELD	234,768	A	A
9A2EY	183,400	A	A
YU1AU	904,264	A	B
YU7CB	792,792	A	B
OM6T	703,948	A	B
TK5EP	2,273,020	A	C
OK1RI	1,786,400	A	C
HA6NF	1,419,024	A	C
YU1KN	93,526	B	A
OK1GW	49,140	B	A
OK2ZAW	41,168	B	A
G0AEV	344,960	B	B
IK2ZVU	344,660	B	B
F5TDK	336,824	B	B
CT8T	948,660	B	C
F6CTT	775,656	B	C
S57AW	696,960	B	C
G4EDG	238,336	C	A
YU1KR	202,776	C	A
9A0C (9A2HI,op)	190,376	C	A
IK4UPB	714,816	C	B
9A3VM	612,648	C	B
LZ2PL	444,600	C	B
RM4W	1,038,162	C	C
S59A	965,328	C	C
SP7GIQ	888,592	C	C
YV4A	2,917,488	D	
OT0T	1,947,240	D	
RM6A	1,889,694	D	

North America

WP2Z (AG8L,op)	2,301,240	A	B
KL7RA	1,039,232	A	C
KP2/WA0QII	286,790	B	A
NP2B	75,296	B	A
TI1Z (TI4ZM,op)	285,360	B	B
CO2II	281,736	B	B
KL7FAP	96,960	B	B
J37K	598,000	B	C
V44NK	327,408	B	C
8P6EX	234,080	B	C
KP2/N3IQ (ND3F,op)	791,120	C	A
NP3G	1,080,624	C	B
V26JT	717,824	C	B
HP1AC	288,144	C	B
J38DX (K1KI,op)	2,045,440	C	C
NP4Z (NP3A,op)	1,148,712	C	C
KL2A	792,880	C	C
VP5K	4,091,778	D	
8P9Z	3,496,262	D	
VP5DX	3,128,488	D	

Oceania

VK2APK	405,888	A	B
YB1KOR	62,426	A	B
YC0LOW	36,358	A	B
ZF2AH	931,588	A	C
VK5GN	382,400	A	C
4D68LER	8,512	B	A
KH6CDO	3,400	B	A
KH6GMP	175,440	B	B
ZL3GA	52,200	B	B
YC3IZK	30,120	B	B
V73UX	451,704	B	C
ZL1ANJ	396,074	B	C
VK2XZ	259,700	B	C
ZF2NT	713,160	C	A
DU7/N7ET	78,384	C	A
VK4TT	172,416	C	B
DU1ODX	111,000	C	B
VK4XW	3,016	C	B
KH6ND	1,303,680	C	C
DU3NXE	19,304	C	C
KH0A	2,012,350	D	
VK4WIL	1,128,834	D	
WH7K	798,336	D	

South America

LP1F	1,343,816	A	B
LU5VV	752,972	A	B
YV7QP	148,352	A	B
CX5BW	1,964,476	A	C
PY0FF	1,356,272	A	C
LU2FA	1,319,472	A	C
LU3VD	175,208	B	A
LU1VK	55,242	B	A
LU5EVK	38,880	B	A
ZX2B (PY2MNL,op)	423,280	B	B
LU4DX	408,002	B	B
AY0N	281,154	B	B
LU1HF	670,026	B	C
LU1NDC	484,806	B	C
HK3AXY	86,240	B	C
LW5DR	61,752	C	A
PY2ELG	10,140	C	A
ZV8O	741,840	C	B
LU1EWL	461,648	C	B
CX9AU	451,572	C	B
PY2KC	983,412	C	C
P43E	689,564	C	C
PT2/KC2BAA	356,532	C	C
LP5F	1,794,774	D	
LU5FB	1,601,536	D	
L50DK	1,372,272	D	

DX station on this ballot was Fabio, I4UFH, who piloted CT8T to a total of 948,660 points. Emerging as the overall winner in the CW Only Single Operator High Power category was Tom, K1KI, who piloted J38DX to top honors with 2,045,440 points. Top W/VE finisher was Bill, W4ZV, who posted a final score of 1,433,952. Rounding out the overall champions were the multioperator entries of VP5K who took top DX honors with a score of 4,091,778 and KC1XX, which led the way for W/VE stations with a score of 3,181,272.

Congratulations go out to the following Single Operator stations that set new ARRL Division records in their categories: Mixed QRP – K0PC (Dakota), WA8RCN (Great Lakes), K0OU (Midwest), N6MU (Pacific), NA4CW (Southeastern), VE3KZ (Canada); Mixed Low – N0AT (Dakota), NA2U (Hudson), KT0K (Midwest), K1RO (New England); Mixed High – W2GG (Atlantic), W0SD (W0DB,op) (Dakota), ND5S (Great Lakes), KQ2M (New England), W4MYA (Roanoke); Phone QRP – N2HNH (Hudson), N1LW (New England), WR6WR (Pacific), N5FPW (Roanoke), VE3BUC (Canada); Phone Low – KK2ED (Atlantic), KU4BP (Roanoke), KT0DX (Rocky Mountain); CW QRP – WA8WV (Roanoke), K5AM (Rocky Mountain), K9AY (Southeastern), KG5U (West Gulf), VA3RU (Canada); CW Low – K4AO (Great Lakes), K1TO (Southeastern); CW High – K0SR (Dakota), W4ZV (Roanoke), N7DF (Rocky Mountain), W6EEN (N6RT,op) (Southwestern), and VO1MP (Canada). Kudos also to the following Multioperator stations that set new Division marks: K9NS (Central), KC1XX (New England), N6IG (Pacific) and W4KZ (Southeastern).

Once the ballots, I mean logs, had been checked, counted (and cleared of all chad) saw the Affiliated Club Competition another close race involving the great state of Florida come to the forefront. In the end, the Florida Contest Group edged the Frankford Radio Club by a mere 237K points—18,824,194 to 18,587,022 in the Medium category. The Unlimited Category competition saw three heavyweights contend for the nod in the top spot, with the Potomac Valley Radio Club emerging victorious. Keeping in mind the old adage from former US Speaker of the House Thomas "Tip" O'Neill that "all politics are local," a good battle was waged in the Local Category with the River City Contesters beating back the challenge of the Hudson Valley Contesters & DXers to win bragging rights.

Without national presidential elections to keep us occupied, the prospects of an active, enthusiastic 2001 ARRL Ten Meter Contest loom on the horizon. The experts say that we will probably be just past the peak of this sunspot cycle, but we should still enjoy good conditions for this year's contest—which is slated for December 15-16, 2001. Hope you are prepared to enjoy a good challenging race, and that the only chads you encounter are those you meet on the air.

SOAPBOX

What a surprise when Swaziland 3DA0AD called me! (4X1KS)... It was my 9th consecutive log entry in this contest and it is always fun!(7J1ABD)... So much activity on the band the illegal CBers finally started to take notice! (AA1CA)... This was a first-time family operation with AA1K (dad), AB1P (mom) and KB3FEE (son Adam), who had passed General 3 weeks before. He had best rate! (AA1K)... The CW frequencies were hopping when the band was open—a fun contest this year with great propagation! (AC5AA)... My first 10-meter contest. My 7 year old brother Justin was in the shack with me for about 4 hours. He's going to be a contester for sure! (AC7CF)... I didn't know it was possible to have this much fun. See you all in the next one (AE9B)... It's great to see 10 in such good shape. Worked all 48 "mainland" states + dc. (EI5DI)… Had a lot of fun and enjoyed myself trying to run stations "big-gun" style from a "little-pistol" station! (G0KRL)… First time in this contest, I was intending to just play but was enjoying it too much (H2G)… It was nice to say 'hi' to many friends on both CW and SSB for my last contest in 20th century. (JA8RWU)…

Enjoyed the contest, but propagation was strange (K0KY)... In heavy QRM if some hams would slow down a bit they would probably hear the "one they needed for a new multi or clean sweep." This is my best effort since 1980 and I had the most fun ever in a contest. (K0VX)…Surprised at how 10 can go short and long. Long live backscatter (K0WA)… My first contest entry ever and first time using contest software. Really got addicted to the contest by Saturday. Had a great time (K1ES)… Top of cycle, bottom of cycle, no matter. This contest is always fun! (K1TH)… Who said "life's too short for QRP"? (K4NR)… Great fun! Thanks for pulling my QRP signal from the ozone! (K7ED)… Fun contest. Being called by SU9ZZ in the early Sunday morning run was a real high point (K8AJS)… First ever Africa continent contact (KA6GMA)… Always a lot of fun. YL's can contest too! (KB4NPI)… Had a great time. First try at contesting with my own call. Thanks to my husband, WM3T, who relinquished the chair for me (KF4OKG)… Great contest that lets me sleep at night! (KI5DR)… Did anybody else have trouble working East Coast but no trouble working anything else (including Europe)? I actually had to use an antenna pointed away from the right coast to work them (KJ9C)… I love having ZS stations answer my CQ (KS7T)… Great contest! Took time off to upgrade to general on Saturday (N0YYO)… Great contest! Many courteous operators. That made for a very enjoyable time for all. (N1BCL)… Thank god for narrow filters! (N4QS)… This was supposed to be a part-time operation but condx were so good it was hard to resist a bigger effort (N9UC)… A renewed pleasure to participate. Strange propagation during this contest (ON6TJ)… G'day to all contesters whom I worked (VK4TT)… Great contest, now I'm a DX hound. (W0CBH)… Great to see the hams take the band back for the weekend! (W6QD)… Where are all these operators the rest of the time? (WB7CWB)… First contest that I have had to share the station with my XYL. Funny thing, I didn't mind giving up the chair for her! (WM3T)…

Scores

Scores are listed by DXCC Entities and ARRL/RAC Sections. Line scores list call sign, score, QSOs, multipliers, class (A = Mixed Mode, B = Phone only, C = CW only, D = Multioperator), and power (A = QRP, B = Low Power, C = High Power).

Africa

Swaziland

3DA0AD (LX1NO,op)	270	11	9	C	C

Tunisia

3V8BB (+packet)	280,686	1141	123	D	B

Morocco

CN8YR	195,040	530	92	C	B

Madeira Islands

CT3IA	560,960	1754	160	B	C

Canary Islands

EC8AUZ	72,600	484	75	B	B
EA8AD	65,570	415	79	B	B
EA8/DJ1OJ	367,536	806	114	C	B
EA8CN	25,956	103	63	C	B
EA8KL	85,902	417	103	C	C

Egypt

SU9ZZ	1,329,300	1980	210	A	B

Mali

TZ6DX	723,840	1393	130	C	C

South Africa

ZS6Z (JM1CAX,op)	2,932,224	3815	256	A	C
ZS6HO	1,804	41	22	B	C
ZS5RON	84,208	277	76	C	B
ZS6BRZ	459,160	1767	130	C	C

Asia

Israel

4Z5FW	30,342	204	39	A	B
4X1KS	261,942	644	149	A	C
4Z5FL/M	7,952	71	56	B	B
4Z5AX	195,312	627	78	C	B
4X/OK1DTP	219,128	559	98	C	C
4X1VF	48,132	191	63	C	C

Cyprus

H2G (5B4AGC,op)	1,920,604	2455	239	A	C
5B4AGN	680,504	1408	121	C	B

West Malaysia

9M2TO	288,704	815	104	A	B

Taiwan

BV7FF	200,960	628	80	C	C

China

B4R	549,524	1092	158	A	C

Kyrgyzstan

EX8MIO	103,600	700	74	B	B
EX2T	158,000	1000	79	B	C

Tajikistan

EY8MM	161,268	532	89	A	B

Turkmenistan

EZ3A (EZ8CW,op)	14,212	209	34	B	B

South Korea

DS5ACV	12,376	119	52	B	B
HL3GOB	10,584	108	49	B	C
HL5UOG	111,520	328	85	C	B
HL5AP	52,824	213	62	C	B

Thailand

HS4BPQ	38,016	264	36	C	B
E20RRW (+E21EIC)	341,360	726	136	D	B
HS0AC (+packet)	272,734	732	121	D	C

Japan

JA1YNE (JP1OGL,op)	326,360	614	164	A	A
JL1IHE	81,436	299	87	A	A
JA7ERJ	71,894	259	103	A	A
JA2UFH	57,354	203	79	A	A
7K2PBB	484	15	11	A	A
JN3PYQ	880,152	1332	217	A	B
JR4PMX	863,720	1177	220	A	B
JH8KYU	513,268	878	161	A	B
JF2VAX	350,754	644	159	A	B
JA0FVU	299,880	589	153	A	B
JF2QNM	288,000	598	150	A	B
JA1XRH	254,624	516	146	A	B
JE1REU	222,952	499	124	A	B
JR4GPA	193,766	473	139	A	B
7K4GUR	175,968	575	104	A	B
JF3IYW	149,408	388	116	A	B
JH5OXF	145,200	348	120	A	B
JA2BQX	97,232	313	118	A	B
JA2DHL	90,480	231	116	A	B
JH6OPP	86,600	267	100	A	B
JR4QZH	83,160	258	105	A	B
JA1BUI	76,558	240	101	A	B
JK2VOC	73,272	259	86	A	B
JE3UHV	49,842	182	71	A	B
JR1LQK	45,080	189	92	A	B
JA1OZK	37,440	180	65	A	B
JA1BBA	25,740	140	55	A	B
JA0IOF	21,168	114	56	A	B
JA1MXY	20,520	100	57	A	B
JF2SKV	15,548	108	46	A	B
JR2AWS	1,056	21	16	A	B
JA1AAT	910	24	13	A	B
JJ2TKX	770	23	11	A	B
JA8GTO	704	16	16	A	B
JA6AVT	468	16	13	A	B

JA2EAAB/1 224 8 8 A B
JA1XPU 144 8 8 A B
JH4UYB 1,423,240 1943 238 A C
JH5FXP 1,103,520 1693 209 A C
JA8RWU 953,040 1467 209 A C
JQ6NAW 728,676 1272 173 A C
JA0QWO 480,224 864 172 A C
JA2AXB 262,668 543 159 A C
7J1ABD 68,780 208 95 A C
JF1OPL 5,184 66 32 A C
JA3LFK 36,778 259 71 B A
JA1WC 12,480 130 48 B A
JH0BDK 235,170 1005 117 B B
JL3VUL 131,300 650 101 B B
JR3RIY 73,914 381 97 B B
JA1SWB 72,354 389 93 B B
JA1CQT 63,008 358 88 B B
JE2HCJ 58,240 320 91 B B
JA6EFT 52,896 304 87 B B
JH1CML 42,828 258 83 B B
JG2REJ 37,570 221 85 B B
JA2GHP 37,088 244 76 B B
JH1UUT 35,358 249 71 B B
JG4OOU 34,440 246 70 B B
JH2WHS 22,040 190 58 B B
JR7LVK 21,420 170 63 B B
JH6FTJ 20,862 171 61 B B
JA1AJK 20,280 169 60 B B
JE7DOT 19,608 172 57 B B
JA9TQY 18,644 158 59 B B
JA1KK 13,770 135 51 B B
JF2FIU 12,672 133 48 B B
JM1GHT 10,812 106 51 B B
JI8BUR 9,900 110 45 B B
JL2HUJ 9,202 107 43 B B
JJ3OOZ 8,064 96 42 B B
JH1RMH 7,462 91 41 B B
JA2BEY 6,106 71 43 B B
JK7DWD 5,986 73 41 B B
JA3WFQ 5,412 82 33 B B
JK1BII 2,700 54 25 B B
7N2UQC 2,646 63 21 B B
JG3DOR 2,610 45 29 B B
JQ1AHZ/2 1,974 47 21 B B
JG1GCO 1,736 31 28 B B
JE1GZB 1,716 39 22 B B
JA1EEG 952 28 17 B B
JR3CVJ 800 20 20 B B
JK8HOS 792 22 18 B B
JR1GGB 624 26 12 B B
JM3HYL 18 3 3 B B
JL2OGZ 2 1 1 B B
JH4UTP 288,408 1182 122 B C
JA2ZJW 231,072 996 116 B C
JR1MRG 21,350 175 61 B C
JR3CVO 19,880 140 71 B C
JN1BMX 17,784 156 57 B C
JG2CNZ 2,256 45 24 B C
JH2BTM 360 20 9 B C
JA2IU 106,140 305 87 C A
JA5CDL 15,840 99 40 C A
JH1NXU 12,848 73 44 C A
JA1XEM 7,936 64 31 C A
JM1OZP 672 14 12 C A
JH9VSF 436,632 967 113 C B
JF1SQC 415,152 961 108 C B
JI1RXQ 404,340 879 115 C B
JH1AZO 402,304 874 112 C B
JA1NLX 237,952 572 104 C B
JR7ZIT (JQ1UKK,op)
237,952 572 104 C B
JA8LN 225,960 537 105 C B
JR7OMD 223,392 538 104 C B
JI3BFC 221,200 553 100 C B
JA5APU 177,816 478 93 C B
JI1HFJ 165,120 430 96 C B
7L1ETP 165,064 440 94 C B
JR0BQD/1
154,440 429 90 C B
JJ1GQH 138,012 371 93 C B
JA5ATN 130,848 376 87 C B
JR2TMB 107,236 323 83 C B
JA3YPL (JJ3TBB,op)
101,824 345 74 C B
JH6CQY 99,528 286 87 C B
JA2CUS 98,496 305 81 C B
JJ1NZA 95,256 294 81 C B
JP1SRG 93,600 260 90 C B
JH1DYV 78,624 234 84 C B
JF1XUM/2 (JA2KKA,op)
75,920 264 73 C B
JN1NOP 75,308 283 67 C B
JA4ETH 73,800 246 75 C B
JK3GWT 71,240 274 65 C B
JL2LPX 68,912 236 73 C B
JH0NVX 68,400 228 75 C B
JA6BGA 60,756 183 83 C B
JM1NHZ 58,788 207 71 C B
JR4CAU 52,852 181 73 C B
JR3XZX 51,736 223 58 C B
JN1MSO 48,312 183 66 C B
JG3LGD 44,980 173 65 C B
JN2AMD 38,808 154 63 C B
JA7ARW 38,080 170 56 C B
JH3JYS 35,400 150 59 C B
JA7CPW 32,160 134 60 C B
JA4AQR 31,464 114 69 C B
JA1GS 30,240 120 63 C B
JR3NDM 25,992 114 57 C B
JA1EJD 24,592 106 58 C B
JG3NKP 23,320 106 55 C B
JA1HHU 22,540 115 49 C B
JF7GDF 20,140 95 53 C B
JA0BMS/1 18,952 103 46 C B
JA3BQC 17,072 97 44 C B
JA6CM 15,456 84 46 C B
JA6QDU 14,608 83 44 C B
JA1AZS 14,400 80 45 C B
JE5XIC 13,984 92 38 C B
JH1PXY 10,780 77 35 C B
JH1MTR 10,656 74 36 C B
JN7OJA 7,936 63 32 C B
JK1NSR 7,392 56 33 C B
JA1HG 6,608 59 28 C B
JA3MIB 4,992 48 26 C B
JF1QBN 4,340 35 31 C B
JA3RK 3,080 35 22 C B
JA3AVO 2,912 28 26 C B
JR0EFE 2,688 32 21 C B
JR2TRC 2,464 28 22 C B
JA9KUG 2,376 27 22 C B
JO1WIZ 2,304 36 16 C B
7K1EQG 2,160 30 18 C B
JP1ODJ 288 9 8 C B
JA7AXP 216 9 6 C B
JH3AIU 743,400 1475 126 C C
JG1ILF 740,460 1435 129 C C
JH1AEP 556,016 1177 118 C C
JI1NJC 168,544 458 92 C C
JA1HP 139,500 373 93 C C
JA3ARM 137,472 358 96 C C
JE2WWB 123,328 376 82 C C
JA1PS 99,324 267 93 C C
JA2VQF 72,708 219 83 C C
JS1PWV 70,104 254 69 C C
JA9CWJ 50,912 172 74 C C
JH7CJM 38,024 194 49 C C
JA8XQI 34,800 150 58 C C
JR6LLN 1,700 25 17 C C
JJ1JRH 1,380 23 15 C C
7L4IOU (+packet)
174,240 499 144 D B
JA1YQH (JI7GBI,JI7LZL,ops)
12,250 88 35 D B
JA6SRB (+packet)
12,056 79 44 D B
JJ3YBB (JA3PJL,JA3FHL,JA3OOK,
JH3FQF,JF3MOK,JF3EBO,JS3VEX,ops)
1,213,070 1831 235 D C
JR1ZTT (JK1JHU,JM4HHH, 7L4VXE,
JR0UUU, JR0XHL,ops)
883,446 1340 219 D C
JH4NMT (+packet)
198,696 485 102 D C
JA2YKA (+packet)
191,294 481 101 D C

Lebanon

OD5/OK1MU
1,226,136 2174 141 C C

Turkey

TA2RJ 44,280 362 60 A B
TA3J 2,838 43 33 B B
TA3YJ 24 4 3 B C
YM3NA (TA3BN,TA3ET,ops)
324,768 887 136 D B

Asiatic Russia

RK9KWB 180,576 444 132 A A
RZ9OU 325,248 906 112 A B
RK9CZO (RX9CAZ,op)
296,408 725 134 A B
RN9RZ 199,584 502 126 A B
RA0FN 103,104 319 96 A B
RZ0CQ 79,900 266 85 A B
UA0SJ 46,860 353 66 A B
UA9JQN 36,156 206 69 A B
RX9WN 15,678 82 67 A B
UA9MA 718,320 1519 164 A C
UA9CDV 702,468 1237 171 A C
RV9SV 431,936 1061 136 A C
UA9OW 367,840 952 121 A C
RW9QA 298,560 754 120 A C
UA9CI 212,500 484 125 A C
UA9OS 50,008 257 76 A C
RA0AM 42,588 228 78 A C
UA9KM 40,560 136 78 A C
RZ9IB 6,944 112 31 B A
UA0EX 32,940 270 61 B B
UA9ACJ 16,638 177 47 B B
RS0F (UA0FZ,op)
263,942 1109 119 B C
RW9HA 202,030 1135 89 B C
RV0AR 194,194 1001 97 B C
UA0SE 9,936 138 36 B C
UA9OUU 594 27 11 B C
UA0FEN 308 22 7 B C
RV9COI 16,592 122 34 C A
UA9OA 182,512 671 68 C B
RU9CI 105,600 352 75 C B
UA0ZS 91,136 356 64 C B
UA9AAP 73,632 312 59 C B
RA9FF 66,880 304 55 C B
UA9APA 66,240 240 69 C B
RU0AT 7,920 60 33 C B
UA9CDC 379,008 676 168 C C
RA0BA 177,056 503 88 C C
UA0AGI 27,192 206 33 C C
RA9DZ 7,216 82 22 C C
RZ9CX 5,508 51 27 C C
RK9JWJ (UA9JLZ,UA9JMA,
UA9JQN,ops)
43,188 354 61 D B
RZ9AWK (RZ9AE,RV9BB,ops)
132,374 370 121 D C

Kazakhstan

UP5P (UN5PR,op)
249,260 1210 103 B B
UP6F (UN7FZ,op)
204,204 663 77 C A
UN7PJO 110,500 427 65 C B
UN9LN 4,576 44 26 C B
UP4L (UN7LZ,op)
380,256 932 102 C C
UP0L (UN9LW,UN7LAN,ops)
1,308,096 2018 216 D C

Hong Kong

VR2BG 833,184 1578 132 C C

India

VU3DMP 7,400 100 37 B B

Cambodia

XU7AAP 43,216 223 73 A C

Europe

Croatia

9A2EY 183,400 406 131 A A
9A1CMS (9A5TR,9A5AHD,9A4RJ,ops)
427,632 741 177 A B
9A3CY 378 11 9 A B
9A2RD 325,464 1146 142 B B
9A3IJ 19,656 182 54 B B
9A0C (9A2HI,op)
190,376 449 106 C A
9A3VM 612,648 1206 127 C B
9M2JI (JK1AJX,op)
46,760 335 35 C B
9A6DM 793,936 1389 143 C C
9A1O (9A2OM,9A3IQ,9A5I,ops)
1,171,620 1627 230 D C
9A6ACY (+packet)
84,744 396 107 D C

Portugal

CT1FLD 10,998 78 39 A B
CT1EAT 156,636 688 114 B B
CT1FOH 8,000 80 50 B B
CT1CLR 2,600 50 26 B B
CT8T (I4UFH,op)
948,660 2910 163 B C
CT1AUO 129,470 605 107 B C
CT1BNW 20,400 170 60 B C
CT1AOZ 480 15 8 C B
CT1EWX 75,050 395 95 C C
CQ9T (CT3CD,CT3EE,CT3KN,ops)
1,443,962 2127 247 D C

Azores

CU2AF 73,098 393 93 B B

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DL1DQY 1,568 17 17 A A
DL1WA 306,950 594 175 A B
DL4FAY 202,176 541 156 A B
DL2JRM 114,114 380 77 A B
DL3ZAI 96,968 254 124 A B
DL1DWT 52,851 185 79 A B
DJ9FG 41,902 173 73 A B
DL6RDR 1,111,392 1319 272 A C
DJ5BV 1,040,430 1308 237 A C
DL1MFL 345,654 711 173 A C
DL5YM 73,584 219 84 A C
DL1DRD 7,644 52 42 A C
DL6DVU 1,610 31 23 A C
DH1SGS 125,856 552 114 B B
DF5PP 38,376 246 78 B B
DH5WB 38,332 259 74 B B
DH5AO 31,680 220 72 B B
DF2EY 3,780 70 27 B B
DL8SDI 3,286 53 31 B B
DJ6GO 2,852 46 31 B B
DA1PJ 2,400 50 24 B B
DJ0BX 352 16 11 B B
DJ6XB 32 4 4 B B
DF1LON 184,600 710 130 B C
DJ3HJ 100,580 470 107 B C
DL1PT 22,152 156 71 B C
DH9SBL 18,018 143 63 B C
DK3KD 86,508 243 89 C A
DL1LAW 36,064 184 49 C A
DM3XI 22,800 115 50 C A
DL7AXM 836 19 11 C A
DL1SAN 100,572 289 87 C B
DL5SVB 90,472 263 86 C B
DL2ZAV 90,464 257 88 C B
DJ5GG 87,576 246 89 C B
DJ9DZ 76,424 233 82 C B
DL3BRA 51,120 180 71 C B
DL2ANM 48,312 183 66 C B
DL5AUA 46,080 160 72 C B
DJ6TK 41,004 153 67 C B
DL8UAT 30,680 118 65 C B
DL4HG 30,160 145 52 C B
DL3DRN 25,520 110 58 C B
DL4JYT 15,824 92 43 C B
DL4KUG 12,400 62 50 C B
DF5RF 9,520 70 34 C B
DL5FCO 7,680 60 32 C B
DK5ZX 6,960 60 29 C B
DL5JQ 6,000 50 30 C B
DL7UXG 3,840 40 24 C B
DK8LV 719,040 1284 140 C C
DK3GI 288,900 535 135 C C
DL2MDU 183,232 409 112 C C
DL2GK 180,188 421 107 C C
DL1JF 166,872 409 102 C C
DL8KJ 165,172 347 119 C C
DL6UNF 156,560 380 103 C C
DK7ZT 132,800 332 100 C C
DJ2QV 118,560 312 95 C C
DJ2YE 63,000 225 70 C C
DL1YFF 62,444 233 67 C C
DL6KVA 54,064 218 62 C C
DL2RTJ 6,600 50 33 C C
DL5JS 4,200 50 21 C C
DL/KP4KE (+packet)
750,288 1096 232 D B
DF9ZP (+packet)
439,888 1447 152 D B
DL6RAI (+DL5RMH)
1,461,208 1778 269 D C
DF0NT (DH1TW,DL3SBI,ops)
1,220,184 1528 269 D C
DF4TD (+DL5GAC, DL1GFH, DL4GBA)
931,848 1450 246 D C

Spain

EA7GSU 75,544 300 76 A B
EA2CR 35,360 139 65 A B
EA1CS 20,664 126 41 A B
EA1DFP 936 26 18 A C
EA3GEG 222,456 806 138 B B
EA3FCQ 98,674 479 103 B B
EA1BIM 41,820 246 85 B B
EA2CCG 28,440 237 60 B B
EA3AAW 27,156 186 73 B B
EA4DBS 26,880 160 84 B B
EA2AVM 20,592 156 66 B B
EA5AAJ 19,760 152 65 B B
EA1ET 17,936 152 59 B B
EA5TN 14,800 100 74 B B
EA5BJG 14,140 101 70 B B
EA3AGB 11,200 100 56 B B
EA3ACA 5,494 67 41 B B
EA4YK 5,148 66 39 B B
EA3ARN 4,784 104 23 B B
EA4EMC 2,728 44 31 B B
EA7FRX 2,700 50 27 B B
EA3ESJ 1,872 39 24 B B
EA5DFV 355,320 1269 140 B C
EA3BIM 261,366 1029 127 B C
EA3SD 106,476 467 114 B C
EA4WF 95,460 645 74 B C
EA3DUZ 86,000 344 125 B C
EA1EXE 82,416 408 101 B C
EA7AAW 69,580 245 71 C A
EA5FID 431,976 878 123 C B
EA4TX 417,136 899 116 C B
EA4BWR 108,800 360 85 C B
EA1WX 86,304 248 87 C B
EA1AEH 74,160 309 60 C B
EA1DG 49,348 169 73 C B
EA4DAT 19,012 97 49 C B
EA4OA 8,296 61 34 C B
EA7TG 5,984 44 34 C B
EA1FBJ 3,956 43 23 C B
EA1DAV 841,784 1514 139 C C
EA5FV 781,488 1459 134 C C
EA3AJW 346,752 672 129 C C
EA3BOX 329,544 1194 138 C C
EA3KU 274,704 582 118 C C
EA1JE 111,320 605 92 C C
EA5WI 110,110 605 91 C C
EA5CMQ 29,600 200 74 C C
EA1HF 28,512 107 66 C C
EA1FBB 12,384 129 24 C C
ED7AJR (+packet)
302,232 771 98 D B
EA7GTF (+packet)
872,236 1456 202 D C
EA3CI (+packet)
193,032 766 126 D C
ED5ASF (+packet)
88,004 449 98 D C
EA5DFX (+packet)
18,328 158 58 D C

Balearic Islands

EA6LP 35,550 237 75 C C

Ireland

EI5DI 453,900 829 170 A B
EI8IC 527,924 856 191 A C
EI4DW 432,424 997 191 A C
EI9HQ 378,222 1058 169 A C
EI7GL 178,842 727 123 B B
EI8IR 317,696 1241 128 B C
EI8GS 315,826 1327 119 B C
EI4CF 65,508 318 103 B C
EI8GP 374,612 787 119 C B

Moldova

ER6A (ER1LW,op)
865,272 1439 186 A C
ER1OO 318,708 680 117 C B
ER1CW 101,232 342 74 C B

Estonia

ES1CN 92,200 296 100 A B
ES6CO 57,776 190 92 A B
ES6PZ 60,760 196 98 A C
ES7FU 51,324 217 78 A C
ES1ABR 58,604 322 91 B B
ES5CX 3,792 79 24 B B
ES1XT (ES1CR,ES1JL,ES1DG,ops)
74,560 233 80 D C

Belarus

EW5P (EW6DF,op)
194,712 600 133 A B
EU1SA 23,100 112 66 A C
EW1ABF 10,716 141 38 B B
EW1WZ 9,504 108 44 B B
EU1DX 342,108 732 117 C B
EU2MM 6,200 50 31 C B
EW8EW 462,196 971 119 C C
EW2AA 295,200 615 120 C C

France

F5MGD 49,104 200 99 A A
F5JY 300,460 587 166 A B
F5POJ 233,930 482 149 A B
F6KRK 165,880 365 130 A B
F5NLX 31,460 143 55 A B
F5TVG 15,480 67 60 A B
F5RZJ 1,070,650 1493 245 A C
F6GOX 66,898 218 83 A C
F5TDK 336,824 1186 142 B B
F8BJI 163,668 593 138 B B
F6KFI (F8CGL,op)
79,516 386 103 B B
F8PMO 62,212 302 103 B B
F5RRO 37,440 180 104 B B
F5MAA 33,210 205 81 B B
F6CLM 6,880 80 43 B B
F6CTT 775,656 2394 162 B C
F6KBI 620,768 2042 152 B C
F6KRC (F6GLH,op)
618,944 2036 152 B C
F5CWU 432,162 1431 151 B C
F5LJA 384,300 1282 150 B C
F5LBL 300,796 1082 139 B C
F6FQK 197,408 797 124 B C
F8NAN 156,000 780 100 B C
F6OIE 155,232 441 88 C A
F6FTB 92,064 275 84 C A
F6IIE 173,400 425 102 C B
F5LJY 158,772 393 101 C B
F5AKL 156,800 392 100 C B
F6AUS 136,340 401 85 C B
F6FJE 119,568 318 94 C B
F8PDR 71,424 248 72 C B
F5RBG 62,660 241 65 C B
F5NQL 53,592 203 66 C B
F5SGI 46,292 162 71 C B
F8BQQ 12,936 66 49 C B
F6DZD 7,700 55 35 C B
F5ICX 1,040 20 13 C B
F5BBD 142,926 581 123 C C
F6KAV 94,428 549 86 C C
F6IFY 82,904 241 86 C C
F6KLO (+packet)
1,357,376 1790 254 D C
F5IQA (+F6IOC,F6IRF,F6HYE,F6GRC)
1,353,492 1745 246 D C
F6KPQ (F5PHW,F6DZD,F6ETI,
F6EPY,ops)
1,024,650 1320 225 D C
F6KJX (+packet)
366,064 672 167 D C

England

G0OGN 104,218 269 107 A A
G3FNM 40,180 230 82 A A
G0WMW 178,398 357 153 A B
G3XTT 159,728 323 149 A B
G6QQ 96,084 259 102 A B
G4EDR 12,200 100 50 A B
M0SDX 857,090 1076 247 A C
G3MXH 404,064 876 184 A C
G3TMA 393,432 719 169 A C
G0AEV 344,960 1232 140 B B
G0KRL 194,120 844 115 B B
G4OJH 350,208 1216 144 B C
G0VSN 175,514 691 127 B C
G4EDG 238,336 532 112 C A
G3KKP 216,996 505 107 C B
G4IIY 133,960 394 85 C B
G3TJE 105,944 323 82 C B
M3C (G0VQR,op)
65,208 247 66 C B
G4ZME 54,464 184 74 C B
G3RSD 54,036 237 57 C B
G0MRH 13,760 86 40 C B
G5G 731,016 1278 143 C C
G0CKP 584,716 1067 137 C C
G0ORH 373,008 818 114 C C
G4BJM 123,136 416 74 C C
G3ZRJ 80,812 227 89 C C
M5W (G0MTN,M0COK,M0COP,ops)
271,776 682 149 D B
M4U (G0DVJ,M0CGE, G7HOW,
G4FTP,G4YJQ,ops)
142,004 388 131 D B
M5X (G0IVZ,G4TSH,ops)
1,886,738 1940 287 D C
GB2DX (+packet)
1,041,680 1503 232 D C

Northern Ireland

GI0KVQ 112,480 592 95 B B

Scotland

MM0BQI 64,152 213 99 A B
GM4ELV 6,290 85 37 B A
GM0JKF 29,896 202 74 B B
GM4UYZ 17,464 148 59 B B
GM4YXI 673,904 2188 154 B C
GM3CFS 214,652 520 103 C B
GM3POI 841,208 1481 142 C C
MM5BRI 63,920 376 85 C C

Guernsey

MU0FAL 12,920 85 38 C B

Wales

GW4BLE 352,000 1375 128 B C
GW3NJW 378,720 789 120 C B

Hungary

HA0GK 18,240 96 60 A A
HA6NF 1,419,024 1741 282 A C
HA5ORK 18,762 159 59 B A
HA6NL 422,240 754 140 C B
HA8ZC 98,072 299 82 C B
HA8DL 30,324 133 57 C B
HA7UG 648,048 1174 138 C C
HG9X (+packet)
110,760 355 78 D C

Switzerland

HB9HFM 25,048 110 62 A C
HB2DAX 46,480 140 83 C A
HB9AYZ 30,160 130 58 C A
HB9ARF 282,720 589 120 C B
HB9DCM 188,640 393 120 C B
HB2DOT (HB9DOT,op)
51,220 197 65 C B
HB9DDZ 27,144 117 58 C C
HB2HFN (HB9HFM,op)
8,232 49 42 C C

Italy

IK2BCP 15,600 91 75 A A
IC8POF 323,020 751 155 A B
IK3SSJ 130,548 443 129 A B
IK1YEE 32,390 165 79 A B
IK2QPR 429,856 900 202 A C
I2SVA 224,790 456 177 A C
IK2AOO 60,152 206 73 A C
IK2WYI 33,210 129 81 A C
IK4WMH 5,848 55 34 A C
IK5WGK 5,440 68 40 B A
IK2ZVU 344,660 811 190 B B
IT9HLR 232,562 961 121 B B
IV3BTY 156,240 630 124 B B
IT9ICS 145,418 799 91 B B
IZ5CML 103,378 405 127 B B
IK3STG 76,362 429 89 B B
IZ5ASZ 74,294 307 121 B B
I7FMN 40,404 273 74 B B
IZ1DFK 39,312 216 91 B B
IK2RPK 28,800 200 72 B B
IK5YJK 28,548 183 78 B B
IZ2ABN 18,864 131 72 B B
IK2WFN 9,894 97 51 B B
IK8IFW 8,080 101 40 B B
I2PJA 584,652 1762 166 B C
I4AVG 483,520 1511 160 B C
IK6GPZ 248,920 889 140 B C
IV3HAX 234,780 903 130 B C
IZ4DPV 103,032 486 106 B C
IK4QJM 79,296 413 96 B C
IK2LOL 77,430 435 89 B C
IK7YZF 5,670 63 45 B C
IK4UPB 714,816 1168 153 C B
IK7JWY 361,560 690 131 C B
IK2WXV 144,648 441 82 C B
IZ1ASP 57,120 204 70 C B
IK2RJK 50,864 187 68 C B
IZ1DFI 42,160 170 62 C B
IZ3ALF 373,592 697 134 C C
IK2AHB 278,928 596 117 C C
I1HJT 210,936 560 94 C C
IZ0AIS 200,448 520 96 C C
IK2WZV 198,522 807 123 C C
IK4MED 117,568 334 88 C C
IK4SXH 42,592 242 88 C C
IK1GNC 11,160 90 31 C C
IV3RCH (+IV3GHY,IV3RAV,IV3HYD,
IV3WQF) 312,352 735 172 D
IK4VET (+IK4RQJ,IK4XCL,IK4ZHH)
865,428 1356 246 D B
IT9GSF (+packet)
1,773,840 2281 285 D C
IK2EKY (+I2VXJ,I2EOW,IK2QEI,
IW2HAJ) 1,676,742 2078 291 D C
IK4MGP (+IK4SXJ)
1,099,824 1416 264 D C
I0TIC (+packet)
685,100 1186 221 D C
IV3ZUY (+packet)
77,406 399 97 D C
IK4QIB (+packet)
44,772 273 82 D C

Sardinia

IS0IGV 343,197 601 171 A B

Norway

LA6YEA 791,384 1007 253 A C
LA5JX 63,540 353 90 B B

Luxembourg

LX1JH 93,744 298 126 A B
LX1NW 54,648 297 92 B B
LX9SW 361,504 1264 143 B C

Lithuania

LY9A (LY3BA,op)
634,314 911 213 A B
LY2LA 74,800 220 100 A B
LY2GF 715,104 1115 191 A C
LY2IC 41,464 149 73 A C
LY2BBF 2,538 47 27 B B
LY2AT 92,520 257 90 C B
LY1DR 89,760 255 88 C B
LY2FF 13,580 97 35 C B
LY4AA 651,456 1132 144 C C

LY1DS 336,420 625 135 C C
LY2KM 131,100 345 95 C C
LY3BH 4,644 43 27 C C

Bulgaria

LZ1UQ 311,540 531 185 A A
LZ2000A 288,252 631 153 A B
LZ2MP 158,372 347 137 A B
LZ2UZ 95,904 248 108 A B
LZ1NG 746,648 1393 134 A C
LZ5AZ 43,660 295 74 B B
LZ2RS 151,240 399 95 C A
LZ2PL 444,600 855 130 C B
LZ2GS 245,520 396 155 C B
LZ1QH 116,656 317 92 C B
LZ1IQ 91,840 280 82 C B
LZ2DL 43,648 176 62 C B
LZ1QV 31,212 153 51 C B
LZ2RF 47,632 229 52 C C
LZ9W (LZ1ANA,LZ1FG,LZ1ZD, LZ4AX,ops)
973,370 1316 235 D C

Austria

OE8CIQ 303,858 559 153 A C
OE8SKQ 289,536 754 96 A C
OE5XWM (OE5CWL,op)
44,892 261 86 B B
OE1DIA 62,400 208 75 C B
OE3BCA 16,128 84 48 C B

Finland

OH1MM 9,912 74 42 A B
OH1NSJ 110 6 5 A B
OH1F 1,074,186 1377 249 A C
OH5NHI 12,960 144 45 B A
OH2BPA 21,600 200 54 B B
OH1MA 288,696 1046 138 B C
OH2RA 123,826 613 101 B C
OH2YL 8,976 67 34 C A
OH3IR 94,080 280 84 C B
OH6RC 55,404 171 81 C B
OH3KOK 36,792 126 73 C B
OH1UP 1,536 96 16 C B
OH6NIO 504,360 934 135 C C
OH6NJ 220,224 496 111 C C
OH1MDR 98,968 278 89 C C
OH5PT 5,336 46 29 C C

Czech Republic

OK2VWB 426,120 698 201 A B
OK1WMV 422,968 767 166 A B
OK1DCF 305,804 544 178 A B
OK1SI 248,920 536 140 A B
OK1DDO 245,848 460 158 A B
OK2ON 179,760 429 105 A B
OK1VBA 98,640 294 120 A B
OK1DVK 65,988 144 141 A B
OK2PBG 54,320 194 70 A B
OK1AUP 8,460 59 45 A B
OK1RI 1,786,400 2211 290 A C
OK2FD 910,470 1184 267 A C
OK1EP 834,452 1171 227 A C
OK1CW 233,856 438 174 A C
OK1AXB 154,350 325 147 A C
OK1DXW 149,600 358 136 A C
OK1GW 49,140 273 90 B A
OK2ZAW 41,168 248 83 B A
OK1AIJ 2,296 41 28 B A
OK2INW 124,608 529 118 B B
OK1AKF 17,010 135 63 B B
OK2EQ 16,958 139 61 B B
OK2RZ 559,200 1864 150 B C
OK2PYA 112,104 346 81 C A
OK1DMP 1,512 21 18 C A
OK1AES 231,812 487 119 C B
OK1GI 225,040 485 116 C B
OK2MBP 200,016 462 108 C B
OK2SJ 170,952 419 102 C B
OK2PAE 158,796 401 99 C B
OK1GS 120,848 332 91 C B
OK1ZP 120,840 318 95 C B
OK2SGY 119,700 315 95 C B
OK1AYY 94,860 279 85 C B
OK2BNC 78,840 219 90 C B
OK2VP 69,000 230 75 C B
OK2BUD 44,604 189 59 C B
OK1FCA 33,280 160 52 C B
OK1AOU 33,020 127 65 C B
OK2ZJ 31,080 210 74 C B
OK2XA 11,152 68 41 C B
OK2BHE 4,680 45 26 C B
OK1DRQ 635,256 1037 153 C C
OK2PDT 394,224 764 129 C C
OK2ZC 295,000 590 125 C C
OK1AOV 222,180 483 115 C C
OK2ABU 137,632 374 92 C C
OK2KLI 134,460 405 83 C C
OK1OX 38,688 186 52 C C
OK1DUT 15,520 97 40 C C
OK2KRT (OK2BUZ,OK2XA,OK2CVA, OK2DW,OK2VMC,OK2BJS,ops)
179,220 414 145 D C
OK1FJD (+packet)
5,016 47 38 D B
OL5Q (OK1FFU,OK1HRA,OK1VSL, ops) 870,300 1222 225 D C
OK1KZD (OK1DSF,OK1TO,ops)
169,200 450 94 D C

Slovakia

OM6T 703,948 938 217 A B
OM6AZ 283,856 509 157 A B
OM4DN 191,520 423 126 A B
OM7CA 74,760 223 84 A B
OM7RC 32,032 128 77 A B
OM1A 1,096,056 1648 234 A C
OM3NA 1,042,496 1512 224 A C
OM3KFF 463,704 834 139 A C
OM4KK 61,404 301 102 B B
OM3YK 26,718 183 73 B B
OM7YC 21,488 158 68 B B
OM8CA 3,800 100 19 B B
OM0TT A 154,336 364 106 C A
OM7PA 160,384 358 112 C B
OM2TB 83,996 253 83 C B
OM3CDZ 66,516 241 69 C B
OM4DA 54,432 216 63 C B
OM3BA 52,800 200 66 C B
OM7IR 42,160 155 68 C B
OM7VF 41,976 159 66 C B
OM7AG 30,316 143 53 C B

Belgium

ON7NQ 390,456 620 204 A B
ON4CHK 16,366 93 49 A B
ON5LL (ON6ZX,op)
165,208 772 107 B B
ON5GQ 114,704 536 107 B B
ON4AFU 417,804 941 111 C B
ON6CW 226,980 485 117 C B
ON4XG 207,360 480 108 C B
ON6TJ 122,108 343 89 C B
ON7SS 20,680 110 47 C B
OT0T (ON4WW,ON4UN,ops)
1,947,240 1842 324 D C
OT0H (+packet)
921,968 1289 232 D C
OT0Z (ON4CBJ,ON4AMX,ON7GB, ON4CJI,ON1DRZ,ops)
711,760 1366 217 D C
ON6BR (ON4CHL,ON4AYL,ON4AUP, ON4BCN,ON4AGY,ops)
236,160 960 123 D C

Faroe Islands

OY1CT 325,200 813 100 C C

Denmark

OZ6PI 27,216 111 68 A B
OZ1HXQ 343,808 1264 136 B C
OZ5EV 89,154 351 127 B C
OZ5UR 53,592 203 66 C B
OZ4FF 4,560 38 30 C B
OZ1AA 520,520 1001 130 C C
OZ3ZW 293,716 757 97 C C
OZ5MJ 19,200 100 48 C C
OZ4OC 2,160 36 15 C C
OZ5BAL (OZ1JTE,OZ6AFZ,OZ1JSH, ops) 97,000 500 97 D C

Netherlandsx

PA3ELD 234,768 506 146 A A
PA3AAV 111,872 292 128 A B
PA3FDO 463,722 863 183 A C
PI4TUE 284,832 711 172 A C
PA0KHS 90,064 433 104 B B
PA0JNH 38,400 240 80 B B
PA3GZC 12,264 146 42 B B
PA9JJ 4,410 63 35 B B
PA0KDM 3,420 57 30 B B
PA0RBO 2,378 41 29 B B
PA1GS 810 27 15 B B
PA3DVA 234 13 9 B B
PA3FQA 358,708 1114 161 B C
PA0IJM 340,600 1300 131 B C
PA3EMN 134,688 366 92 C B
PA3ARM 128,820 348 95 C B
PA3BGQ 80,300 275 73 C B
PA0JED 59,640 213 70 C B
PA3BFH 51,968 224 58 C B
PA1MRK 21,280 132 40 C B
PA3HBX 3,864 46 21 C B
PA5WT 216,432 500 108 C C
PA3ADJ 91,512 279 82 C C
PI4RCK (PE1PZF,PA3GZM,PA4MRS, PA3GPC,PB9FN,NL-12818,PA5TG, PB5DX,PB7CW,ops)
241,384 528 143 D B
PA1AW (+packet)
214,676 451 119 D B
PI4COM (+packet)
1,501,760 1704 304 D C
PA1TT (+PA3FGI,PA2AWU)
683,316 1346 222 D C

Slovenia

S52LW 423,738 662 189 A B
S51W 404,544 760 172 A B
S51TA 1,265,544 1683 243 A C
S55A 544,128 882 192 A C
S56A 318,756 492 202 A C
S57M 196,812 693 142 B B
S57AW 696,960 1981 176 B C
S51DX 380,100 1267 150 B C
S52ZW 375,900 1251 150 B C
S57U 303,360 633 120 C B
S53AU 16,320 85 48 C B
S59A 965,328 1548 156 C C
S58A 868,552 1439 151 C C
S51B 470,136 1031 114 C C
S50C (+packet)
1,886,820 2131 295 D C
S55M (S55M,S59KW,IK3UNA,S57C, S51EQ,ops)
1,711,952 2179 274 D C
S53S (S50B,S57IIO,S57NDT,S57LWG, IV3IPS,ops)
166,212 729 114 D C

Sweden

SM6DER 264,060 495 163 A B
SM3EAE 29,046 160 47 A B
SM0BDS 16,536 83 53 A B
7S2E (SM2DMU,op)
662,962 986 211 A C
SM6WQB 169,024 373 139 A C
SM7LZQ 1,792 32 28 A C
8S7A (SM7CRW,op)
194,304 759 128 B B
8S7K 37,064 226 82 B B
SM4AIO 26,622 153 87 B B
SM0MCE 4,368 91 24 B B
SK0UX 368,804 1346 137 B C
SM0FM 5,840 73 40 B C
SM7CZC 3,024 28 27 C A
SM5G (SM5JBM,op)
230,208 528 109 C B
SM3AVW 132,888 339 98 C B
SM3X (SM3CVM,op)
121,520 310 98 C B
SM7EH 81,340 245 83 C B
SM2LIY 38,760 170 57 C B
7S5Q (SM5COP,op)
29,520 165 45 C B
SM6N (SM6NJK,op)
21,996 117 47 C B
8S5A (SM5AJV,op)
21,504 112 48 C B
SM2T (SM2EZT,op)
239,760 540 111 C C
SM7BHM 109,504 307 116 C C
8S5X (SM5HJZ,op)
75,492 233 81 C C
SM7BVO 41,472 162 64 C C
SL2ZA (+SM2UJW,SM2VHD)
42,250 225 65 D B
SM7BJW (+packet)
20,976 114 46 D B

Poland

SP2EWQ 108,750 275 125 A A
SP3GTS 301,368 501 174 A B
SQ9HYM 284,598 583 163 A B
SP3LWP 121,568 353 116 A B
SP5ANX 119,504 317 97 A B
SP5BB 18,480 151 60 A B
SP5ATO 116,688 286 102 A C
SP2FWC 83,168 226 92 A C
SP9CP 21,420 170 63 B A
SP9QMP 244,408 892 137 B B
SP5LCC 78,440 370 106 B B
SP9KJT 29,346 219 67 B B
SN4AAZ 22,304 164 68 B B
SQ9LR 19,720 145 68 B B
SQ4CUX 14,616 126 58 B B
SP9HZF 14,364 126 57 B B
SP8UZJ 13,908 122 57 B B
SQ8FEW 8,448 96 44 B B
SP3BVI 6,020 70 43 B B
SP9MCU 4,620 70 33 B B
SQ9ZM 1,364 31 22 B B
SP7LHX 666 37 9 B B
SP7DQR 18 3 3 B B
SP6IXF 357,840 1278 140 B C
SP8GWI 177,862 787 113 B C
SP6CZ 149,668 527 142 B C
SQ8JLF 4,200 60 35 B C
SP7FDV 3,000 50 30 B C
SP4GFG 86,016 224 96 C A
SP9TTG 10,400 52 50 C A
SN8A (SP8AQA,op)
3,648 38 24 C A
SP4OIC 70,288 191 92 C B
SQ2HEB 58,712 179 82 C B
SP3HC 56,548 211 67 C B
SP3XR 26,260 101 65 C B
SP3AZO 13,244 77 43 C B
SP5BEN 9,512 58 41 C B
SP9KOV (SP9EMI,op)
2,640 33 20 C B
3Z3LPR 2,552 29 22 C B
SP7GIQ 888,592 1502 148 C C
SP6HTQ 14,042 119 59 C C
HF9KRT (SP9ADU, +op)
83,072 236 88 D B
SN0KAO (SP9LAS,SP9JZT,SQ9CAQ, SQ9DJG,ops)
66,248 255 98 D B
SP6AXW (+SP9IXF)
392 14 14 D B
SP2000S (SP5UAF,SP5HGB,SQ5EBL, SP5TAT,SQ5BPM,ops)
608,336 987 197 D C
SQ4NR (+packet)
39,884 169 59 D C

Greece

SV1CIB 116,928 424 116 A B
SV1DZB 32,376 228 71 A A
SV1DKL 111,296 592 94 B B
SV2AEL 18,328 158 58 B B

Bosnia-Herzegovina

T94KW 2,142 51 21 B A
T92M 123,888 348 89 C B
T99W 599,700 2000 150 C C

Iceland

TF3IRA (TF3AO,TF3HP,ops)
294,930 1305 113 D C

Corsica

TK5EP 2,273,020 2790 290 A C

Kaliningrad

RN2FA 55,980 180 90 A B
UA2CZ 41,464 142 73 C B
RW2F (UA2FB,UA2FF,UA2FM,ops)
1,446,016 1718 286 D C

European Russia

RX3AEX 46,998 234 63 A A
RU3QW 641,650 1085 205 A B
UA4FER 508,444 1018 158 A B
RA3AD 453,872 1040 152 A B
RU3FM 295,392 532 181 A B
RN4WA 288,876 663 133 A B
RW3DU 203,320 531 130 A B
RW3TN 202,908 553 111 A B
RA3OU 146,812 510 127 A B
RA3AF 135,660 466 102 A B
UA3QU 61,766 236 89 A B
RA1AR 9,000 79 36 A B
UA3LBE 2,484 52 23 A B
UA6LP 1,850 29 25 A B
RW3DY 986 17 17 A B
RW1ZA 1,068,608 1346 236 A C
RK6CZ 994,520 1374 230 A C
RD4M 900,340 1413 218 A C
RX3ARI 850,542 1147 231 A C
UA6LJ 720,232 1179 197 A C
UA4RC 416,888 817 164 A C
UA1AJW 183,306 509 137 A C
RU3DX 83,136 323 96 A C
RU6MM 73,600 209 100 A C
RZ1AZ 55,000 198 100 A C
RX3DTN 31,878 162 63 A C
RA3DGH 19,608 228 43 B A
RA3WA 111,512 524 106 B B
RA3DNC 80,256 456 88 B B
RN3RQ 75,050 395 95 B B
RZ1AK 57,904 376 77 B B
UA3LHL 22,554 179 63 B B
U1BA 19,600 196 50 B B
UA4LBK 18,612 198 47 B B
RZ1AU 13,588 158 43 B B
RA6AZ 4,130 60 35 B B
UA4LCH 270,000 1080 125 B C
UA3BL 207,690 903 115 B C
RA3ANI 69,160 455 76 B C
RZ6HX 60,444 219 69 C A
UA3AD 3,960 45 22 C A
RZ4FA 319,000 725 110 C B
RM3C 263,112 577 114 C B
UA4RF 187,060 499 94 C B
RN6AL 175,152 492 89 C B
RZ3DX 144,840 426 85 C B
RA4CTR 134,368 494 68 C B
UA1ZZ 90,160 322 70 C B
RN6CF 86,976 302 72 C B
RV4LM 64,588 241 67 C B
UA6AK 42,640 163 65 C B
RW4CW 38,912 128 76 C B
RW1AI 31,842 166 61 C B
RK3DK 25,480 182 35 C B
RK9AD 22,816 124 46 C B
RU3RQ 8,680 70 31 C B
UA1CIO 6,936 51 34 C B
RM4W 1,038,162 1612 213 C C
RU4CO 387,960 915 106 C C
UA3TU 355,736 839 106 C C
UA3RV 264,792 649 102 C C
RK6BZ 55,680 290 48 C C
RK3AD 20,240 111 46 C C
RV1CC 19,764 82 61 C C
RK3EWA (UA3EKG,RZ3EC,RZ3EM, ops) 200,032 523 133 D
UA1ANA (+packet)
139,446 391 127 D B
RM6A (+packet)
1,889,694 2224 277 D C
RU1A (RV1AW, RA1ACJ, RN1AM, logger) 1,395,034 1670 269 D C
RL3A (RA3ATX,RK3AW,RV3BA, UA3ASZ,UA3QDX,ops)
1,249,752 1621 258 D C
RI3A (+packet)
867,150 1468 205 D C

Ukraine

UT1QW 631,182 1101 177 A B
UT5JDS 276,176 505 164 A B
US0KW 260,100 498 153 A B
UY5TE 156,032 415 106 A B
EM3J (UU2JZ,op)
1,407,648 1816 248 A C
UT2IY 949,922 1454 211 A C
UX5UO 163,800 360 140 A C
UU0JC 55,800 203 100 A C
UZ5U 234,740 970 121 B B
UU4JO 86,592 492 88 B B
UR5QBB 43,168 304 71 B B
US5WDL 34,034 221 77 B B
UT4MW 252 18 7 B B
UV7D (UR5DDZ,op)
349,962 1241 141 B C
UR6MX 161,998 757 107 B C
UT7QL 119,544 586 102 B C
UT7MD 6,240 80 39 B C
UT1YV 1,840 46 20 B C
US3QW 70,744 239 74 C A
UR9MM 26,400 150 44 C A
UT0H 8,640 60 36 C A
UT2QQ 345,876 779 111 C B
UT2IO 339,760 685 124 C B
UR4QOS 254,800 650 98 C B
UT1FA 190,120 485 98 C B
UR6QS 145,236 399 91 C B
UX7MY 133,760 418 80 C B
UT5PW 90,472 263 86 C B
UX5EF 75,392 248 76 C B
UT7QF 74,256 238 78 C B
UT1IA 8,024 59 34 C B
UT5UGR 338,496 688 123 C C
UR7IA 120,600 403 75 C C
UR2E (UR7EO,US6EX,UR5EFJ, US6ET,ops)
408,028 847 166 D B
UX2FXX (UT9FJ,UR5FJF,UT7FO,ops)
593,460 915 210 D C

Latvia

YL2NN 96,800 310 100 A B
YL7A 556,404 915 199 A C
YL2LY 329,300 560 178 A C
YL7C 140,346 621 113 B B
YL3BZ 7,128 81 44 B B
YL2NK 36,456 148 62 C B
YL3DW 473,144 833 142 C C

Romania

YO4AAC 20,828 142 41 A A
YO2BEH 297,756 600 162 A B
YO7BGA 194,824 413 142 A B
YO3APJ 181,662 410 137 A B
YO9HP 24,752 110 68 A B
YO8MI 52,206 222 77 A C
YO9GZU 16,160 202 40 B A
YO3III 1,978 43 23 B A
YO7LBX 28,860 195 74 B C
YO6EX 255,360 573 114 C B
YO9FJW 201,144 493 102 C B
YR8A (YO8RXP,op)
196,560 473 105 C B
YO6BHN 170,640 395 108 C B
YO3ND 148,896 376 99 C B
YO8FR 104,192 296 88 C B
YO4ZF 53,088 171 79 C B
YO8DHD 51,336 208 62 C B
YO6BMC 46,964 199 59 C B
YO2ARV 39,984 119 84 C B
YO4GJS 31,104 216 36 C B
YO5OEF 32,550 217 75 C C

Yugoslavia

YU1AU 904,264 1277 218 A B
YU7CB 792,792 1144 234 A B
4N1N (YT1CA,op)
293,930 759 119 A B
YU7KMN (YU7RW,op)
131,610 400 123 A B
YU1KK 1,217,680 1606 248 A C
YU7BW 228,152 497 158 A C
YU1KN 93,526 463 101 B A
YU1JW 258,336 1104 117 B B
YU7QL 152,928 648 118 B B
YU1BO 9,828 117 42 B B
YT7A 361,790 1265 143 B C
YU1KR 202,776 497 102 C A
YU4WU 318,128 674 118 C B
YU1QW 217,560 518 105 C B
YU7GW 205,792 472 109 C B
4N1FG 96,104 293 82 C B
YU1BL 77,736 237 82 C B
YU1PJ 60 5 3 C B
YZ9A (YU1NW,op)
767,296 1262 152 C C
YU1OL 543,864 1054 129 C C
YU7SF 216,256 495 109 C C
YU7KM 156,180 411 95 C C
YV4A (YV5IVB,YV5AMH,OH0XX,ops)
2,917,488 3764 266 D C
YZ7A (+packet)
1,033,760 1430 208 D C

Macedonia

Z32AF 117,602 287 127 A A
Z31GX 56,416 180 86 A A

North America

Barbados

8P6EX 234,080 1064 110 B C
8P9Z (K3KG, K4FJ,op)
3,496,262 3860 311 D C

Cuba

CO2II 281,736 1204 117 B B

Saint Martin

FS/W2JJ (+WB2BHC, W5GJ, K2KJI, W2AZK, KF2HC, WA2VUN,ops)
1,428,724 2008 209 D B

Panama

HP1AC 288,144 664 108 C B

Grenada

J37K 598,000 2300 130 B C
J38DX (K1KI,op)
2,045,440 3197 160 C C

Alaska

KL7RA 1,039,232 1881 184 A C
KL7FAP 96,960 606 80 B B
WL7UQ 48,160 344 70 B B
KL2A 792,880 1871 106 C C

Virgin Islands

WP2Z (AG8L,op)
2,301,240 2841 254 A B
KP2/WA0QII 286,790 1205 119 B A
NP2B 75,296 362 104 B A
KP2/N3IQ (ND3F,op)
791,120 1593 124 C A
KP2D (KP2N,NP2E,NP2W,NP2DJ, WP2S,ops) 374,392 1766 106 D B

Puerto Rico

WP4LNY 15,400 140 55 B B
WP3GG 12,528 36 174 B B
NP3OD 5,360 67 40 B B
NP3G 1,080,624 1916 141 C B
NP4Z (NP3A,op)
1,148,712 2081 138 C C

Costa Rica

TI1Z (TI4ZM,op)
285,360 1161 123 B B

Antigua & Barbuda

V26JT 717,824 1402 128 C B

Belize

V31QI (+packet)
1,700,748 2517 238 D C

St.Kitts & Nevis

V44NK 327,408 1436 114 B C

Turks & Caicos Islands

VP5Q (KT0F,N0WBV,ops)
1,949,706 2891 229 D B
VP5K (AA5B, K9DX, K9RS, ops)
4,091,778 4655 309 D C
VP5DX (N4KE,NU4Y,ops)
3,128,488 3972 292 D C

Oceania

Philippines

4D68LER 8,512 152 28 B A
DU1DX 17,730 197 45 B B
DU7/N7ET
78,384 284 69 C A
DU1ODX 111,000 375 74 C B
DU3NXE 19,304 127 38 C C

Mariana Islands

KH0A (JF1MIA,JH7IMX,JE2PCY,ops)
2,012,350 2783 241 D C

Hawaii

KH6CDO 3,400 34 50 B A
KH6GMP 175,440 1020 86 B B
KH6/N6TCZ 300 15 10 B B
KH6ND 1,303,680 2328 140 C C
KH6IN (KH6B,AH7A,NH6DR, WH6LU,ops) 71,540 265 98 D B
WH7K (+packet)
798,336 1698 168 D C

Marshall Islands

V73UX 451,704 1915 118 B C

Australia

VK2APK 405,888 683 168 A B
VK5GN 382,400 714 160 A C
VK2XZ 259,700 1225 106 B C
VK4DMP 58,032 312 93 B C
VK4TT 172,416 450 96 C B
VK4XW 3,016 29 26 C B
VK4WIL (VK4DX,VK4DZ,VK4FJ, VK4SN,ops)
1,128,834 1579 217 D C

Indonesia

YB1KOR 62,426 201 91 A B
YC0LOW 36,358 180 53 A B
YC3IZK 30,120 251 60 B B

New Zealand

ZF2AH 931,588 1596 194 A C
ZL3GA 52,200 290 90 B B
ZL1TM 80 8 5 B B
ZL1ANJ 396,074 1489 133 B C
ZF2NT 713,160 1415 126 C A

South America

Chile

CE4PBB 19,630 150 65 A B
3G3R (+packet)
1,217,088 2111 144 D C

Bolivia

CP1FF 13,000 130 50 B C

Uruguay

CX5BW 1,964,476 2547 262 A C
CX1ACV 246,380 970 127 B B
CV5H 160,072 748 107 B B
CX3CCC 52,020 306 85 B C
CX9AU 451,572 933 121 C B
CX1JJ 293,584 620 118 C B
CX1CCC (+packet)
973,090 1457 215 D C

Ecuador

HC2BEV (UA4WAE,op)
104,120 497 95 A B
HC2SL 979,808 1828 134 A C

Colombia

HK3AXY 86,240 561 77 B C

Argentina

LP1F 1,343,816 1862 241 A B
LU5VV 752,972 1444 218 A B
LU2FA 1,319,472 1944 238 A C
LU7YS 1,302,336 1736 266 A C
LU5FA 1,072,560 1456 218 A C
LU3VD 175,208 724 121 B A
LU1VK 55,242 297 93 B A
LU5EVK 38,880 270 72 B A
LU2HNP 32,980 194 85 B A

LU3DR 22,620 145 78 B A
LU1HN 4,556 67 34 B A
LU4DX 408,002 1351 151 B B
AY0N 281,154 997 141 B B
LW7EIC 274,512 1032 133 B B
LU8ADX 226,446 803 141 B B
LU1FF 185,244 718 129 B B
LU2EC 173,508 761 114 B B
LW7EGO 78,492 422 93 B B
LU5JKG 3,850 55 35 B B
LW1HDJ 2,704 52 26 B B
LU1HF 670,026 2085 159 B C
LU1NDC 484,806 1649 147 B C
LW5DR 61,752 186 83 C A
LU1EWL 461,648 945 122 C B
LU8DW 303,800 775 98 C B
LW7DQW 16,644 146 57 C C
LT5Y (LU1YU,LU2VDQ,ops)
113,678 503 113 D B
LP5F (+packet)
1,794,774 2402 267 D C
LU5FB (LU1FGE,LU1FAM,LU6FQD, LU3FQG,LU2FT,LU1FKR, LU3FZW,ops)
1,601,536 2431 256 D C
L50DK (LU5EML,LU7DW,LW7EKM, LW9EUJ,ops)
1,372,272 1726 253 D C
LU4AA (LU1BCE,LU3DW,LU7AWP, LW9DAH,ops)
1,101,926 1440 217 D C
LU1FC (+packet)
952,020 1417 205 D C
LU5FF (+packet)
426,650 748 161 D C
LU9APM (+packet)
124,968 287 127 D C

Peru

4T4AHW (OA4AHW,op)
52,190 307 85 B C

Aruba

P43E 689,564 2573 134 C C
P43JB 181,152 444 102 C C

Brazil

PV8AZ 1,634 26 19 A B
PY0FF 1,356,272 2291 148 A C
PP1CZ 308,688 654 118 A C
ZX2B (PY2MNL,op)
423,280 1480 143 B B
ZX4Y 158,208 618 128 B B
PY2LED 64,672 344 94 B B
PS5S 49,104 264 93 B B
PU2MXU 47,160 262 90 B B
PY5JO 32,224 212 76 B B
PR7AR 306 17 9 B B
PR7FN 33,110 215 77 B C
PY7ZY 13,800 115 60 B C
PR7SM 13,442 143 47 B C
PY2ELG 10,140 65 39 C A
ZV8O 741,840 1407 132 C B
PY4FQ 81,780 236 87 C B
PQ7Q (PY7IQ,op)
50,148 200 63 C B
ZW2Z (PY2ZI,op)
18,240 120 38 C B
PY2KC 983,412 2775 177 C C
PT2/KC2BAA 356,532 801 111 C C
PY3AU 158,368 392 101 C C
PY5HSD 83,844 411 102 C C
ZV8I (PV8IG,op)
14,160 120 59 C C
PY7BEL 3,306 57 29 C C
PU7ENW 1,540 35 22 C C
PX2W (PY2YU,PY2NDX,ops)
1,097,008 1409 253 D B
PY3MHZ 1,158,936 1591 258 D C
PY2GEC (PY2TO,PY2GY,PY2ESZ, PR8RZJ,PU2WFP,N5TN,op)
393,696 1367 144 D C
PY2ZR (+PU2NYV)
138,370 392 137 D C
PY2NY (+PU2VYT)
666,250 1110 205 D C
PT7ZAA (+packet)
27,974 129 71 D C

Venezuela

YV7QP 148,352 360 122 A B
YW3B 128,952 597 108 B B

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Connecticut

K7SZ 24,528 125 56 A A
NM1K 19,352 112 59 A A
K1RO 1,476,984 2006 246 A B
W3EP 1,159,152 1519 248 A B
W1EQ 404,376 855 166 A B
W1TS 73,402 224 107 A B
N1BSV 40,404 259 78 A B
W1IVB 21,420 152 51 A B
NX1Q 17,568 99 61 A B
KQ2M 2,747,164 3279 287 A C
N8WXQ 207,350 548 143 A C
KA1VMG 105,640 275 139 A C
N1NQD 104,160 307 140 A C
NT1N 74,080 234 80 A C
WV1M 34,030 163 83 A C
N1JEO 22,320 186 60 B A
KA1JVR 139,496 658 106 B B
KA1SVK 100,254 539 93 B B
W1AZT 33,440 209 80 B B
N1OPO 9,520 119 40 B B
W1CTN 3,920 70 28 B B
K1MKF 2,320 40 29 B B
W1AMF 264,320 1120 118 B C
W1AW (N1ND,op)
141,812 587 121 B C
N4QX (@W1INF)
5,376 47 28 C A
W1TJL (+K1EBY)
956,768 1339 232 D B
N1MM (+N1IX)
1,577,372 2017 278 D C
K1JN (+packet)
166,586 420 163 D C
N4XR (+packet)
62,712 201 78 D C

Eastern Massachusetts

WG1Z 116,012 299 97 A A
K1HT 420,336 681 189 A B
W1VIV 371,312 638 184 A B
N3KCJ 251,542 573 173 A B
K1WCC 44,398 281 79 A B
NF1A 9,540 70 45 A B
N1IR 333,940 1415 118 B B
N1SV 303,134 1157 131 B B
K1YA 110,400 575 96 B B
W1DYJ 84,376 398 106 B B
KA1AMR 82,752 431 96 B B
W1MMM 72,420 355 102 B B
WA1VIL 50,034 269 93 B B
WA1OFR 49,896 308 81 B B
KY1B 33,490 197 85 B B
KD1EA 5,904 72 41 B B
W1PLK 5,472 76 36 B B
N1IBC 300,356 1262 119 B C
W1RY 251,056 923 136 B C
K1RC 59,616 207 72 C A
W1WAI 661,436 1207 137 C B
K1DC 524,680 1009 130 C B
WZ1K 227,156 521 109 C B
K1EP 163,072 392 104 C B
W1TW 70,632 218 81 C B
K5MA 299,712 669 112 C C
K1TH 70,956 219 81 C C
KV1J (+packet)
101,436 474 107 D B
AA1ON (+W1RH,KC1YR)
2,035,638 2283 297 D C
K2C (N1RR,WM1K,N1LH,N1XS, N2PGD,ops)
1,393,800 1784 276 D C
AG1C (+KA1VWX)
82,840 250 109 D C

Maine

W1LIC 218,808 615 108 A B
AA1KS 84,328 312 83 A B
N1LW 66,640 340 98 B A
W1CEK 240 12 10 B A
AB1R 153,866 719 107 B B
WN1OTV 43,500 290 75 B B
KL7JR/1 1,806 43 21 B B
W4ZGR 4,368 42 26 C A
K1PQS 361,552 764 118 C B
KD1OG 42,432 156 68 C B
AC1O 250,852 527 119 C C
W1GF 165,064 439 94 C C

New Hampshire

KG1V 246,960 531 147 A B
W1XZ 70,434 228 91 A B
K1PDY 17,020 106 74 A B
KC1F 278,472 605 164 A C
W1DAD 160 10 8 B A
K1MOM 3,744 52 36 B B
WW1O 98 7 7 B B
AA1CA 216,140 505 107 C A
AA1QD 1,976 26 19 C A
WE1USA 911,232 1582 144 C B
W1END 169,600 424 100 C B
KR1G 933,984 1693 138 C C
K1BV 145,512 423 86 C C
WA1ZYX (+packet)
60,196 298 101 D B
AE1D (+KB1FQC)
53,044 200 89 D B
KC1XX (+K1GQ,KM3T)
3,181,272 3690 318 D C

Rhode Island

K1VSJ 109,668 308 111 A B
N1NK 27,224 159 83 A B
KS1J 348,432 587 183 A C
N1HRA 207,878 840 121 A C
W1RFQ 93,264 223 134 A C
W1VHF (W1JJM,op)
7,488 117 32 B A
N1OLF 186,500 746 125 B B
K4IJK 3,328 52 32 B B
K1AM 857,308 2713 158 B C
W1OP 330,528 1252 132 B C
AB1BX 157,036 473 83 C B

Vermont

KA1BSZ 3,952 58 26 A B
K1CN 310,800 760 168 A C
N1BQ 58,968 324 91 B A
N1BCL 56,376 324 87 B B
K1LPS 54,880 245 112 B B
W1SJ 675,410 2329 145 B C
N2FF 531,216 1953 136 B C
K1IB 136,080 374 90 C B
AA1SU 125,736 338 93 C B
K1KD 6,322 55 29 C B
K2LE 964,540 1663 145 C C
W1PU (AA1SU,N1ZUK,K1HD,ops)
678,948 1738 174 D C

Western Massachusetts

K5ZD 463,736 836 196 A C
KX1X 165,564 657 126 B B
W1KT 123,664 472 131 B B
WT1S 107,100 526 102 B B
N1FUS 101,124 477 106 B B
KB1EAA 79,734 411 97 B B
N1ISB 38,376 246 78 B B
N1VOR 34,604 211 82 B B
N1MHH 26,108 214 61 B B
K1VUT 873,600 1560 140 C B
AE1B 233,604 567 103 C B
AA1JD (+packet)
1,461,796 2091 238 D C
WA1ZUH (+packet)
105,600 257 150 D C
NC1I (+N1SR) 89,880 420 107 D C

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Eastern New York

W2WB 80,276 261 122 A A
W2ENY 299,290 682 173 A B
WD2K 20,492 110 47 A B
W2GDJ 295,152 757 172 A C
AB2IW 61,060 355 86 B A
WA2YEI 11,500 115 50 B B
N2HTT 10,290 105 49 B B
KB2SSS 4,864 76 32 B B
N2LLS 330 15 11 B B
N2MTG 204 17 6 B B
WT4Q 384,468 1393 138 B C
K2ZZ 102,240 426 120 B C
N3EMF 94,752 423 112 B C
W2FCA 48,694 251 97 B C
N2XG 16,896 192 44 B C
K2DW 124,600 350 89 C A
N2JJ 104,580 315 83 C A
K2UF 396,552 806 123 C B
WW3K 101,104 284 89 C B
AI2L 62,656 178 88 C B
K2SX 614,856 1122 137 C C
NA2M 153,088 368 104 C C
N2IX (+N2IW, W2RE)
2,041,170 2407 285 D C
K2UG (KE2DX,WA2JQK,N2BZP,ops)
1,062,396 1720 243 D C
W2MU (@W2XL)(KD2NE,N2MCI, WA2MMX,W2XL,ops)
842,240 1165 224 D C
KE2I (+logger)
102,612 281 102 D C

NYC-Long Island

WB2AMU
180,880 358 140 A A
WB2BXO 159,294 373 139 A B
KZ2G 45,696 164 84 A B
KA2TGI/N 21,948 212 62 A B
AG3G 21,692 244 58 A B
W2HLI 213,256 437 122 A C
NY6DX 88,000 400 110 B A
KS2G 269,276 1142 118 B B
WA2CNV 194,956 799 122 B B
WB2KHO 159,512 628 127 B B
WB2ZTH 111,132 441 126 B B
NI2P 65,424 348 94 B B
KC2FYJ 60,552 348 87 B B
WA2OJK 41,500 250 83 B B
K2TGW 32,550 217 75 B B
N2LEB 17,664 138 64 B B
KF2XF 16,166 137 59 B B
K2DUX 13,860 105 66 B B
NY2M 9,682 103 47 B B
KB2HAN 4,590 51 45 B B
KA6WBQ 2,352 49 24 B B
W2BZH 10,486 107 49 B C
WO2N 232,288 488 119 C A
WA2VZ 281,316 589 119 C B
KA2D 191,632 406 118 C B
WB2ART 103,488 294 88 C B
N2NI 101,160 284 90 C B
WW2G 23,580 130 45 C B
WB2DLA 21,168 98 54 C B
N2GC 538,112 1051 128 C C
N1XL (+K2GH)
382,416 798 186 D B
K2QMF (+packet)
110,160 269 108 D B
WB2JSM 30,464 218 68 D B
N2UN (+N8UM)
578,934 912 213 D C

Northern New Jersey

N2NH 179,690 426 151 A A
NA2U 1,189,524 1498 238 A B
K2WA 424,270 731 203 A B
NO2T 117,856 263 116 A B
WA2LXE 76,908 325 102 A B
N2LK 62,116 177 113 A B
K2YLH 61,938 246 93 A B
KO2OK 61,846 287 107 A B
NA2AA 421,414 647 217 A C
W2LE 99,840 247 104 A C
N2NHN 112,860 513 110 B A
KD2UF 109,868 454 121 B A
NO2EL 110,946 451 123 B B
WT2S 53,934 303 89 B B
WI2W 53,508 294 91 B B
K2ZB 50,964 274 93 B B
K2AMI 27,720 198 70 B B
N2OPJ 10,208 116 44 B B
KA2NJP 6,880 86 40 B B
WA2QHL 3,888 54 36 B B
KC2GDQ 3,782 61 31 B B
AB2FA 2,112 33 32 B B
WA2BKN 320 20 8 B B
N2EOC 434,826 1479 147 B C
KF2TI 62,328 318 98 B C
N2CFD 28,656 199 72 B C
K2JT 40,080 167 60 C A
W2TO 16,472 70 58 C A
N2NO 11,232 72 39 C A
W2JEK 6,960 58 30 C A
W2BVH 2,880 36 20 C A
W2CVW 156,384 362 108 C B
N2KJM 115,388 317 91 C B
WK2M 13,320 74 45 C B
WA2VYA 564,984 1060 133 C C
N2ED (+packet)
446,182 683 187 D B
N2NT (N2NC,W2RQ)
2,316,328 2903 266 D C
AB2BK (+W2PKJ,KC2FQZ)
713,996 1145 206 D C
AB2DE (+packet)
599,500 1079 218 D C
K2BM (+packet)
408,300 694 150 D C

Northern New York

N2JNZ 8,464 71 46 A A
NS2P 166,616 706 118 B B
WB2BAU 6,000 100 30 B B
WZ2T 24,000 120 50 C A

Southern New Jersey

K1JT 295,920 523 180 A B
WA2IAU 19,110 124 65 A B
KE2OI 24,320 190 64 B A
KK2ED 359,452 1231 146 B B
N1IBM 119,712 516 116 B B
W2LEC 28,832 212 68 B B
KD2IN 15,120 135 56 B B
W2RDS 8,910 99 45 B B
N3XOF 5,040 60 42 B B
WB2FXE/T 32 4 4 B B
NQ3N 326,390 1283 127 B C
N2RF 69,452 358 97 B C
N2BHS 112 8 7 B C
N2CQ 119,504 308 97 C A
K2HPV 48,800 199 61 C A
WK2G 458,400 955 120 C B
WA2VQV 135,960 329 103 C B
K2UR 133,952 322 104 C B
K2MK 72,960 228 80 C B
K2PT 34,020 135 63 C B
W5KI 28,272 114 62 C B
W2JSF 16,464 84 49 C B
W2YC (+packet)
677,692 854 241 D
N2XYZ (+logger)
22,750 175 65 D B
N1RK (+packet)
77,292 339 114 D C
N2SCJ (+packet)
34,604 211 82 D C

Western New York

N2XT 125,580 326 130 A A
WW2P 282,240 545 168 A B
K2CF 154,842 372 131 A B
N2UM 123,216 290 136 A B
K2YEH 72,924 207 118 A B
KM2L 58,158 198 81 A B
KB2EOQ 56,034 224 99 A B
N2PP 1,562,904 2195 252 A C
N2WK 846,176 1150 248 A C
W2FUI 97,552 268 91 A C
K2UA 47,784 186 66 A C
N2DCH 13,442 98 14 A C
KG2AU 216,750 868 125 B B
N2USB 79,664 383 104 B B
N2OPW 65,664 342 96 B B
KB2SGX 27,872 208 67 B B
N2LQQ 24,564 178 69 B B
KF2VX 16,562 169 49 B B
KF2SJ 11,554 109 53 B B
K2QR 6,612 87 38 B B
WA2SRY 5,120 80 32 B B
AF2K 250,728 1011 124 B C
NA2A 172,800 800 108 B C
WR2V 80,850 385 105 B C
K2SM 180,940 415 109 C A
W2TX 220,880 502 110 C B
K2CS 166,920 390 107 C B
WA2EYA 162,408 402 101 C B
K2CDJ 123,968 298 104 C B
KA2MGE 55,112 166 83 C B
NE2T 36,540 145 63 C B
N2CU 670,052 1319 127 C C
W2EZ 132,060 355 93 C C
W2KA (+packet)
280,416 511 184 D B
W2RW (+WB2KAO)
266,484 603 159 D B
W2GO (+packet)
155,064 384 142 D B
WB2DVU (+packet)
3,840 40 24 D B
N2MG (+packet)
171,808 413 104 D C

3

Delaware

W3PP 365,928 633 193 A A
NY3C 312,912 698 159 A B
N8NA 100,880 261 104 A B
N3KW 492,480 1083 190 A C
N3ELK 61,000 244 125 B A
N3WYM 46,008 284 81 B B
AA1K (+AB1P,KB3FEE)
1,992,768 2323 291 D C

Eastern Pennsylvania

WT3W 288,144 549 174 A A
WA3IIA 172,730 383 115 A B
W3KM 75,900 202 110 A B
K3XR 74,366 290 103 A B
W3SSS 33,210 162 81 A B
KC3LE 3,364 58 29 A B
W3AP 121,040 317 136 A C
K3PP 45,120 200 80 A C
W3MF 5,100 74 30 A C
WC3A 40 5 4 B A
N3KYZ 41,250 275 75 B B
N3RM 31,992 172 93 B B
N3KGC 4,732 91 26 B B
N3EVZ 986 29 17 B B
N3JIX 220 11 10 B B
K3MGT 56,056 308 91 B C
N3RN 54,648 207 66 C A
NE3I 34,224 138 62 C A
W3BGN 405,592 838 121 C B
WB2FFY 161,976 397 102 C B
KC3Q 119,040 310 96 C B
WY3T 112,504 287 98 C B
N3CZB 3,016 29 26 C B
W8IJ 4 1 1 C B
K3SV 776,044 1481 131 C C
AA3TT 746,648 1393 134 C C
AA3B 616,200 1183 130 C C
K3TEJ 589,140 1091 135 C C
K3QIA 172,656 396 109 C C
K3MD 56,640 240 59 C C
K3VA 23,760 110 54 C C
N3RD (+packet)
266,960 461 188 D B
KB3MM (+packet)
80,224 218 92 D B
KS3F (+packet)
1,524,420 2133 270 D C
K3WW (+packet)
1,498,420 1977 245 D C
N3ED (+packet)
921,344 1106 244 D C
K3II (+packet)
604,304 844 211 D C
K3NZ (+packet)
66,312 205 108 D C

Maryland-DC

W3UJ 489,636 728 203 A B
W3IP 337,902 639 199 A B
WK3I 313,116 498 194 A B
W3DQ 268,800 551 175 A B
K3MLA 174,376 457 142 A B
WB8YYY 118,530 322 135 A B
WD3A 116,688 318 132 A B
W3ERU 24,000 120 50 A B
AC3P 8,360 88 44 A B
W2GG 2,430,912 3367 264 A C
K3ZO 1,918,848 2335 263 A C
K2PLF 1,512,620 1960 265 A C
WX3B 1,314,720 1975 249 A C
N3OC 1,298,742 1806 233 A C
K3NM 728,768 1696 193 A C
N4GG 80,640 238 112 A C
K3MM 40,796 177 62 A C
W3FQE 28,060 131 61 A C
W3OU 15,876 104 63 A C
N3RER 10,250 125 41 B A
K3DNE 152,776 676 113 B B
K3IRV 72,922 361 101 B B
WA3EEE 71,198 367 97 B B
N3FNE 59,630 335 89 B B
KA3TCC 34,720 217 80 B B
N3WIZ 28,860 195 74 B B
N3EYB 26,358 191 69 B B
KB3EOF 9,416 107 44 B B
W3LEO 9,212 98 47 B B
K3CTR 7,392 84 44 B B
K4CGY 350,280 1260 139 B C
N3FX 119,712 516 116 B C
4U1WB (AJ3M,op)
69,888 547 64 B C
K3GV 64,584 351 92 B C
W3SMD 9,672 93 52 B C
K3TW 131,532 339 97 C A
WD3P 7,504 67 28 C A
W3CB 385,560 765 126 C B
KE3VV 318,420 575 183 C B
W3CP 201,600 450 112 C B
W3DAD 25,652 121 53 C B
WN3C 23,760 110 54 C B
N3OA 23,280 97 60 C B
N3HBX 470,184 1781 132 C C
W3GN 431,256 906 119 C C
N3UM 251,196 519 121 C C
W3AZ 149,520 356 105 C C
W3HVQ 11,928 71 42 C C
N3II (+packet)
347,108 528 214 D B
W3FT (N3DUH,N3WD,KB3FOX, N3JYO,W3VP,W3QYL,AA3SB, KB1PE,N3ZNU,ops)
170,816 551 136 D B
WB4ZHO (+packet)
159,600 395 114 D B
N3RR (+packet)
1,921,544 2301 284 D C
WR3L (+K3FT,KA3TUL,AA3SC)
1,350,440 1624 245 D C
W3LJ (+K3NCO,W3IDT,K8DH)
394,284 646 206 D C
K3IXD (+packet)
198,770 715 139 D C
W3UL (+packet)
175,696 370 158 D C
K3DI (+packet)
122,094 279 133 D C
N3KTV (+packet)
40,608 216 94 D C

Western Pennsylvania

K3DE 163,372 1034 158 A B
N3UE 36,792 252 73 A B
WB3DPS 16,530 130 57 A B
WB3EPE 29,808 138 92 A C
WA3GQU 6,512 83 37 A C
WB0IWG 47,700 318 75 B A
WN3VAW 30,400 190 80 B B
N3MBC 12,690 135 47 B B
N3WAV 10,716 114 47 B B
KM3J 10,584 108 49 B C
K3RYA 2,016 56 18 B C
AA3GM 8,528 82 26 C A
WA3SES 362,848 782 116 C B
N3IXR 351,288 697 126 C B
NB4J 81,008 244 83 C B
K3FH 59,072 208 71 C B
K3JHT 7,128 66 27 C B
AD8J 85,320 270 79 C C

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Alabama

W4DEC 290,550 565 149 A A
WX4I 30,046 115 83 A C
KU4BL 80,520 366 110 B B
WB4WXE 20,640 129 80 B B
K4WXX 8,888 101 44 B B
AG4W 95,612 451 106 B C
KU0C 464,400 900 129 C B
KC3QU 144,708 389 93 C C
K4WI (+KV4T,KS4YT)
1,155,584 1874 256 D C
KK4TE (+KD4TT,KF4LAB)
525,892 1800 146 D C
WA4AL (+packet)
30,780 190 81 D C

Georgia

K6EID 298,752 551 192 A B
AA4GA 71,928 232 111 A B
K4YJ 68,002 199 121 A B
KF4MHY 23,532 159 74 A B
K4BAI 1,092,200 1300 254 A C
K4FYM 5,394 87 31 A C
KU4HN 6,240 78 40 B A
KT4Q 128,712 519 124 B B
W4LLP 65,340 330 99 B B
WB4SQ 51,870 285 91 B B
WA4TII 437,360 1420 154 B C
W4RA 45,790 241 95 B C
K9AY 276,860 545 127 C A
W4ATL 278,400 580 120 C B
W4AN (W4PA,op)
1,331,712 2177 153 C C
K4SB (+packet)
467,526 711 201 D B
W4KZ (+packet)
2,344,216 2467 287 D C
W4WA (+K4IDX)
582,528 869 246 D C

Kentucky

KG4BIG 100,570 251 113 A B
K4IU 103,416 294 124 A C
W4LC 100,044 397 126 B B
KB4NPI 96,792 444 109 B B
KN4IV 37,730 245 77 B B
KG4IOT 23,808 186 64 B B
KG4C 22,010 155 71 B B
K4AO 670,208 1232 136 C B
KM4FO 56,848 187 76 C B
N4GN 924,352 1616 143 C C
K4WW (+K4UOL)
207,936 644 144 D B

North Carolina

N4YDU 661,932 934 227 A B
WB4MSG 157,336 360 142 A B
W4IDX 3,480 39 29 A B
N4ZC (K4ZA,op)
1,742,034 2109 259 A C
N5FPW 50,676 309 82 B A
KG4DZU 2,660 70 19 B A
KU4BP 241,564 922 131 B B
K4TMC 41,064 236 87 B B
K4YYR 26,896 164 82 B B
K4WES 11,904 124 48 B B
N4TL 1,024 32 16 B B
W4WTB 114,450 525 109 B C
W4YDY 32,648 212 77 B C
N4UH 12,650 115 55 B C
K2SST 5,472 72 38 B C
N4MO 564,432 1069 132 C B

WJ9B 369,904 758 122 C B
K3KO 321,408 648 124 C B
WD4IFN 44,240 158 70 C B
KB4ONY/N 32,508 129 63 C B
AE4EC 18,988 99 47 C B
W4ZV 1,433,952 2300 156 C C
N4AF 939,036 1597 147 C C
K8YC (+packet) 8,550 74 57 D B
K4MA (+KI7WX)
1,995,834 2324 289 D C
W3GQ (+packet)
104,340 307 141 D C

Northern Florida

KB4N 538,200 1007 180 A B
W0EBA 218,672 447 158 A B
WR4K 128,874 294 141 A B
NF4A 108,120 351 85 A B
WB4IHI 41,480 170 61 A B
NN4DF 39,144 159 84 A B
N4EK 290,360 665 170 A C
N4KW 108,300 278 114 A C
W7QF 55,056 217 93 A C
KQ4YY 43,740 270 81 B A
N4OX 418,112 1504 139 B B
K4UCF (KD4RWN,op)
277,704 1102 126 B B
WA4VIY 73,730 365 101 B B
N4LIO 63,874 293 109 B B
KD4EZC 30,912 184 84 B B
KG4BWK 7,400 74 50 B B
KG4ACF 144,072 620 116 B C
W4UEA 41,924 223 94 B C
NO4S 522,288 1054 124 C B
KN4Y 259,200 600 108 C B
W3TMZ 31,040 97 80 C C

South Carolina

KS4YX 160,650 419 153 A B
AA4V 281,952 525 176 A C
KT4FP 40,228 226 89 B B
W2JJC 437,320 1683 130 B C
AF4OX 479,500 959 125 C B
K0COP 74,412 239 78 C B
WA8OJR 21,412 101 53 C B
AA4NN 382,592 854 112 C C
W4CGR (+W4OPW)
3,180 53 30 D B

Southern Florida

NA4CW 491,062 834 187 A A
W4UM 702,572 1369 229 A B
AE4RO 586,576 784 244 A B
W4OV 380,100 652 175 A B
W4/YV5DTA 254,312 453 166 A B
K1PJ 109,668 327 114 A B
N4RP 15,900 81 51 A B
AD4TR 1,126,740 2161 211 A C
AA4HP 623,658 1222 217 A C
W4SAA 505,050 781 195 A C
WB2QLP 390,548 983 163 A C
KS4GW 49,280 308 80 B A
K1EY 100,920 435 116 B B
KK4TA 91,080 506 90 B B
WT5L 69,540 366 95 B B
K4RFK 66,048 344 96 B B
KE4JZT 51,120 284 90 B B
KD4ZKX 25,550 175 73 B B
NJ2F 304,128 1188 128 B C
WA3TIH 95,760 456 105 B C
N8PR 34,170 255 67 B C
W4FMS 168,780 485 87 C A
W4/NP3X 337,484 708 119 C B
WA4RRB 12,996 57 57 C B
N4BP 1,271,808 2209 144 C C
K1PT 1,076,896 1844 146 C C
WB3ANE (+W3AZD)
244,998 1047 117 D C

Tennessee

W4DAN 133,100 334 121 A B
K0EJ 109,312 299 122 A B
N4USG 48,620 193 85 A B
WD4PTJ/N 44,936 246 82 A B
KI4I 9,360 68 45 A B
KW4JS 3,720 40 30 A B
N4JN 3,220 64 23 A B
K4RO 483,840 818 180 A C
W4RK 185,440 392 152 A C
AG4V 4,524 44 39 A C
W4TD 89,232 429 104 B A
NY4T 211,736 796 133 B B
NQ4U 148,840 610 122 B B
W1ADE 50,490 297 85 B B
KV4DT 27,456 208 66 B B
KS2X 23,400 180 65 B B
KA4LBD 15,120 108 70 B B
WB9BSH 12,204 113 54 B B
KG4CKX 7,482 87 43 B B
W4MEA 3,180 53 30 B B
WA4JA/M 2,484 46 27 B B
KG4GCO 1,386 33 21 B B
K3CQ 50 5 5 B B
KE4OAR 65,824 374 88 B C
N4ZI 668,160 1305 128 C B
NA4K 321,600 670 120 C B
W4TYU 73,440 216 85 C B
W4HZD 55,008 191 72 C B
W4YGE 30,780 135 57 C B
WD4OHD 24,168 114 53 C B
W4AUI 23,484 103 57 C B
N4ZZ 1,114,260 1896 147 C C
W9WI 704,304 1314 134 C C
K4AMC 675,684 1233 137 C C
K4LTA 432,540 801 135 C C
W4NZ 226,800 523 108 C C
N4IR 144,360 401 90 C C
AA3VA 97,000 250 97 C C
W4BSF (W4NPL,WA4WMN,W5EDQ,
ops) 35,096 152 82 D B
W4CAT (K1KY,KC4QFR,KG4ENY,ops)
667,542 1276 213 D C
KB4KC (AA0BA,K4DIT,KB4KA,
N4ZCO,ops)
459,550 1167 175 D C
N4VV (+packet)
434,750 722 185 D C
AA4NU (+N4JN)
387,368 860 164 D C

Virginia

WA4JUK 319,638 555 167 A B
K4UK 277,550 481 175 A B
NC4S 213,192 476 162 A B
NA4MA 141,750 402 135 A B
WM3T 122,720 321 130 A B
WB4DNL 62,400 207 100 A B
KF4OKG 20,502 150 67 A B
K5VG 1,188 40 18 A B
K3MZ 210 10 7 A B
W4MYA 2,087,784 2566 271 A C
N4ZJ 1,219,180 1986 235 A C
N4MM 521,700 720 235 A C
W2YE 364,560 747 186 A C
K4SO 164,160 488 120 A C
W4IF 63,504 190 84 A C
KC4ATU 5,616 78 36 B A
AD4DG 100,280 460 109 B B
K4PZC 64,800 360 90 B B
N3GMW 40,672 248 82 B B
N4DEN 33,540 195 86 B B
N2VA 23,450 175 67 B B
KG4CGR 19,712 154 64 B B
K1SO 9,996 98 51 B B
WA4FXX 8,480 106 40 B B
WE4V 616 22 14 B B
KG4KCY 307,440 1098 140 B C
K4YT 121,044 462 131 B C
AA4D 12,272 118 52 B C
N4ROA 145,248 356 132 C A
W4YE 321,360 618 130 C B
WA4QDM 228,028 523 109 C B
K4ORD 186,192 431 108 C B
N4PD 122,544 333 92 C B
N4OHE 56,376 162 87 C B
W4VC 40,824 162 63 C B
N3TG 29,380 113 65 C B
W4SNH 27,328 112 61 C B
W3ULS/N 4,928 56 22 C B
WU4G 437,976 867 126 C C
W4AU 278,388 627 111 C C
W4HJ 74,228 241 77 C C
K6ETM 16,200 81 50 C C
KB4OLM (+packet)
341,836 728 187 D B
WK4Y (+packet)
140,220 249 190 D B
K4JA (+W4JVN,K9GY)
2,186,574 2462 291 D C
K1SE (+K4EU,K4ZW)
2,129,930 2368 289 D C
W3IO (+packet)
292,500 585 125 D C
KO4MR (+packet)
55,800 180 155 D C

West Central Florida

N4IG 794,200 1124 220 A B
WC4E 2,472,804 2986 298 A C
K4LQ 553,020 813 195 A C
K9HUY 244,512 950 108 A C
N4PK 171,884 886 97 B B
K8FK 58,368 304 96 B B
W4GAC 46,980 270 87 B B
N2EGO 12,200 122 50 B B
W4JN 4,588 62 37 B B
K4XS 1,003,932 3180 158 B C
K1TO 1,094,616 1984 138 C B
WD4AHZ 745,740 1381 135 C B
K4OJ 905,960 1595 142 C C
K5KG 694,792 1306 133 C C
N4DL (+packet)
578,860 989 206 D B
K4FB (+packet)
252,852 1108 114 D B
N4TO (+packet)
1,816,920 2446 252 D C

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Arkansas

KG5RM 388,332 886 161 A B
W5RL 73,600 300 80 A C
KB5EKX 78,684 474 83 B B
W5YM (AC5RR,op)
373,968 1485 126 B C
K5LG 620,312 1166 133 C C
W5HUQ 260,348 671 97 C C
K5GO (K5ALU,KM5G,N5DX)
1,849,752 2073 276 D C

Louisiana

N8OO 1,915,812 2553 243 A C
W5WMU 1,595,632 2231 248 A C
AA5FJ 291,868 1114 131 B B

Mississippi

AC5SU 196,416 527 124 A B
W5KK 54,988 214 118 A B
KB5IXI 19,024 138 58 A B
W5XX 1,157,216 1664 232 A C
N3AWS 14,592 192 38 B A
K2FF 2,496 48 26 B A
N5KGY 133,994 563 119 B B
KD5CKP 40,000 250 80 B B
KJ5RC 7,380 90 41 B B
KE5K 177,408 704 126 B C
K5MDX (+WQ5L,W5UE,YY5OIA,N5FG)
1,550,848 2021 233 D C

New Mexico

KD5JAA 27,170 136 65 A B
NA5S 216,840 372 195 A C
KC5LFV 25,080 209 60 B A
W5GZ 86,940 414 105 B B
KE5BL 81,508 574 71 B B
K5AM 278,200 650 107 C A
W5YZ 322,848 684 118 C B
N5UL 146,680 386 95 C B
N7DF 923,020 1736 133 C C
K7UP 689,248 1446 119 C C
KK5OV (+KB5ZSK)
39,600 214 75 D B

North Texas

WA8ZBT 211,344 625 119 A A
WD5K 1,004,850 1497 231 A B
K5ZO 774,480 1178 210 A B
W5CWQ 250,264 530 164 A B
WK5K 165,496 395 137 A B
N1CC 123,600 385 120 A B
K5CEM 32,430 165 69 A B
N5JR 864,892 1327 238 A C
N5JL 65,570 415 79 B B
N5YXO 24,080 215 56 B B
KC5OZT 1,190 35 17 B B
N5TY 94,620 498 95 B C
W5FO 22,428 178 63 B C
KB5KYO 56,232 198 71 C A
K5RX 45,008 194 58 C A
W5RYA 42,120 195 54 C A
K4NR 40,000 200 50 C A
WQ5W 711,808 1328 134 C B
KE5C 461,616 979 118 C B
W4YOK 126,360 351 90 C B
W5EIJ 46,248 141 82 C B
N5CHA 42,504 160 66 C B
W3DYA 15,200 100 38 C B
N5PO 501,696 937 134 C C
N5RG 82,336 248 83 C C
N8SM 72,960 228 80 C C
N5YA (WX0B,N5UM,ops)
2,233,246 2579 293 D C

Oklahoma

W5ZT 9,202 104 43 A B
N5OHL 91,800 400 100 A C
W5OSU 155,324 754 103 B B
KD5DLL 48,594 273 89 B B
N5ZQ 10,512 146 36 B B
WA9AFM/5 10,010 143 35 B B
KB5BOB 377,856 1476 128 B C
N5RXF 106,856 703 76 B C
N5WL 20,880 174 30 C A
W5TM (W5AO,op)
796,960 1465 136 C B
K5KA 492,000 984 125 C B
K0CIE 49,386 233 53 C B
N5NA 405,600 845 120 C C

South Texas

N5XT 229,090 464 155 A B
K0GEO 163,476 490 114 A B
KK5VN 29,394 213 69 A B
KF5ND 12,460 96 35 A B
K5XR (W5ASP,op)
1,167,696 1764 216 A C
K5NZ 976,048 1403 212 A C
N5WU 9,944 113 44 B A
WD5FGZ 5,880 84 35 B A
N5XD 241,098 843 143 B B
WA5IYX 83,664 498 84 B B
KK5MI 66,468 382 87 B B
KI5DR 52,700 310 85 B B
N5AFV 47,112 302 78 B B
WB0YEA 43,240 235 92 B B
KC5QIG 28,564 194 74 B B
KN5Z 25,498 209 61 B B
KD5EUV 2,400 50 24 B B
W5PR 1,035,702 3177 163 B C
K5TR 955,638 3123 153 B C
W5UFA 73,710 351 105 B C
N5DD 46,280 260 89 B C
AC5ZS 7,380 90 41 B C
KG5U 402,144 852 118 C A
N5TW 169,320 498 85 C A
W0OY (N6ZZ,op)
327,228 737 111 C B
AF5Z 254,016 588 108 C B
AC5AA 145,200 363 100 C B
NO5W 100,500 335 75 C B
N5AF 4,032 42 24 C B
AD5Q 961,848 1648 146 C C
K5PI 927,360 1680 138 C C
W5BBR 18,144 81 56 C C
NX5M (+N5XJ,KB5ZFO,K1OJ)
2,433,380 3055 289 D C
W5SB (+W5IDX,KK5LD)
757,530 1861 171 D C
K5IUA (+packet)
287,956 483 193 D C
N5MT (+packet)
259,740 608 185 D C

West Texas

N5RZ 576,268 1361 154 A C
N5ZC 19,992 196 51 B B
KE5OG 197,964 1053 94 B C
N5DO 684,472 1277 134 C B
NZ5M 20,664 123 42 C B
WB5QLR 10,752 192 56 C B

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East Bay

W6GKF 481,584 901 158 A B
KG6HM 39,026 156 79 A B
K6LW 92,916 534 87 B B
K6BIR 25,878 227 57 B B
KE6QR 21,632 169 64 B B
KS6Q 12,314 131 47 B B
KQ6TW 2,064 43 24 B B
KF5UVB 1,610 35 23 B B
W6GPM 140,012 493 71 C B
K6SRZ 49,044 183 67 C B
KI6OY 13,968 95 36 C B

Los Angeles

NK6A 30,228 131 66 A A
K6RO 938,956 1665 191 A B
WO6M 315,700 626 154 A B
W3SE 282,336 521 173 A B
K6LA 1,460,800 2365 220 A C
W6KC 177,038 489 127 A C
N6OU 128,772 343 126 A C
N6IFR 149,460 795 94 B B
K6ZCL 115,056 473 102 B B
KE6FCT 102,720 480 107 B B
WB6NFO 74,646 377 99 B B
N6UB 30,498 221 69 B B
AD6SC 13,038 123 53 B B
K6ASK 9,600 100 48 B B
KQ6EE 6,264 87 36 B B
AD6AF 748 22 17 B B
WA6HXF 176 11 8 B B
N6OPR 116,928 522 112 B C
KU6T 46,492 196 59 C A
WA7BNM 218,120 665 82 C B
N6GL 129,792 416 78 C B
WA6BOB 62,176 232 67 C B
K6NT 2,432 32 19 C B
K6SE 275,328 718 96 C C
W6AM (N6IC,KO6I,WA9AWX,N6FH,
W6VX,KJ6Y,ops)
44,352 352 63 D B
W6YRA (WA6AYI, K6LDO,ops)
203,346 506 143 D B
K6BUM (+packet)
157,728 846 93 D C

Orange

K6EY 140,346 370 113 A B
WA6GFR 56,454 208 97 A B
W6QZ 4,992 156 32 A B
K6NR 117,292 309 118 A C
W6ISO 2,880 36 20 A C
WK6I 44,380 317 70 B A
KE6WOX 9,828 126 39 B A
W6SA 38,808 294 66 B B
K6ACZ 35,432 206 86 B B
KA6GMA 16,430 155 53 B B
KE6GFI 874 23 19 B B
WW6O 182,484 822 111 B C
KF6XA 26,910 195 69 B C
K6HRT 63,248 236 67 C A
W6KK 225,080 662 85 C B
AC6VN 138,016 454 76 C B
WD0AVV 87,300 291 75 C B
KH6DX/M 16,188 71 57 C B
W6EEN (N6RT,op)
1,049,472 1822 144 C C
N6QS 90,480 290 78 C C
W6IER (KR6ER, W6LKI, KG6ECQ,
K6EY, WB6MJQ,ops)
79,456 255 104 D C

Santa Barbara

WA6FGV 297,838 630 137 A A
WF6D 2,580 43 30 B A
N6ZE 33,396 242 69 B B
W6NS 17,664 138 64 B B
N6NL 7,448 98 38 B B
KB6VME 1,080 30 18 B B
W6WQC 41,976 157 66 C A
W6TK 313,116 807 97 C C

Santa Clara Valley

K6XX 365,944 722 149 A A
KG6ECI 43,680 167 78 A A
N6EM 355,740 697 165 A B
W1SRD 254,286 545 153 A B
NU6P 140,712 538 66 A B
N6IV 47,424 194 76 A B
K6ENT 6,840 95 36 A B
N6DE 1,127,910 1999 205 A C
K6RB 899,460 1726 171 A C
K6GT 246,432 644 136 A C
WB7ODY 28,140 195 67 A C
AD6RY 2,288 44 26 B A
NT6S 51,192 324 79 B B
KC6PJK 25,344 198 64 B B
N2ALE 13,140 146 45 B B
K6IF 714,168 2835 126 B C
KF6A 197,820 942 105 B C
W4NJK 19,504 105 46 C A
WD6DX 125,388 387 81 C B
W9MAK 51,240 209 61 C B
W6LSN 5,984 44 34 C B
N6ZB 427,248 989 108 C C
AD6E 213,120 592 90 C C
KF6UTE (+N6ROB)
32,736 264 62 D B
W6YX (W6LD,N7MH,KE6FZF,ops)
2,002,932 2791 246 D C
W6OAT (+packet)
16,368 93 44 D C

San Diego

WN6K 610,450 1396 145 A B
N6VH 122,264 354 124 A B
NE6O 15,544 98 58 A B
K7JJ 314,986 604 149 A C
W6CN 53,544 291 92 B A
W6QU (W8QZA,op)
43,890 285 77 B A
KD6QK 96,824 637 76 B C
AK6R 58,424 218 67 C B
AA6EE 33,824 151 56 C B
K6KT (+packet)
119,190 256 137 D C
K6HAI (WB6LLO,KA6UCD,W6SDW,
W6REW,W6JXA,KK6YK,W7JBC,ops)
74,778 312 103 D B

San Francisco

N6ZFO 295,668 676 129 A B
KC6AWX 196,800 1025 96 B B
W6ESJ 34,040 230 74 B B
AD6G 76,112 268 71 C B
AA6DX 55,040 215 64 C B
KQ6NN 25,584 123 52 C B
K6CTA 28,000 125 56 C C

San Joaquin Valley

N6MU 884,510 1336 215 A A
NT6K 594,186 1139 167 A B
NI6G 528,294 1009 169 A B
K6CSL 86,400 263 188 A B
KA6BIM 978,670 1836 217 A C
KS6H 733,460 1715 182 A C
N6IIU 50,184 306 82 B B
KI6PG 3,100 50 31 B B
W6FRH 144,072 828 87 B C
AK7G 66,456 234 71 C B
KN6YD 24,480 100 60 C B
W6TE (+WA6LUT)
256,742 1271 101 D C

Sacramento Valley

W6NK 106,908 366 118 A B
K6DGW 26,352 117 61 A B
N6JM 11,856 77 52 A B
KI6T 306,680 594 170 A C
WR6WR 52,404 397 66 B A
AB6GS 237,286 997 119 B B
KC6SEH 110,720 691 80 B B
N6TL 14,168 161 44 B B
KE6OUA 6,264 87 36 B B
K3EST 743,204 2926 127 B C
KI6CG 395,524 1622 122 B C
KA6WHA 116,032 784 74 B C
K6KO 72,030 343 105 B C
K1ES 165,600 460 90 C B
K6LRN 115,536 348 83 C B
K6FO 103,488 309 84 C B
WT6P 86,832 324 67 C B
K6KYJ 79,300 305 65 C B
K6ME 69,580 245 71 C B
W6RKC 37,620 165 57 C B
K6KM (K2KW,op)
891,280 1715 130 C C
W6QD 489,192 1122 109 C C
W6IXP 231,660 852 117 C C
K6TA 38,880 180 54 C C
W6UT (+packet)
868,608 1303 208 D B
K6SG (+packet)
152,768 394 112 D B
N6IG (+packet)
2,070,774 2698 261 D C
N6ZS (+packet)
1,406,720 2324 224 D C
K6NO (+packet)
726,382 1741 179 D C

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Arizona

K7TR 172,860 554 129 A B
N7JXS 169,488 405 132 A C
W7USA 167,124 733 114 B B
KJ7IV 118,296 636 93 B B
K7YAK 86,240 490 88 B B
WA7VHF/T
936 26 18 B B
K6LL 758,608 2789 136 B C
W7WW 530,400 2040 130 B C
W7ZR 529,920 2304 115 B C
WX7P 179,712 865 104 B C
K7RE 128,960 403 80 C A
KU7Y 34,892 141 61 C A
W7ZMD 26,352 122 54 C A
N7IR 4,872 42 29 C A
KJ7WY 197,960 502 98 C B
W2HTX 44,020 154 71 C B
N7KU 1,002,520 1765 142 C C
KC7V 866,976 1643 132 C C
KN5H 522,976 1108 118 C C
W7YS 387,780 841 115 C C
W7IBM (N7DZ,N0ADI,K7NX,K7DRT,
KF7SI,N7OJT,WR7A,ops)
625,296 1488 168 D C

Eastern Washington

W9LT 607,680 1282 160 A B
KC7WUE 13,520 102 52 A B
W7LGG 93,688 250 98 A C
WS7V 140,160 730 96 B B
N7BES 257,040 1512 85 B C
W7AV (+N7EY)
197,500 433 158 D C
K7JAR (N7CKJ,AB7IZ,N7YRT,ops)
62,906 443 71 D C

Idaho

W7ZRC 185,844 612 102 A B
K0IP 255,552 958 132 A C
K7ZO 213,444 1078 99 B C
K7FR 4,600 50 23 C A
KA7T 240,688 613 98 C B
WO7Y 223,040 656 85 C B
KK7A (+packet)
35,168 157 56 D B

Montana

KK7UV 133,980 433 110 A B
KS7T 317,370 645 149 A C
W7BMI 4,212 78 27 B B
WB7CWB 85,778 557 77 B C
AC7GM 1,216 18 16 C A
KE7NO 91,476 295 77 C B
K7BG 738,680 1565 118 C C
K7ABV (+packet)
62,952 245 86 D B
WT6G (+packet)
1,606,706 2384 227 D C
W7ED (+packet)
495,884 1498 151 D C
AB7RS (+K7ETT)
189,924 969 98 D C

Nevada

W3IBW 16,320 160 51 B B
W7EB 424,710 1815 117 B C
N7ZT 213,248 1088 98 B C
N7PU 132,048 393 84 C B
N7QN 49,200 205 60 C B
K7NV 708,064 1528 116 C C
K5RC (+packet)
1,193,750 2041 191 D C

Oregon

KI7Y 568,424 996 164 A B
N7VS 38,690 219 53 A B
KC7ZFP 11,772 218 54 A B
K7MI 1,320,894 2599 183 A C
K7ZZ 1,045,280 1973 188 A C
K0JJ 330,096 841 156 A C
WA7ND 211,876 1014 98 A C
KD7IEB 16,576 148 56 B A
N7EMC 30,940 221 70 B B
W7ZB 145,926 737 99 B C
KK7CG 7,740 86 45 B C
KD7CTF 7,068 57 31 C A
N7OU 516,120 1259 102 C B
N7YW 271,440 754 90 C B
AA7IH 29,480 134 55 C B
N7TL 28,600 130 55 C B
KC7VWT (+AA7LE)
98,100 320 109 D B
W7BX (+JG7AMD)
94,600 346 100 D B
KB7VLC (+KC7HTS)
20,972 214 49 D B
W7NYW (KD7IEB,KK7OF,N7CMH,
N7DLH,KD7GXF,KD7GHR,ops)
15,210 169 45 D B
W7GG (+K7ZUM, N7LF)
1,366,596 2638 203 D C
W7NX (+N7EAT,K7EW)
859,118 1491 191 D C
K7UQT (+W7OT)
310,440 720 156 D C
KB7RTA (+K3DUW,KK7NJ)
286,340 1390 103 D C

Utah

AC7CF 22,400 135 56 A A
W7TU (W8EQA,op)
367,392 653 178 A B
KO7X 244,134 610 137 A C
N7LYV 41,184 286 72 B B
N7RXE 33,320 238 70 B B
K1IF 226,362 1217 93 B C
N7XJ 47,616 186 64 C A
KD7BOD 6,720 70 24 C A
W7CT 522,240 1088 120 C B
W7HS 157,320 411 95 C B
W7GT 22,704 129 44 C B
AK7O 23,944 146 41 C C

Western Washington

W7CD 109,242 286 119 A A
N7LOX 947,968 1738 184 A B
W7QN 345,060 723 142 A B
KB7PKC 95,906 607 79 A B
K1LOG 75,276 232 102 A B
NA7R 23,210 125 55 A B
W7AKR 13,932 102 54 A B
AA7VT 9,328 91 44 A B
KC7ZEP 50,086 317 79 B B
KI7XA 36,300 242 75 B B
KG7P 24,564 178 69 B B

KC7WDL 21,200 201 53 B B
KD7HNS 16,124 139 58 B B
KB5QBX 8,256 96 43 B B
AC7IF 4,030 65 31 B B
K7RI 738,948 3239 114 B C
N7QNO 43,956 333 66 B C
K7ED (WA0RJY,op)
262,200 691 95 C A
W7/JR1NKN 170,100 525 81 C A
KH7YD 111,600 370 75 C A
N7WA 301,728 899 84 C B
AD7U 279,188 768 91 C B
AB7RW 211,904 603 88 C B
KD7GTI 152,280 423 90 C B
W7EAI 80,340 309 65 C B
N7XY 43,148 160 67 C B
K7QQ 788,184 1603 123 C C
N4SL 497,056 1268 98 C C
W7OM 192,600 535 90 C C
N7ETC 184,184 594 77 C C
W7QC 161,920 507 80 C C
W7PE (+KJ7OY,KB7YCJ)
68,904 396 87 D B
K7PN (+K7NT)
143,200 2054 200 D C
N7KE (@W7VP) (+KB7N,N6NR,
N9KAH,W7HQJ,KD7GIM, NW7DX,
AC2K,W7QC,N7SBR,W7/YO3GJC)
1,027,936 1831 182 D C
KB7N (+N7VMV)
628,184 1122 149 D C
N7PP (+N7DOE,WG7X,W7BUN)
403,180 2122 95 D C

Wyoming

WG7Y 200,216 834 116 A B
N7JT 9,030 105 43 B A
KD7RX 12,516 149 42 B B
NC7O 13,104 84 39 C A
WC7S 178,464 507 88 C B

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Michigan

K8CV 24,064 129 47 A A
WD8S 346,608 745 166 A B
K8GT 262,242 525 153 A B
K8AAX 99,120 273 105 A B
WB8RFB 97,416 316 99 A B
KC8MPQ 43,860 194 86 A B
WA8OLD 13,158 87 43 A B
KD8DX 4,428 54 27 A B
ND5S 882,114 1147 237 A C
N8KIE 73,200 366 100 B B
KF8JA 35,420 253 70 B B
KD8LU 25,120 157 80 B B
K8ESQ 8,364 102 41 B B
K8WUZ 4,774 77 31 B B
KE8FO 4,690 67 35 B B
KC8IJZ 3,024 54 28 B B
N8WTH 1,900 50 19 B B
WA8YLZ 1,540 35 22 B B
WA8AEN 1,280 32 20 B B
K8CC (N8NX,op)
640,920 2180 147 B C
AA4R 335,610 1243 135 B C
AB8DF 7,200 58 30 C A
W8MJ 307,860 733 105 C B
K8IR 244,296 522 117 C B
K8SIA 157,080 374 105 C B
W8RU 124,656 318 98 C B
K8KU 68,800 215 80 C B
KB8PGW 15,756 101 39 C B
KT8X 38,080 170 56 C C
W8XC 1,288 23 14 C C
AA8TC (+packet)
52,224 137 128 D B
KC8ELY (N8NJE,N8ESW,N8MMF,ops)
18,200 175 52 D B

Ohio

WA8RCN
405,594 693 189 A A
N8XA 43,776 220 96 A A
KG8DH 263,022 506 177 A B
K8BL 248,540 449 170 A B
WB8RTJ 222,140 442 145 A B
NC8V 208,208 438 154 A B
K8AB 193,192 411 164 A B
W8IDM 62,016 208 96 A B
N8WS 54,984 195 79 A B
AF8C 34,736 167 52 A B
K8LN 26,230 115 61 A B
NS8O 12,986 78 43 A B
K8MR 6,636 55 42 A B
N8MFS 2,392 50 23 A B
K8CX 588,088 898 212 A C
K8KR 152,558 524 119 A C
KB8FZY 4,563 117 39 A C
N8MWK 68,704 304 113 B A
ND8DX 306,240 1160 132 B B
N8GZE 151,200 630 120 B B
W8DD 126,720 529 120 B B
WT8E 93,366 399 117 B B
AK8B 78,020 415 94 B B
W8KNQ 60,102 371 81 B B
KB8UUZ 59,664 339 88 B B
N8KM 59,332 326 91 B B
W8TTS 41,832 252 83 B B
N8XWO 41,664 248 84 B B
KC8UR 23,998 169 71 B B
WJ8C 23,100 175 66 B B
KB8VJL 22,490 173 65 B B
K8VUS 14,308 146 49 B B
K1DRW 11,058 97 57 B B
KC8HWV 3,080 55 28 B B
KB8LNP 2,496 48 26 B B
KA8JXG 980 35 14 B B
W8KEN 172,546 713 121 B C
W8PG 30,030 195 77 B C
WB8IEA 24,344 179 68 B C
W8VE 93,280 265 88 C A
K8AJS 330,720 689 120 C B
W8PN 121,680 338 90 C B
W8GOC 62,208 192 81 C B
WT8P 59,200 200 74 C B
N8XP 50,160 165 76 C B
W8DHG 42,120 162 65 C B
W8WTS 4,888 47 26 C B
N8DCJ 927,964 1670 139 C C
W8AV 857,888 1577 136 C C
N8BJQ 800,240 1429 140 C C
W8CAR 654,192 1239 132 C C
KU8E 266,112 594 112 C C
W8MHV 19,968 102 64 C C
N8NR (+N9AG)
1,551,240 1857 278 D C
K8ND (+packet)
764,168 1091 236 D C
K5ZG (+packet)
577,808 1078 134 D C

West Virginia

K5IID 591,408 883 216 A B
KC8FS 253,368 492 162 A B
K8MN 1,205,936 1631 232 A C
K2UOP 1,066,720 1507 236 A C
N4ZR 126,126 328 99 A C
N0NGT 20,400 170 60 B B
KV3R 347,432 1268 137 B C
N4SEA 141,608 571 124 B C
WA8WV 199,800 450 111 C A
K8OWL 38,304 168 57 C A
W8WEJ 21,840 105 52 C A
W8OP 119,988 303 99 C B
W8ZA (+packet)
892,700 1317 226 D C

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Illinois

NW9S 17,150 109 49 A A
KG9X 1,327,104 1649 256 A B
N9IJ 387,840 680 160 A B
N9JF 348,798 595 183 A B
N9NU 305,216 886 152 A B
W9IL 303,668 559 178 A B
K9JE 296,840 605 181 A B
WX9U 280,540 496 166 A B
N9GH 198,936 409 162 A B
KX9DX 179,480 501 140 A B
AK9Y 149,340 388 131 A B
KU9Z 135,450 368 129 A B
N9GUN 127,368 344 122 A B
K9JLS 102,460 466 109 A B
K9KM 65,052 210 78 A B
N9KHR 61,918 249 83 A B
WA9FIH 51,504 192 87 A B
N9IO 49,484 257 89 A B
N9MSG 46,184 171 92 A B
N9REP 39,328 215 68 A B
AK9F 22,400 125 56 A B
KD9XP 22,110 158 67 A B
WO9LF 18,144 128 56 A B
KR9L (N9JF,op)
16,100 101 50 A B
AD4OS 12,800 87 40 A B
KG9PQ 9,200 71 40 A B
WK9O 8,928 65 36 A B
W9LYA 6,696 70 36 A B
K9XD (K9PG,op)
1,646,054 2202 271 A C
NA9D 534,674 1360 181 A C
N9QQK 261,616 527 166 A C
K9SD 211,012 594 142 A C
KB9CRY 162,540 481 135 A C
K9RR 160,320 321 167 A C
W9SMC 57,602 296 83 A C
W9OA 53,856 204 66 A C
K9LU 23,184 107 69 A C
W9HL 25,986 213 61 B A
KD9ST 112,400 562 100 B B
N9LYE 65,946 379 87 B B
WA9CCQ 48,384 288 84 B B
N9VKE 45,708 293 78 B B
KD9AC 43,680 240 91 B B
N9KUT 42,720 267 80 B B
NW9V 38,948 214 91 B B
W9YS 37,284 239 78 B B
W9LYN 34,944 224 78 B B
W9CEO 34,656 228 76 B B
KF9US 30,954 201 77 B B
W9JJT 30,192 204 74 B B
W9FGH 28,152 204 69 B B
N9LZ 24,054 211 57 B B
WA9RIJ 18,258 179 51 B B
WB9WOZ 17,820 162 55 B B
KB9CYL 17,600 160 55 B B
N9FWM 16,800 150 56 B B
N9XBG 14,190 129 55 B B
N9TUQ 13,248 138 48 B B
KG9JP 12,900 129 50 B B
N9MBR 8,232 98 42 B B
W9CEJ 4,992 78 32 B B
N9ALC 4,950 75 33 B B
KB9WFC 3,360 70 24 B B
WD9HSH 2,944 64 23 B B
KB9NGI 2,856 68 21 B B
W9LNQ 2,700 50 27 B B
WA9LKZ 2,420 55 22 B B
W9AVB 1,260 30 21 B B
N9EYF 1,156 34 17 B B
WA9SOV 858 33 13 B B
N9BT 816 24 17 B B
WD9CIR 720 30 12 B B
NG9R 288 18 8 B B
KA9ZIM 220 11 10 B B
WN9GUC 132 11 6 B B
WO9S 108 18 3 B B
WB9Z 763,464 2448 156 B C
N2BJ 697,774 2168 161 B C
N9LCR 169,212 717 118 B C
KK9A 18,576 172 54 B C
W9ICU 5,168 68 38 B C
N9UC (WO9S,op)
213,796 473 113 C A
KA9NZI 10,488 57 46 C A
K9WA 280,112 574 122 C B
K9ZO 137,600 344 100 C B
NV8V 70,470 405 87 C B
K9KJ 2,720 40 17 C B
W9AX 1,456 28 13 C B
K9BGL 749,664 1368 137 C C
W9OF 575,460 1035 139 C C
W9YYG 415,000 830 125 C C
K9CS 348,348 554 182 C C
N9CO 237,620 545 109 C C
K9UQN 229,680 494 116 C C
K9NU 181,650 433 105 C C
AA9NF 27,456 132 52 C C
KG9N (+packet)
213,360 515 140 D B
AE9D (+packet)
19,256 128 58 D B
K9NS (K9HMB,K9PW,K9QVB,
KS9W,N9EP,ops)
2,813,658 3277 303 D C
KI9A (+WE9A)
1,479,744 1703 288 D C

Indiana

W9UR 67,368 250 84 A A
KJ9C 803,292 1050 219 A B
W9AU 639,804 945 222 A B
N4TZ 489,834 779 193 A B
KC9FC 104,400 297 120 A B
K9WX 86,330 271 97 A B
KC9TV 83,136 229 96 A B
K9MI 51,824 269 79 A B
WB9ZEZ 35,708 129 79 A B
N9PW 33,370 133 71 A B
WA0JTL 19,012 129 49 A B
K9NW 2,049,822 2523 263 A C
KE9I 489,402 889 171 A C
W9BS 400,548 867 174 A C
K9RU 188,352 458 144 A C
K9XV 24,310 141 65 A C
N9NGG 111,904 538 104 B B
WA1MKE 91,592 428 107 B B
N9LF 48,848 284 86 B B
N9RLA 30,636 207 74 B B
KG9HG 3,538 61 29 B B
K9EA 1,920 40 24 B B
W9RE 907,200 2800 162 B C
W9HP 195,024 717 136 B C
KC9OP 98,670 427 115 B C
WD9ATU 18,150 165 55 B C
N9DR 8,200 100 41 B C
K8JP 114,460 295 97 C A
K9DIY 2,964 39 19 C A
K9BG 401,448 778 129 C B
WT9U 4,144 37 28 C B
K9IG 147,392 376 98 C C
K9JWI 95,632 278 86 C C
N9SE (+N9XLV)
138,054 314 173 D B
K8LEE (+WD8SDL,WA8JOC)
1,399,592 1793 274 D C
W9IU (+packet)
738,300 1171 214 D C
AE9YL (+packet)
63,856 307 104 D C

Wisconsin

W9OP 775,072 1113 212 A B
N9UA 189,336 418 138 A B
K9KR 156,728 413 143 A B
N9AU 110,062 285 113 A B
W9XT 1,491,456 1973 256 A C
N9CK 915,136 1324 181 A C
WT9Q 23,920 117 52 A C
N9PQU 219,456 864 127 B B
KB9JIF 77,224 394 98 B B
N9NUN 72,800 400 91 B B
WB9PUB 58,996 343 86 B B
KB9LIE 51,040 290 88 B B
N9ESC 21,112 182 58 B B
K9WTF 15,980 170 47 B B
KA9JBD 5,994 81 37 B B
KB9VSG 3,456 96 18 B B
WE9V 371,606 1213 149 B C
K9AP 20,984 172 61 B C
K9RSW 12,432 111 56 B C
W9LO 40,584 178 57 C A
KB9S 611,520 1092 140 C B
K9QC 289,080 657 110 C B
K0SN 204,764 497 103 C B
WA1UJU 198,800 497 100 C B
N9CIQ 174,648 383 114 C B
W9WUU 147,312 372 99 C B
AA9PB 132,076 371 89 C B
N9XX 131,712 336 98 C B
K9DAF 36,240 151 60 C B
KB9UKE 18,988 101 47 C B
WA9GON 16,864 68 62 C B
NE9U 572,352 1084 132 C C
K9MA 495,500 991 125 C C
WA9IRV 66,420 205 81 C C
NF9V 18,360 90 51 C C
N9FH (+KZ9G,N9VA,WB9UAI)
1,459,090 1884 265 D C
KF9YR (+packet)
29,540 163 70 D C

0

Colorado

AB0CD 8,120 60 35 A A
W0ETT 701,276 1159 199 A B
CO8DM 464,932 1021 136 A B
W0CBH 23,904 166 72 A B
KI0II 75,848 499 76 B A
KK0Q 53,820 345 78 B A
KT0DX 350,000 1400 125 B B
K0TIV 92,040 590 78 B B
KF4MDW 16,992 177 48 B B
W0AJ 9,632 112 43 B B
N0LER 2,080 40 26 B B
AB0MG 260 10 13 B B
KG0ZI 570,480 2377 120 B C
N0TK 31,648 172 46 C A
K1EQA 21,976 133 41 C A
K5GF 24,804 117 53 C B
N0KV 530,244 1134 117 C C
W0DET (+packet)
413,760 1055 160 D B
N0QJS (+WV7T)
1,624 29 28 D B
KV0Q (+packet)
2,198,560 2728 280 D C
K0DU (K0CL,N0KE,ops)
1,636,880 2135 259 D C
W0AH (+K0RI)
1,347,940 2078 242 D C
AE0Q (+AB0MV)
923,698 1479 193 D C

Iowa

KC0AYG 5,828 87 31 A A
N0HR 185,188 448 134 A B
NE0P 121,104 332 116 A B
AD0H 20,210 166 47 A B
K0SRL 19,776 141 48 A C
KA0DX 55,100 290 95 B B
N0FCD 31,222 233 67 B B
WB0SNL 25,090 193 65 B B
KB0CWZ 19,716 186 53 B B
N0SPP 15,732 138 57 B B
K0MXL 3,596 62 29 B B
W0ETC 436,536 1692 129 B C
K0DAS 127,776 528 121 B C
W0PPF 47,952 296 81 B C
NO9S 2,604 31 21 C A
KE0FT 113,240 298 95 C B
N0AAA 40,200 150 67 C B
K0KAT (+K0CFI)
73,508 391 94 D B

Kansas

K0WA 478,850 1050 157 A B
K0BJ 345,504 629 177 A B
WB0YJT 143,640 513 126 A B
KB0WPY 100,298 413 97 A B
W0IE/M 12,314 129 47 A B
N0VMW 16,544 176 47 B A
N0JK/M 728 28 13 B A
N0YYO 66,456 426 78 B B
KC0IUW 43,350 287 75 B B
KC0GL 28,158 247 57 B B
KA0EIC 21,670 197 55 B B
KA0RID 12,600 126 50 B B
WA0PSF 6,336 96 33 B B
KC0IDI 396 22 9 B B
KK0SS 528,896 2067 128 B C
NW0L (@W0NKL)
512,532 1857 138 B C
N0UU 235,300 905 130 B C
W0NXS 117,972 339 87 C B
K0RY 94,136 287 82 C B
KG0UA 206,724 483 107 C C
K0GY (+W0TM)
1,461,660 1767 255 D C
W0BR (+N0BTN,N0SZE,W0DEW)
217,512 610 159 D C

Minnesota

K0PC 234,500 537 125 A A
N0AT 1,040,736 1495 222 A B
K0TT 932,062 1421 227 A B
K0OB 828,240 1349 204 A B
KM0O 796,272 1194 212 A B
N0HJZ 569,972 1244 194 A B
KW4T 437,898 1009 177 A B
K0VH 191,556 485 153 A B
WA0BNX 106,358 275 107 A B
KF0Q 41,676 251 69 A B
K0IR 417,780 897 165 A C
K0AD 392,150 780 155 A C
KT0R 94,842 288 99 A C
K0HB 77,244 291 82 A C
WA0VBW 36,820 263 70 B A
AC0W 344,760 1326 130 B B
K0COM 84,042 483 87 B B
N0PI 52,360 340 77 B B
KA0DAQ 43,632 303 72 B B
WR0DK 39,884 338 59 B B
KC0IWV (KC0IWW,op)
31,440 262 60 B B
K0BUD 23,790 195 61 B B
KI0RF 15,576 177 44 B B
WA0GNO 14,580 162 45 B B
KC0CJP/T 4,340 62 35 B B
WA0MHJ 56,052 346 81 B C
N0UR 266,832 612 109 C A
NA0N 550,056 1118 123 C B
W0ZQ 250,880 560 112 C B
W0PI 154,424 398 97 C B
KI0F 100,368 306 82 C B
KN0V 70,840 230 77 C B
K0SR 704,728 1286 137 C C
K0CAT 234,080 616 95 C C
W0UC (+packet)
157,596 362 138 D B
K0SV (+KC0IRY)
17,820 165 54 D B

Missouri

K0OU 396,100 716 170 A A
AE9B 675,856 1351 212 A B
KG0US 593,952 1171 184 A B
KF0K 575,244 1379 171 A B
K0GN 425,542 740 169 A B
KA0GGI 204,594 435 129 A B
WA0IYY 96,512 268 104 A B
W0YZZ 101,430 300 115 A C
KK2G 59,470 313 95 B B
KA0FSP 27,468 218 63 B B
K0DAT 25,344 176 72 B B
N0XR 10,842 139 39 B B
WB0QLU 1,638 39 21 B B
K0DAN 214,758 873 123 B C
K0KY 78,208 416 94 B C
K0BX 30,940 238 65 B C
W0GOM 25,862 193 67 B C
WD0FLJ 6,900 69 25 C A
K0RWL 261,280 568 115 C B
KS0M 76,752 246 78 C B
KI0MB 44,800 200 56 C B
W0JOE 30,780 135 57 C B
N9HDE 11,088 84 33 C B
K2VV 1,278,668 2117 151 C C
WA0SXV (+packet)
64,024 218 106 D C
AA0A (+packet)
37,230 158 85 D C

North Dakota

K9IUA 3,640 70 26 B A
K0UD 101,388 497 102 B B
N0RDJ 19,656 182 54 B C
K0VX 216,360 601 90 C B
N7IV 203,280 601 84 C B

Nebraska

KT0K 827,424 1286 204 A B
K0DG 580,216 1390 182 A C
N0WY 137,080 745 92 B B
N0NF 100,472 661 76 B B
NU0C 24,308 206 59 B B
KB0ARZ 18,144 162 56 B B
N0LZ 1,440 40 18 B B
WD0HSP 25,900 259 50 B C
WN0L 138,768 354 98 C B
K0IL (+packet) 4,818 52 33 D B
K0DI (+packet)
1,227,996 1634 231 D C

South Dakota

W0SD (W0DB,op)
1,725,498 2388 257 A C
WB0ULX 34,034 187 91 B B
WJ0S 10,200 150 34 B B
KD0S (+WD0T,WB0RWH)
1,470,840 2359 238 D C

VE

Maritime-Newfoundland

VE1AOE 388,284 1372 131 A B
VE9WH 19,370 128 65 A B
VE9MY 23,944 164 73 B C
VE1OP (+packet)
1,329,240 1688 228 D C

New Brunswick

VE9DXR 100,734 489 103 B B

Nova Scotia

VE1JS 248,472 627 153 A B

Newfoundland-Labrador

VO1WET 797,964 2203 174 A C
VO1MP 1,118,880 1998 140 C C

Quebec

VE2AWR 416,880 721 180 A B
VE2OWL 137,772 439 129 A B
VA2IC 7,488 104 36 B A
VE2XL 36,450 225 81 B B
VE2LHP 23,180 190 61 B B
VE2OCP 16,200 150 54 B B
VA2FB 394,160 1517 130 B C
VE2FFE 22,464 108 52 C B
VE2ZA 8,844 67 33 C B

Ontario

VE3KZ 475,610 778 199 A A
VE3ZT 795,408 1046 227 A B
VE3STT 665,916 1029 211 A B
VE3MQW 482,256 784 204 A B
VE3OJN 42,484 247 86 A B
VA3IX 14,892 123 51 A B
VE3BUC 90,800 454 100 B A
VE3SRE 217,750 871 125 B B
VE3VZ 123,384 582 106 B B
VA3SWG 76,032 432 88 B B
VA3GCB 18,096 174 52 B B
VE3TMG 17,278 163 53 B B
VE3XO 440,440 1540 143 B C
VA3TT 238,524 858 139 B C
VA3KA 167,280 820 102 B C
VE3SKX 15,228 141 54 B C
VA3SX 12,144 138 44 B C
VA3RU 247,044 519 119 C A
VA3EU 241,500 525 115 C A
VA3UZ 175,120 398 110 C A
VA3TTT 168,064 403 104 C A
VE3HX 124,740 315 99 C A
VE3VFR 383,952 842 114 C B
VE3KP 346,608 747 116 C B
VE3IAY 172,620 411 105 C B
VA3ZW 140,456 363 97 C B
VE3UKR 8,000 80 25 C B
VE3PN 285,600 600 119 C C
VE3EJ 68,080 230 74 C C
VE3RZ (+packet)
304,880 546 185 D B
VE3HG (+VE3HKC,VA3GGF)
202,566 493 159 D B
VA3NA (+packet)
39,360 138 80 D B
VE3OIL (+VE3NPB,VE3SMA)
378,862 659 187 D C

Manitoba

VE4MG 91,698 386 87 A B
VE4RA 48,546 261 93 B B
VE4IM 294,272 608 121 C C
VC4X (VE4XT, VE4VV,ops)
863,440 1535 215 D C

Saskatchewan

VE5SF 763,578 1567 177 A B
VA5DX 580,832 2593 112 B C
VE5BCS 41,268 362 57 B C
VE5UF 580,770 1107 135 C B
VE5GC 261,360 724 90 C B
VE5AAD 198,576 587 84 C B
VE5ZX 696,000 1451 120 C C

Alberta

VE6ZT 505,720 910 188 A B
VE6TN 18,584 107 46 A B
VE6JY (VE7CC,op)
1,830,168 2915 229 A C
VA6NO 338,216 769 134 A C
VA6RC 120,472 814 74 B B
VA6RA 79,184 708 56 B B
VE6VW 44,304 312 71 B B
VE6FI 409,836 2009 102 B C
VE6YR 55,380 355 78 B C
VE6ZA 52,440 380 69 B C
VE6BF 152,944 480 79 C A
VE6EX 370,576 1007 92 C B
VE6LB 101,640 330 77 C B

British Columbia

VE7NF 250,824 1493 84 B B
VE7IN 199,894 1123 89 B B
VE7NNN 108,592 617 88 B B
VE7AS 93,184 512 91 B B
VE7FO 51,504 348 74 B B
VA7DX 446,832 2088 107 B C
VE7XO 55,132 358 77 B C
VE7VF 122,112 423 72 C A
VE7XF 286,308 724 99 C B
VE7UF 411,272 1018 101 C C
VE7SCC (+packet)
244,634 1261 97 D C
VA7MAR (VE7EOE,VE7ZBK,VE7EMN,
VE7XDY,ops)
23,870 217 55 D C

Yukon

VY1MBB 80,376 591 68 B B

Checklogs:

3Z0WM, 3Z7FBQ, 7S2A, 9A3MA, 9A4W, A45XR, A52UD, AA2OI, CT3KY, CX2AM, CX3CY, DK7AN, DL1DTC, DL1JFM, DL2AXM, DL2OM, DL3NM, DL4FN, DL5DWW, DL5JMN, DL5NA, DL7UGO, DL7VMM, EA1CXY, EA3AKN, EA3BJM, EA4EKH, EA5AJX, EA5VN, EA6TC, EM7Q, EM8I, EU7ZZ, EX2X, F5JBR, F5YVG, G3IGW, HA8FK, HA8JV, HA9SU, HG8W, HL1/KB9GQG, JA5ATN, JR5JAQ, K3CKO, K4UVT, K5EOK, K6FM, K6HNZ, K6III, KA4DON, KB0JSH, KB0UKI, KB3CDF, KC4YOT, KC5RPF, KC7JEF/MM, KE8KT, KF3CV, KU4UN, LA1FW, LA1YE, LA2HFA, LA3JT, LU1ARV, LU6VCD, LU9GDN, LZ1AQ, LZ1HB, LZ1JZ, LZ2A, N2CG, N2LDV, N2PUA, OK1DSU, OK2SPS, ON4CJN, OZ6TL, OZ8SW, PA3GAB, PA3HGF, PA4DO, PA5TT, PY2DBU, PY2NZR, PY2SP, RA0JBL, RA4UAT, RA6AX, RU3DG, RU3WR, RU4HP, RV3QX, RV9CLF, RV9FQ, RW4LQ, RX6LG, RX9FB, SM2SCK, SM5ENX, SM6BWQ, SM7ATL, SP1DMD, SP3CUG, SP4DZT, SP4Z, SP5LKM, SP7DQR, SV/OK1YM, SV2BOH, SV3AQR, SW0DXA, UA0CW, UA3AGW, UA9CLB, UA9JMS, UR7UL, UT1EO, UT7E, UU9JH, UX6F, UZ5M, W0HED, W4NTI, W6FC, W8LKU, WA2BMH, WB0GGM, WB4NRI, YL2GN, YL2GTD, YO3FOM, YO4ATW, YO4BSM, YO4KCC, YO6BZL, YU1OJ

SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WB0JJX—Many thanks for the kind receptions I received as I toured most of the Field Day sites (at least the ones I knew about) in Delaware. The grand tour, as I have come to think of it, is one of the more enjoyable things I do as SM. Once again, I was impressed with the amount of creativity and ingenuity that went into these sites and more importantly how quickly they all came together. This will be very important when we have to answer the "call." While I want thank everyone that participated at any of the Field Day activities in the state, I would like to extend a special thanks to all those who took on the dreaded job of Field Day "chairman." This is often a hard position to fill, but it is one of the most important functions we do. Thanks for stepping up to the plate. I am happy to announce two new appointments to the Delaware section field service staff. Doug Rambo, KA3KHZ, has signed on as the new SGL. Doug has been scanning the pending state legislation for anything that might affect Amateur Radio. Shelia Bowden, N3QQS, has accepted appointments as a PIO and OES. Thanks to both for volunteering their services to the field service. Traffic(June) DTN QNI 130 QTC 17 in 21 sess, DEPN QNI 32 QTC 2 in 5 sess. K3JL 31, N3HMQ 3. 73 Randall.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL – SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. OOC Alan Maslin, N3EA. STM: Paul Craig, N3YSI. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO, Dave Heller, K3TX, George Law, N3KYZ, James E. Bear, WB3FQY, Harry Thomas, W3KOD. Hamfest trips in July included Dallas, Pa. where I attended the Murgas ARC. Hamfest. As usual, I enjoyed myself very much. The chance to see a lot of quite a few people that I do not get a chance to see very often is always exciting for me. Two of the E. Pa. Field Appointees in that area have been with the Section for quite a few years. Alice Rogers, KA3KMH, EC for Luzerne County, and Jim Martin, N3DCG, DEC for District 3, are two of the best there are. Jim is probably the busiest DEC in E. Pa. and does an outstanding job. Alice handles a county, which is effectively split by the typical Pennsylvania topography, and she handles it very well. Alice, Jim and I have come through several rough spots together and their loyalty and dedication to the E. Pa. Section is second to none. The Hamfest that was next on the list was Harrisburg ARC. In Bressler, Pa. During my visit there I was delighted to meet several persons who will probably fill some of the vital field appointment vacancies that exist in that part of the Section. Hopefully, by the time this article is printed, I will have the vacancies filled. With Hamfests stretching all the way into late October there are still quite a few more trips to make and I am looking forward to them all. Field Day 2001 – I received fourteen SM –Field Day messages many thanks to everyone who helped relay the messages. Mid-Atlantic Amateur Radio Club reports that members of MARC supplied the annual Memorial Day parade held in Radnor Township with communications. Organized by Bob, N3JIZ, the group consisted of; Bob, W3ZQN; Ned, WQ3Z; Rick, N3AGS; Jeff, WA3RIZ; Steve, KD0VA; Dieter, WB3JWU; Rich, KC2EFA; Roger, N3VBZ; Beth, KA3GKI; and Bob, W3SA. Congratulations to all for an excellent job. Coming attractions in E. Pa. include an October "Techfest" in the Philadelphia area. Hosted by WCAU Channel 10 Amateur Radio is being included through the efforts of Paul, WA3GFZ. The Techfest is scheduled for October 19, 20 and 21at the Philadelphia Convention Center. Information will be added as it becomes available. Tfc: K2BCL 480, N3YSI 404, N3EFW 315, W3IPX 308, W3HK 251, N3SW 103, W3UAQ 90, W3NNL 60, KB3BBR 43, W3TWV 42, KB3CEZ 39, N3IRN 33, K3TX 25, W3JLX 24, KB3DCT 16, N8JSO 12, N3ZXE 11, N3AS 10, KB3CVO 9, K3ARR 8, KA3LVP 7, KB3DDL 5. Net Reports: EPA 180, EPAEPTN 166, PTTN 64, CATN 10, LCARES 9, SEPPTN 8, D3ARES 6, MARCTN 2, MCOES 1.

MARYLAND/DC: SM, Tom Abernethy, W3TOM—301-292-6263-w3tom@arrl.org. MDC Section Webpage: http://www.qsl.net/w3tom/. Congratulations to the year 2001 winners of the 65 scholarships the Foundation for Amateur Radio administers. ALLE EC N3GP reports 52 ARES members with 4 net session on 146.880 (PL 123.0). ARES was called to handle an emergency at the Moran Manor Nursing Home on June 12. They provided inside communication between floors and nursing stations during a complete failure of the phone system. Notification was received at 1300 hours on the 12th and Amateur Radio communications were provided from 1330 - 1640 hours. Nine operators participated and three repeaters were used due to the nursing home's location at the bottom of a valley in mountainous western Maryland. ANAR EC N3QXW reports 42 members, 4 sessions of the ANAR ARES Net on 146.805 (PL107.2) and 1 training session. Members of ANAR ARES provided communications for a 25k foot race in the Annapolis area. WASH EC KD3JK reports 50 members and 4 sessions each of the WASH ARES-RACES Net and the Four States Net. FRED EC N8AAY reports 10 members, 4 sessions of the FRED ARES Net, and 1 ARES test conducted on June 12th by RO, N2CSQ. N8AAY is participating in the second of three ARRL Certification & Continuing Education Program (CCEP) online courses. CARR AEC KE3FL reports 25 members, and 3 sessions of the CARET Net with 26 check ins. Welcome to new CARR ARES member KB3FYI. HOWA EC K3EF reports 22 members with 2 sessions of the HOWA ARES Net on 147.135. CHAR EC/SM W3TOM reports 29 members, 4 nets sessions, 1 drill and 1 meeting. The Blossom Point ARC sponsored Field Day in CHAR. FD Chairman, AA3RT, reported 18 Amateurs worked as a team and had a smooth operating station on the air in very short notice. 73, Tom. With the Nets: NET/NET MGR/QND/QTC/QNI: MSN/KC3Y/29/45/227, MEPN/N3WKE/26/50/310,

MDD/WJ3K/58/151/260, MDD top brass AA3SB 203, W3YVQ138, AA3GV135, BTN/AA3LN/30/70/339. Tfc: KK3F 2025, AA3SB 152, W3YVQ 88, K3CSX 56, KC3Y 54, AA3GV 48, N3WKE 42, W3CB 33, N3DE 33, WA1QAA 33, N3KGM 18, N3ZKP 14, KE3FL 0, PSHR: KK3F 217, AA3SB 158, W3YVQ 139, N3WKE 116, K3CSX 109, N3ZKP 101, W3CB 98, WA1QAA 94, KC3Y 93, AA3GV 90, KE3FL 75.

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. Congrats to Old Barney ARC, Tri-City Radio Assn and Shore Points ARC. They have received 25-year affiliation certificates from ARRL. Also hats off to WA2DUE and WB6GLI on receiving their 25-year pin and certificate. I'm pleased that many hams in SNJ are taking the emergency course from ARRL. There are many aspects to ham radio. Thru public service we give something back to our community. Lou and I enjoyed our visits on Field Day to a few clubs and our home club. June Rpt. Nets QNI NJM WA2OPY 134, NJN (E) AG2R 194, NJN (L) AG2R 166, NJPN W2CC 186, NJSN K2PB 173 (above joint with NNJ), JSARS K2ATQ 297, SJTN KB2RTZ 65, SJVN WB2UVB 277. SAR rpts K2UL 172, WA2YL 142, WB2UVB 61, AA2SV 60, KB2RTZ 43, N2VQA 39, WJ2F 37, WA2CUW 27, K2UL-4 27, W2MC 24, KB2VYZ 17, N2WFN 11, KA2CQX 8, W2AZ 7, KA2YKN 6, KB2YBM, KB2VSR, KC2ETU, N2ZMI 1. PSHR: KB2RTZ 200, WB2UVB 192, K2UL 172, WA2YL 143, AA2SV 121, KA2CQX 96, WA2CUW 95, N2VQA 85, WJ2F 75, KA2YKN 61, N2WFN 45, KB2YJD 33, N2HQL 30, W2MC 28. SJTN is on M/W/F and Sundays now.

WESTERN NEW YORK: SM Scott Bauer, W2LC—Congratulations to the Drumlins ARC, which has been an affiliated society of the ARRL for 25 years, and to Terry K2OO who has been the South Towns ARS newsletter editor for 10 years. Skyline ARC members Chris KB2FAF, Fred K2DN, John KC2FLO and Wendy KB2NCW provided communications for the YMCA 5K foot race. Thank you for you efforts! How was Field Day? I worked a few stations on 40 m CW using W2AE, the Radio Amateurs of Greater Syracuse call sign. I also enjoyed going out and shooting the bull with the guys for awhile. The Tompkins County ARC experimented with a wire V-beam for 80 and 40m during Field Day. Sounds like they had a fun and interesting time! How about your group? Anything exciting or amusing to share? May Net Summaries:

Net	NM	Sess	QNI	QSP
BRVSN	N2OYQ	30	171	0
ESS	WI2G	30	375	76
NYPON	N2YJZ	30	351	121
NYS/L	W2YGW	30	284	233
NYSCN	W2MTA	4	10	0
OARC	N2KPR	5	42	4
OCTEN/L	KA2ZNZ	30	647	252
STAR	N2NCB	30	235	15
WDN/E	N2JRS	30	485	58
CNYTN	WA2PUU	30	393	71
NYPHONE	N2LTC	30	223	360
NYS/E	WB2QIX	30	306	151
NYS/M	KA2GJV	30	166	93
NYSPTEN	WB3CUF	30	293	51
OCTEN/E	KA2ZNZ	30	1395	249
OMEN	N2UC	1	14	1
TIGARDS	W2MTA	4	22	3
WDN/L	W2GUT	30	468	91

Traffic (June 2001), * indicates PSHR, #indicates BPL: N2LTC#* 1641, KA2ZNZ#* 504, W2MTA* 391, NN2H* 384, KA2GJV* 238, WI2G* 199, KB2KOJ* 178, WB2QIX* 146, W2LC* 82, W2GUT* 72, KG2D* 71, N2CCN* 70, KC2EOT* 63, KA2BCE* 56, KA2DBD* 55, W2PII* 45, KA2IWK* 41, AF2K* 31, KB2ETO* 26, WA2GUP* 22, W2RH 20, KA2BCE* 15, KB2WII* 15, K2DN* 12. Digital; Stn Rx/Tx: KA2GJV 25/1, N2LTC 522/418.

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-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: N3BZW. DEC-Rapid Response: N3HJY. DEC-OES: K3TB. Well Field Day has come and gone and I hope that like myself, you had a great time. Sally, N3MYZ, and I did get to visit with several of the clubs in the section that I had not been to in the past. Unfortunately, I started to not feel well and had to cut my travels short. One of the high points during the trip was while visiting the BVARA site we had the opportunity to hear Susan Helms calling "CQ Field Day" from the International Space Station. Talk about adding some excitement to Field Day. As I said last month, in September, there will be a Western Pennsylvania section convention. This will be a part of the Butler hamfest. The event is sponsored by the Butler County Amateur Radio Association and will be held on September 9. Additional information is available in *QST* and on their Web site http://www.qsl.net/w3udx. The convention will also have a guest from league headquarters in the person of Dan Miller, K3UFG. Dan is originally from the Erie area and I personally am looking forward to having Dan at the event. One of Dan's forums will be about the new emergency communications courses that the ARRL is sponsoring online. Many other division and section leadership officials will also be present. In addition there will be field card checkers available for DXCC, WAS and VHF/UHF awards. Please be sure to stop by the ARRL table at the hamfest and say hi. 73 de John Rodgers, N3MSE, WPA-SM, n3mse@arrl.org.

***Editor's Note**: A portion of the Section News column inadvertently was omitted from the August 2001* QST. *The missing August column for those specific sections will appear first and be followed by the September column. We apologize for any inconvenience to our members.*

CENTRAL DIVISION

ILLINOIS (August): SM, Bruce Boston, KD9UL—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W: KB9AIL. The Metro AC had a nice program on telegraph keys presented by historian NE9H. MAC has decided to purchase a banner to be used at hamfests and other events. The club will operate K9Y from Grosse Point Lighthouse in Evanston during National Lighthouse Weekend, August 3-4. The 44th running of the Des Plaines River Canoe Marathon was extremely successful this year according to the Lake Co. RACES newsletter. Over 700 canoes traversed the 19-mile course. Club members were on hand to provide communications during the event. The Egyptian RC provided communications for the March of Dimes Walk America event in Edwardsville. Some ERC members who attended Field Day walked away with very nice attendance prizes. The club made it easier to sign up for Field Day by including a postcard with the newsletter. The Kishwaukee ARC has named N9ZNC a lifetime member for his extensive work on behalf of the club. Submarines on the Air event coordinator N9VOK reports the special event held at the Museum of Science and Industry in April was well received. The station made 550 contacts including 12 submarines and various surface ships. The group plans to operate the special event again next year. The Sangamon Valley RC supported a ride by the Springfield Bicycle Club in April. The 14-mile course meandered through Menard Co. The DuPage Amateur Radio Club, W9DUP operated a special event commemorating Armed Forces Day. The event took place at the First Division War Museum at Cantigny, in Wheaton. A number of stations and modes were set up, with operation outdoors among the tanks and army reenactment groups. SSB, CW, APRS and vintage army radios (AM) were demonstrated. A QSL and SASE resulted in a nice certificate from W9DUP. The STARS newsletter reports the group has discontinued use of their autopatch. The cost of the phone line, low utilization and the need to consider replacement of the repeater all factored into the decision. STARS will celebrate its 25th anniversary this year during their annual club picnic July 22. The club is seeking information on its early years. Contact kb9ww@arrl.net if you can help. The Fulton Co. ARC is working to correct an interference problem on their repeater and is considering the purchase of a HF vertical. Schaumburg ARC had a large crew for the 2001 MS Walk in Busse Woods. Eighteen SARC members contributed over 129 hours to the event. The club's activities were featured in the April 10 issue of the *Daily Herald*. All radio clubs in Illinois that receive publicity throughout the year should send a copy of the articles to ARRL HQ as well as to the Section Manager. May traffic: K9CNP 117, WD9F 62, NN9M 52, W9HLX 46, WB9TVD 37, N9GZ 27, N9DT 27, NC9T 24, W9FIF 11, KA9IMX 9, WA9RUM 6. ISN de WB9TVD QNI 225, QTC 108, Sessions 31. Ninth region report cycle 1 and 2 de KF4UBX sessions 62 Traffic 226 average 3.64 time 692 minutes rate of traffic 3.06 Illinois Rep. NN9M, W9HLX, N9PLM, N9GZ, WD9F. W9VEY Memorial Net report de K9AXS 6 with 167 check-ins.

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH—ACC: N9KP. STM: K9CNP. PIC: N9EWA. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W: KB9AIL. A number of stations earned bonus points during Field Day by sending a message via NTS to the Illinois Section Manager. Those stations include: Peoria Area ARC, Lewis & Clark RC, Palisades ARC, Western Illinois ARC/HARC, National Trail ARC, Rockford ARO, Illinois Valley RC, W9MKS, Starved Rock RC, WB9PPK, Picorams, Illinois Valley ARC/Jacksonville ARS, Hamfesters RC, Shawnee ARA. Congratulations to WA9RUM and the W9VEY Memorial Net. The net marked its 25th anniversary on June 18th with 103 check-ins. Visit www.w9vey.net to hear a sample from the first net in 1976. Lake Co. RACES reports their license class was a huge success, with 12 new Amateurs joining our ranks. The group has been busy preparing for their family picnic and the Lake Zurich Triathlon. Western Illinois ARC has purchased a set of ARRL books for presentation to the Quincy Public Library. The WIARC newsletter Feedline has featured a number of nice articles from members on how they got started in the hobby. A similar series of articles has appeared in the Kankakee ARS newsletter Key Klicks. KARS member W9IOU appeared in recent issue of QST. She was a participant in the "Youth in Amateur Radio" forum at this year's Dayton Hamvention. K9LA was the guest speaker at the June meeting of the North Shore RC. He spoke on the topic of predicting radio signal characteristics based upon solar and atmospheric conditions. The Six Meter Club of Chicago newsletter Halo reports eighteen members and friends provided communications assistance at the tenth annual "Run for the Roses" in La Grange Park. SMCC member W9ZZU has announced that he is no longer able to coordinate the collection of canceled stamps for a local mission. Thousands of stamps were collected over his many years of service, and he thanks everyone who assisted with the project. The Prairie DX Group presented at program on their latest DXpedition to Vanuatu at a recent meeting of the Metro AC. They operated as YJ0PD and YJ0V during November, 2000. June traffic: NN9M 81, W9HLX 73, WD9F 39, WB9TVD 35, KA9IMX 21, NC9T 16, N9GZ 8, WA9RUM 6, W9FIF 3, WA9APQ 2. ISN de WB9TVD QNI 195, QTC 103, Sessions 29. From W9KNJ: June D9RN Report. Section 60L, traffic-328, Average per session-5.49, Rate of traffic-3.48. 85% of Illinois traffic handled by: NN9M, W9HLX, N9GZ, WB9KAE, N9PLM, KA9RYF, NS9F. W9VEY Memorial Net report de K9AXS 6 with 244 check-ins.

Continued on page 124.

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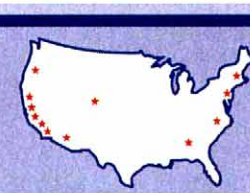

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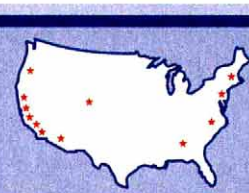

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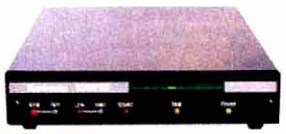

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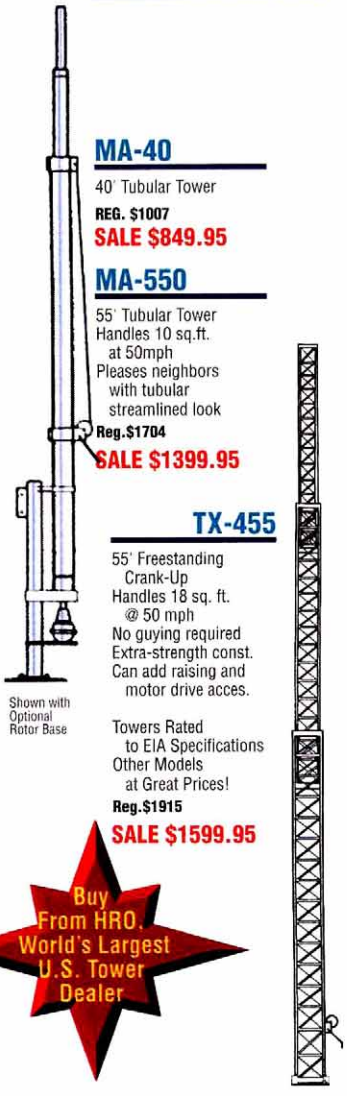

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INDIANA (August): SM, Peggy Coulter, W9JUJ—ASM for Resources & Recruitment: W9IH. SEC: K9ZBM. ASEC: WA9ZCE. STM: WA9JWL. SGL: K9JZZ. PIC: KB9LEI. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys 5/15, Billie R. Uncapher, N9GMD, Hartford City; 5/17, Paul Wurtz, K9JSK, Evansville. They will be sorely missed. Did you know the Indpls Radio Club was founded in 1914 and the oldest continuously meeting Amateur Radio Club in the United States according to the Amachewer. N9YNF would like to thank those who missed the Dayton Hamvention to help with communications for the Union Hospital Triathlon in Terre Haute AA9SP, N9FMD, WA9TGO, WB9WVG, KB9NXH, K9GBO, KG9GN, KG9GS and KB9RUP. The Allen County Hams had a workout when a tornado ripped through the edge of Ft. Wayne. There were relatively few injuries and none appeared to be serious. There had been no advanced warning as associated with severe weather. The Sloppy Code Net is still available for those wishing to build confidence and help to increase code speed. The speed is generally 1-10 wpm. If you want to copy only contact Henry KA9ZNN 219-749-8968 for details. It meets on Sunday at 9 PM (0200 UTC) on 40 M (7.1405 MHz). If I haven't answered your e-mail please try again. NMs ITN/WA9JWL, QIN/K9PUI/KJ9J, ICN/K8LEN, VHF/WA9JWL.

Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	1330/2130/2300	2329	185	1576	87
QIN	3656	1430/0000	189	77	724	56
ICN	3705	2315	18	2	146	14
Hoosier VHF nets(1 nets)			30	0	60	4

D9RN held 62 sessions with total QTC 226. IN represented by WA9JWL, N9KNJ, WB9QPA, K9GBR and KB9NPU. 9RN held 62 sessions with total QTC 212. Represented by KO9D, K9PUI, N9HZ, WB9OFG, KJ9J, WB9UYU, and W9FC. Tfc: W9FC 253, KJ9J 115, KO9D 55, K9KNJ 54, K9GBR 51, WA9JWL 48, WD9HII 38, KA9EIV 37, W9JUJ 32, KB9NPU 28, WB9QPA 19, WB9OFG 17, W9EHY 16, W9UEM 15, K9RPZ 10, AB9AA 8, AB9A 6, K9ZBM 5, K9CUN 4, WB9NCE 2, K8LEN 2.

INDIANA: SM, Peggy Coulter, W9JUJ—ASM for Resources & Recruitment, W9IH. SEC: K9ZBM. ASEC: WA9ZCE. STM: WA9JWL. SGL: K9JZZ. PIC: KB9LEI. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys: 6/8, William M. Jenkins, W9WHL, Bedford; 6/28, Viola Gable, KA9KGW, Parker City; 7/1, William R. Brown, WB9SBY, Shelbyville and 7/8 John W. Kennedy, KA9BWP, Kokomo. They will be missed. Communications was provided for the annual Brickyard Run in Hobart by KF9EX, W9WY, WD9GQO and W9CCH. The Indy Hamfest is history and so are some awards. IN ARRL presented 4 youth Excellence awards to Chris Campbell, KB9YYL, Enjoyment, Chris Gilbert, KB9LTH, Public Service, Amanda Harl, KB9THQ, Public Service and Zachary G. Michael, KB9UQQ, Technical Creation. Honorable mentioned were Jacob Geruhr, KB9YKB and Heather Heininger, KB9ZLB. The IRCC presented a Technical Excellence award to Dr. Gary S. Stouder, K9SG. Congratulations to all above. Blue River Valley ARS has been an affiliated ARRL member for 25 yrs. There were 86 nets, drills and tests this month. A great report from W8ISH on the Amateur Radio involvement in the World Police and Fire Games in Indy. Nearly 4 dozen police and fire officers from the U.S. and Canada competed in a one day cross county endurance race. There were 26 hams from 7 counties covered the 6 hr event. The ham net was called early to clear a large tree limb from the road and later in the race two lost competitors were found and put back on course to finish the race. The officials of the games expressed their gratitude toward the professionalism and quality of communications exhibited by the amateurs. 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	2245	227	1591	83
QIN	3656	1430/0000	145	63	629	52
ICN	3705	2315	29	7	197	17
Hoosier VHF nets(5 nets)			329	8	420	20

D9RN QTC 328 in 60 sessions IN QNI WB9QPA, N9KNJ, WA9JWL, K9GBR, KB9NPU, W9DEK, W9UEM and WD9INY. 9RN QTC 189 in 60 sessions IN QNI KJ9J, K9PUI, KO9D, WB9OFG, N9HZ, WB9UYU and W9FC. Tfc: W9FC 291, KJ9J 105, N9KNJ 80, WA9JWL 72, KO9D 68, K9GBR 66, WD9HII 48, W9JUJ 48, KB9NPU 44, WB9QPA 44, K9PUI 39, KA9EIV 30, K9RPZ 26, W9UEM 23, WB9OFG 16, AB9AA 11, AB9A 8, W9EHY 8, K8LEN 7, K9ZBM 5, K9DIY 3, WB9NCE 3, K9CUN 2.

WISCONSIN (August): SM, Don Michalski, W9IXG—BWN 3985 0600 W9RCW. BEN 3985 1200 KE9VU. WSBN 3985 1730 K9FHI. WNN 3723 1800 KB9ROB . WSSN 3645 1830 N9BDL. WIN-E 3662 1900 WB9ICH. WIN-L 3662 2200 W9UW. It is with deep regret that I inform you of the passing of WZ7V, Barry Norrgran, 63. Barry was killed in an auto accident. He was an ORS, received the Brass Pounder League award, was on the Public Service Honor Roll and very active in the BWN, WSBN, and BEN. Bill Hauk, 90, W9SNH, is a Silent Key. May 9RN report shows 95% Wisconsin representation. Madison's Four Lakes ARC has won the 2001 WIQP with 640K points!! Well done! Do you think the VE tests need change? If so, leave a note on section Web site www.w9ixg.eboard.com in the "feedback" section. I will compile the comments and forward them to the ARRL VEC. We greatly appreciate AD9X, WB9RQR, K9ZZ, and WB9YSD for giving statements at the Assembly hearing on AB-368 (our PRB-1 bill). Looks like it will pass and go to the senate. A good club activity for old and new alike is kit building! Suggest checking out Ten-Tec kits. Good quality, well documented, & fun projects! Go to http://www.tentec.com/ for more information. 73, Don, W9IXG, 608-274-1886. Tfc: W9RCW 827, K9JPS 718, W9IHW 628, N9VE 514, WD9GNK 506, N9TVT 467, W9YPY 359, W9CBE 313, K9LGU 133, K9GU 119, K9FHI 102, N9CK 96, N9BDL 89, AD9X 85, N9KHD 84, W9YCV 80, W9UW 68, AG9G 63, KG9B 50, KE9VU 50, KB9ROB 37, KA9FVX 34, K9HDF 30, W9BHL 29, N9JIY 28, AA9BB 26, WB9ICH 26, WD9FLJ 22, KA9BHK 10, KN9P 8, K9UTQ 4, W9PVD 1.

WISCONSIN: SM: Don Michalski, W9IXG—SEC: WB9RQR. STM: K9LGU. ACC: K9FHI. SGL: AD9X. OOC: W9DGI. PIC: K9ZZ. TC: K9GDF. ASM: K9UTQ, W9RCW, W9CBE. BM: WB9NRK. With deep regret I inform you of the passing of Anne Elston, KA9LBB. Also, Jerome Carpentier, N9MMT. He was a member of Polk County ARA. Many thanks to the Amateurs (W9DGI, KG9NG, AG9G, KB9TJI, KB9DED, KB9PVI, KB9JMB, WA9NBC, N9LIA, and NZ9U) who helped me on the Northwoods cycling tour. Together we showed the power of Amateur Radio in the week-long support of the 300 riders. Field Day was blessed with good weather and reasonable band conditions. I received messages from many clubs (Milwaukee Repeater Club, Tri-County ARC, HVARC, FLARC, Wisconsin Rapids ARC, K9VSO group and Amateur Eagle group, e.g.) that reported great participation! Well done!! June 9RN report indicates 100% Wisconsin participation at each net! Lynn Tamblyn, K9KR, donated a Mosely TA33 beam to the West Allis ARC! Thanks, Lynn! Many of us are sitting on equipment that can be used by others. Don't let it collect dust! Donate it to your club or a new ham in need. You'll get more personal satisfaction out of doing that than anything else. The Wisconsin Novice Net, 3723 kHz @ 1800 Central and Slow Speed Net, 3645 kHz @1830 would love to have you check in. The complete listing of Wisconsin nets are on the WNA site: www.wna.eboard.com. 73, Don, W9IXG. Tfc: K9JPS 867, W9YPY 589, W9RCW 481, N9VE 444, WD9GNK 442, N9TVT 429, K9GU 409, W9CBE 311, W9IHW 272, K9LGU 108, N9BDL 97, N9FHI 81, AG9G 70, N9CK 66, W9YCV 56, KE9VU 53, KG9B 51, W9UW 37, KB9ROB 36, W9BHL 34, AA9BB 32, K9HDF 21, WB9ICH 20, WA7UVX 18, WD9FLJ 15, N9JIY 8, KA9BHK 8.

DAKOTA DIVISION

MINNESOTA (August): SM, Randy Wendel, KM0D—Jerry Fraser of Marine on St. Croix has bowed out as Net Manager of our evening ARRL Section Net. Jerry has been NM since Oct 1997 and did a great job. Thanks Jerry! As of June, a replacement NM was still being sought. I hope all of you had a great Field Day this past June 23-24. The state Department of Emergency Mgmt Amateur Radio Communications group held an informal field day near the state capitol. Staff at the DEM were all invited to visit and view our equipment and learn more of amateur radio capabilities.

Net	Freq	Time	QNI/QTC/Sess	NM
MSPN/E	3860	5:30 P	614/111/31	vacant
MSPN/N	3860	12 P	421/49/31	WA0TFC
MSSN	3710	6 P	N/A	vacant
MSN/1	3605	6:30 P	221/106/31	K0WPK
MSN/2	3605	9:50 P	117/10/28	K0PIZ
PAW	3925	9A-5P	2233/206/76	KA0IZA

Tfc: WA0TFC, W0LAW, KB0OHI, W0GRW, K0PIZ, K0WPK, W0HPD, W3FAF, KC0HAW, K0PSH, W0WVO, KB0AII, KA0IZA, KN9U, WD0GUF, KB0AIJ, WA0YSL, N0JP.

MINNESOTA: SM, Randy Wendel, KM0D—Jerry Klemm, KB0OHI of Forest Lake has agreed to the duties as Net Manger for the MN ARRL Section Evening Phone Net. Jerry has been an active participant on the net and has also been a great asset for receiving traffic for the Twin Cities. Only a few Twin Cities stations regularly provide this public service so we could use a few more! Our thanks to Jerry Fraser, W0WVO, of Marine MN (on the St. Croix) for his past efforts as NM for the evening net. Jerry...your past efforts were greatly appreciated! Below is a listing of our ARRL nets on HF. Also listed below are those stations who turned in Station Activity Reports for June 2001. 73 de Randy Wendel, KM0D.

Net	Freq	Time	QNI/QTC/Sess	Mgr
MSPN/E	3860	5:30 P	653/143/30	KB0OHI
MSPN/N	3860	12 P	415/72/30	WA0TFC
MSSN	3710	6 P	N/A	vacant
MSN/1	3605	6:30 P	218/64/30	K0WPK
MSN/2	3605	9:50 P	115/38/30	K0PIZ
PAW	3925	9A-5P	1877/93/72	KA0IZA

Tfc: WA0TFC, W0LAW, KB0OHI, K0WPK, KB0AII, W0GRW, W0HPD, KC0HAW, W3FAF, K0PSH, KB0AIJ, KA0IZA, WD0GUF, KN9U, N0JP, W0WVO, WA0YSL.

NORTH DAKOTA (August): SM, Kent Olson, KA0LDG — Hope you are enjoying your summer and getting all those ham radio projects completed. Sad to report that Grand Forks ham George Kraus, W0EUQ, is now a Silent Key. I'm sure he will be missed by all. I attended the Mayville Hamfest on the first weekend of June. It was good to meet new folks and chat with old friends. Theodore Roosevelt ARC Picnic to be held on August 10-12. Affiliated clubs please update your information on the League Web site. Non-affiliated clubs consider becoming affiliated by contacting the ARRL or me. I'm always looking for motivated hams to join the ND Section Team. There are many opportunities for you to help out the advancement of Amateur Radio. Please take the online survey on the web site. It will help me with resource planning. Section Web site at: http://home.earthlink.net/~qtipf16/. May Tfc: HF NM KE0XT reports Goose River Net, 4/51/0; WX Net 27/712/8; Data Net 31/755/15.

NORTH DAKOTA: SM, Kent Olson, KA0LDG — Field Day was a big success in ND. I know of stations in Bismarck, Grand Forks, Fargo, Leeds, Jamestown, and Dickinson that were on the air. The weather cooperated and the band conditions were good. The Fargo hams are again fighting tower restrictions as of this writing. Because of a mix-up down at City Hall, they are revisiting the issue with city officials. Check with your local municipality to see what, if any, ordinances are on the books. It is best to take action early and get local officials on your side. Contact me if you need any ideas on how it's done. Also, the ARRL has an excellent new book out on antenna zoning, which can help with your case. I just got confirmation that KC0CU, from Minot, passed away early this week. Jack was a very active DXer who enjoyed building equipment especially amplifiers. He was well know & respected in the local ham community. Section Web site at: http://home.earthlink.net/~qtipf16/. June Tfc: HF NM KE0XT reports Goose River Net, 4/40/0; WX Net 29/612/9; Data Net 30/565/21. N0RDJ 5.

SOUTH DAKOTA (August): SM, Roland Cory, W0YMB—Lake Area Radio Klub received a thank you for their working April with the flooding conditions at Watertown, for the Codington Co Emergency Management. On May 10, they provided communications for the run around Lake Kampesa.

More checkins are encouraged for the Novice Net on Sunday evenings at 7 PM CST on 3700 kHz. Lark Klub is getting new jackets. Each members pays $30 and the club pays the balance. This is an idea that maybe other clubs would like to do. Pierre ARC operated a special event station on June 1 at the LaFramboise Island picnic shelter. They have changed their club meeting to the second Thursday of each month. The Ten Net for May had 297 messages with SD represented 97% by W6IVV and KA0KPY. The annual Wolksmarch at Crazy Horse Mt was held June 2-3 with 7300 walkers on Saturday and 1000 on Sunday. Fourteen amateurs provided communication on the 6.2-mile walk with 4 checkpoints and a medical tent.

SOUTH DAKOTA: SM, Roland Cory, W0YMB—The 3rd annual Little House on the Prairie special event station was aired on June 30- July 1 from DeSmet, sponsored by Huron ARC. The Annual Mini triathlon was held at Lake Kampeska with a 10 kilometer run. Watertown Lark furnished communications. Sioux Empire ARC at Sioux Falls now has a new HF transceiver—a Kenwood TS-850 SAT. They operated a special event station W0Y from the USS South Dakota Battleship Memorial site. The new rig got a workout at the event. Pierre ARC voted to support an effort to promote passage of a PRB-1 type bill in the 2002 South Dakota legislature. They also have had a Lewis and Clark special event station on the air and they made 238 SSB contacts and 39 CW contacts for a total of 277 contacts. They will have a special event station at the WW2 Memorial dedication in Pierre. Pierre will have VE testing on November 17. Black Hills ARC testing on June 9 resulted in 1 advancing to General and 2 new Techs. This month's public service honor goes to W6IVV and WN0Y. Total traffic reported 355.

DELTA DIVISION

ARKANSAS (August): SM, Bob Ideker,WB5VUH – The section leadership recently met for a one-day retreat to discuss plans and goals for our section. Time was spent learning processes we will follow toward being "value-important" to the organization. I think good things came from the retreat & we're better prepared to help with club plans and projects. I urge you to invite them to your club meeting for a program. The section Web page is available. Check it out at: "all-arkansas-hams.org". Also, don't forget to sign up for an email list server at: www.qth.net. Pull down the choices on the left side of the page and find: "All-Arkansas." Follow the prompts, and start receiving periodic emails reflecting current happenings in our section – some will be on Web page & other items on list server. Sign up for both & keep up and better yet, get involved in all aspects of our section. During May, our HF nets had 107 sessions, with over 2900 checking in, operating over 34 hrs collectively and 154 pieces of traffic. Individuals who lead our section with traffic handling include: KC5TMU 58, K7ZQR 46, K5BOC 43, W5RXU 11, AD5AM 4. Tnx to everyone who checks into our nets regularly and hope others will continue to do so as often as possible. You're important to us & we need your participation.

ARKANSAS: SM, Bob Ideker, WB5VUH—Even though I mentioned FD activities in last months issue, let me expand my comments. I was very pleased to have visited several of the sites & seeing activities really up close & personal. Stops included Pea Ridge to visit with the Benton County Radio Organization, U of A club in Fayetteville, FSAARC in Ft. Smith, the ARVARF in Russellville, Greenbrier to Faulkner County ARC, and North Little Rock to visit the STARS members. Everyone looked a little toasted due to our warmer-than-wished wx, but everyone also looked as if they were having a good time & making lots of contacts. My sincere appreciation is extended to each club I visited, and to the one's I didn't make this year for organizing and holding a FD site. What a great way to solidify your club by getting all the members together for this once a year event. For those competing, good luck on your scores. You've already won just by participating. We've got another big event coming up in October that will need your help & more info in the next *QST* will be devoted to sharing the details. It, too, will be good fun and fellowship should you wish to participate as a club. It's called the Arkansas QSO Party and we really need your participation. Traffic for June includes a total of 34 hrs of net operation, passing 203 pieces of traffic, with over 2600 checking into our 4 HF nets. Great job & keep up the good work. AR represented by K7ZQR, K5BOC, W9YCE, W5RXU, W5HDN, KA5MGL & AD5AM.

LOUISIANA (August): SM, Mickey Cox, K5MC— ACC: KM5YL. OOC: WB5CXJ. PIC: K5IQ. SEC: AC5TM. SGL: KD5KNZ. LCW NM: W4DLZ. LTN NM: WB5ZED. After many years of dedicated service, KG5GE has decided to step down as STM. Thanks, Chuck, for leading our section traffic nets and your prompt monthly reports. All traffic handlers in LA hope you will continue to be active as time permits. Matt, KD5KNZ, has accepted the important position of State Government Liaison. Matt lives in Baton Rouge and will be ideally situated to help our section keep a close watch on our state lawmakers. Matt would also welcome Local Government Liaison volunteers from around the section to monitor city and parish government actions that might affect Amateur Radio, such as local antenna ordinances. Congratulations to K5DPG for completing the League's on-line emergency communications course. All ARES members and other amateurs interested in public service are encouraged to take the course. The Jefferson Amateur Radio Club promoted our hobby by sponsoring special event stations on the Steamboat Natchez and the Big Easy Steam Train in April and May, respectively. Great going, JARC! Thanks to the special efforts of K5IQZ, Governor Foster issued a proclamation declaring Amateur Radio Week June 17-23. Tfc: K5IQZ 147, W5CDX 131, K5MC 101, K5DPG 36, KG5GE 23, KM5YL 18, W5PY 2. PSHR: K5DPG 134, K5IQZ 128, W5CDX 121, KM5YL 106, K5MC 97, W5PY 70, KG5GE 53. Net Reports: sessions/QNI/QTC. LTN: 31/351/79.

LOUISIANA: SM, Mickey Cox, K5MC — Tropical Storm Allison caused extensive flooding in much of south LA. In East Baton Rouge Parish, ARES and RACES were activated on June 7 and many responded to the call. K5MAN, East Baton Rouge EC, reports that the following amateurs deserve special recognition for their quick response and dedication during the event: N5ADF, K4FNA, AC5SH, N5SMQ, KC5ZZ, KC5FOJ, N5GA, K5GWR, KD5OLH, KD5HEY, KC5HMI,

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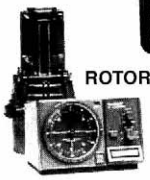
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KD5MLD KD5JZN, and N5XQS. K5MAN also reports that many others assisted during the disaster by relaying traffic for local residents and shelter operators. Thanks to all who participated for providing such exemplary public service! Field Day messages were received from the following clubs: Acadiana Amateur Radio Association, Atchafalaya Amateur DX Association, Southwest LA Amateur Repeater Club, Thibodeaux ARC, and Twin City Ham Club. Which ARRL affiliated club will be the first to win the LA Section Top Club Award? Stay tuned. WA5LQZ and K5WNV are the new EC's for Calcasieu Parish and Jefferson Davis Parish, respectively. Alan and Dave come highly recommended for their positions by WB5TUG, Southwest LA DEC. To all appointees, members, and clubs, please keep sending (or start sending!) your activity reports and newsletters in to help me write these monthly section reports. Tfc: K5IQZ 356, K5MC 114, K5DPG 54, KM5YL 26, KG5GE 19, W5PY 4. PSHR: K5IQZ 140, K5DPG 135, K5MC 98, KG5GE 92, KM5YL 88, W5PY 74. Net Reports: sessions/QNI/QTC. LTN: 30/339/90. LCW: 30/175/28.

MISSISSIPPI (August): SM, Malcolm Keown, W5XX—Section Web Page: www.arrlmiss.org. Web Master: K5IBM at k5ibm@arrl.net. ASM: N5EZX, W5EPW. ACC: N5JGK. SGL: AB5WF. STM: KJ5YY. TC: N5XXX. Mississippi was well represented at the 50th Dayton Hamvention. Those seen in the Flea Market and vendor displays were W5BLM, WD5BJT, KC5COP, W5FI, K5FLU, K5HQV, N5JGK, KB5JNZ, K5JZ, KD5LDT, KC5LIU, AA5MT, KC5NIS, KC5NSZ, KC5OXI, KC5RC, KM5UH, K5VVA, W5VWV, KJ5XQ, W5XX, and KB5YJH. A great time was had by all. Prepare for next year! Seven hams from the Jackson ARC and Yazoo County provided communications for the ATour of Yazoo City Stage Race. Those participating were W5GEJ, AB5WF, AC5SU, KD5EDV, W5LEW, KC5MUV, and W5LLO. In another public service effort the Lowndes Co ARC and Magnolia ARC provided communications for the J-3 Ranch May Horse Trials. Those assisting with ham radio support for this cross-country event were KJ5SI, N5LOK, AC5MR, KD5FUR, and KD5MSZ. A big Mississippi welcome to WB5ZED, who is manager of DRN5. Thanks to the Jackson County ARC for another great Pascagoula Hamfest. SGL/LGL Report: AB5WF, AK5J. OO Report: KP4RS. PIO Report: W5KWB. DEC/EC Reports: NN5AF, KD5CKP, W5DJW, KB5DZJ, KD5EWB, N5NQ, WB5OCD, W5OXA, KB5RQK, AB5WF, KB5ZEA. Net Reports: sessions/QNI/QTC. MSPN 31/2948/39, MTN 31/118/54, MSN 31/1250/10, PBRA 31/569/7, Jackson Co ARES/RACES 31/475/28. West Coast MS 2M Net 13/168/2, Bluff City ARC Em Net 6/162/1, JARCEN 5/100/4, NW MS ARES 5/22/0, LARC 4/84/0, MBHN 4/33/0, MLEN 4/93/0, Attala Co ARES 3/38/2, Central Miss Linking Net 1/24/0. PSHR: WB5ZED 205, KB5W 140, K5VV 129, W5XX 91, KJ5YY 80. Traffic: WB5ZED 661 (BPL), KB5W 563 (BPL), K5VV 70, W5LEW 18, KJ5YY 18, W5XX 4.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Section Web Site: www.arrlmiss.org—WJ5K reports that the Tupelo ARC had another successful operation (750 QSOs) from the annual Elvis Presley Festival. The Hattiesburg ARC provided communications for the Hub City Hustle Triatholon. Congratulations to KJ5YY on earning the Public Service Honor Role Commendation Certificate. Field Day participants had great weather but so-so radio conditions. Mississippi Clubs out in force were: Bluff City ARC (W5KHB), Columbus/Starkville/West Point ARCs (AA5MT), Delta ARA (K5BX), Jackson ARC (W5PFC), Jackson Co ARC (W5WA), Hattiesburg ARC (K5PN), Laurel ARC (W5LAR), MDXA (K5MDX), Meridian ARC (W5FQ), Northwest Mississippi ARC (K5K), and the Tupelo ARC (KK5K). Budding country music recording star N5HGN has a new CD out called Hammin It Up! Check with Dennis for a copy. The Keesler ARC provided assistance in many areas during the Mississippi Special Olympics held at Keesler AFB. The Jackson ARC set up communications for the Heatwave Classic Triatholon at the Reservoir and along the Natchez Trace. Congratulations to the Jackson County ARC for being recognized as an ARRL affiliated Club for 25 years. Check page 53 of the July *QST*. Mississippi was Number 10 in overall ARES activity in the 2000 SET. We are making progress! Regret to report the passing of N5OYY of Anguilla and WA5POH of Vidalia, La. OO Rpt: K5XQ. PIO Rpt: W5KWB. DEC/EC Rpt: N5NQ, KC5TYL, AB5WF, N5ZNT. Net Reports: sessions/QNI/QTC. MSPN 30/2647/58, MTN 30/91/66, MSN 30/1169/13, PBRA 30/579/8, West Coast MS ARES 13/132/2, SW MS ARES 6/61/0, Bluff City ARC 6/128/0, Attala Co ARES 5/72/3, JARCEN 4/69/4, MLEN 4/72/0, MCARA 4/53/0, MBHN 4/26/0, LARC 4/43/0, Central MS Skywarn Linking Net 1/47/0, Lamar Co ARES 1/8/0. Tfc: WB5ZED 772 (BPL), KB5W 636 (BPL), K5VV 77, W5LEW 43, KJ5YY 14, W5XX 8. Traffic statistics provided by KJ5YY, MS STM.

TENNESSEE (August): SM, O. D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU. TC: KB4LVJ. April 12 was a very busy day for a few of CARC's club members. Special Olympics, the Annual Scout Exhibit and the MS Walk all were scheduled for that day. Those participating were KD4AWO, N4MKG, KR4SL, KE4CTQ, KE4QOC, WA4BXC, KD4HFO, N4NTX, N4RPE, KE4AGW, AG4IE, KC4ZAG, KG4CKX, KJ4RC, KA4VMA, KA4VLZ, KF4JOP, N4BMR, KA4MKA, KA0YDC, KF4UGT, W4AME, KF4VBD, KG4EJF, AG4HG, KG4KIL, WD4DJW, KB4YRC and KP4JRS, a ham from Puerto Rico the scouts got to talk to via 10 meters. Congratulations to Charlie Ann, WG4G, and Charlie, AD4F, on receiving the John Anthony Award for outstanding service to the Chattanooga ARC. Thanks to the BSFARC member W4NPL, KB4PNG, KF4ELF, W5EDQ, KE4RKJ, KB9WQZ and WA4MWN for making the Big South Fork trail ride a success. Thanks to NARC members for providing communications for the MS Walk-a-thon: KC4TMV, KC4ZOA, KG4BHH & wife, KE4TQO, N4GWE, N4VHM, KE4JWS, N4BHO, K4WME, KF4OAL & K4ANH. Net Sess/QTC/QNI: TCWN 22/31/153; TMPN 23/32/2305; TEPN 22/50/1765; TEMPN 23/42/777; TSCWN 28/25/78. Tfc: W4SQE 53, N4PU 50, WA4HKU 31, W4SYE 22, KE4GYR 17, WB4DYJ 12, WA4GLS 10, WD4JJ 5, WA4GZZ 1.

TENNESSEE: SM, O. D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU . TC: KB4LJV. Now that Field Day is over, I hope that every club had a high score but most important that every ham had a great fun time. A group of Tri-cities hams are now working to get a DX cluster up and running again. Those involved with the DX cluster are KG4CKV, W4FXO, W4CBX, N4DW, W4BCU, K4KU and

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WD4JJ who is furnishing the hardware. ORARC now has its own repeater, thanks to K4EAJ who donated his 147.150 repeater. Roaul has been a member and supporter of the club for several years. The Mid South 2 M SSB Group, which is a weak-signal organization, has been organized with about 30 members. Officers are N4LGY –pres; W4KGN-treas & KA5TSL-sec. These officers are planning a charter party in the near future. W4CJY & W4ZLW did a wonderful job organizing communications for the Special Olympics. Their assistance came from 3 radio clubs: RATS, NARC & SMRC and included the following hams: KD4CVO, N4BPT, KE4MGS, WB4ZCQ, KF4OAL, AD4QP, NF4G, N5DTC, KC4TMV, KC2DOY & KG4HAE. Tour de Cure Bike-a-thon was assisted by the following NARC members: KC4TMV, N4SYJ, WB4ZCQ, KE4TQO, KF4OAH, KG4BHH & Mrs Pitkin, W3OI, KG4HAF, KF4MCD & K4ANH. The Nashville Hamfest was greatly improved, mostly due to a new location and great facilities. RACK members furnished communications for the annual 5K Run for the Deaf, and the Knoxville Track Club's 24th Annual News Sentinel Expo: KG4HJS, KG4LEO, KC4HMK, KG4KVP, KG4KVR, AF1P, KG4MOU & KB4FZK. The Knoxville Hamfest was a big success as reported by RACK Panels. DARC member won the non-commercial antenna gain competition for the 423 MHz category at the S.E. VHF Society conference held in Nashville in April. DRN-5 rpt sess 60, msg 975. TN rep 72% by W4OGG, KE4GYR, KB5FLC, KD4BZ. Net sess/QTC/QNI: TMPN 30/46/2127; TCWN 20/15/135; TEMPN 21/48/660; TEPN 26/114/1757; TSCWN 25/5/96. Tfc: WA4HKU 71, KE4GYR 62, W4SYE 22, WD4JJ 15, WB4DYJ 13, N4PU 9, WA4GLS 8, WA4GZZ 5.

GREAT LAKES DIVISION

KENTUCKY (August): SM, John D. Meyers, NB4K—This *QST* writing finds us in the section coming to grips with the death of Ron Oller, KG4JVT, and AAT4YQ/T who was electrocuted Sunday, May 20, while erecting a 2-meter antenna on his house in Irvington, Kentucky. He was 54. Silent Keys this month: George Brown, K4CSG. The end of May saw two emergency incidents happen with 24 hours in Southern Kentucky. Jim Hicks, WB4CTX, ASM Ky, and his son Harold Hicks (KE4HON), an EMT on the Whitley County ambulance, used the 444.050 (KB4PTJ) repeater and their dual band antennas to help relay information to the Whitley County 911 center. Nice job, gentleman. The Northern Kentucky Ham-o-rama had a nice turn out along with beautiful weather to have it.

Net	*QNI*	*QTC*	*Sess*	
NMKRN	598	23	23	N4AFP
KSN	249	28	31	KO4OL
KYN	304	36	31	K4AVS
KTN	2147	67	62	KF4GQ
NKEN	75	2	4	KA4MAP
NKEN	72	5	5	WD8JAW
WTEPN	43	1	5	KO4OL
TSTMN	334	29	31	KG4EAM
1ARES	52	6	10	KE4JFS
7DARN	54	4	4	WD8JAW
13ARES	22	4	4	N4CQR
K4MSU	40	3	4	K4JFD
WARN	110	7	5	KA4MAP

PSHR - KE4JFS 128, KO4OL 108, N4CQR 74. Tfc: N4CQR 66, K4AVX 44, KE4JFS 38, KO4OL 34, WB4ZDU 5.

KENTUCKY: SM, John D. Meyers, N4GNL—Field Day activity reports that have been received by me are from Murray University ARC, Central Amateur Radio Society, Maysville ARC, Paducah ARC, Oldham County ARC, Mammoth Cave ARC, and Capital ARS. Nice job and thanks for the reports. Silent Key report or June, N4WWA, Denver Eades from Bowling Green. Lexington Hamfest is next on the agenda on August 12th at the Armory and September 8th is the Louisville Hamfest at the Bulllit County Fairgrounds. I will be at the Maysville ARC on August 6th, Mammoth Cave ARC meeting on August 21st, the Murray University ARC club meeting on October 2nd and the ARTS Louisville Club meeting on October the 12th.

Net	*QNI*	*QTC*	*Sess*	*NM*
KRN	536	21	21	N4AFP
KSN	201	24	30	KO4OL
KYN	300	42	30	K4AVX
KTN	1981	112	60	KF4GQN
KEN	63	0	4	KA4MAP
NKEN	50	2	4	WD8JAW
WTEPN	37	1	4	KO4OL
1ARES	58	5	9	KE4JFS
7DARN	63	1	4	WD8JAW
K4MSU	34	1	4	K4JFD
WARN	101	4	5	KA4MAP

PSHR: KE4JFS 101, KO4OL 82. Tfc: K4AVX 35, KO4OL 33, KE4JFS 24, WB4ZDU 16, WD8JAW 11.

MICHIGAN (August): SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net). ASM: John Freeman, N8ZE (n8ze@arrl.net). SEC: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). STM: James Wades, WB8SIW (wb8siw@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (dcolangelo@ameritech.net) SGL: Ed Hude, WA8QJE (edhude@juno.com). TC: Dave Smith, W8YZ (w8yz@arrl.net). Youth Activities: Steve Lendzion, KC8MCQ (kc8mcq@arrl.net). BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net). I would like to welcome Richard McKibben, KC8KTW to our growing list of Public Information Officers. Richard has taken over the duties of PIO for the OACARS Club in Oakland County. If your club does not have a Public Information Officer ask about it at your next meeting and see if you can get someone to take on this important responsibility of managing PR for your club. There is lots of help available from resources provided by ARRL Headquarters. Let me know if you are interested. How many past or present youth workers read this column. I'm referring

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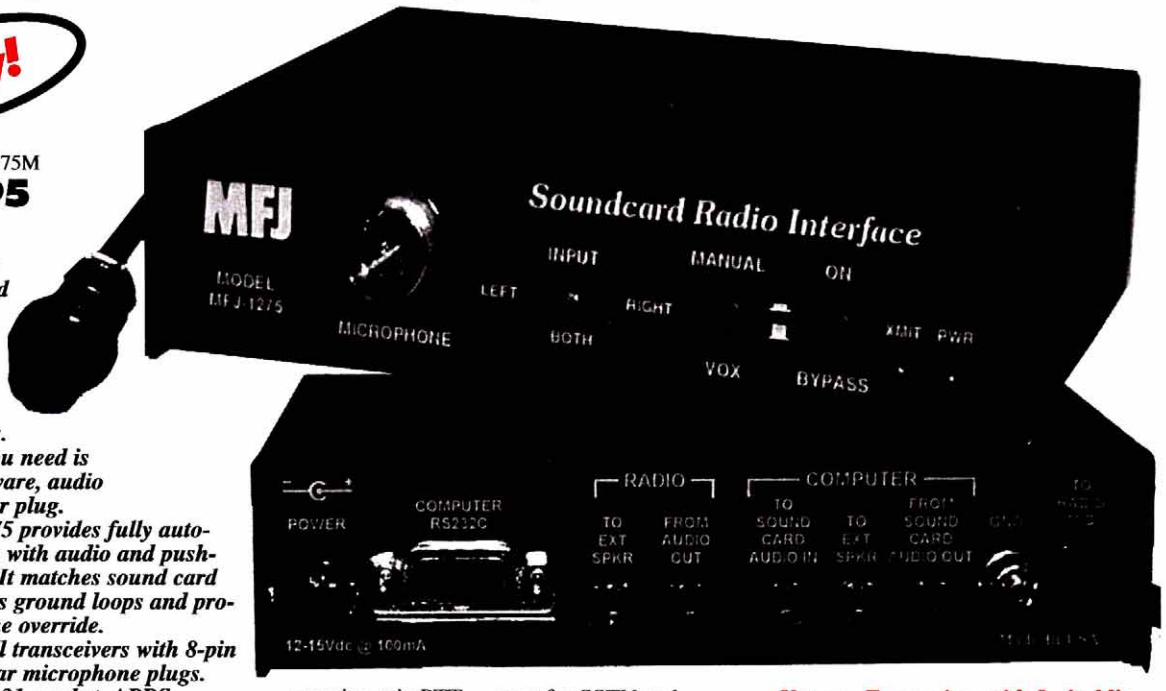


Plug this new MFJ-1275 sound card interface between your transceiver and computer and enjoy operating all digital modes.

Everything you need is included -- software, audio cables and power plug.

The MFJ-1275 provides fully automatic operation with audio and push-to-talk control. It matches sound card audio, eliminates ground loops and provides microphone override.

Works with all transceivers with 8-pin round or modular microphone plugs.

Operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, high speed CW Meteor Scatter and many others. Also use as Contest Voice Keyer and CW Contest Memory Keyer.

Digital Modes or Normal Operation

Choose digital modes or normal transceiver/computer operation with the push of a switch.

Selecting the ON digital mode, all connections are made between your rig and computer for instant digital operation.

In the BYPASS normal mode, your transceiver and computer connections are restored for their normal operation.

Audio Isolation Transformers

Audio isolation transformers and relay eliminate ground loops, audio hum, noise and distortion.

RFI-Proof

Extensive RF suppression and line isolation eliminates RF feedback problems.

Automatic Microphone Override

You can override any digital mode and transmit microphone audio at any time by pressing mic PTT -- great for SSTV and Contest Voice Keyer operation.

More Impressive Features

Serial port -- lets computer control your radio to override and/or interrupt digital transmissions.

VOX Control -- lets you use automatic VOX control when not using computer serial port control.

Level Controls -- for transmitter drive and for receiver-to-sound card drive level. No need to adjust microphone gain or sound card level when you change modes.

Stereo or Mono Audio Input -- A front panel switch selects left, right, or both sound card audio output channels to accommodate various programs.

Off-the-air recording -- for replaying or for use with spectrum analyzer programs.

Speaker on/off switch lets you hear receiver audio when you want it.

Rugged Construction -- All aluminum cabinet and surface-mount construction gives you years of trouble-free service.

Use any Transceiver with 8-pin Mic

Internal jumpers program microphone wiring for any brand or model radio -- no soldering required. Order **MFJ-1275** for 8-pin *round* mic plug. Order **MFJ-1275M** for 8-pin *modular* mic (RJ45) plug.

Everything you need is included

MFJ-1275/MFJ-1275M includes audio cables, power plug and a CD with a collection of the most popular amateur radio software to operate PSK-31, RTTY, SSTV, PACKET, AMTOR, CW, HSCW Meteor Scatter, Contest Voice Keying and other modes. Uses 12 VDC or 110 VAC with optional adapter (**MFJ-1312B, $14.95**).

No Matter What™ Warranty

Protected by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your MFJ-1275/MFJ-1275M *no matter what* for one full year.

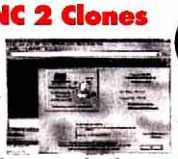
Try it for 30 Days

Order from MFJ and try it -- no obligation. If not delighted, return it within 30 days for refund less shipping.

Operate PSK-31 with your MFJ-1278, MFJ/TAPR TNC 2 Clones

MultiCommHost™ for MFJ-1278 Multimode TNCs. **MFJ-1289H, $79.95.** Supports all packet, HF modes. *Adds PSK-31.* 32-bit host mode runs under Windows 95,98,Me,NT,2000,XP™. Syncs with popular logging programs. Toolbar, Hotkeys, user defined macros, quick connects, receiver buffer, more!

MultiCommHost™ for packet only. **MFJ-1284H, $49.95.** 32-bit packet terminal software gives you true multi-tasking in Windows 95,98,Me,NT,2000,XP™. Uses standard Windows commands. *Also adds PSK-31!*



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to scout leaders, 4-H leaders, church youth group leaders, teachers, etc. WE NEED YOU! Yes, our youth program, in the section, is very important to us and we cannot seem to get enough of you to volunteer some time to help in your community. Some of you have put in a lot of time in past years and feel that perhaps someone else will do it. It's just not happening and I appeal to those of you that can help to please contact me and offer your support. If you could just be a club contact person, or if you have a little more time, you could coordinate activities at a county level. It doesn't pay well at all if you are looking for dollars, but it is an investment in our youth, our future leaders. It does pay extremely well in the rewards you get such as a smiling face, because you care enough to devote some time to "THEIR" causes, or the thanks you get several years later when you realize that you helped to get someone motivated to become a community leader. Grandparents, this is for you too. You can never lose with an investment in our future. Won't you please help? 73, Dick W8FQT. Traffic reports for May 2001: N8FPN 245, K8LJG 236, K8GA 235, N8EIZ 196, KB8ZYY 181, W8RTN 169, WX8Y 159, AA8PI 126, AA8SN 95, W8RF 91, K8KV 70, K8AE 67, W8RNQ 54, WI8K 47, K3UWO 34, K8UPE 34, WA8DHB 26, KI8GR 24, K8ZJU 21, KA8DDQ 21, N8UN 20, W8YIQ 18, K8JN 14, N8TDE 13, K8AMR 10, KN8LD 9, WB8WJV 8, N8EXS 5. Deadline 5th of the month. Please support the following SECTION NETS:

Net	QNI	QTC	Sess	NM	Freq	Time	Day
QMN			no report	WB8SIW	3.663	6:30&10 PM	Dy
MACS			no report	W8RNQ	3.953	11 PM	Dy (1 PM Sun.)
MITN	432	367	31	N8FPN	3.952	7 PM	Dy
UPN	922	43	35	AA8SN	3.921	5 PM	Dy (Noon Sun.)
GLETN	108	62	31	WB8ICN	3.932	8:30 PM	Dy
SEMTN			no report	WI8K	145.330	10:15 PM	Dy
WSSBN	874	34	31	K8CPW	3.935	7 PM	Dy
MI-ARPSC	82	3	4	W8FQT	7.232	5 PM	Sn (Alt. 3.932)
VHF			no report	KB8ZYY	Var.	Var.	

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)— WANTED, PROFESSIONAL COMMUNICATORS! WHERE? Throughout the Michigan Section WHAT? Simulated Emergency Test (SET) WHEN? October 6 and 7, 2001 WHY? To fine tune our local and statewide emergency plans and to build solid working relationships with our served agencies such as Red Cross, Salvation Army, National Weather Service and local emergency services and public safety agencies. If you don't think that the services we provide are important, you are wrong. We have had our share of unusual weather conditions from drought to flooding and fires to hazardous materials incidents on our roadways, rails and waterways. When a state of emergency exists due to natural or industrial and transportation disasters we have the ability to provide essential communications support to served agencies and to our communities. We think it can't happen to us, but take a look around you and ask yourself what if the plane overhead should fall from the sky or the innocent looking tanker driving along next to us on the highway should blow a tire and the driver should loose control? Did you know that many tankers on our highways contain tons of dangerous chemicals such as acids and gasoline and even hazardous radioactive waste materials? I don't want to scare anyone, but we must be aware of the dangers that surround us, and if an incident did occur, how we could help to protect our families, property and our communities. If you are an Amateur Radio Emergency Service (ARES) member, you should be familiar with how they work in your community. You should have received training in how to respond to a call up. If you're not a member, I urge you to seek out your local emergency coordinator and get signed up. Are you a traffic handler? If you are, our National Traffic System (NTS) plays an important role in getting the traffic moving. You may say that we all have cell phones and PCS devices now and they will work just fine. Keep in mind that although these devices use radio frequencies, those towers still connect you to a landline phone system and when they are overloaded, as happens in emergency situations, they are all but useless. Does anyone remember all the millions of paging customers that lost their service when a satellite went out just a few years ago? It can happen to us! The bottom line is that our services are valuable to others if we know how to use them and if we understand what needs to be done. You cannot expect to walk in during an emergency to offer your help if you are untrained. They cannot take time to train you during an emergency. The time to do it is now. Volunteer your services with your ARES or NTS Traffic Nets. Most radio clubs will be able to tell you how to get in touch with your emergency coordinator and find the NTS Nets. If you have never handled traffic, just check in and help will be provided to you. The next thing you can do is find out what your local SET scenario is and plan to get involved. You can do it from home if you like, or you can help to provide your services in the field. I want to urge all of you to get involved in SET this year. More information along with last years scores appear in the July 2001 issue of QST. Hope to hear you on the nets. 73, Dick W8FQT. Tfc (June): AA8PI 303, K8GA 284, K8LJG 194, KB8ZYY 192, K8KV 144, N8EIZ 130, W8RTN 124, N8FPN 104, WX8Y 86, K8AE 61, W8RNQ 46, WI8K 46, W8RF 40, WA8DHB 28, K8UPE 28, KI8GR 27, KN8LD 27, KA8DDQ 23, W8YIQ 19, K8ZJU 13, N8TDE 12, K8AMR 11, K8JN 8, N8UN 7, W8NGO 5. Deadline 5th of the month.

OHIO: SM: Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12 and check out the OSJ at www.maser.com)— All Ohio Hams are invited to the Ohio Section Conference, Saturday, September 15, 9 AM at the Ohio EMA HQ (Ohio 161 in Northwest Columbus). This year the technical demonstration is called "PSK-31 for Dummies" along with the usual tours, awards (Newsletter Contest and Severson winners for 2001) plus the popular pizza party for lunch. Your participation is not only welcomed but encouraged. Ask anyone who has been there - it is the social event of the year in the Ohio Section. New officers for the Cambridge ARA are, W8FWF, pres; N0KYN, veep; N8JMK, sec; and AB8JH, tres; N8IMW, editor. Want to thank Steve Gocala, KB8VAO, Youngstown, for taking me to area Field Day sites. Especially the YSU site where Dr. Gordon Frissora, KZ3W, and his students were still duping results by hand; no computer program - honest. GOBA bicycle event crossed into 23 counties in June and the 2,000 cyclists had Ham Radio's communications skills to thank for

MFJ *Speech Intelligibility* Enhancer™
gave me back my Ham Radio hobby

MFJ-616 **$169.95**

"As I got older, my high frequency hearing loss was destroying my ham radio for me . . ."

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

I know I'm not the only ham who can't understand all the speech in a QSO caused by high frequency hearing loss. I developed a solution that I want to share with my fellow hams.

I almost gave up my ham radio hobby

I have been a passionate ham radio operator for over 40 years ever since I was a teenager. I loved every minute of it. Still do, but I almost had to give it up.

As I grew older (I'm 56 now) I found myself asking "*What did you say?*" so often it got downright embarrassing. I can hear pretty good most of the time. I just can't always understand what people are saying and my left ear is weaker than my right ear.

It got to where I was having trouble carrying on QSOs. I could hear, but I just couldn't quite make out all the words.

My hearing problem almost put a stop to my lifelong hobby.

There was no way I was going to give up ham radio . . .

Research showed me what to do

I searched the literature and spoke to hearing and speech experts.

According to their research on the intelligibility of speech in hearing English words:

1. The frequencies important for speech intelligibility are the consonant sounds from 500 to 4000 Hz. They contribute 83% of word intelligibility.

Frequencies from 500 to 1000 Hz contributes 35% of word intelligibility and 35% of sound energy.

Frequencies from 1000 to 4000 Hz contributes *48% of intelligibility* but has *only 4% of sound energy!*

2. In contrast, frequencies from 125 to 500 Hz contributes 55% of sound energy but only 4% to word intelligibility.

***In** other words, nearly half the speech intelligibility is contained in 1000 to 4000 Hz frequency range with only 4% of the speech sound energy.*

On the other hand, the low frequencies 125 to 500 Hz have most of the speech energy but contribute very little to intelligibility.

How I improved my ability to hear and understand QSOs

The research showed me what to do.

First, drastically increase the speech energy above 500 Hz where 83% of intelligibility is concentrated.

Second, drastically reduce the speech energy below 500 Hz that contributes only 4% of intelligibility.

Amateur radio communications limit audio to about 300 to 2700 Hz.

I split the audio band into four overlapping octave ranges centered at 300, 600, 1200, 2400 Hz.

I could boost or cut each range by nearly 20 db to give me full control. This let me maximize speech intelligibility for most kinds of frequency loss.

My left ear is weaker than my right ear so I split the output audio into left and right channels with separate 2½ watt amplifiers. A balance control lets me equalize the perceived loudness to each ear. *Now both ears help in improving speech intelligibility!*

I couldn't believe my ears!

I built one and hooked it to my rig.

I boosted the high frequencies, cut the low frequencies, set the volume and adjusted the balanced control so I could hear each side equally loud.

I couldn't believe my ears! Speech that I could hear but barely understand before was now highly understandable. I got my ham radio back!

With this concept, you'll *understand* QSOs better and enjoy ragchewing and contesting more, even if you don't have high frequency hearing loss.

It helped me so much I wanted to share this with my fellow hams

I developed this into an accessory that any ham can use.

I made it immune to RFI, added a front panel phone jack, on/off speaker switch, two selectable transceiver inputs, a bypass switch for in/out comparison and built it into 10Wx2½Hx6D inch aluminum enclosure. Needs 12 VDC.

Other Uses

Replace your rig's audio section for superb audio. Eliminate hum, buzzes, poor frequency response, low audio power.

Works with SSB, FM, AM, CW -- any voice mode. Use any rig -- ham, marine, aircraft, CB. Use for PA systems, internet phone, radio talk shows.

MFJ-616 Accessories

MFJ-392, $19.95. Matching high performance communication headphones.

MFJ-281, $12.95. Mylar cone speaker emphasizes 600-4000 Hz for crystal clear speech fidelity. Requires two.

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!***

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quick medical care and emergency received throughout the route. GOBA made a contribution to all ARES county organizations that participated. OHIO SECTION CONGRATS TO (A) Ohio June Field day participants. The SM received 27 messages that weekend; (B) Bellbrook ARC for its 25th anniversary July 4th - formed in 1976 the day the nation celebrated its 200th birthday, and (C) Jeff Slattery, N8SUZ, Athens; Sonny Alfman, W8FHF, Norwich; and ASM Connie Hamilton, N8IO, Marietta, for extra outstanding effort during GOBA. SEPT OHIO HAMFESTS; (9) at Hancock County, Findlay RC; (16) at Cincinnati, GCARA (new location); and (23) at Cleveland for the Hamfest Assn...de K8QOE. Now for June traffic reports.

Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	99	42	331	28	1845	3.577	WD8KFN
BN (L)	174	91	327	30	2200	3.577	NY8V
OSN	93	30	415	29	1810	3.708	WB8KQJ
OSSBN	1559	664	2583	90	1030, 1615, 1845	3.9725	N8IO

Tfc: N8IO 318, WD8KFN 219, N8BV 215, W8STX 141, K8PJ 123, WA8SSI 117, WA8EYQ 107, N8OD 99, N7CEU 95, WB8KVM 94, W8PBX 89, KC8HJL 87, KA8FCC 84, N8TNV 83, KD8HB 82, WB8SIQ 63, N8DD 59, KA8VWE 55, N8IBR 58, KA8CXG 56, N8CW 50, N8GP 46, NS8C 43, W8RG 40, KI8IM 38, K8QIP 38, W8RPS 36, AB8KB 34, N8YWX 33, WB8PMG 31, K8RC 31, NY9V 30, KC8HTP 28, KC4IYD 27, KC8DWM 25, WD8KBW 25, KB8SIA 20, KC8PDY 17, N8RRB 15, W8BO 13, NA8KD 13, KC8KYP 13, N8WLE 13, N8GOB 12, KB8TIA 10, W8VQV 10, KC8HPR 8, N8RAK 7, KB8ESY 5, K8WC 2.

HUDSON DIVISION

EASTERN NEW YORK: SM, Pete Cecere, N2YJZ— STM: Jim Peterson, K2CSS. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. 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. Hope everyone is enjoying their summer hamming. Our Simulated Emergency Test is coming up fast. Let's make it a great event this year. Remember to help new amateurs all you can. 73 de Pete, N2YJZ. June - PSHR: KC2DAA 160, K2CSS 156, WB2ZCM 145, N2YJZ 142, WA2YBM 137, KC2HUV 124, W2JHO 108, W2AKT 106. Station Traffic: N2YJZ 143, K2CSS 115, KC2DAA 93, WA2YBM 66, WB2ZCM 55, N2TWN 52, W2JHO 24, KC2HUV 22, WA2WMJ 12, KC2GLD 8, WA2BSS 7, N2AWI 7, K2AVV 6, W2AKT 2. Net Reports: QNI/QTC CDN 254/143. ESS 375/152. HVN 613/303, SDN 515/219, NYPHONE 223/744. NYPON 351/247, NYS/E 306/310, NYS/M 166/203, NYS/L 284/493, NYSPTEN 322/114.

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. It is with regret that I bid farewell to four NLI radio amateurs who became Silent Keys recently - Andy Borrok, N2TZX, Past President of HOSARC and EC for Queens County; John Fredericksen, KA2YMR, Past President of LIMARC and ARRL Hudson Division Assistant Director; Warren Bogin, W2GZA, Director of RCARC; and Ed Primavera, K2YAW, of Suffolk Country Radio Club. Each contributed greatly to our section and to Amateur Radio - they will be missed. Mark Philips, KC2ENI, of Astoria, NY, has been appointed as N2TZX's successor as EC of Queens. Congratulations and thanks to SEC Tom Carrubba, KA2D, who helped pass Health and Welfare traffic for the American Red Cross during the June floods in Texas. Field Day was held the weekend of June 22, 23 and 24, 2001. Many clubs had Field Day sites and most were visited by one or more members of the NLI Section Staff. My schedule took me to the Kings County Radio Club in Brooklyn, Hall of Science Amateur Radio Club in Queens, Nassau Amateur Radio Club in East Meadow, Wantagh Amateur Radio Club in Wantagh, Long Island Mobile Amateur Radio Club in North Bellmore, Larkfield Amateur Radio Club in Huntington, American Red Cross Emergency Communications Communications Service in Eatons Neck, Order of Boiled Owls Contest Club in Lloyds Neck and Great South Bay Amateur Radio Club in North Lindenhurst. Thank you to each of these clubs, their officers and members for your hospitality. There were many displays of Amateur Radio ingenuity. Many clubs attempted satellite contacts. I was lucky enough to be present at Larkfield when the International Space Station passed overhead and was able to hear Astronaut Susan Helms, KC7NHZ, 40 DB over S9, working Field Day! I also saw displays of APRS, SSTV, PSK-31 and other exotic modes at many sites. Although each club did Field Day differently, everyone I saw appeared to be having a good time and accomplishing the emergency preparedness that exemplifies ham radio on Field Day. Congratulations to all for a great Field Day! I would like to also thank my Section Staff for visiting the different club sites. Rob Todaro, N1XL (Assistant Section Manager & Official Observer Coordinator), George Gluck, WA2WKV (District Emergency Coordinator Nassau County), and Sid Wolin, K2LJH (Technical Coordinator) joined with me for all or part of my travels. Section Amateurs helped out at the zoning board of appeals hearing of John Lazar, KC2FII, in Bellport village on July 10. Appearing to speak on behalf of John were Frank Fallon, N2FF, Norm Wesler, K2YEW, Richard Knadle, K2RIW, Howard Liebman, W2QUV, and George Tranos, N2G. John was appealing the village's 30 foot height limit to put up a vertical antenna. Hopefully by now John has his variance, however, it is cases like this which created the need for the PRB-1 legislation currently pending in Albany. No amateur should need a variance for a vertical antenna! Hopefully, NY State law will soon have a provision incorporating "reasonable accommodation" to prevent this necessity. There will be a Section Staff meeting on Sunday, September 30, at Babylon Town Hall, North Lindenhurst at 9:30 AM. All ARRL appointees are welcome to attend. The monthly NLI Section e-happenings newsletter is being e-mailed to all ARRL members in the section who have subscribed to Division / Section bulletins. If you have not received this newsletter, go to the ARRL Web site (www.arrl.org) and update your profile. Check the box that indicates you want Division / Section bulletins. Previous newsletters are available on the NLI site. Please e-mail me with your club's information and I will get it in the newsletter! Congratulations to Charlie WA2YOW for revitalizing the NLI-cw traffic net! LI-CW for June: 21 sessions, QNI: 75, QTC: 47, QSP: 45, 370 minutes. Please check into NLI-cw (3630 kHz at 1930 local time Monday through Friday). The Suffolk County VHF traffic net is on 145.210 at 8 PM local time Monday through Thursday with Claire WA2VZK as net control. September Events: Sep. 2&3, Jewish Arts Festival of Long Island, Commack. Sep 9, Babylon Village Country Fair. For both events, contact Walter KA2RGI at 631-957-0218 or ka2rgi@arrl.net. Sep 9, MS Bike-athon, Dowling College, Oakdale. Contact Joe Lipton, N2IOZ at 631-273-3365 or zedmail@mindspring.com. Sep 15, Great Cow Harbor 10k, Contact Chuck Hartley N2JIY at (631) 768-5242 or chucksnd@optonline.net. Sep. 15, DXCC card checking session by KD1F at Babylon Town Hall EOC at 10 AM. Pre-registration required - contact Phil N2MUN at 631-226-0698 or n2mun@arrl.net Sep. 23, Ocean to Sound Relay, starts at Jones Beach. Contact George WA2WKV at 516-822-2659 or georgegluck@juno.com. September hamfests: LIMARC on Sep. 9 in Bethpage at 8:30 AM. See www.limarc.org for info. Volunteer Exam sessions, club listings, upcoming events and more are available on the NLI Web site - www.arrlhudson.org/nli. Tfc: WB2GTG 634, KB2KLH 151, AB2IZ 81, N2AKZ 80, WA2YOW 72, W2RJL 30, KA2YDW 20, KA2UEC 13, KC2FWD 11, WA2VZK 5, N2TEE 5, KA2D 3.

NORTHERN NEW JERSEY: SM, Bill Hudzik, W2UDT—STM: WB2FTX. SEC: K2MPH. ACC: N3RB. OOC: KB2JSG. SGL: K1XV. In spite of all the bad weather Field Day in NNJ was a success! Many clubs preserved through the severe lightening and rain to turn in outstanding scores. It appears that the Cherryville RA operating W2GD may have come close to a 4A record. I did manage to visit a few clubs on Saturday: 10-70 RA who had their Skywarn spotters working to report local flooding, the Morris RC who were testing some new RACES generators, and the Tri- County RA operating W2LI from the Watchung Reservation. Field Day is the opportunity to show the public what Amateur is about and some clubs even invited local politicians to visit their sites to see how Amateur Radio operators respond to emergency situations. Good idea! Thanks to the Sussex RC and West Jersey DXG for including me in their FD reports. The State Legislature passed a Cell Phone Bill Senate-1867 which only stated that Police are instructed to note on accident forms if a cell phone was in use when the accident occurred. As for now there are no other cell phone bills in committee. We still need to monitor our local governments for any municipal ordinances that may appear. Tfc: K2VX 83, KB2VRO 60, WA2MWT 40, N2OPJ 37, N2RPI 36, N2GJ 33, K2PB 32, KC2ANN 23, W2MTO 19, W2CC 14, K2DBK 12, N3RB 9.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD. SEC: NA0R. ACC: N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. STM: KB0RUU. TSARCN is making money again. On the 4th of July they were out again, and have ordered coax for their repeater. They have also spent 98 hours on storm watch so far this year. If you want to know how they do it call WA0AUU. GCARC is making a proposal to the ARC to install a permanent station at their HQ. That would certainly be preferable to the ad hoc kind. Did you participate in FD? I managed to visit two of the three groups that invited me. I took my 'secret weapon' along (N0SM) so we could work some serious CW! Thanks to those who let us operate. I have received only three reports from FD. I'm sure others operated. FMARC reports one result of FD is that no one went away malnourished! Sorry to note the passing of KA0GVU and WB0SNL. K0JGH and N0ICF recently made a trip to Europe. So... how was the trip and the DX? Looks like the OTM club will learn sooner than the rest of us. I am now working on new certificates for each of the station appointees in the section. Being a computer guy, I am trying to automate the printing as much possible. Enuf. 73 de N0JL. Newsletters were received from TSARCN, GRARC, FMARC, DARC. PSHR: KB0RUU 115, N0JL 82. Traffic: KB0RUU 253, W0SS 115, WB0B 27, N0JL 14.

KANSAS: SM, Orlan Cook, W0OYH—ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. STM: Ron Cowan, KB0DTI. PIC: Scott Slocum, KC0DYA. I am sorry to report the passing of Wanda, the wife of Bob Summers, K0BXF. As you remember, Bob was our Section Manager for 31 years. Please let me know if you have changed your e-mail address. I am having mail come back to me. Don't forget the ARRL Kansas State convention at Salina August 19. The Section Meeting will begin at 10 AM with the presentation of the Ks Amateur of the year, Johnson County RAC 50 year ARRL affiliate certificate presentation, DEC Bob, WG0Q, and EC Carl, N0ORS, will cover their participation in the Hoisington tornado disaster. See my KAR Newsletter for details and a map. Check the convention's Web site www.qsl.net/ckarc for more. It takes $$ to put on a convention, so support Ham Radio, the host club, and ARRL with your participation. May Kansas Nets: sessions/QNI/QTC, KSBN 31/899/54, KPN 21/292/22, KMWN 31/782/566, KWN 31/785/474, CSTN 27/1746/77, QKS 60/135/86, QKS-SS 11/21/4. SEC 58/658/27, QNS KB0AMY, N0BTH, KC0CFL, KC0CIG, WD0DDG, WD0DVM, AA0IQ, N0LKK, W0PBV, KB0WEQ, Joseph, WD0DVM, SEC. TEN 297 msg in 60 sessions Ks 74% with AA0FO, K0PY, W0WWR, NB0Z, W0SS/Mgr.BBS, AA0HJ rec 22 W1AW Bulletins 326 Personal 0 NTS. Ks tfc W0WWR 162, W0OYH 38, KB0DTI 21, N0RZ 19, NB0Z 17, K0RY 12, W0FCL 11, N0ZIZ 2. OBS K0RY 27, WA0DTH 12.

MISSOURI: SM, Dale Bagley, K0KY—For more news, check-out ARRL MO Web page http://www.qsl.net/arrl-mo. MO Section ARRL members and Appointees are encouraged to make plans to attend the ARRL MO State Convention / CMRA Hamfest in Columbia, MO Aug. 25th. There will be lots of flea marketers and Commercial Vendors taking part this year. There will also be some excellent forums, not the least of which is the ARRL Forum. Wade Walstrom, W0EJ, Midwest Director will lead the forum and the featured speaker Dan Miller, K3UFG, the Certification and Educational Programs Coordinator for the ARRL HQ will make a presentation. The Ozark Mountain Repeater Group hosted a fine Hamfest in Houston, MO. Willie Adey, N0TPE, and the membership did a great job. This year, the weather was great and those attending had a wonderful time. An Amateur Radio Legislative Alert System is being developed to inform Section Amateur Radio operators about bills introduced in the Missouri Legis-

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MFJ-989C *Legal Limit* Antenna Tuner

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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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MFJ AirCore™ Roller Inductor gives high-Q, low loss, high efficiency and high power handling.

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MFJ will repair or replace your MFJ-989C (at our option) *no matter what* for one year.

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 (10¾Wx4½Hx15D in).

More hams use MFJ tuners than all other tuners in the world!

MFJ-986 Two knob *Differential-T*™

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$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

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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.

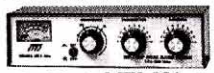
MFJ-906/903 *6 Meter* Tuners

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.

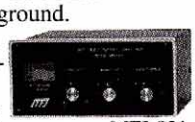
MFJ-922 144/440 MHz Tuner

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

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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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lature that would, if they passed, benefit or harm Amateur Radio. We need Amateurs in all Legislative Districts to sign up for the Alert system so we as Amateurs can respond quickly to support or challenge legislation that affects us. Send an e-mail to k0ky@arrl.org and indicate that you wish to be added to the list of those wishing to be kept up to date on Legislative matters and actions are being taken or considered. The SM attended the MARAC national convention in Hampton, VA. MARAC is better known as the County Hunters. MARAC is a MO Section Affiliated Club that has members from all over the US and the world. At this year's convention, Gene Tyree, N4ANV, the convention chairman and Van "Pete" Peterson, K4QFK, Convention Finance director, did an outstanding job. Ace Jansen, N3AHA, County Hunter columnist for World Radio and Ted Melinosky, K1BV, CQ Awards editor were among those attended this years event. The efforts of Bill Inkrote, K2NJ, the MARAC President and the Board made this a great year for MARAC and County Hunting. Net Sess/QNI/QTC: MTN 3/357/59; WAARCI 4/62/0; Rolla Billboard 30/356/8; Audrain Co ARES 4/44/2; Jackson Co ARES 5/74/0. Tfc: KE0K 11.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. It is with deep regret to inform you that N0OCI is a Silent Key. I am pleased to announce the following appointments: KA0BAK and KC0JRV as Official Emergency Stations. N7GT has resigned as EC for Scottsbluff County. Although He was EC for only a short time, he made and impact in Western Nebraska. Greg will be returning to Cheyenne, WY. Thank you for your hard work, Greg! 17 Amateurs provided communications support for the fireworks show in Kearney. Net Reports: MIDNE ARES: QNI 268, QTC 2 & 30 sessions. NMPN: QNI 1384, QTC 18 & 30 sessions. West Nebraska Net: QNI 1416, QTC 146 & 30 Sessions. Lincoln/Logan ARES: QNI 18, QTC 2 & 3 sessions. W0IRZ Memorial Net: QNI 59, QTC 1 & 4 sessions. NE Storm Net: QNI 697, QTC 14 & 30 sessions. NCHN: QNI 69, QTC 2 & 11 sessions. NE 40 Meter Net: QNI 270, QTC 4 & 25 sessions. MARES: QNI 179, QTC 2 & 4 sessions. ENE 2 Meter Net: QNI 430, QTC 2 & 4 sessions. Tfc: K0PTK 86, KE0XQ 20, W0UJI 5, WA0ZCM 5, WA0ZCN 4, N0BTS 2, KA0DOC 2, K0RRL 2, WB0ART 2, WY0F 2, W0EXK 2, KA0O 2, KB0MTT 2.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—ASMs: KZ1Z, NK1J, N1API, K1STM. BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: WA1D. STM: K1HEJ. SGL: K1AH. TC: W1FAI. Don't miss our annual Nutmeg State Hamfest and Computer Show, Mountain Side Resort, Wallingford, Sunday, October 7. Members of the Meriden ARC are working very hard to provide a fb program. Riley Hollingsworth, K4ZDH, Legal Adviser Compliance & Information Bureau, and ARRL Vice President Kay Craigie, WT3P, will honor us with their presence this year! Make plans now to come out and have fun. Help ensure the success of the hamfest so that it can continue to be an annual event. Pete, KZ1Z, might have retired and left the Bethel Educational Amateur Radio Society as its leader, but he's still hard at work. Get this: BEARS member Eric Griffin-N1JSY, from Bethel, has been assigned to Kiribati for two years with the Peace Corps after having graduated from medical school. Pete did his own research on the Internet and figured out the licensing process. Eric will be licensed in September and CARA/BEARS members have provided a complete station for him to use which, at this writing, is being delivered in person by his family! He will operate as T30ES and will even meet up with ops doing an DX-pedition there! See http://people.mags.net/boem/kiribati1.htm for details on this exciting project. Ham Radio operators are needed for the Annual Multiple Sclerosis Bike Tour / Sights & Sounds which will take place in Madison on Saturday, Sept 22 and Sunday, Sept 23 rain or shine. This is an especially great chance for those of you new to ARES to get your feet wet in service to agencies. Contact coordinator Don, N1HAX (n1hax@arrl.net). He is wonderfully organized and will show you the ropes! Come on out and support the public service booth at the Big E September 14-30 West Springfield, MA. Contact Larry, K1HEJ (buckl@mail.ccsu.edu), or Al, N1JWF (aln1jwf@juno.com), if you wish to help out. Net Sess/QNI/QTC/NM: WESCON 30/223/50/KA1GWE; NVTN 26/101/30/KB1CTC; ECTN 240/240/19/WA4QXT; CPN 29/156/72/N1DIO; CN 25/81/67/N1AEH. Tfc: NM1K 1279, KA1VED 578, WA4QXT 214, KA1GWE 107.

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. Members of the Marconi Radio Club are constructing an operational 1902 wireless station from scratch! A Coherer circuit was recently completed. MRC members have played a pivotal role in helping establish a permanent Cape Cod station, as reported in July Section News. Natick Emergency Radio Net members provided communications for the annual Rizzo Foundation 5K Road Race on July 4th. Framingham ARA proudly awarded $400 college scholarships to young Amateurs N1UVA, N1VYF and N1JFP recently. Amateur Radio stations aboard or associated with some 60 historic vessels were QRV on July 21-22 for the annual Museum Ship special event sponsored by the USS Salem Radio Club. K1DBB is actively involved supporting the American Red Cross in Newburyport. See http://groups.yahoo.com/group/newburyport_red_cross_disaster_team for details. Area Skywarn nets have been very busy this summer, activating for several serious storms that passed through Central and Eastern MA. Want to be more involved in Skywarn? Contact KD1CY or visit http://www.ultranet.com/~rmacedo/. From the "Internet-Is-Looking-For-A-Few-Good-Hams" department: the hi-tech media touted a recent story about a computer organization proposing that Amateurs be utilized for backup emergency communications in the event of an attack or outage on the 'net. ARRL president W5JBP was quoted extensively. The article was great PR for Amateur Radio! W1ABC recently retired after a spendid job as North Shore RA's newsletter editor. Pentucket RC will soon have its new 2m repeater in operation. EMA ARRL Web Site of the Month: the Massasoit ARA at http://www.qsl.net/w1mv/. This SM had the honor of presenting a 60-year ARRL member plaque to W1DL of Framingham. Fall is just around the corner; many clubs will

MFJ 1.8-170 MHz SWR Analyzer™

Reads complex impedance . . . Super easy-to-use

***New** MFJ-259B reads antenna SWR . . . Complex RF Impedance: Resistance(R) and Reactance(X) or Magnitude(Z) and Phase(degrees) . . . Coax cable loss(dB) . . . Coax cable length and Distance to fault . . . Return Loss . . . Reflection Coefficient . . . Inductance . . . Capacitance . . . Battery Voltage. LCD digital readout . . . covers 1.8-170 MHz . . . built-in frequency counter . . . side-by-side meters . . . Ni-Cad charger circuit . . . battery saver . . . low battery warning . . . smooth reduction drive tuning . . . and much more!*

***The** world's most popular SWR analyzer just got incredibly better and gives you more value than ever!*

MFJ-259B gives you a complete picture of your antenna's performance. You can read antenna SWR and Complex Impedance from 1.8 to 170 MHz.

You can read Complex Impedance as series resistance and reactance (R+jX) or as magnitude (Z) and phase (degrees).

You can determine velocity factor, coax cable loss in dB, length of coax and distance to a short or open in feet.

You can read SWR, return loss and reflection coefficient at any frequency simultaneously at a single glance.

You can also read inductance in uH and capacitance in pF at RF frequencies.

Large easy-to-read two line LCD screen and side-by-side meters clearly display your information.

It has built-in frequency counter, Ni-Cad charger circuit, battery saver, low battery warning and smooth reduction drive tuning.

Super easy to use! Just set the bandswitch and tune the dial -- just like your transceiver. SWR and Complex Impedance are displayed instantly!

Here's what you can do

Find your antenna's true resonant frequency. Trim dipoles and verticals.

Adjust your Yagi, quad, loop and other antennas, change antenna spacing and height and watch SWR, resistance and reactance change instantly. You'll know exactly what to do by simply watching the display.

Perfectly tune critical HF mobile antennas in seconds for super DX -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on one band, or analyze multiband performance over the entire spectrum 1.8-170 MHz!

Check SWR outside the ham bands without violating FCC rules.

Take the guesswork out of building and adjusting matching networks and baluns.

Accurately measure distance to a short or open in a failed coax. Measure length of a roll of coax, coax loss, velocity factor and impedance.

Measure inductance and capacitance. Troubleshoot and measure resonant frequency and approximate Q of traps, stubs, transmission lines, RF chokes, tuned circuits and baluns.

Adjust your antenna tuner for a perfect 1:1 match without creating QRM.

And this is only the beginning! The MFJ-259B is a complete ham radio test station including -- frequency counter, RF signal generator, *SWR Analyzer*™, RF Resistance and Reactance Analyzer, Coax Analyzer, Capacitance and Inductance Meter and much more!

NEW

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Call or write for Free Manual

MFJ's comprehensive instruction manual is packed with useful applications -- all explained in simple language you can understand.

Take it anywhere

Fully portable, take it anywhere -- remote sites, up towers, on DX-peditions. It uses 10 AA or Ni-Cad batteries (not included) or 110 VAC with MFJ-1315, $14.95. Its rugged all metal cabinet is a compact 4x2x6¾ inches.

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MFJ-249B, $229.95. Like MFJ-259B, but reads SWR, true impedance magnitude and frequency only on LCD. No meters.

MFJ-209, $139.95. Like MFJ-249B but reads SWR only on meter and has no LCD or frequency counter.

MFJ-219B, $99.95. UHF *SWR Analyzer*™ covers 420-450 MHz. Jack for external frequency counter. 7½x2½x2¼ inches. Use two 9 volt batteries or 110 VAC with MFJ-1312B, $12.95. *Free* "N" to SO-239 adapter.

SWR Analyzer Accessories

Dip Meter Adapter

MFJ-66, $19.95. Plug a dip meter coupling coil into your MFJ *SWR Analyzer*™ and turn it into a sensitive and accurate bandswitched dip meter. Save time and take the guesswork out of winding coils and determining resonant frequency of tuned circuits and Q of coils. Set of two coils cover 1.8-170 MHz depending on your *SWR Analyzer*™.

Genuine MFJ Carrying Case

MFJ-29C, $24.95. Tote your MFJ-259B anywhere with this *genuine* MFJ custom carrying case. Has back pocket with security cover for carrying dip coils, adaptors and accessories.

Made of special foam-filled fabric, the MFJ-29C cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

Has clear protective window for frequency display and cutouts for knobs and connectors so you can use your MFJ *SWR Analyzer*™ without taking it out of your case. *Look for the MFJ logo for genuine authenticity!*

MFJ-99, $54.85. Accessory Package for MFJ-259/B/249/B/209. Includes *genuine* MFJ-29C carrying case, MFJ-66 dip meter adapter, MFJ-1315 110 VAC adapter. ***Save $5!***

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Measure signal strength over 60 dB range, check and set FM deviation, measure antenna gain, beamwidth, front-to-back ratio, sidelobes, feedline loss in dB. Plot field strength patterns, position antennas, measure preamp gain, detect feedline faults, track down hidden transmitters, tune transmitters and filters. Plug in scope to analyze modulation wave forms, measure audio distortion, noise and instantaneous peak deviation. Covers 143.5 to 148.5 MHz. Headphone jack, battery check function. Uses 9V battery. 4x2½x6¾ in.

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soon resume their normal meeting schedules. EMA Amateurs: your "home work" assignment is to write or e-mail me with three items or areas that the League does well, and three which need improvement. I will summarize in a future bulletin. This SM attended the recent New England Division Cabinet meeting in Portsmouth, NH. 73 de K9HI. Tfc: W1GMF 1453, KW1U 765, NG1A 441, NZ1D 170, WA1FNM 82, K1SEC 68, WA1LPM 48, K1BZD 43, N1IST 42, NC1X 30, N1TPU 30, N1LAH 25, K8SH 24, KD1LE 22, KB1EB 11, WA1VRB 9, N1TDF 2.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: NX1A. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: KA1WRC. PIC: KD1OW. SEC: N1KGS. Asst. Dirs.: KA1TKS, K1NIT. Web Site: N1WFO. Maine Amateurs put Field Day on the air with 59 and 5NN reports from Portland Head Light in the southern part to Presque Isle in the north, as well as from the eastern shores of the Atlantic to the western mountains in Buckfield. There was also a good showing from the central part of the state from the Pine State ARC in Bangor, along with Augusta ARC, the WAWA and the Andy ARC. Thank you all for contributing to Field Day, which is a real labor of love for the hobby. Other RF activity included the Pottle Hill Road Race. Hams were on hand to keep the event running smoothly (hi, hi). Tnx to KB1EJI, KA1VZL, K1GAL, N1YIS, W1IF, and N1GZB. Portland radio Ops found plenty to keep them busy with a simulated air disaster at Portland Jetport. Tnx to W1NIA, W1IF, W1ZE, N1AKP, NX1A, NX1C, N1NCC, N1GRO, K4GAG, KB1GLW, KB1GLX, KB1GLV, KB1GLY, KB1GRU, KB1GRV, also N1REX, as an observer for the Fire Dept., and K1GAX for all his hard work to coordinate this event. 73, Bill, N1KAT. Tfc: W1JTH 52, KA2ZKM 50, W1QU 48, W1JX 36, KA1RFD 24.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org)—NH Web site (www.nhradio.org). I am pleased to announce the appointment of Jack Sheehy, W1JS, as OOC. Jack comes back into the NH Field Organization having been ASM and ACC previously. Thanks, Jack, for approaching me and offering your services. Congratulations to all of NH-ARES placing 4th in last yr's Simulated Emergency Test. NH-ARES also placed 8th in the Section/Local Nets category in the same test. A special congrats to Gary Okula, N3CLZ, who has directed the revitalization effort of ARES and being so successful since returning as SEC. As in previous years, I made my FD trek across NH traveling over 500 miles. I have decided to go to an A/B schedule hitting clubs every other year. Sorry I was not able to make PCARC/GBRA or the IRS/Amoskeag clubs this in this yr's trek. I have noticed an upswing in new licensees in NH. I had seen an average of 2-5 each month. That seems to have increased to an average of 15-20 in the past 3-4 months. Thanks to those clubs running classes and to those who run Test Sessions. Thanks to those people, who like Jack, have contacted me in the past month asking how they can help. N1QXF, I haven't forgotten you. -73 Al. Net NM/Sess/QNI/QTC: GSFM N1RCQ 29/202/41; GSPN WB1GXM 30/98/40; VTNH WA1JVV 30/114/126. Tfc: W1PEX 991, N1NH 80, W1ALE 57, K1STV 45, WB1GXM 34, N1CPX 6, WA1JVV 111.

RHODE ISLAND: SM, Armand Lambert, K1FLD—As your SM is still on extended travel, I had the pleasure of touring all the ARRL affiliated clubs' Field Day sites that made their plans known to me. The enthusiasm and resourcefulness shown at each site was very impressive. Who says ham radio activity is declining? It wasn't evident by what I saw. The Fidelity ARC even had a satellite TV system running to watch the Weather Channel. RI-SEC, N1JMA reports that the last of the planned Skywarn seminars took place on June 12th. They surely have been kept in practice with numerous severe weather events. Keep up the great work, gang! You really do make a difference! N1JMA, together with a half dozen volunteers from Massachusetts provided communications support to the Ocean State 150 bicycle race from Newport to Mystic to URI, an American Diabetes Association fund raiser. The hams facilitated the work of the Yagoog Valley Search & Rescue EMT's who treated several injuries during the two-day event. W3PDK and I represented RI at the Division Director's Cabinet meeting in NH. We learned a great deal about what ARRL is doing in a long list of topics, again making a difference. 73 and good DXing to all, W1YRC, ASM/RI.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org—ASM: N1MAP. ASM (digital): KD1SM. STM: NZ1D. SEC: K1VSG. OOC: WT1W. Field Day is over. Bands were not in as good condition as last year. At least from the top of Mt. Wachuset they weren't. All clubs that participated sent their reports to the SM and should take credit for the extra 100 points. I've been looking for CW operators that could fill in on 1RN during the summer. Contact me via e-mail, and I'll fill you in on net procedures and methods used to deliver the traffic. We don't get a lot of traffic during the summer, so you really will not have much to do. If you have been interested in traffic handling, this is a great opportunity to expand your skills. I realize that ham radio takes a back seat during the summer months. While the weather is good, it is the time to think of revamping your antenna system. Thought about that new tower or antenna. This is the time to get the job done. Sure beats doing it in the cold and damp weather or fall and winter. Tfc (May): N1WAS 225, K1TMA 224, KD1SM 11, N1RLX 4, W1ZPB 115, W1UD 297. (June) N1WAS 264, K1TMA 337, KD1SM 9, N1RLX 4, N1LZF 4, W1ZPB, W1UD 321.

NORTHWESTERN DIVISION

ALASKA: SM, Kent Petty, KL5T — Good participation section-wide in this year's Field Day. Fairbanks hams deployed along Chena River to support boat race. Anchorage hams support Anchorage Mayor's Marathon, including use of APRS and ATV. Combined event with Field Day was big success. Mat-Su and Anchorage hams support Girl Scout encampment - huge success! Juneau hams support SAR for lost hiker. HF Pactor stations and amateur PACSAT stations needed throughout the section to interface communications networks between districts....can you help? Contact KL5T or AD4BL. HF nets: Sniper's Net 3920 1800 AST, Bush Net 7093 2000 AST, Motley Group 3933 2100 AST, and Alaska Pacific Net 14292 M-F 0830 AST. ALL HAMS - Please report communication drills and exercises, emergency communication activations, and public service activities via our online interactive FSD-157 (Public Service Activity Report) form at: http://www.qsl.net/aresalaska/fsd157/public_service.html.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—STM Don Calbick, W7GB, is stepping down as a TCC Director after holding this volunteer position for many years. Jerry, AD0A, will take Don's place in the National Traffic System. The annual WARTS (WA Amateur Radio Traffic System) net picnic will be held at Lake Kachees on July 15. Over 30 hams helped with medical communications for Hoopfest in Spokane on June 29-30. In Memoriam: Sally Casey, N7ZJY, became a Silent Key. Hamfests: The Walla Walla hamfest scheduled for September is cancelled. FYI section awards managers are: DXCC —Jay Townsend, WS7I, in Spokane; WAS — Carl Strode, WA7QJY, in Pasco; VHF – Jeff Spinler N7VPN in Pasco. Net Activity: WSN: QNI 868, tfc 287; Noontime Net: QNI 8917, tfc 293; WARTS: QNI 3233, tfc 78. Tfc: W7GB 183, KA7EKL 153, K7GXZ 98, K7BFL 43, KA7CSP 20. PSHR: W7GB 138, K7GXZ 123.

IDAHO: SM: M.P. Elliott, K7BOI — OOC: W7ZU. SEC: AA7VR. STM: W7GHT. The 2001 Boise River Festival is history and an excellent ham radio demonstration was held again this year by Treasure Valley area hams. Idaho was also well represented in Field Day '01. In addition to the fun of contacts, Idaho hams got publicity for their efforts – TV, radio, and press coverage. Great job! News later on the winners of the Section Field Day trophies (individual and group). Ham radio was represented at the Western Idaho Fair again this year. Many CW messages were passed. It is September and time for club meetings to pickup again. Get out to a local meeting and be involved! 73 - Mike, K7BOI. Tfc: W7GHT-429, KB7VYH-60, KB7GZU-45. PSHR: W7GHT-130, WB7VYH-93. Nets: FARM-30/2434/39/W7WJH; NWTN-30/1117/59/KC7RNT; IDCD-21/385/14/WB7VYH; IMN-30/396/323/W6ZOH. http://id_arrl.homestead.com/mainpage.html.

MONTANA: SM, Darrell Thomas, N7KOR—June was a rather busy time for Amateur Radio in the Montana Section. Three picnics/miniature hamfests were held with good attendance at all three. The annual McClean Picnic hosted by WB7SWH was held at Hardin on June 2-3, The Bartlett Creek Campout hosted by Amateurs from the Lincoln Area was held June 9-10 with about 8 attendees, the annual Fathers Day Picnic/Hamfest was held in Glendive on June 16-17 with sixty plus in attendance. On June 7, hams, students and professors from Montana State University launched a high altitude balloon from Big Timber, MT. The package contained a camera, APRS, and a 70 cm repeater. After a three hour flight to 45,000 feet the system was recovered near Hardin, MT. On June 26, the Yellowstone Amateur Radio Emergency Service Group of Billings assisted the National Weather Service during a watch and warning. About 20 Amateur stations participated in tracking and reporting the position of two storms. The first produced heavy rain and hail. The second produced heavy rains, hail and a tornado in the Huntley area near Billings. Net/QNI/QTC/NM MSN 104/1 W7OW, MTN 1547/48 N7AIK, IMN 396/323 W6ZOH. PSHR: N7AIK 120.

OREGON: SM, Bill Sawders, K7ZM—ASM: KK7CW. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. STC: N7LA. ACC: K7SQ. The September deadline for *QST* news is July 14th. So, the Field Day weekend has just ended! Congratulations to the many clubs that participated this year. Unfortunately, the bands were terrible. 10 meters never opened, and 15 was alive in the afternoon. The only "good" band was 20 meters, and it was so crowded, the low-power stations had a real tough time getting contacts. So much for Cycle 23! Pretty soon, the 10 meter rigs will all be on sale, and "low-band" DX'ers will be back in action on 40, 80, and top-band, 160 meters. Upcoming hamfests include the 55th annual Walla Walla Valley hamfest in Walla Walla, Washington, and the BIG Swap-toberfest in Rickreall, near Salem. Check out the www.arrl.org Web sight for complete details to these and other special events planned for the rest of the year. A new HF ARES net if now forming. Tune in to 3993.5 on Tuesday nights at 6 PM for more details. This new net is just getting started and actual dates and times may change. Bob Boswell, W7LOU, is in charge. Anyone who knows Bob, knows this net will be very successful for ham radio and to the entire Oregon Section! Don't forget to e-mail me your new club officers' names and call signs, for publication, here. Continue to have a great summer, and keep in touch. NTS traffic totals for June: W7IZ 137, N7DRP 131, W7VSE 80, KC7SRL 77, N7YSS 56, KC7ZZB 50, K7NLM 37, KK1A 36, KC7SGM 6.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—Please welcome two new appointees in Western Washington. Dan Colton, W7SMC, of Shelton, has been appointed as an OES station, and Scott Douglas, W7XC, of Bonney Lake, is our newest Official Observer. The ARES team of Kirkland now has a new repeater operating on 146.80 MHz with nets each Tuesday at 1830 hours. The Shoreline ACS have moved their net time to Thursdays at 1900 hours. Are you reporting your traffic to STM Pati, W7ZIW? Public service activity helps justify our existence. Reporting via SEC N7NVP, we find ARES teams active in public events. The Trident Triple Bike Tour was supported by 10 Kitsap and Mason Co volunteers serving as SAG vehicles where they provided emergency assistance/transportation, rest area managers, relay stations and net control stations. In all they contributed 99 hours and 619 miles. Cowlitz Co. Hams were busy with an MS Walk and Tour-De-Blast bike ride. At the end of the bike ride a person fell down a 250 foot cliff. Randy, NU7D, relayed rescue communications and coordinated 3 helicopters in to the accident scene. Total hours: 157 - Mileage 1557. Red Cross and SAR exercises were used for training in Clark Co. And thanks to all of you who made Field Day a success this year. Summer may be time for inactivity for some, but not for members of the Clark Co. ARC of Vancouver. That group supported the 4th of July celebration at Fort Vancouver and Pearson Air Museum. This group has Friday brunch. For time and location monitor the Tuesday evening ARES net at 7:00 PM on 147.24 MHz. Newly elected president of the group is Luther Brisky, KC7KVL. 73.

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. MDARC

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members KI6O, KM6QX, WA6DQN, WA6JAU, KD6GLY, KB6KNB, KG6DER and KE6ZIW provided communications for the Mt. Diablo Spring Trailride. VVRC members KA6FDI, KF6ZSH, WH6AB, K6HEW, N6WVF and KF6KFP provided communications for the Vacaville Fiesta Days Parade. EBARC welcomed new member KG6GOP. NALCO ARES/RACES completed its annual training for its Berkeley Amateur Radio Fire Patrol; ready to participate in this year's patrols are: KF6OBQ, W6CZN, KC6TGT, WA6CCF, K6APW, W6WTI, KE6CFW, AB6WF, N6LFW, KD6WZY, KI6WF, WA2UNP, KF6SCX, W6WXO, WB6PIV, KF6JRN, K6KX, KF6JRO and KG6YT. SARS mourns the lost of longtime member W6WLW. New ORCA officers are: Pres/WB6NER, VP/W6LL, Sec/W6THD, Tres/KE6IUE, and board members KF6UVB, K6EHQ and KB6MP. LARK congratulates W6DXO who received his general ticket. June tfc: W6DOB 604, WB6UZX 43, KE6QR 24. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7PM; NCN2-SLOW SESSION/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—ASM, SEC: Paul, NN7B. ASM: Dick, W6OLD. This has been a long, hot month for amateurs helping with communications on behalf of the Martis Fire fighters. KJ7UK, Dick Creley, submitted a report and sounds like DCART and Washoe County were able to work together. Reports have been arriving about different groups on their Field Day participation and there must have been more than 25 so far. I hope they submit more info as there have been some really innovative methods and antenna's used in Nevada. We also had legislation pass again, paid leaves of absence for public employees when active on ARES or RACES assignments, tnx to W7LWI, RUSS SHIVELY, Washoe County RACES officer. Our legislators seem to be recognizing the volunteer work done by amateurs in Nevada. This is a busy time, an exercise 14th of July for North E. NV, in which some amateurs here in S. NV will participate on behalf of the American Red X, which has finally moved into their permanent location in the Las Vegas area. There's antenna work ahead. Looking forward to hamfest in Reno, and seeing old friends. 73 to all, Jan, nk7n@aol.com. Tfc: W7VPK90, N7CPP 21, W7TC 6, NV7YL 6, K7NHP 4.

PACIFIC: SM, Ron Phillips, AH6HN—KH7M reports that Kauai's Field Day group made somewhere between 600 and 800 QSOs during the event. But the more important item: we had many new operators this year! Dennis Niles, KH6XT, reports Field Day on Maui was a success. Several Oahu operations occurred during Field Day with groups at Bellows AFS, Waimanalo another group from Tantalis State Park overlooking downtown Honolulu, a group in Kaiwailoa and the Koolau ARC operating their antenna farm from Chinaman's Hat, Lee Wical reports. Expectations for this year's convention are for an attendance of at least 300+ with door prizes, vendors displays, tee shirt sales, a flea market and a food bazaar for those who don't have to pack their lunch and don't have to leave the premise. Their is a no-host cocktail party planned for Friday night and a possibility of a buffet dinner on Saturday night following the convention. Dan Spears, KH6UW reports in late May he was contacted Hinano Lependu of the Pacific Development Center. She is researching the benefit of Amateur Radio for the Governor of Palau. He was able assist Ms Lependu with her research and report back to the Governor. It appears as though the Governor is contemplating the cost and return on investment of setting up amateur network.

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ—It will be my pleasure to continue as Section Manager for another term. I am blessed with excellent appointees in the Section who keep all important aspects of Section business running smoothly. We continue to receive applications for field appointments particularly in the Official Observer" program and, of course, the various ARES-related categories. Speaking of ARES, thanks to Steve, N6NPN, for stepping up to become Glenn/Butte EC. This is a very early reminder, but EMCOMM 2002 will be a day and a half event. It will be held at Bishop Quinn High School near Redding on April 20 (9 AM-5 PM) and Sunday April 21 from 9 AM until noon. We anticipate a dinner/social event on Saturday evening. We have applied to ARRL HQ for "Operating Specialty Convention" status. If that is granted, we may have a featured speaker from ARRL HQ. Overnight RV camping will be allowed at the EMCOMM site. Field Day just concluded, and reports I am hearing from around the Section indicate a high level of participation—and some excellent scores. Good job on the part of many of the clubs which sponsored Field Day activities. Several of the Field Day sites were actually pressed into service to provide some communications support for fire activity in the area. Hurts the score, but doesn't hurt the image of Amateur Radio! After all, that is part of what Field Day is all about—preparing to assist "in the field" when an actual emergency occurs. Our Section and the American Red Cross Zone 5 (northern California) recently signed an operational agreement which specifies how each entity will support the other during time of emergency. Thanks to SECs K6SOJ & WA6SLA for their work on this. Until next month, 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. Congratulations and THANKS to Marci, KE6IAU, and the Humbolt County Amateur Radio Clubs for a wonderful section convention in Ferndale. 425 people were in attendance with vendors, swapfest, excellent hamfest food, and great weather. Thanks to W6CF and WV1X for making the long trip and representing the Pacific Division and ARRL Headquarters. Forums were held on propagation, emergency communications, ARRL, and solar power. Planning is underway for next year's meeting. Remember that Pacificon is coming up soon. Field Day went well in the section, but the SM only received two messages from participating clubs. More practice messages are needed in the nets, folks. A section emergency net is on Tuesday evenings at 1930 on 3915 kHz. Also at noon, the State of Jefferson net meets on 7232 kHz daily. Fire season is well underway on the north coast and all should remain prepared as it is very dry this year. SCRA is planning a September swapfest in Santa Rosa. Sorry to report that KE6WHH, Del Norte DEC and club president, is a SK.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN—ASM: Mike Siegel, KI6PR. ASM: John Lee, K6YK. SEC: Kent LeBarts, K6IN. ACC: Charles McConnell, W6DPD. OOC: Victor Magana, N1VM. STM: Fred Silveira, K6RAU. It is appropriate to recognize some of the outstanding amateurs of the Section. If DXing is your forte, then I would like to remind you that our Section card checker for DXCC is Chet Jensen, W6XK. Chet, a Professor at California State University, Stanislaus, has recently operated from Turks, and Caicos Islands.To make an appointment to have your cards checked, send Chet an e-mail at w6xk@arrl.net. Thanks, Chet, for your continued work on behalf of Amateur Radio. I know many of you are working the "birds," otherwise known as the satellites, these days which brings to mind yet another resource of information in the Section. That resource is John Lee, K6YK, who has been a Section pioneer in satellite work. John has even lured me into some activity in satellite communications. John is also an accomplished weak-signal man. John's e-mail address is k6yk@juno.com. Someone who has made a considerable contribution to the Section and Amateur Radio in general is Charles McConnell, W6DPD. Charles has been Section Manager, Division Director, Volunteer Examiner, DXCC card checker and continues to be of great help to me as Affiliated Club Coordinator. Of course, I couldn't speak of Charles without mentioning the Central California DX Club based here in SJV. If you are a Dxer, I would suggest contacting Charles for more information at w6dpd@arrl.org.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W – SEC: KM6GE. BM: WB6MRQ. TC: WA6PWW. OOC: KB6FPW. SCV Homepage is http://www.pdarrl.org/scvsec - Info on license exam sessions is also available on the SCV homepage... Field day has passed. As it happens, I received but a single FD message, from W6IO, the City of San Jose Office of Emergency Services Amateur group. That I didn't receive a message from other FD groups doesn't mean they weren't sent - only that they weren't delivered. This is an interesting commentary on the state of traffic handling in Amateur radio. The Foothill College Electronics Flea market is meeting again on the 2nd Saturday of each month. Turn your junk into cash and vice versa! The Lockheed-Martin club's name is changing from LMERA ARC to "The Employee Connection ARC" or TEC ARC. The club call will remain WA6GFY. They have a club net every Wednesday night at 8 PM local on the linked club repeaters, WA6GFY (224.28- 100 Hz, 443.775+ 100 Hz, 1283.7- and 145.62 simplex). The net is simply to pass information of a formal or informal nature. For more info contact WB6PVU/Terry tnak@pacbell.net. The Santa Cruz County ARC planned a large Field Day operation at the top of Empire Grade in the Santa Cruz mountains. The normal club meetings are at 7:30 PM on the 3rd Friday of each month at Dominican Hospital, 1515 Soquel Drive, Santa Cruz. Visit their Web site at www.k6bj.org for more info. The Foothills ARS is sponsoring a license class. By the time you're reading this, it's already started (24Jul - 28Aug). If you are interested, contact Rich Stiebel, W6APZ, w6apz@arrl.net of check the FARS Web page www.fars.k6ya.org/classes.html. See you next month! 73 de Glenn, WB6W. Tfc: W6PRI 1.

ROANOKE DIVISION

NORTH CAROLINA: SM: John Covington, W4CC—SEC: KE4JHJ. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl.org. I am pleased to report that many groups participated in Field Day this year. 23 groups sent Field Day messages to me, and many more participated. I borrowed an idea from Gene Fegely, K3EJG, and took a marathon tour of Field Day stations in eastern North Carolina. I could not visit them all, but I had a great time at the ones I visited. Many stations were visible to the public, and all groups had a great time and learned a few things in the process. Great work, everyone. We were privileged to have a special guest on the Tar Heel Emergency Net (3923 kHz, 7:30 PM) on June 26. Joel Cline, a lead National Weather Service forecaster, talked about the threats to the state from tropical weather and how we should respond to it. Joel stated that out of 67 deaths since 1970 directly related to tropical weather, 57 of these were due primarily to rainfall and flooding. When asked how active of a hurricane season is expected this year, Joel reminded us that in 1992 we had only one serious storm make landfall in the United States: Hurricane Andrew. Most people in Florida would not consider that to be a mild season. We only need one bad storm to cause lots of problems for us. Make sure you have prepared to protect your family, and if possible provide radio communications if we are activated due to any disaster. Newly affiliated clubs: Smith Chart Amateur Radio Society (Raleigh area), Aggie Amateur Radio Club (NC A&T University). Welcome aboard! It is with great sadness that I report the loss of Lynn Pitegoff, KO4QH, on June 19. Lynn was a tireless volunteer for Amateur Radio. She was Education Director for the Raleigh ARS, assisting many folks in becoming hams, and was also active in promoting Amateur Radio at schools and museums. You probably have met Lynn if you have attended many hamfests in our state. June tfc: W4EAT 679 (BPL), KB5WY 184, K4IWW 172, NC4ML 152, AB4E 128, AA4YW 123, KE4JHJ 122, KI4YV 120, N4AF 98, W4IRE 73, AD4XV 55, W3HL 54, N4TAB 52, WA4SRD 41, KE4AHC 40, AC4DV 34, W4CC 32, K4WKT 22, N0SU 19, NT4K 10, KB8VCZ 10, KE4YMA 9, AE4HJ 9, N8UTY 7, KC4PGN 7, KG4MBQ 4, N4NTO 4. May tfc: N4TAB 14.

SOUTH CAROLINA: SM Patricia M. Hensley, N4ROS - School activities have been in full session for almost a month. Elementary and middle school teachers will be looking for challenging ways to present their curricula to the students. We amateur operators have an ideal program for this task. What better way than for us to introduce these students to math, science, social studies and reading through amateur radio. You and your club can volunteer to assist any existing school club, and more importantly, to establish a new club in your local school. Our ARRL education initiatives can occur during the school day, in after-school programs, and at special events. Your service to our schools as mentors, teachers and consultants will be greatly appreciated. Please contact me if you are interested. I wish to begin our semi-annual SC ARRL SM seminars in October. These meetings will be held at both the Rock Hill and Sumter Hamfests. Each club and/or repeater-sponsored group is requested to send a representative for establishment of a state-wide Council. These seminars will allow us to meet our SC Section officials and work together to coordinate ARRL-sponsored activities in SC. It is my sincere desire that we will be able to provide a foundation for cooperation in the amateur radio community through these

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RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz	.18/FT	.16/FT	.14/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.19/FT	.17/FT	.15/FT
RG223/U SOLID SC 2 95% BRD NC/DB/UV JKT 2.0 dB/600 WATTS @ 30 MHz	.69/FT	.62/FT	.56/FT
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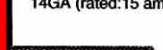

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programs. Tfc: AF4QZ 268, KA4LRM 94, KA4UIV 91, K4JMV 74, WD4BUH 56, KG4FQG 55, K4JIF 24, K4BG 19, WB4PCS 15. PSHR: KG4FQG 144, AF4QZ 143, KA4UIV 130, KA4LRM 114, K4BG 113, WD4BUH 88.

VIRGINIA: SM, Carl Clements, W4CAC—SEC: N4NW. I cannot believe that it is already September. I don't know where the summer has gone. During the summer, I have been trying to meet as many of you as possible by traveling around to the various hamfests and club meetings in the section. August saw the Roanoke and Berryville hamfests. I will be at the Virginia Beach hamfest this month. Hamfests have long been a tradition with Amateur Radio operators. Large or small, hamfests are a gathering of friends. If you have not been to a hamfest, or have not been to one lately, you may wish to attend just one to see what you are missing. Whether or not you buy anything, meeting the hams face-to-face that you speak with on the radio every day is well worth the cost of admission. There is always the added bonus of possibly finding that one treasure at the fest that you cannot live without. If you know of a hamfest or club meeting in your area that you would like me to attend, please let me know. I will certainly try to work it in. On another note, I would like to thank Jeff, KV4AP, for accepting the responsibility of the Section Traffic Manager's position. Please send all your monthly traffic reports to Jeff. Butch, N8LE, and Chip, KB8TNU, will be taking the reins of the NVTN from Jeff. My thanks to these well qualified individuals for their services to the Section. If you would like to become active in some way with the Section, get in touch with me. If your club or organization is having a special event, send me the information and I will include it in the Section News. I can be reached at w4cac@arrl.org. I look forward to meeting as many of you as possible, and to working with the many dedicated amateurs in the Virginia Section. 73 de Carl, W4CAC. Tfc: KV4AP 368, W3BBQ 274, WA4DOX 183, K4YVX 128, K0IBS 98, WB4ZNB 78, W4CAC 77, K4MTX 74, KE4PAP 74, WB4UHC 51, KD4FUN 44, WD4MIS 15, W4MWC 11, KU4MF 9, KB4CAU 9, W4JLS 7, W4YE 5, N4FNT 2, WB2KQG 2.

WEST VIRGINIA: SM, O.N.(Olie) Rinehart, WD8V— Hey a great month for Amateur Radio in WV with the WV QSO Party and ARRL Field Day. Several messages were receive by SM indicating a lot of participation in the FD activity. I am president of KARC this year, so worked some with club station. I am receiving and sorting logs for the WV QSP and have received logs from several stations. The Technician class course material is available now in three VCR tapes, a CD and workbooks. Check it out @ ARRL Web site. The II phase of emergency course is filling up fast. Check them both out with your DEC or EC. Available on line. The WVSARC sponsored WV ARRL Convention is fast approaching. Saturday, Aug 25, is the date at "The Mill." If you have not already contacted Patrick, N8MIN, with your club's demonstration project, please do so as soon as possible. Ed, N8OYY, already has your club's ad for program, I hope. If not, please get a (camera ready) ad to him before publishing date. Congratulation to Patrick Clark , KC8BFD, Newsline's Young Amateur of the Year. Good luck at the Huntsville Hamfest and National Space Camp, Patrick. We know West Virginia will be a little higher up on the Amateur Radio ladder because of you. We are pleased and proud of you. Tfc: W8YS 297, KA8WNO 250, WD8V 183, WD8DHC 176, WW8D 104, KC8CON 64, W8WWF 58, N8BP 11, N8NMA 50. WVFN 828/ 151/721 KC8CON. WVMDN 607/27/349 WW8D; WVN E 87/ 65/184 W8WWF; WVN L 98/27/210 W8WWF; ARES/RACES 84/0/122.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Tim Armagost, WB0TUB— ASM: Jeff Ryan, N0WPA. 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. What a fabulous Field Day. Camping in the Colorado mountains-with ham radio thrown in for free! I was at the PPRAA/MARC site near Woodland Park. The WX and scenery were spectacular and the company couldn't be beat. XYL Gloria, N0ZFX, and I invited a non-ham friend to camp with us. Her observation: What a great, down-to-earth bunch of people. Thanks, Maura, for visiting Field Day and we're glad you had a good time. Maybe next year we'll get you on the air! SM Tim, WB0TUB, reports Field Day messages as follows: AI, K0FRP reports the Colo. QRP club at their Aloha site on Rampart Range southwest of Denver at Sedalia (or did they operate two sites?); Pikes Peak and Mountain ARC reported at Sourdough Valley near Woodland Park by Mike, K0TER; Pueblo Ham Club operated from City Park in Pueblo, by Alan, KB0TLS; Park County RC operated from Deer Creek Elementary, report by Padre, W0WPD; W0DZ reports from West of Loveland (group?): Arapaho County Rest District 22 operating from Lockheed Martin, from Ben, KB0UBZ: Montrose ARC operated from Sunset Mesa near Montrose, sent by Royce, AA0JD. Did we miss anyone? The annual Colorado 14er event is August 26, 2001. Contact Bob, KB0CY, for info or go to www.Colorado14erEvent.org. Excellent job, as usual, from everyone supporting the annual Pikes Peak Hill Climb. Congrats also to the Boulder-area hams on their out-of-this-world contact with the International Space Station under the ARISS program. Gloria and I are off to the RM convention in Bryce Canyon, so I'll miss the MS-150 this year. More next month. If you have items for this column, please e-mail me at n0wpa@arrl.net. 73 de N0WPA.

NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5IBS, N5ART. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO, W5UWY. TC: W8GY. ACC: N5ART. Roadrunner Net handled 209 msgs with 1289 checkins. Breakfast Club handled 342 msgs with 952 checkins. Yucca Net handled 23 msgs with 540 checkins. Caravan Club Net handled 3 msgs with 57 checkins. SCAT Net handled 9 msgs with 360 checkins. Four Corners Net handled 31 msgs with 400 checkins. GARS Net handled 7 msgs with 28 checkins. Rusty's Net handled 94 msgs with 823 checkins (with FB assistance of KA5EMH & K5TCU and others. Rusty, KD5SY, passed away on June 5…May he rest in peace.) Valencia County Net handled 11 msgs with 39 checkins. Deming ARC Net handled 11 msgs with 71 checkins. Field Day was a great success with everyone making record scores! The Alamogordo Hamfest is Saturday, Sept 1. See you there! The Socorro Hamfest is scheduled for Oct 27. So sorry to report the passing of Rusty, KD5SY, and W5IH (who I've known since 1948), N6LT, KC5SUW and W5GBV (an old Pampa, TX, friend). They will all certainly be missed! Best 73, W5PDY.

UTAH: SM, Mel Parkes, AC7CP—Another summer has just ended, and it is now time to start planning all your fall activities. First, I would like to express my appreciation to all the club officers and members throughout Utah who have made the club events happen this year. If you are not involved with a club in your area, please start by attending the meetings and helping with the activities. There are many fun and interesting activities you can be part of and learn to improve your ham skills at the same time. Ask you local club officers what you can do to help. Next month is the annual Jamboree-on-the-Air (JOTA). This has become a great way to introduce ham radio to younger people and have a lot of fun doing it. Many clubs have very interesting events and opportunities during the JOTA weekend so get out and help. If you are in an area with no club, let me know and I would be more than happy to help you get one started in your area. 73 de Mel, AC7CP.

WYOMING: SM, Bob Williams, N7LKH—There have been some changes in the WY Section staff appointments, and it is time to summarize them. Art Edmonds, KK7BZ, TC, has resigned to go off around the country doing good things. He is replaced by Robert Elder, K7EMS, formerly TS relder5@hotmail.com. He has two main missions initially, first to stay on top of packet in the Section, and second, to look into getting WEMA grants to fund the site rental for the HERC repeaters. Two new ASMs have been appointed. Greg Rix, WB7GR, wb7gr@arrl.net, is appointed ASM to represent the SM in the Southeast region of the section. Mary Williams, KF7MC, kf7mc@arrl.net, is appointed ASM for Special Projects (since she has been doing that anyway). She will continue to be ACC. Please welcome these new section staff appointees and give them plenty to do. Tfc: NN7H 185. PSHR: NN7H 193.

SOUTHEASTERN DIVISION

ALABAMA: SM Bill Cleveland, KR4TZ – ASMs: W4XI, WB4GM, KB4KOY. SEC: W4NTI. STM: AC4CS. BM: KA4ZXL. OOC: WB4GM. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. PIC: KA4MGE. The Mobile Amateur Radio Club is having its annual hamfest on Friday September 14 and Saturday September 15 at the Elks Lodges #108 on Dauphin Island Parkway in Mobile, Alabama. The hours of the hamfest are Friday from 5:00 PM to 9:00 PM and Saturday from 8:00 AM to 2:00 PM. Talk-ins will be done on the 146.82 (-) MHz repeater. Admission is $5.00 per person while children under 12 are admitted free. For more information contact Larry Early at 334-342-7601. I hope to see you there. This Alabama QSO Party will be on Saturday September 29, 2001 from 18:00 UTC to 2400 UTC and is sponsored by AI4AA, The Central Alabama HF/VHF Contesting Club. There are multiple categories for operation: AL QRP (<5W), AL Low Power (<200W), AL High Power (>200W), Non-AL QRP (<5W), Non-AL Low Power (<200W), Non-AL High Power (>200W) with Single Operator, Multiple Operator, and Rover Operations possible. The exchange for AL Stations is signal report and county, and the exchange for non-AL stations is signal report and state. For more information, go to http://web.dbtech.net/~dxcc/. Field Day, 2001, was a success in Alabama this year! I would like to thank the DeKalb County ARC, South Baldwin ARC, East Alabama ARC, Eufaula ARC, Gulf Coast DX Association, the South Alabama ARC, and the Montgomery ARC for submitting their Field Day reports. I know everybody had a great time, and we're all looking forward to next year! God Bless & 73, Bill Cleveland KR4TZ. Tfc: WA4GQS 581, W4ZJY 412, W4CKS 144, AC4CS 132, KC4VNO 106, WB4GM 89, W4QAT 17, W4DGH 15, W4XI 10, W4NTI 6, WB4TVY 6.

GEORGIA: SM: Sandy Donahue, W4RU—ASM/South Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. Asst SM/IT: Mike Boatright, KO4WX, SEC: Lowry Rouse, KM4Z. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JNL. ACC: Susan Swiderski, AF4FO. OOC: Mike, Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. Website: www.qsl.net/arrl-ga. Field Day was another gastronomic success. Those who know me know that I consider FD just another excuse to eat, so I tour several Atlanta area sites to visit and chat and eat. This year Kennehoochee, N. Fulton, Gwinnett and Alford ARCs suffered a visit from me on Saturday. Early Sunday I visited the Paulding ARS for breakfast and a preview of their site for the Paulding hamfest on Sept 15. Thanks to all the clubs who tolerated my visits. Everything went as planned except for Alford ARC where no-one saved a piece of promised strawberry pie, and I had to settle for pecan pie instead. New officers in the Southeastern DX Club. Pres K4PI, V Pres W3WL, Sec. K4HGG, Treas W4TE. The club says thanks and farewell to Nancy, NK4U, who was treasurer for six years. Congrats to Andy Funk, KB7UV, who won another EMMY award for rival WAGA-TV. When you read this, I should be retired after 20 years at WGCL-Channel 46. I was supposed to leave July 1, but I was asked to stay on a few weeks because a replacement couldn't be found. 73, Sandy. Tfc (June): WB4GGS 234, W4WXA 203, AF4NS 157, KG4FXG 80, K1FP 45, K4ZC 39, K4BEH 37, WB4BIK 31, K4WKT 29, KA4HHE 22.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP— ACC: WA4B. BM: N4GMU. OOC: KD4NLV. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. The following participated in Field Day, and seems everyone enjoyed it to the fullest. Villages Amateur Radio Club, 15 members, including 11 ARES, Hernando City Amateur Radio Assoc with 10 members including two ARES Reps, North Florida Amateur Radio Society with 35 operators including 30 ARES members, Cary Amateur Radio Club, Tallahassee Amateur Radio Assoc., Orange Park Amateur Radio Club, Brandon Amateur Radio Society, Five Flays Amateur Radio Society including 23 operators and ARES members. The antenna support structure bill is in draft form, and was circulated to all ARRL members with call GOTOBUTTON BM_1_ sign@arrl.net. Several comments have been received and will be shared with the other two Section Managers. The next process will be to approach a legislator to sponsor the bill. The writing of the bill will be left with the legislator as it requires language acceptable to the committees, etc. This is a highly specialized field and we want to be certain of our intent to get support from both

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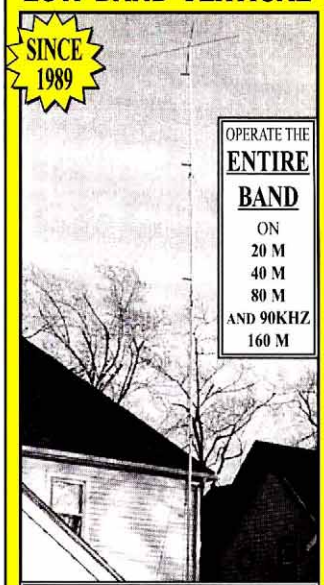

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Houses of Congress. Your comments of the draft should be addressed to me, as the three Section Managers want to be sure all amateurs in the state will be covered. de 73 Rudy, WA4PUP. Tfc: WX4H 1644, AG4DL 183, KE4DNO 167, NR2F 152, WD4GDB 138, N9MN 113, W8IM 89, KF4WIJ 101, W4KIX 95, AF4PU 79, K1JPG 53, W5MEN 53, K4DMH 45, KM4WC 42, K4JTD 36, AB4PG 35, WA1VOP 33, KG4LZQ 29, KB4DCR 25, KJ4HS 19, N4EC 11, WB2IMO 9, WX4J 6, WA4EYU 6, WD4ILF 4, WB9GIU 4, W4ZEJ 4, KF4INJ 2.

PUERTO RICO: SM, Víctor Madera, KP4PQ —Logramos un acuerdo con el ARRL para ofrecer el curso de Comunicaciones de Emergencia en español. Este curso es parte del programa de educación continuada que esta desarrollando el ARRL y conlleva estudios y preparación formal para aprobar un examen que cualifica a los radioaficionados para ser certificados por el American Radio Relay League. Será ofrecido a la IARU para uso internacionalmente y es posible que las agencias requieran esta certificación a todos los que participen en programas de comunicaciones de emergencia dentro de las agencias. Tan pronto se completen las traducciones se anunciará el comienzo del curso. Esperamos poder ofrecer más cursos de capacitación según el ARRL los vaya completando. Estamos dentro de la temporada de huracanes en el Caribe. Sigue preparándose un grupo de operadores dentro del programa de ARES. Esperamos que se organice una red local en cada distrito en la bada de 2 metros "simples". Esta vendrá a complementar la red en HF entre distritos. Sigue adelante el programa de Observadores Oficiales, los próximos talleres serán en Ponce, Mayagüez y posiblemente Fajardo. Los candidatos que logren su acreditación estarán en posición de ayudar a los radioaficionados en asuntos de cumplimiento con el propósito de reducir o eliminar las violaciones en el aire. El PRARL está publicando traducciones en español de segmentos importantes de la Parte 97 en la Revista ¡EUREKA! esto ayudará a mejorar el cumplimiento. Se hacen preparativos para celebrar el "Lighthouse Weekend", hasta ahora la FRA y el PRARL han anunciado su participación en esa actividad. Los interesados en participar en los distintos seminarios y talleres comuníquense con el Section Manager por correo regular, teléfono, o vía email a kp4pq@arrl.org.

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI—SEC: W4SS. STM: KJ4N. ACC: WA4AW. PIC: W4STB. OOC: K4GP. BM: KC4ZHF. SGL: KC4N. DEC/ASM: N4LEM, WB9SHT, AA4BN, KD4GR. WEB PAGE: http://www.sflarrl .org. Thanks to the South Brevard, Dade, Ft Myers, Indian River, Orlando, Vero Beach, Wellington Clubs, and ECs for newsletters and activity info. Amateur Radio made big news in "The Miami Herald" this month. The June 19 article highlighted the importance of weather information sent from boats and ships at sea. The June 24 article painted a Field Day picture and brought out the general communication and fun aspects, as well as other areas of public service. When your ham radio activities are highlighted in any news media, please let ARRL know. Last month, I put out a plea for someone who spoke French and would be willing to help a French ham now residing in France but moving to Lee County. The section news had barely been re-sent from ARRL HQ when I got the first of 6 replies. Thank you. COMING: JOTA !! Scouting's Jamboree On The Air…our chance to bring new, young life into the hobby. If you are willing to help please let coordinator, Sal Ippolito, know (e-mail N4YQU@arrl.net). The South Brevard ARC earned 600 FD points in bonuses. The Indian River ARC reports the appointment of KF4XB as ARRL Awards Manager for WAS card checking for the club and surrounding area. Congrats to KN4JN and NA4CW for high scores in the ARRL CW sweepstakes. The Dade ARC teamed up with the South FL FM Assoc. and EOC for Field Day this year. ARRL welcomes back the America Radio Club in Miami! Lee County FD was held in Lehigh Acres. It was covered by CBS and NBC TV. It's storm season. Read of KE4UEI's lightning strike experience on http://www.lightningsafety.noaa .gov. Osceola had 6 Skywarn activations including an f-0 tornado that touched down. They welcome a new Public Safety Dept. Director and look forward to continued good relations. Palm Beach Co. ARES (PBCARES) EC, N4QPM, with assistance, licensed over a dozen Palm Beach County Sheriff's office Explorer Scouts in the Belle Glade area. They will man the West County Shelters during hurricane season. Way to go! The "Palm Beach Post" featured an exciting FD article about activities at the Boca Raton ARA/FAU site and Wellington site. The Jupiter-Tequesta Group and PBC ARES also enjoyed active FD sites. The Port St. Lucie ARA hamfest application for Nov. 10 has been approved by Director Butler. Best wishes for a successful hamfest. June Traffic: WA9VND 524, KA4FZI 167, KD4GR 154, KD4HGU 86, KC4ZHF 79, KE4WBI 64, WA2YL 62, WA4EIC 60, W6VIF 53, AA4BN 48, K4VMC 47, WA4CSQ 43, KD4JMV 40, WB4PAM 31, KT4XK 29, KG4MLD 14, KG4CHW14, KG4GZL 13, KG4MLC 11, K4OVC 11, W4WYR 9, KF4OMB 9, KQ4TR 6, AF4NR 6, W3JI 5.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St. Croix—ASM: Drew, NP2E, St. Thomas. ASM: Mal, NP2L, St. John. Section 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. St. John Club active on FD this year from the Nat'l Park Biosphere. Murphy did a number on NP2L's laptop, 300 Qs were lost. Ouch. Participating were Doug, NP2CQ, Paul, NP2JF, Sam, NP2FO, Tony, KP2Z, George, KP2G, and Mal, NP2L. Next year, St. Croix will be on! Jimmy, KP2BH, and Roberto, NP2JV, are active on 6 meters. Look for them on 50.110 MHz. Good showing for Director Butlet's visit, especially on St. John and St. Thomas! Lou, KV4JC, sporting almost new Nissan Sentra – nice 2M mobile installation, Lou. A reminder that the Intercontinental Amateur Traffic Net and the Maritime Mobile Service Net are active on 14.300 every day from 7 AM to 10 PM Eastern Time. Good place to meet for schedules and to get latest severe weather reports, also the Hurricane Watch Net on 14.325 when the "goin' gets rough"! V.I. Section Web site www.viaccess.net/~jellis. 73 all, John, NP2B.

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR, ae4mr@arrl.org, http://www.wcfarrl.org—ASM: NA4AR. ASM-Web: N4PK. ASM-Legal: K4LAW. SEC: KD4E. TC: KT4WX. BM: KE4WU. STM: AB4XK. SGL: KC4N. ACC: AC4MK. PIC: WX1JAD. Please join me in welcoming Jack Dole, WX1JAD, as the new Public Information Coordinator for WCF. The Manatee ARC has won the Section Manager's Field Day Trophy with their joint Ground Zero 2001/FD exercise with the Sheriff office. During FD, they had done radio classes, ICS classes, 2 VE test session and a SKYWARN class. Many different agencies attended their FD with their gear as well including 2 helicopters. They also had arranged for excellent media coverage. Well done. (Visit the section's web site for more information.) NA4AR ASM, KE4BXF and myself logged 747 miles and visited 21 FD sites this year. Kudos to all on a very fine FD in the rain. N4PK reports Pinellas ARES coordinated communications for the Kiwanis Dunedin Midnight Run on the evening of July 3. 21 hams participated as communicators. SEC KD4E reports a increase of 6 ARES members for a new total of 426. In June there were 48 Nets, 21 Ops, 3 public service events, 15 drills and 3 emergencies. The total man hours reported for June is an impressive 1,937.8 hours. June Net report is available on the section's Web page. June PSHR: K4SCL 147, K4RBR 143, KF4KSN 127, AA4HT 122, KT4TD 109, WB2LEZ 106, AE4MR 99, KF4OPT 89, KE4VBA 86, W4AUN 73. SAR: K4SCL 254, AA4HT 146, AB4XK 88, KF4KSN 50, KT4TD 49, K4RBR 45, KF4OPT 32, AE4MR 26, AA4WJ 22, KE4VBA 18, W4AUN 17, WB2LEZ 6, K9EHP 6. 73, Dave, AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—Field Day has come and gone and here in Arizona it was a big success. Many individual people and club stations participated in all portions of the Amateur Radio frequency spectrums including ATV, APRS, etc. I was able to visit only three (3) clubs this year due to work schedule, but my assistants visited several other clubs set-ups and they reported everyone doing well and having a good time. I did something unusual this year in that I took the time to sit down and operate 15-meters for over an hour. The Lake Havasu City Mayor and several members of the City council visited the London Bridge Radio Association field day site. The idea was to show the local government that amateur radio can be counted upon to help out with local emergencies. The mayor and his council were very impressed and an article was printed in the local newspaper. Received Field Day messages from Radio Society of Tucson, Catalina ARC, IBM ARC, Old Pueblo ARC, London Bridge ARC, Eastern Arizona ARC (solar power from Mount Graham), Arizona Radio Association, Central DX Association, and Yavapai ARC. Very good representation for this state. Don't forget to checkout the state web site at www.qsl.net/arrlaz/. This site has all the latest state information and links to many clubs. Thanks Tom, WB7NXH, for keeping this Web site updated. This is the month for the Southwestern Division Convention, 7-9 September, in Riverside, California. I hope you have made the necessary reservations. If not, go to their Web site at www.qsl.net/arrl-2001swdc. AMSAT has scheduled a conference for Friday starting at 1300 hours. The Southwestern Division Section Managers have also scheduled several talks for the various volunteers starting at 1300 hours. If you need additional information, call me at home and I will point you in the right direction. Looking forward to seeing many of Arizona people at this convention. The Hualapai Amateur Radio Association will hold it annual fall hamfest on 29 September 2001 at the Mohave Community College in Kingman starting at 0600 hours. I plan on attending and hope you will also support this organization. 73, Clifford Hauser, KD6XH. ATEN QNI 833, QTC 36, sess 30. Tfc: W7EP 101.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF—Propagation has been very good at times especially on 20 meters. One very nice gentleman called CQ and repeated the following several times "oh two bad", "oh two bad", this was followed by," well I am not really bad, I am a Lutheran minister in Finland". He had an outstanding signal and a great sense of humor. Give him a call when you hear him. - At the TRW swap meet last week an active ham from the Pasadena area asked me why my column was so short lately. I told him that HQ must have done some editing. As you know, HQ always reduces the print size so that only younger hams can read it! He said OH! So goes life in the big city. - Spud, K6KH, our LAACARC, officer and guru has fabricated a great letter to all Clubs in this area. It seems that clubs change officers too often and the new ones don't get indoctrinated to the important thing in club life; like attending the LA Council meetings. This Council sponsors conventions in the area and has money to help do other very good things for the Amateur Radio cause. Spud's letter should be answered by sending a representative to the LA Council meetings. Many conversations on the bands ask about the price of gasoline. One radio station in Texas said that gas was $1.18/gallon; the Los Angeles price was $1.78/gallon. On 15 meters, the band was almost dead except for 9K1GS. I gave him a call, and he said hi Phineas. He gave me a 5/7 and I gave him the same, but I forgot to ask him the price of gasoline. Some one popped in and said that gasoline was probably free if you have a limousine. You never know what you will hear on the Ham bands these days when it is hot weather. Vy 73, de W6BF, Phineas.

ORANGE: SM, Joe Brown, W6UBQ, 909 687 8394— ASM Riv. Co: Brett 780 346 9291. ASM Orange Co: Art W6XD, 714 556 4396. ASM: S.B Co: Jeff, KD6NXD. 909 886 3453. Field Day 2001 was a happy event. Mister Murphy was at his best. One club had a van fire and the club generator started putting out 220 AC where 110 AC was supposed to be. You can guess what happened to a lot of equipment. All in all, reports indicate the food was great. Congratulations to the Downey ARC on the 50th Anniversary. The club was revitalized by a proposed antenna ordinance in the 1970s. Bob Wartenbe, WB6GJW, was DARC president at that time. The city officials were so impressed by the professionalism and the presentation that the present antenna ordinance was enacted. The Amateur Radio community was the winner. A fair resolution to an issue that could have had a disastrous effect on Amateur Radio. The City of Downey has a law that Amateur Radio can live with (From Q5 DARC). The AD6IJ Mountain Toppers were at it again for the VHF and up ARRL Contest. The tally total was 6,634 points. (From The Modulator). The ARRL on line Emergency Communications Course has something for everyone. It will enhance your knowledge by providing in-depth look an emergency communications. Among the many topics are Working with Volunteers, Human Resource Aspects for NCS, Net Manager Duties and Qualifications, Mutual Assistance and ARES MAT Concept. FCC Emergency. (The Modulator). If your ARRL membership is up for renewal, use your ARC to renew. The cost is the same, but ARRL will rebate to the club $2.00 on renewal and $5.00 for new member. In most clubs, membership officer or the treasurer will take your check. Dr.

Steve Graboff is the Emergency Services Office's Selection for Volunteer of the Month. He is the Chief Radio Officer (President) of the RACES unit. (CERT Newsletter). For the CW, every Sunday 1700Z, 1000 local and 2300Z, 1500 local on 21.158 plus or minus. It's a place for slower CW operators to meet and operate (FISTS). Orange County RACES has a very informative (SSTV) or (ATV) presentation with live demonstrations that are available to any City Organization. Call 714 704 7919 Robert. (NET CONTROL). Tfc: KC6SKK 241, K6IUI 196, W6QZ 93,W6JPH 47. W6QZ NTS BBS 284. PSHR W6QZ 151,KC6SKK 129, W6JPH 97, K6IUI 84. SCN/V NET MGR W6JPH reports 20 sessions. QNI 111, QTC 81, AVG Net time 22 minutes.

SAN DIEGO: SM, Tuck Miller, NZ6T—619-434-4211; Just a few days left before we head off to the 2001 Southwest Division Convention. This year it is being held in Riverside, CA, at the Holiday Inn Convention Center. I am sure we will all have a great time. On Friday afternoon, we will have several Field activity sessions. At 4 PM, we will have an ARES forum, and Jack Hunter from Santa Barbara will be conducting the session. We will be talking about various ARES topics, including possible mutual aid. Want to know more about ARES. This is the place to be. As stated previously in another article, Warren Dilley, KT6A, had resigned as Section Traffic manager, a position he held for many years. Stepping up to the plate as the new STM is Tom Caudle, KC6NXZ. Tom has been very active in San Diego ham activities for many years, and will be for many years to come. We wish Tom good luck, and thanks for stepping up. Unfortunately our Official Observer Coordinator, Bill Sallee, K6TWO, had to resign, and I will be looking for a replacement for Bill. Bill has done a great job, and is world renowned for finding the "ditter." July 8th was a sad date in San Diego. Over 25 hams were helping out with the ILACSD beach cleanup. Walt Davis WA6ODQ, became a Silent Key while at Dog Beach. We will sure miss him. We are always looking for many volunteers, and we will be having another beach cleanup during the month of September, and hope you can help. Just a reminder that the ARES Alert is now available on the San Diego Web site. Please keep me updated on your club activities, and I will try to get them in my weekly Internet newsletter. You say, you are not getting the newsletters. Well, if you have Internet capability, and are a League member, sign up for the members only section at www.arrl.org. You can sign up for the section news, and also obtain an arrl.net e-mail alias. Is your call about to expire? If you need help, let me know, and we will help anyway we can. That's it for this month. See you at Riverside!! Until next month... Remember, Helping Others.....Always Worthwhile!! 73, Tuck, NZ6T.

SANTA BARBARA: SM, Robert Griffin, K6YR, (k6yr@arrl.org or k6yr@arrl.net)—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: Warren Glenn, KM6RZ (wglennrz@ix.netcom.com). 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) & for Internet, Jack Bankson, AD6AD (ad6ad@arrl.net); & DECs: Santa Barb-Dave Lamb, WA6BRW (wa6brw@arrl.net); SLO-Bill Peirce, KE6FKS (ke6fks@arrl.net) & Ven-Dave Gilmore, AA6VH (aa6vh@arrl.net). RIGHT NOW, WRITE your Congressional Representatives to urge co-sponsorship of The Amateur Radio Spectrum Protection Act (HR 817 and S 549). Make plans to attend the 2001 SW Division Convention coming up on Sept 7-9 in Riverside, CA. Contact: w6ybs@arrl.net. FREE instant Section news updates? Join the SB Reflector! E-mail majordomo@qth.net the message subscribe arrlsb. SB Sec Web: www.qsl.net/arrlsb/. Join in our Section NTS traffic nets: 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). Thats 30 in memory of SK, W6HW.

WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL—Ham-Com has come and gone so has Field Day, and now it finally has hit 100 degrees around here. At least it waited until after Field Day for that and there were some interesting antenna arrays out there that weekend. The Garland ARC found that a power company boom truck makes an ideal tower. I hope everybody enjoyed their outing and learned something new. I would like to remind everyone about the Texas ARES Net that meets every Monday night on 3.873 MHz at 19:30 local time. All club presidents need to update the club's info with the staff in Newington so that we have the correct information to pass on to new or prospective hams in your community. Also, if you would send a copy of your club's newsletter to Jerry Combest, N5JL, (ntx@worldnet.att.net) so that he can incorporate it in the section newsletter. I would like to thank John Fullingim, WN5PFI, for taking on the responsibility of the OO program for NTX. Hope to see a lot of you at the next round of fall Hamfests. 73 de KA5TXL. SEC Bill K5MWC; STM Carolyn KC5OZT; OOC, ACC John WN5PFI; TC Don KB5YAM; SGL Tom N5GAR; ASMs Gary KB5LWZ; James N5JZ; Jack KX5K; Jerry N5JL.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL July has been a difficult month here in Oklahoma. John R. Schiller, W5VTC of Tulsa became a Silent Key July 11. David Horn, KK5I, of Tulsa tragically died in an accident while on a trip to the Cayman Islands. And I sadly report that our current ASM and immediate past SEC Bennett Basore, W5ZTN, of Stillwater, died from complications of heat stroke. The space I have available here is nowhere close to the tribute I would like to afford Bennett. He was a good friend and an integral part of the ham community in our section. Bennett served as SEC for some 30 years. He was active in representing ARRL in Oklahoma VOAD, and devoted much of his life to helping many of us in the section. He was faculty advisor to the Oklahoma State University Radio Club, W5YJ, and would run the OPEN net from that station just about every Sunday morning. He also served as trustee for the Stillwater ARC. I would encourage you to visit http://www.stillwaterarc.org for more information about Bennett and the Bennett Basore scholarship fund. If you don't have access, let me know and I'll get that information to you. I've received many comments from hams around the state expressing their grief. From the eulogy of one of Bennett's long time friends Martin McCormick, W5AGZ, "That spirit, while it can't be replaced, can live on. We've seen the example and now it is up to us to carry on." 73, Charlie. Tfc: N5IKN 946, WB5NKC 428, KF5A 392, WB5NKD 227, WA5OUV 180, K5KXL 138, KE5JE 75, K5CXP 73, KM5VA 64, KI5LQ 60, KK5GY 56, WA5IMO 26, W5REC 25, N5FM 2.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, K5SBU. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. Despite all the scientific advancements in communications today, ham radio is still the only resource available in times of a severe disaster. Cell phones, the Web, police, and fire communications are so often the first to go down. One thing I would like to stress is we are there to furnish communications. We are not policeman or fireman. This seems to be one of the problems that have caused some agencies to reject or services during an emergency. Whether it was in fact hams or another organization that looked a lot like hams that caused the problems is yet to be determined. We have been asked on occasion to do other jobs, and we do if it doesn't take us away from our post while performing our duties as a communicator. To interfere with one of the agency's job is not becoming of a ham operator. We do not use red lights or siren, we do not have badges made up that looks like a Texas Ranger badge. The only badges we use are the ones made up for ARRL positions of DEC or EC, etc. We do have some law enforcement people that are in these positions that do have red lights and sirens on their personal vehicles. This kind of action will have you removed from your position as soon as the paper work can be completed. We've had such a case here in South Texas. We're still looking for pictures of the Houston flood that do not have a copyright attached. We really need some from the business and housing area. Shelter pictures would be great. We had two SKs on July 8. N5XJS became a SK after undergoing open-heart surgery a week before. Ed will be missed on the 2 meter nets. W5TBV fell from the top of his 80 foot tower. Since his belt was disconnected, we think he might have started down. Always use your belt, and I think you should have someone there with you in case of problems. Bob will be missed by all. Field Day was a great success this year. Each year I get more radiograms than the year before. This year it almost doubled. I'm glad to see that more groups are learning how to make a radiogram, and also it's worth that extra 100 points. Some of the pictures that I've seen indicate you found some shade and had plenty of fans to move the hot air around. Everyone have a great September. God Bless. Tfc: W5SEG 1969, KA5KLU 365, W5TUK 214, W5ZX 211, W5KLV 153, N5OUJ 123, N5NAV 110, W5GKH 82, W5ZIN 40, K0YNW 34, KD5GM 20, WD5AAH 12.

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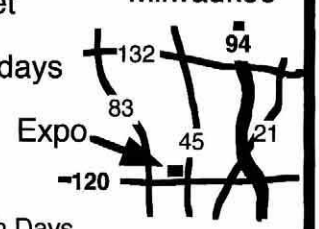

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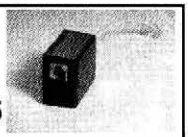

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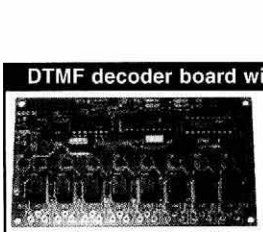

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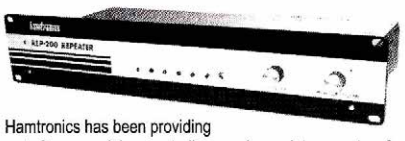

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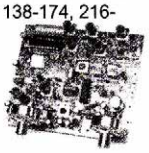

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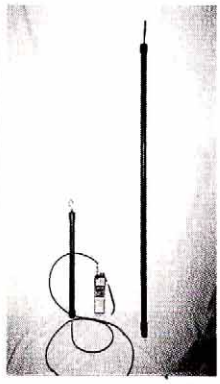

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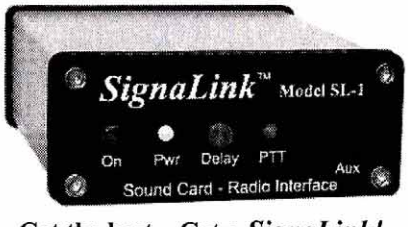

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Tech-Talk by Ten-Tec

Strong Signal Performance
by Allan Kaplan, W1AEL

We continue the last Tech-Talk discussion of impairments to strong signal performance in our receivers by considering some aspects of dynamic range. The RF front-end in modern receivers covers at least an entire amateur band. When we have tuned to some signal of interest, no matter how narrow a filter we select, the receiver must still contend with strong unwanted signals outside the final passband.

Strong signals cause a variety of problems in a receiver. Among them are reduction of weak-signal sensitivity, production in the receiver of spurious signals in the passband, transfer of modulation or noise to the desired signal, and unwanted influence on the AGC. Apart from some bells and whistles the dif ference in value between a moderately priced receiver and an expensive one is strong-signal performance — arguably one of the most important qualities of a receiver for modern amateur radio use.

Because the impairments described above may occur in confusing combinations, receiver designers and evaluators have devised test methods to quantify them separately. The blocking dynamic range (BDR) number assesses the resistance to desensing or gain compression, the reduction of in-passband sensitivity by a strong interferer outside the selectivity passband. The test applies a strong signal at a specified frequency offset from a weak signal at the receiver s passband center. The tester increases the amplitude of the QRM signal until the signal in the passband diminishes by 1 decibel. The dB difference between the interferer and the receiver noise floor is the BDR number. Bigger is better! This becomes the basis for assessing how likely it is that a strong signal down the band will reduce your receiver gain. The prudent amateur will not concentrate on BDR or any single number when he compares competing radios.

You can reduce the effect of the strong signals with the RF gain control or attenuator, but they affect the strong signals and the weak ones equally, so if the weak signal is too close to the noise floor, you lose it.

Another dynamic range topic next time. 73 de W1AEL

Allan Kaplan, W1AEL, joined Ten-Tec as an RF engineer after retiring as Senior Staff Engineer at Raytheon, Falls Church, VA., where he designed high performance receivers. He holds a MSECE degree from the University of Massachusetts.

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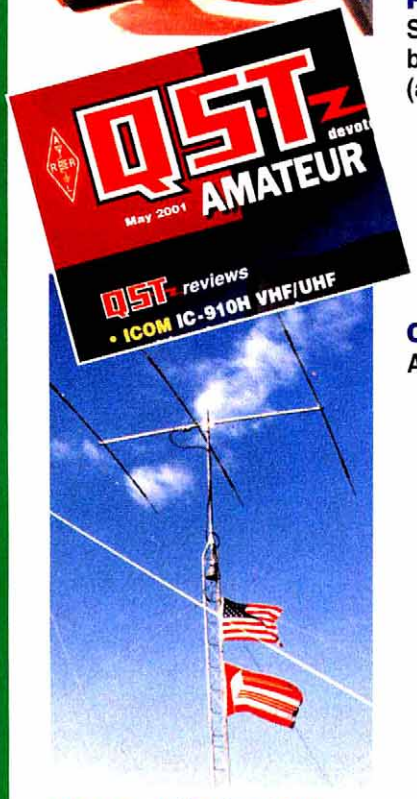

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Wind Load (with mast adapter)	10 sq. ft.	7.5 sq. ft.	5.0 sq. ft.	1.5 sq. ft.
Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
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Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
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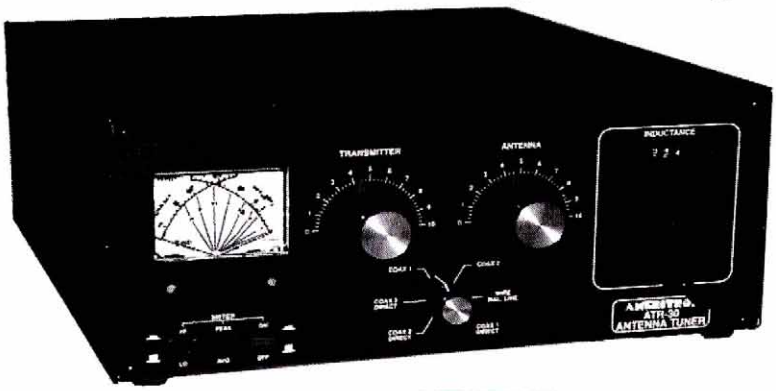

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ATR-20, $459. Handles full 1.2 kW SSB/600 Watts CW. Handles full SSB power of Ameritron AL-811/811H/80B/ALS-500M/600, other 1.2 kW SSB amps. Roller inductor, turns counter, verniers on capacitors, balun, cross-needle SWR/Wattmeter.

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

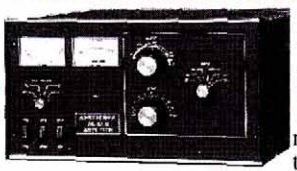
Suggested Retail

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

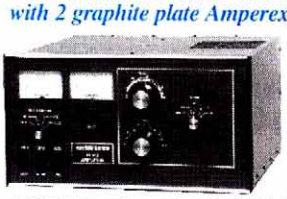
Suggested Retail

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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High current Roller Inductor
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Cross-Needle Meter
6 position Antenna Switch
Built-in 4:1 Balun
Gear driven Turns Counter

VC-300DLP

$459.95

The VECTRONICS HFT-1500 is not just an antenna tuner . . . it's a beautifully crafted work of art, using the finest components available and the highest quality construction.

Every HFT-1500 aluminum cabinet is carefully crafted with a durable baked-on paint that won't scratch or chip.

The attractive two-color Lexan front panel is scratch-proof. Take a quarter. Scratch the HFT-1500 front panel as much as you want. You won't leave a mark!

Arc-Free Operation

Two heavy duty 4.5 kV transmitting variable capacitors and a massive high current roller inductor gives you arc-free operation up to 2 kW PEP SSB.

Precision Resetability

A sturdy hand cranked roller inductor lets you quickly fly from band to band. A precision 5-digit gear driven turns counter lets you accurately return to your previous settings.

Large comfortable knobs and smooth vernier drives on the variable capacitors make tuning precise and easy. Bright red pointers on logging scales make accurate resetability a breeze.

Absolute Minimum SWR

You can tune your SWR down to the absolute minimum!

Why? Because all three matching network components, the roller inductor and both variable capacitors are fully adjustable.

Tune any Antenna

You can tune any *real* antenna from 1.8 to 30 MHz, including all MARS and WARC bands. You can tune verticals, dipoles, inverted vees, yagis, quads, long-wires, whips, G5RVs, etc . . .

*SSB*Analyzer Bargraph™*

VECTRONICS' exclusive 21 segment bargraph display lets you visually follow your instantaneous voice peaks. Has level and delay controls.

Accurate SWR/Power Meter

A shielded directional coupler and backlit Cross-Needle meter displays accurate SWR, forward and reflected power simultaneously. Reads both peak and average power on 300/3000 Watt scales.

6 Position Ceramic Antenna Switch

Select two coax fed antennas (tuned or bypassed), balanced line/wire or bypass.

Built-in Balun

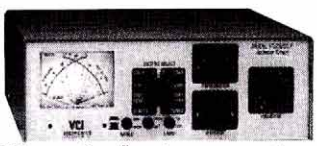
A 4:1 Ruthroff voltage balun feeds dual high voltage Delrin terminal posts for balanced lines. HFT-1500 is 5.5x12.5x12 inches. Has *VECTRONICS'* splendid one year limited warranty.

Try any product for 30 days

Call toll-free 800-363-2922 and order any product from VECTRONICS. Try it for 30 days. If you're not completely satisfied return it for a full refund, less shipping and handling -- no hassles. All VECTRONICS products come with a one year warranty.

300 Watt Antenna Tuner

VC-300DLP
$159.95



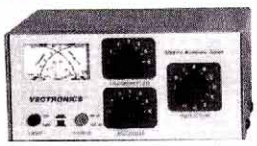
VECTRONICS uses the finest components available to build the highest quality 300 Watt antenna tuner ever made.

You can tune any *real* antenna 1.8-30 MHz. Custom 48 position switched inductor and continuous rotation 1000 Volt capacitors provide arc-free operation. Handles 300 Watts PEP SSB, (150 Watts on 1.8 MHz).

8 position antenna switch, built-in 50 Ohm dummy load, peak reading backlit cross-needle SWR Power meter, 4:1 balun for balanced line antenna. Scratch-proof Lexan front panel. 10.2x9.4x3.5 inches. Weighs 3.4 pounds.

300 Watt Mobile Tuner

VC-300M
$109.95



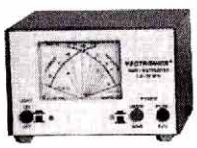
The VC-300M *Mobile* Antenna Tuner is compact, lightweight, easy-to-operate and is our most economical tuner.

It's compatible with *any* mobile antenna and any mobile HF transceiver and is compact enough to fit in the most compact car.

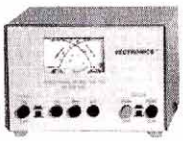
It can also be used at home with dipoles, vees, verticals, beams or quads fed by coax.

Backlit dual movement meter simultaneously monitors Power and SWR. Covers 1.8 to 30 MHz. Handles 300 Watts SSB PEP, 200 Watts continuous, (150 Watts on 1.8 MHz). 7.25x8.75x3.6 inches. Weighs 3.4 lbs.

SWR/Power Meters



PM-30
$79.95
PM-30UV
$89.95



PM-30, $79.95, for 1.8 to 60 MHz. Displays forward and reflected power and SWR simultaneously on dual movement Cross-Needle meter. True shielded directional coupler assures accuracy. Backlit meter displays peak or average power in 300/3000 Watt ranges. First-rate construction includes scratch-proof case/front panel. 5.3x5.75x3.5 inches. SO-239 connectors.

For 144/220/440 MHz, 30/300 Watt ranges: PM-30UV, $89.95, has SO-239 connectors. PM-30UVN, $89.95, has N connectors. PM-30UVB, $89.95, has BNC connectors.

1500 Watt *dry* Dummy Load

DL-650M, $74.95. Handles 100 Watts continuous, 1500 Watts for 10 seconds to 650 MHz. Ceramic resistor. SWR < 1.3. SO-239 connector. **DL-650MN, $84.95** has N connector.

Low Pass TVI Filter

LP-30, $55.95. Eliminates TVI by attenuating harmonics at the source. Plugs between transmitter and antenna or tuner. Handles 1500 Watts.

High Pass TVI Filter

HPF-2, $34.95. Installs between VCR/TV and cable TV or antenna lead-in cable. Eliminates or reduces interference caused by nearby HF transmitters.

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- AC/DC Current
- Beeper
- Diode Test
- Transistor Test
- Free Holster
- Meets UL-1244 safety specs

Model M-2760 - $19.95 (9 functions)

Elenco Model LCM-1950 — $69.95

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- Capacitance to 400µF
- Inductance to 40H
- Resistance to 4.00MΩ
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- Diode & Transistor Test
- Audible Continuity Test

Fluke Model 87III — $319

Features high performance AC/DC voltage and current measurement, frequency, duty cycle, resistance, conductance, and capacitance measurement.

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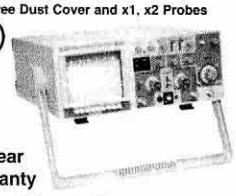

2 year Warranty

S-1325	25MHz	Dual Trace	$325
S-1330	25MHz	Delayed Sweep	$439
S-1340	40MHz	Dual Trace	$475
S-1345	40MHz	Delayed Sweep	$569
S-1360	60MHz	Delayed Sweep	$725
S-1390	100MHz	Delayed Sweep	$895

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DS-203	20MHz/10Ms/s Analog/Digital	$695
DS-303	40MHz/20Ms/s Analog/Digital	$850
DS-603	60MHz/20Ms/s Analog/Digital	$950

Test Instruments

Elenco 3MHz Sweep Function Generator with built-in 60MHz frequency counter Model GF-8046

$195.95

This sweep function generator with counter is an instrument capable of generating square, triangle, and sine waveforms, and TTL, CMOS pulse over a frequency range from 0.2Hz to 2MHz

GF-8025 - Without Counter $139.95

20MHz Sweep / Function Generator with Frequency Counter Model 4040

** Special ** $425

- 0.2Hz to 20MHz
- AM & FM modulation
- Burst Operation
- External Frequency counter to 30MHz
- Linear and Log sweep

BK PRECISION

10MHz Model 4017	$325
5MHz Model 4011	$255
3MHz Model 4003	$205

Elenco Handheld Universal Counter 1MHz - 2.8GHz Model F-2800 — $99

Features 10 digit display, 16 segment, and RF signal strength bargraph. Includes antenna, NiCad battery, and AC adapter. Resolution to 10Hz.

C-2800 Case with Belt Clip $14.95

Elenco Power Supply Model XP-581 — $85

4 Fully Regulated Power Supplies in 1 Unit

Elenco Power Supply Model XP-603 — $85

Elenco RF Generator with Counter Model SG-9500 — $225

Features internal AM mod. at 1kHz RF output 100MV - 30MHz. Audio output 1kHz @ 1V RMS.

SG-9000 (analog w/o counter) $124

Elenco 10Hz - 1MHz Digital Audio Generator Model SG-9300 — $225

Features built-in 150MHz frequency counter, low distortion and sine/square waves

SG-9200 (w/o counter) $124

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Electronically controlled, ideal for professionals, students, and hobbyists. Available in kit form or assembled.

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Works w/ any iron! Turn any soldering iron into a variable iron.

Features:
- Cushion Grip Handle Soldering Iron (optional) with Grounded Tip for Soldering Static Sensitive Devices. Easily Replaceable. Uses Long Life, Plated Conical Tip
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- Sponge Pad

Ordering Information:

Model SL-5 - No iron. (Kit SL-5K) — $29.95

Model SL-5-40 - Includes 40W UL iron. (Kit SL-5K-40) — $35.95

Limited Time Offer: *FREE SP-1A Solder Practice Kit w/ Kit Order!*

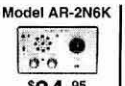
Weller® Model WES50 Soldering Iron — $119

50 watts of **controlled** power - designed for **continuous** production **soldering.**

The new, innovative WES50 is an ideal station for continuous production soldering, and its economical price makes it a good station for occasional users. The soldering iron includes a new heater and sensor combination that allows for relatively quick heat-up and recovery.

Elenco Educational Kits

Model AR-2N6K — $34.95



2 Meter / 6 Meter Amateur Radio Kit

Model AM-780K — $11.95

2 IC Radio Kit

Model M-1005K Digital Multimeter Kit — $19.95

- 19 Ranges
- 3-1/2 Digit LCD
- Transistor Test
- Diode Test

Model RCC-7K Radio Controlled Race Car Kit — $29.95

7 Functions

Digital/Analog Trainer

Elenco Model XK-550

Elenco's advanced designed Digital/Analog Trainer is specially designed for school projects. It is built on a single PC board for maximum reliability. It includes 5 built-in power supplies, a function generator with continuously variable sine, triangular, and square waveforms. All power supplies are regulated and protected against shorts.

$165

Specifications

Power Supplies:
- +1.25 - 20VDC @ 5A (1.25V to 15V @ 1A)
- +1.25V to 20VDC @ 5A (1.25V to 15V @ 1A)
- +12V +5% @ 1A
- -12V +5% @ 1A
- +5V +5% @ 1A

Function Generator:
- **Waveforms:** Sine, Square, Triangle, Complementary Square
- **Frequency:** 1Hz to 100kHz in 5 steps, continuously variable

Digital Section:
- **Data Switches:** 8 DPST
- Hi 5V Low 0V
- Logic Switches: 2 no bounce with complementary output "ON" voltage level 2.8V min. "OFF" 1V max.

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SP-2000	144	<.8	20 Adj.	750/200W	250.00
SP-220	222	<.9	20 Adj.	650/200W	250.00
SP-7000	70cm	<.9	20 Adj.	500/100W	250.00
SP-23	1296	<.9	18	100/10W	360.00
SP-13	2304	1.2	18	50/10W	380.00
LNA	144	<.4	18	NA	220.00
LNA	432	<.5	18	NA	220.00
SLN	1296	<.4	30	NA	290.00
SLN	2304	<.4	30	NA	290.00

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UTM-1200-DLX	15 W MAST-MOUNT 1268 TX-UPCONVERTER	A
UTM-1200-1	1 W 1268 MHz. TX-UPCONVERTER	L
GaAsPA20	20 Watt 2304 /2400 MHz. Amplifier	L
UEK-3000S	2400MHz. MastMount Mode "S" Converter 0.8db 460.00	
LT230S	1296MHz 30W Transverter NF < 0.9 dB	1400.00
AS-3000	2 port Antenna Switch High Power DC - 3.0 GHz	180.00
AS-304	4 Port Antenna Switch High Power DC - 600 MHz.	180.00
TLA1275MC	100 Watt Solid State 1250-1296 MHz. Linear Amplifier	Call!
WIMO ANTENNAS — NEW!	70, 23 & 13 cm Helical Antennas	Call!
	23 & 13 cm LONG YAGIS	Call!

DB6NT 1268MHz. - 47GHz. MICROWAVE EQUIPMENT

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MKU23G2	2304 MHz. Transverter NF <0.8dB 1 W output	499.00
MKU34G2	3456 MHz. Transverter NF <1.0dB 200mW output	580.00
MKU57G2	5760 MHz Transverter NF <1.0dB 200mW output	580.00
MKU10G2	10.368 GHz Transverter NF 1.2typ 200mW output	580.00
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DB6NT TRANSVERTER KITS See QST Review May '01

MKU13G2KIT... 285.00 MKU23G2KIT... 305.00 MKU34G2KIT...380.00
MKU57G2KIT... 380.00 MKU10G2KIT... 380.00

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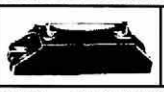

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300 Watt Antenna Tuner

MFJ949E Full 1.8-30MHz Operation. Custom designed inductor switch, 1000 volt tuning capacitors, Teflon insulation washers and proper L/C ratio gives you arc-free no worries operation with up to 300 Watts 1.8 to 30 MHz. Tunes any Antenna. Tunes out SWR on dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave receiving antennas.... Nearly anything! Use coax, random wire or balanced lines. Has heavy duty 4:1 balun. 8 Position Super Antenna Switch Lets you select two coax fed antennas, random wire/balanced line or built-in dummy load through your MFJ-949E or direct to your transceiver. Has MFJ's full size 3 inch lighted Cross Needle Meter. Lamp has on/off switch, requires 12 VDC or 110 VAC with MFJ-1312B, $14.95. Full size built-in non-inductive 50 Ohm dummy load.

Popular MFJ Tuners

MFJ901B	*200 watt tuner*	**65.95**
MFJ945E	*300w tnr w/mtr*	**89.95**
MFJ948	*300w tnr w/mtr,sw*	**109.95**
MFJ969	*6-160m tnr 300w*	**174.95**
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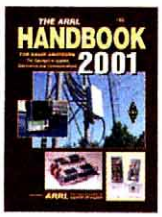

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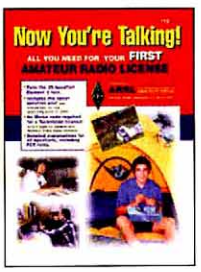

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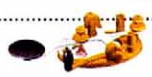

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HUGE ICOM DEALS ★ HUGE YAESU DEALS

IC-775 DSP.. New Lower Price!

The Icom IC-775DSP is a competition class HF transceiver featuring 200 watt RF output, digital signal processing, automatic antenna tuner, true dual RX, CW memory keyer, CTCSS tone encode, twin pass band tuning, dual antenna inputs, 101 memory chanels, built-in power supply, and much more. Supplied with AC power cord.

PW-1 ..... New Lower Price!

The Icom PW-1 is a 1000 watt solid state linear amplifier for HF and 6m operation, featuring a high power automatic antenna tuner, built-in power supply, and a removable front control panel, and more.

IC-746 ..... Icom Special!

The Icom IC-746 is an all mode transceiver covering HF/6m/2m. The radio features digital signal processing, 100 watt RF output on all bands, twin PBT, a 4.9"multifunction LCD display with band scope, automatic antenna tuner, and more. Supplied with a hand mic and DC power cord.

IC-756 PRO ..... Icom Special!

The Icom IC-756 PRO is an all mode HF/6m transceiver featuring DSP, automatic antenna tuner, 100 watts RF output, digital twin PBT, a 5" multifunction LCD display with band scope function, and more. Supplied with hand mic and DC power cord.

FT-1000MP MARK-V ..... New!

Competition class HF transceiver with DSP, auto tuner, 200W output, and more!

FT-1000D ..... In Stock!

Great competition class HF XCVR with dual RX, auto tuner, and 200W output.

FT-920 ..... Yaesu Special!

Nice all mode HF/6m transceiver with DSP, automatic tuner, and more.

Quadra System ... Lower Price!

Solid state 1 kW amplifier with auto tuner. No-tune HF and 6moperation!

FT-847 ..... Yaesu Special!

The Yaesu FT-847 is an all mode transceiver covering HF/6m/2m/70cm! The radio is perfect for satellite operation. Features digital signal processing, built-in RS-232 interface, built-in CTCSS tone encode/decode module, optional ATAS-100 mobile screwdriver type antenna, and more. Supplied with an up/down hand mic and DC power cord.

FT-840 ..... Great Low Price!

Great entry level HF XCVR featuring built-in CTCSS tone encode, noise blanker, IF shift, 100 memories and more. With hand mic and DC power cord.

IC-706MK2G ..... Icom Special!

The Icom IC-706MK2G is a compact HF/6m/2m/70cm all mode transceiver with digital signal processing, automatic repeater offset, built-in CW keyer, built-in CTCSS tone encode/decode/scan, 107 memory channels and more. A detachable front panel offers convenient mounting, even in compact vehicles.

IC-718 ..... Great Low Price!

The Icom IC-718 is an all mode HF transceiver featuring a front panel mounted speaker, IF shift, optional DSP module, multiple scanning modes, noise blanker, RIT, and more.

IC-2800H ..... Icom Special!

The Icom IC-2800H is a 2m/70cm dual band mobile FM transceiver with a 3" color TFT display. The radio features a separate control face, video input, bandscope display, 9600 bps Packet jack, CTCSS tone encode/decode/scan, 232 memories, cross band duplex, and more. With DTMF hand mic, mounting brackets, and power cord.

IC-910H ..... Now In Stock!

The IC-910H is a dual band 2m/70cm all mode XCVR with true dual band operation, featuring dual data jacks, optional 23cm band module, optional DSP, and more.

FT-90R ..... In Stock!

Ultracompact 2m/70cm mobile XCVR with removeable face, extended RX, and more.

FT-7100M ..... Now In Stock!

Great 2m/70cm dual band mobile, 45/35 Watts, removable front panel, and more!

FT-1500M... New Lower Price!

Tiny 2m mobile XCVR with 50W output.

FT-2600M ..... Please Call!

Rugged 2m mobile with intermod free RX.

FT-100D ..... In Stock!

Ultra-compact all mode XCVR for HF/6m/2m/70cm. Features DSP, CW keyer, tone encode/decode, 200 memories, VOX, and more. Supplied with a DTMF hand mic, power cord and mounting bracket.

FT-817 ..... Now In Stock!

A truly tiny self-contained all mode HF/6m/2m/70cm QRP XCVR featuring DSP, tone encode/decode, 200 memories, VOX, and more! Supplied with a hand mic, DC power cord and duck antenna.

IC-W32A ..... New Lower Price!
IC-Q7A ..... Icom Special!
IC-T7H ..... Icom Special!
IC-T81A ..... Quad Band HT!
IC-T2H ..... Great Low Price!

IC-207H ..... Great Low Price!

Great 2m/70cm dual band mobile XCVR with CTCSS tone encode/decode, 182 memories, removable face, and more.

IC-2100H ..... Icom Special!

Rugged 2m mobile XCVR at a great price.

IC-PCR1000 ..... Icom Special!
IC-R8500 ..... In Stock!
IC-R75 ..... Icom Special!
IC-R2 ..... In Stock!
IC-R3 ..... Icom Special!
IC-R10 ..... Icom Special!

G-2800DXA $1089

Heavy duty antenna rotator handles 34 sq. ft. of antenna load, and features 450° rotation, preset and variable speed.

G-1000DXA $499
G-800SA/DXA $329/409
G-450A $249
G-5500 ..... $599
G-550 ..... $299

VX-5R ..... In Stock!

Tiny 6m/2m/70cm HT, with CTCSS tone encode/decode/scan, long life Lithium-Ion battery pack, extended RX, and more.

FT-50RD ..... In Stock!
VX-1R ..... Please Call!
VX-150 ..... Please Call!

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Real Performance for the Real World!

Today's elite-class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics on the front panel save you seconds in a pile-up or a contest "run," and Yaesu's HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

I. Interlocked Digital Bandwidth Tracking System (IDBT)

II. Variable RF Front-End Filter (VRF)

III. 200 Watts of Transmitter Power Output

IV. Class-A SSB Operation

V. Multi-Function Shuttle Jog Tuning/ Control Ring

Features

■Frequency Coverage: (RX) 100 kHz-30 MHz; (TX)160-10 m Amateur Bands ■Dual In-band Receive w/Separate "S" Meters ■Ten Pole Collins® Mechanical Filter Built-in ■RX DSP Noise Reduction and CW Peaking Filter ■High-speed Automatic Antenna Tuner ■Two TX/RX Antenna Jacks plus RX-only Jack ■TX Microphone Equalizer ■RF Speech Processor ■Direct Digital Synthesis ■CW Spot and Two Key Jacks ■Two Headphone Jacks (1/4" and 3.5 mm) ■Low-Level Transverter RF Drive Jack ■Separate FP-29 Power Supply (30 V/13.8 V DC Output)

HF 200 W All-Mode Transceiver

MARK-V FT-1000MP

For Elite-Class Amateur Radio Operators...

A NEW BREAKTHROUGH IN TRANSMITTED AUDIO QUALITY: THE YAESU MD-200A8X HIGH-FIDELITY DESKTOP MICROPHONE.

- New-Technology Polyethylene Terephthalate Film High-Fidelity Dynamic Microphone Element
- Vibration-Resistant Housing
- VSPC (Variable Side Pressure Control) Technique (Patent Pending)
- Ease of Operation through Ergonomic Design
- Provision for User-Supplied Additional Microphone Element

VSPC (Variable Side Pressure Control)

APPLICABLE TRANSCEIVERS

MARK-V FT-1000MP, FT-1000MP, FT-1000/-1000D*, FT-990*, FT-920, FT-900, FT-847, FT-840*, FT-817

* The FT-1000/-1000D/-990/-840 do not support the illumination of the TX LED during transmission.

Ultra-High-Fidelity Desktop Microphone

MD-200A8X

Expand Your DX Horizons With The FTV-1000 50 MHz Transverter!

- 50 MHz Transverter with 200 W PEP Power Output
- Class-A Bias Selection for Low TX IMD (PO: 50 W)
- High-Performance Receiver Front End
- Automatic, Effortless Operation with MARK-V FT-1000MP
- Upgrade to High Power with VL-1000 Linear Amplifier

Specifications

Frequency Range:	50-54 MHz
Antenna Impedance:	50 Ohms
Power Output:	200 Watts PEP
Spurious Emissions:	At least 60 dB down
Power Source:	DC 30 V and 13.8 V (supplied by FP-29 Power Supply of MARK-V)
Dimensions:	9.6" x 5.4" x 13" WHD (243.5 x 136.5 x 331 mm)

200 W 50 MHz Transverter

FTV-1000

YAESU

Choice of the World's top DX ers

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http://www.vxstd.com

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

144
220
440

Everything adds up! Kenwood's new FM Tribander (144/220/440MHz) offers dual-channel RX capability and prime performance in a superbly compact design.

- Receives 2 frequencies simultaneously even on the same band
- 0.1~1300MHz high-frequency range RX (B band)[1]
- FM/FM-W/FM-N/AM plus SSB/CW receive
- Bar antenna for receiving AM broadcasts
- Special weather channel RX mode
- 435 memory channels, multiple scan functions
- 7.4V 1550mAh lithium-ion battery (std.) for high output[2] and extended operation
- 16-key pad plus multi-scroll key for easy operation
- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Large frequency display for single-band use
- Automatic simplex checker
- Wireless remote control function
- Battery indicator • Internal VOX • MCP software

[1] Note that certain frequencies are unavailable. [2] 5W output

"Above specifications subject to change without notice."

NEW

TH-F6A

FM TRIBANDER

KENWOOD COMMUNICATIONS CORPORATION

AMATEUR RADIO PRODUCTS GROUP
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