Official Journal of
The American Radio
Relay League

QST

devoted entirely to
AMATEUR RADIO

January 1999

QST reviews:

- 222-MHz handhelds by Pryme and Alinco
- Pryme PR-52 6-meter H-T
- ICOM IC-2100H 2-meter transceiver

Rotator Magic

Balloons to the Edge of Space!

New Ham Companion:
Practical information for all hams

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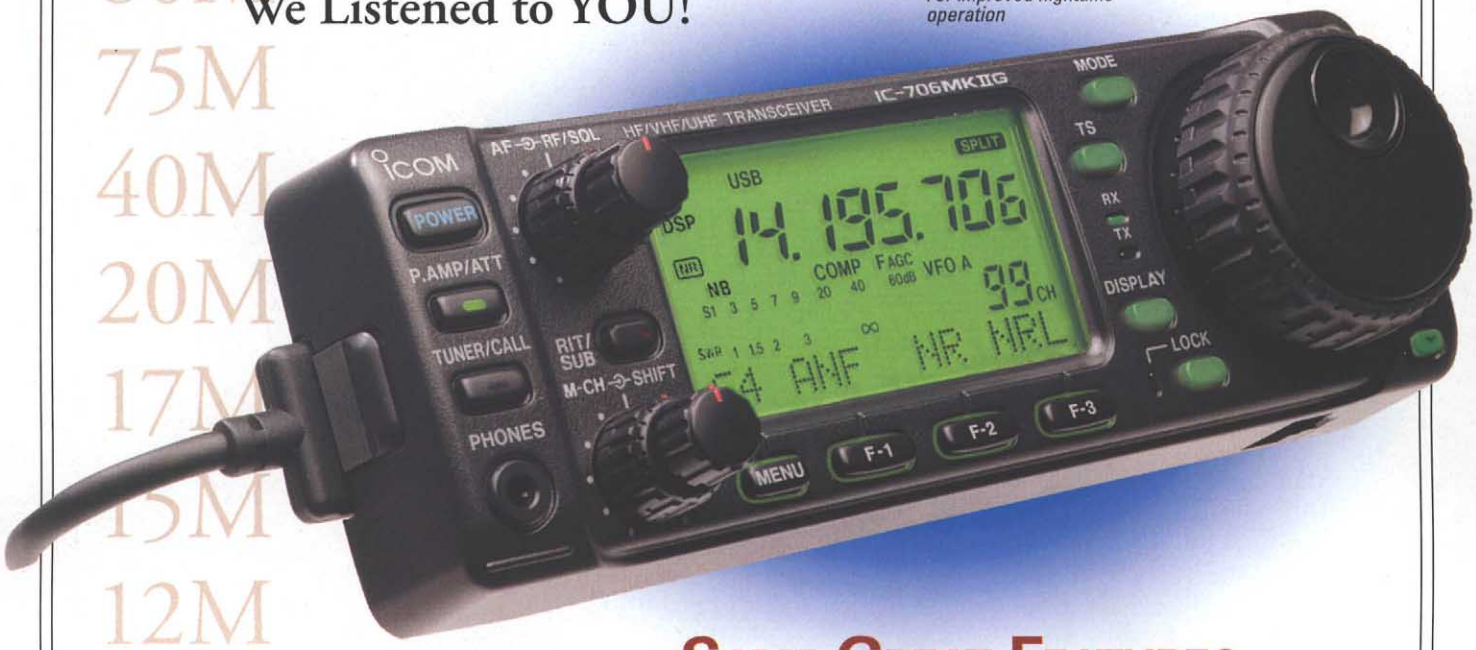
ICOM IC-706MKIIG

How Could We Make the BEST even BETTER? We Listened to YOU!

HF/6M/2M/440 MHz
Worldwide or around town, the new '706MKIIG has the power and features to take you there

Backlit Keys
For improved nighttime operation



Yes, You CAN Take It With You
Faceplate shown in optional Remote Control configuration. Requires OPC-581 11 ft. (3.5 m) or OPC-587 16 ft. (5 m) separation cable

In The Trunk, Under The Seat, or Under The Dash
The '706MKIIG is very compact. It measures only 6.6 (w) x 2.3 (w) x 7.9 (w) in /167 (h) x 58 (w) x 200 (d) mm. It's a mobile sized rig with base station capabilities

Same Great Features as the Performance Proven '706MKII, But With

- **MORE Power**
- **440 MHz Added**
- **MORE *FUN!***

- Tone Squelch (CTCSS decode)
- Auto Repeater Function
- DSP Included • Backlit Keys
- 50W on 2 M • 20W on 440 MHz

ICOM options required for PC operation:
CT-17 Level Converter
OPC-478 Connection Cable
Third party software

PC Ready!

Join the thousands of hams who use ICOM's 706 series radios. Contact your authorized ICOM dealer today, or call ICOM for a free brochure, day or night. **425-450-6088**

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HANDHELDS

NEW with MORE POWER IC-T2H

2 Meter Single Bander • **6W @ 9.6 Volts • 500 mW Audio • 8 Programmable Keys Stenciled w/ Default Settings for Easier Operation** • Built-In Tone Squelch with Pocket Beep and Tone Scan • 40 Memory Channels • Cloning Capabilities • Uses 8 "AA" Ni-Cd (included) or Alkaline Batteries • Affordable • 2.3"(W), 5.5"(H), 1.3"(D), 14.8 oz

IC-T22A/IC-T42A (2M/440 MHz)

Single Bander • Fun, Shirt Pocket Small and Easy to Use • Large Alphanumeric Display • Wide Receive Coverage, Including Air Band • 5 W @ 13.5 V (3 W Out of Box) • Air Band Receive • 80 Memory Channels (40 w/Alpha Display) • 2.3"(W), 4.3"(H), 1.1"(D), 10.9 oz

IC-T7AHP

New 7 Watt IC-T7H* coming soon

2 Meter/440 MHz Dual Bander • Dual Bands at a Single Bander Size & Price • Very Easy to Use–No Function Key • Works One Band at a Time, Switch Between Bands with One Touch of the Band Key • Now 4 W (2M)/3 W (440) Out of the Box with BP-173 • "Intuitive" Help Display • CTCSS Encode/Decode• Very Affordable • 2.5"(W), 4.8"(H), 1.1"(D), 11.3 oz

IC-Q7A

2 Meter/440 MHz Dual Bander • Extended Rx 30-1300 MHz (cellular blocked), Airband Receive Broadcast FM and AM Receive (most TV stations, too) • 300 Mw Transmitter • 200 Memories • Uses "AA" Alkaline or Ni-Cd Batteries • Rugged Construction • Tone Squelch • Easy to Use • Splash Resistant • 6-25 KHz Channel Step • Full Scanning Capability • Receiver Attenuator • Power Save Feature • 2.3"(W), 3.4"(H), 0.98"(D) (Shown with optional antenna)

IC-W32A

2 Meter/440 MHz Dual Bander • 5 W Out of the Box • No Function Key • PC Programmable • 200 Memories with Alphanumeric Display , Messaging & Paging • "Intuitive" Help Display • Backlit Display and Keypad • Wide Band RX (Including Air Band) • V/V, V/U, U/U Operation with VHF/UHF Tuning Knob Exchange • Encode/Decode • PC/Radio-to-Radio Cloning • 2.2"(W), 4.9"(H), 1.2"(D), 12.0 oz

IC-T8A

6 Meter/2 Meter/440 MHz Tri Bander Handheld • Worlds Smallest! • Super Thin Profile/Lightweight Design • Up to 5 Watts Power on All Bands (13.5 V DC) • 4.5 Watts Out of Box with Supplied BP-200 Battery • One-Touch Band Switching • Ni-MH Powered! • RX (MHz): 50-54 (6 meters), 118 - 174 (2 meters), 400 - 470 (440 MHz) Broadcast FM and AM Receive (most TV stations, too) • Airband Receive • 123 Memory Channels with 10 Scan Edges and 1 Call for Each Band • MIL SPEC 810 C/D/E • Tone Squelch with Pocket Beep • Backlit Display with Timer • Built in Guide Function • JIS Grade 4 Water Resistance • Wall Charger Included • DTMF Encoder with 9 DTMF Memories • Handheld to Handheld Cloning Capability or PC Programming Capability** • 2.3 (W), 4.3 (H), 1.2 (D), 9.9 oz

MOBILES

Optional Infrared Wireless Mic

*The HM-90 infrared optional wireless mic works with the new IC-2100H, IC-207H** and the more advanced IC-2710H. Enjoy cable-free operation on the GO!*

IC-2100H

2 Meter • 55/10/5 Watts (selectable) • TX 144-148 MHz • RX 136-174 MHz† • 75 db/93 db IMD • 113 Memory Channels • Heavy Duty, One Piece, Die Cast Aluminum Chassis • MIL SPEC 810 C/D/E Shock/Vibration • Front Panel Programmable Alphanumeric Display • PC or Radio to Radio Cloning** • DTMF Microphone (HM-98S) • CTCSS Encode/Decode Standard – 50 Tone Frequencies • Independently Programmable Tx/Rx • Tone Scan • Auto Repeater with Busy Lockout • Priority Watch (3 types) • 5.5"(W) x 1.6"(H) x 7.1"(D), 2 lb 10 oz

IC-2710H

2M/440 MHz Advanced Dual Bander • 2M (50 W)/440 MHz (35 W) • Detachable Control Panel** • Fast Scanning • 220 Memory Channels • PC Programmable • CTCSS Encode (decode optional) • RF Attenuator • 8 DTMF Memory Switches • v/v, u/u Simultaneous RX • Built-In Duplexer • 3 Selectable Power Levels: 50 (35), 10, 5 • 5.5"(W), 1.6"(H), 8.4"(D), 3.1 lb

IC-207H

2M/440MHz Dual Bander • 2M (45 W)/440 MHz (35 W) • Super Compact Detachable Control Panel** with Big Keys, Big Knobs and a Big Display • Work One Band at a Time • 9600 Baud Ready • Wide Band RX (Includes Air Band) • CTCSS Encode/Decode • Very Affordable • 5.5"(W), 1.6"(H), 8.1"(D), 2.6 lb

BASE STATIONS

IC-821H

2M/440 MHz Advanced Satellite & Digital Base Station • All Modes • Easy to Use! • Continuous Adjustable Transmit Power • Sub Band Transmit • 9600 Full Compatibility Out of the Box • 160 Memories • Noise Blanker & IF Shift on Main & Sub Bands (independent main/sub RX) • Built-In Electronic Keyer • Satellite Tracking with Doppler Correction

• Compact! 9.5"(W), 3.7"(H), 9.4"(D), 11.0 lb

"By far the easiest to use satellite radio on the market today. In less than 10 minutes after unpacking the 821H, I was on the air at 9600 baud with KO-23"
– Michael Wyrick, N4USI, AO-27
Control Operator

VHF & UHF

Solar Cycle 23 is here. Now's the best time to upgrade your license… or your shack. When you upgrade to General Class or higher, mail us a copy of your amateur radio license. **ICOM is giving away one IC-706MKII each month,** between April 1998 and March 1999. For complete details, visit your authorized dealer today.

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RL-115

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MH-C777 Universal Charger & Conditioner

- Will charge **nearly any type of rechargeable NiMH and NiCD battery pack!**
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WOW! New from Alpha Delta!

Why didn't someone think of this before?

ALPHA DELTA Models DH-1 and DH-2 Hydraulic Dampened Fold-Over Mast Fixtures for HF Verticals and Small VHF/UHF Ground Planes

Now one person can raise and lower an HF vertical in a simple 30 second operation!

- Easy antenna adjustments and maintenance.
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- Small VHF/UHF ground planes and discones can easily be raised.
- The Model DH-1 fold-over fixture includes a powder coated steel pedestal--$249.95 ea.
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- Stainless steel hardware, aircraft grade aluminum and "post-hole" type mounting with premix concrete. Designed for verticals up to 29 ft. and 25 lbs. weight. DH series fold-over fixtures are pre-assembled and include a hydraulic dampener for safe operation. User supplied mast tubes shown in photos.

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QTH of W8AD

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Technical

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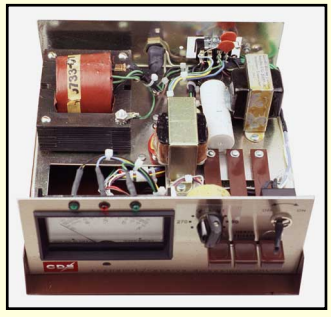
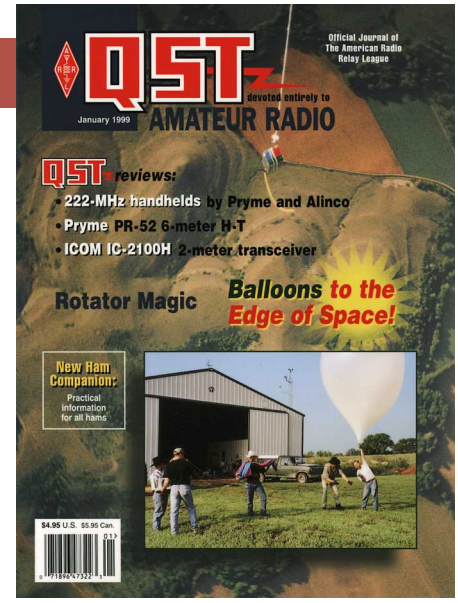


News and Features

New Ham Companion

Operating

Departments



Our Cover

This is the view from 10,000 feet over Kansas. The photograph was taken by a 35mm camera riding in the payload capsule of an Amateur Radio balloon as it climbed to more than 100,000 feet. The object dangling from the top of the photo is a low-power beacon package. In the inset photograph, members of the Kansas Near Space Project prepare to launch their balloon. See "Ham Radio Ballooning to Near Space" in this issue.

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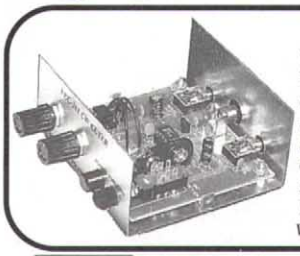


Full featured CW Keyer Kit, $24.95!

VEC-201K, the best electronic keyer bargain in ham radio! Send beautiful sounding Morse Code. Self-completing dot-dashes and dot-dash memory forgive timing errors -- makes sending CW easy and accurate. Front panel volume/speed (3-65 wpm) controls. Weight adjusts 25-75%. Sidetone (300 -1000Hz) has LM386 audio amp for external speaker/phones. Select Iambic A or B, fully automatic or semi-auto "bug" mode. Tune mode for tuning rig. RF proof. Sleep Mode battery saver. Use 9V battery. 1¾x4x3½ in. *Simple skill level.*

VEC-201K shown in optional case (vinyl cover top not shown), VEC-201KC, $14.95

CW Memory Keyer Kit stores 512 characters in four 128 character non-volatile EEPROM message memories. *Carry on entire QSOs by just pressing memory message buttons.* True sinewave sidetone with soft rise and fall time eliminates harsh keyclicks. Has all features of VEC-201K CW Keyer Kit. 1¾x 6¼x5¼ in. *Simple skill level.* Order **VEC-221K, $69.95.**

20/30/40/80 Meter Receiver Kits give high performance! Covers entire band or tailor to cover desired portion. Copy CW/SSB/AM. NE602/ 612 mixer-oscillator, LM386 high gain audio amplifier. 1¾x4¾x 5¼ in. *Moderate skill level.* Order **VEC-1120K** (20 Meters),**VEC-1130K**(30 Meters),**VEC-1140K** (40 Meters), **VEC-1180K** (80 Meters), **$29.95 ea.**

20/30/40/80 Meter QRP CW transmitter Kits let you work the world! Variable crystal oscillator tuning, front panel switch selects 1 of 2 crystals. 1 crystal for popular frequency included. Transmit/Receive switch lets you connect receiver. 1¾x4x3½ in. *Intermediate skill level.* Order **VEC-1220K** (20 Meters), **VEC-1230K** (30 Meters), **VEC-1240K** (40 Meters), **VEC-1280K** (80 Meters), **$29.95 ea.**

Tunable SSB/CW Audio Filter Kit has sharp *four* pole peak and notch filters. Eliminate interference. Zero in with frequency control and adjust bandwidth for best response. Extra steep skirts. Tune frequency from 300 to 3000 Hz. Vary bandwidth from 80 Hz to nearly flat. Notch is an outstanding 50 dB. 1 Watt amplifier. Speaker/Phone jacks. 12 VDC at 300 mA. 1¾x4¾x5¼ inches. *Intermediate skill level.* Order **VEC-841K, $34.95.**

Super CW Audio Filter Kit gives you three bandwidths: 80, 110, 180 Hz. Eight poles gives super steep skirts with no ringing. Pull CW QSOs out of terrible QRM! Plugs into phone jack to drive phones. QRM down 60 dB one octave from center frequency (750 Hz) for 80 Hz bandwidth. Improves S/N ratio 15 dB. Use 9V battery. 1¾x4x 3½ in. *Simple skill level.* Order **VEC-820K, $19.95.**

Super CW filter/amplifier Kit has powerful 1 watt audio amplifier to drive speaker. Pull CW signals out of QRM with extremely narrow 80 Hz bandwidth without ringing. 8 poles active IC filtering uses cascaded low-Q stages. Razor sharp selectivity. 3 bandwidths: 80,110, 180 Hz. Center frequency: 750 Hz. Up to 15 dB of noise reduction. Auto noise limiter knocks down static crashes, impulse noises. Use 9-18VDC, 300 mA max. 1¾x4 x3½ in. *Simple skill level.* Order **VEC-821K, $29.95.**

Super SSB Audio Filter Kit dramatically improves readability with 8 poles. Optimizes audio bandwidth, reduces sideband splatter, low, high pitched interference, hiss, static crashes, background noise, 60/120 Hz hum. 375 Hz highpass cutoff. 2.5, 2, 1.5 kHz low-pass cutoffs. Plugs into phone jack to drive head phones. Use 9V battery. 1¾x4x 3½ in. *Simple skill level.* Order **VEC-830K, $19.95.**

144/220/440 MHz Low-Noise Preamplifier Kits soup up your antenna system. Helps pull in weak signals. Works wonders for scanner or ham-band receiver. Quality microwave type bipolar device gives great low-noise performance and immunity from damaging electrostatic discharge. 1x1½ in. *Simple skill level.* Order **VEC-1402K** (144 MHz),**VEC-1422K** (220 MHz), **VEC-1444K** (440 MHz), **$17.95.**

High-performance 2 Meter Preamp Kit pulls weak signals out of noise. Solves three reception problems -- boosts signals using a 1-dB noise figure microwave transistor, provides razor-sharp bandpass filtering, eliminates unwanted electrical noises with built-in balun. Uses 9-14 volts DC. Tiny 1½x3x1 in. fits in any size box. *Intermediate skill level.* Order **VEC-1402DK, $59.95.**

2/6/10 Meter FM Receiver Kits let you tune into the world of ham radio. Catch all the action! Each covers the entire FM subband and runs off your 9 volt battery. Plug in speaker or headphones for loud clear reception. 1¾x4x3½ in. *Intermediate skill level.* Order **VEC-1002K** (2 Meters), **VEC-1006K** (6 Meters), **VEC-1010K** (10 Meters), **$34.95 each.**

2 Meter Monitor Kit receives 144-148 MHz. Low noise, high gain RF preamp gives you excellent 0.1 uV sensitivity. Air variable tuning capacitor has 8:1 reduction. Dual conversion superhet provides selectivity and stability. Automatically eliminates squelch tails. Built-in speaker, squelch, tone, volume controls. 19¼ in. telescopic whip. 9V battery. 2x4¼x4 in. *Intermediate skill level.* Order **VEC-104K, $79.95.**

5 Watt 2 Meter FM transmitter Kit lets you transmit voice and data -- AFSK data (up to 1200 baud) and FSK data (up to 9600 baud). Jumper select reactance or direct FM modulators. Reliable Motorola NBFM transmitter IC and PA transistor. Crystal controlled (x8 frequency multiplication). -60 dBc spurs and harmonics. Use 12-14 VDC, 1.5 amps. 5-pin DIN microphone jack. 1¾x4¾x5¼ in. *Difficult skill level.* Order **VEC-1202K, $99.95.**

All purpose Ni-Cad/Ni-MH Rapid Battery Conditioner Kit safely quick charges expensive batteries -- no overcharging -- many in less than an hour. HTs, cell phones, camcorders, lap top computers. Handles 1 to 12 cells. Charging status LEDs. Discharge before charge function reconditions batteries. Also removes memory effect. Runs on 12-15 VDC. 1¾x4¾x5¼ in. *Moderate skill level.* Order **VEC-412K, $49.95.**

Crystal radio set Kit lets you relive the experience of early radio pioneers. This baby really works! Wind your own inductor, wire up the earliest radio circuit without soldering a thing and listen to the magic of radio that needs no power. Put up an antenna, connect a ground. Stations come in amazingly loud and clear. Includes antenna wire, sensitive earphone. 1¾x5x6½ in. *Simple skill level.* Order **VEC-121K, $19.95.**

Shortwave Receiver Kit lets you listen to the world! Covers 75/80, 49, 40, 30, 31, 20, 25, 22, 19, 17, 16, 15 and 13 Meter bands. Explore AM, SSB, CW, WWV, RTTY and Packet signals. Vernier reduction drive, smooth regeneration control, RF stage. *Includes all metal cabinet.* 2 earphone jacks. Use 9V battery. 2½x7x6 in. *Intermediate skill level.* Order **VEC-102K, $59.95.**

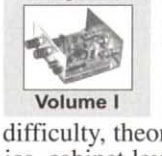
Shortwave Converter Kit converts AM or AM/FM radios to shortwave receivers at a push of a button. Hear stations all over the world at various times of the day and year. Choose two 1 MHz bands between 3 and 22 MHz. Popular 13, 16, 19, 25, 31, 41, 49 and 60 Meters international broadcast bands. On/off bypass, NE-602/612 mixer-oscillator IC and tuned input circuit. Use 9 V battery. 1¾x4x3½ in. *Intermediate skill level.* Order **VEC-101K, $27.95.**

Aircraft Receiver Kit tunes entire voice aircraft band 118-136 MHz. Picks up air traffic 100 miles away. Track progress of incoming/outgoing traffic in your area, gain advanced weather information, and discover how the National Air Traffic System really works. Great way to learn about aviation. Use 9V battery. Drives external speaker/phones. 1¾x4x3½ in. *Intermediate skill level.* Order **VEC-131K, $29.95.**

AM Radio Transmitter Kit lets you set up your own AM station and broadcast crystal clear programming from your studio with *you* as the disc jockey or talk show host. Play music from CD player, tape deck or other source. Choose clear frequency from 530-1750 KHz. Standard line level or microphone input. Easy to connect to CD, tape deck or mike mixers. Audio level adjustment. Has high level AM modulation for low distortion. 1¾x4x3½ in. *Simple skill level.* Order **VEC-1290K, $29.95.**

TV Transmitter Kit lets you plug in camcorders, VCRs or TV cameras and transmit high quality audio/video to nearby TV sets. Imagine watching your favorite movie on a portable TV by the pool with a tape playing indoors. Create your own personal TV station for some great neighborhood fun! Use a hidden video camera to monitor remote areas. Adjustable to channels 3-6. 1¾x4¾x5¼ in. *Moderate skill level.* Order **VEC-1294K, $27.95.**

The *GIANT* Book of Electronic Projects, Volume I.



Project book includes 19 kits on this page. Has building tips, complete parts lists, parts placement and PC board layouts, test and alignment, operating instructions, in case of difficulty, theory and specs, schematics, cabinet layout.

Order VEC-1901, $19.95.

Inspect and download our manuals from:

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Vectronics kits feature a professional quality epoxy glass PC board with solder mask and component legend, simple step-by-step instructions and highest quality components.

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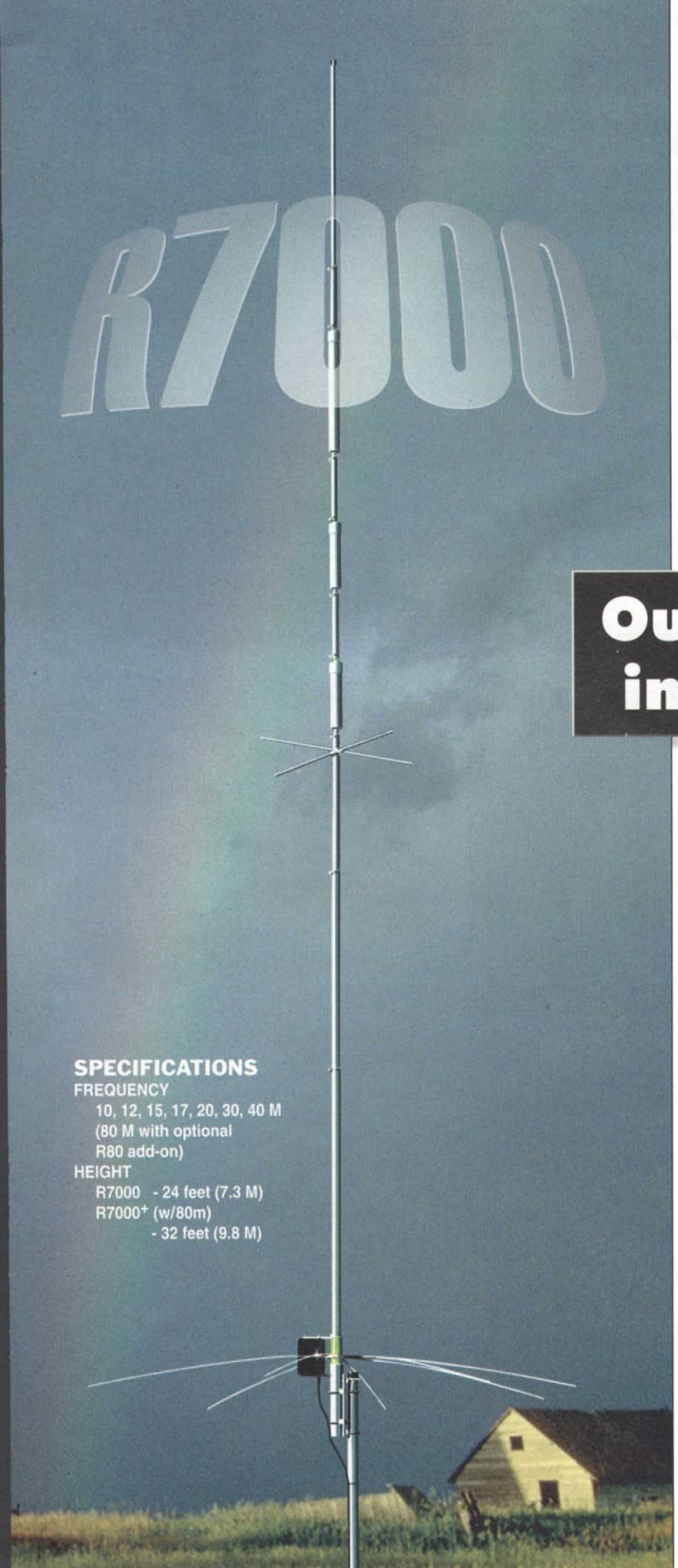

SPECIFICATIONS

FREQUENCY
10, 12, 15, 17, 20, 30, 40 M
(80 M with optional
R80 add-on)

HEIGHT
R7000 - 24 feet (7.3 M)
R7000+ (w/80m)
- 32 feet (9.8 M)

10, 12, 15, 17, 20, 30, 40 Meters

Outstanding Performance, Reliability, and Looks

The Cushcraft R7000 delivers top performance on seven bands in a package ready for home or portable use. The R7000 offers easy assembly, a small footprint, and a "stealthy" appearance in a manageable size. The R7000 is the best choice for all around HF use.

Our customers say it best!

Great Performer

"Making great DX contacts to South America and Europe - in poor propagation conditions. My God what will it be like when conditions improve? . . . can hardly wait . . . will add 80 meters soon. Thank you for an excellent product." N1XAE

Reliable

"The R7000 withstood several New England ice/snow storms with no damage." KA1WIU

Outstanding in its field!

Slim Silhouette

"I have antenna restrictions, but no complaints from neighbors!" KS4VN

Easy Installation and Tuning

"The use of similar size hardware is appreciated as this minimizes the number of tools I have to carry up the ladder . . . After following the R7000 printed instructions the antenna worked the first time. It has been a pleasant experience to put up a vertical antenna which performs to the manufacturer's specifications." K1NB

Automatic Band Changing

"Seven bands right out of the box with no tuning is impressive." WV0H

So, if you want an R7000 in your field…or yard… on the roof, or even on the RV for Field Day, contact your dealer today!

Visit our web site (**http://www.cushcraft.com**) for the latest R7000 news and details of our other fine products. You can review the manual and learn how the R7000 and R7000+ work.

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E-mail: hamsales@cushcraft.com

OWNERS SAY IT ALL!

Reputation. It builds every day with TEN-TEC. Thirty years of refining our craft delivers top-of-the-line amateur gear and unparalleled service after the sale. TEN-TEC owners made our reputation what it is today. Ask an Omni-VI *Plus* owner about the quality of our gear and the advice we offer, and they'll tell you - *No one does it better.*

Performance of the Omni-VI *Plus* is unmatched by anyone. We've taken the best qualities of the original Omni-VI and added even more Digital Signal Processing technology. You'll hear signals that no other receiver does, under the worst of band conditions.

"With both of my rigs hooked up to a switch, I was able to switch between the (brand X) and Omni-VI Plus for comparison. Folks, this Omni-VI Plus is the hottest rig I've EVER owned."
- Bill Sawders, K7ZM

"Ten-Tec has really outdone itself with the receiver."
- Howard Eskridge, K9GYI

"We have consistently found it possible to copy weak signals on both SSB and CW with the Omni that gave us trouble with the ___."
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Restructuring: The Next Step

Unless there was a last-minute extension, December 1 was the deadline for comments on the FCC's amateur license restructuring proposals (WT Docket No. 98-143). Until January 15 there is an opportunity to file reply comments, responding to arguments and proposals made by others.

As this *QST* went to press, the League's comments were in the final drafting stages. If you have been following the issue in recent months, the filing will contain no surprises. Reflecting survey results that show members believe the present structure is more complicated than required, the ARRL supports the FCC's proposal to reduce the number of classes of amateur license from six to four through the elimination of the Novice and Technician Plus licenses. However, the League's approach leads to more streamlined regulations than does the FCC's, and expanded privileges for everyone. The details were in last month's *QST*, p 49. An earlier ARRL Board proposal to rename the license classes was not supported by the membership, and has been dropped.

If the Novice and Technician Plus license classes are to be eliminated, what happens to present licensees? In this round of restructuring, unlike the 1960s, ensuring that present licensees lose no privileges has a high priority. It would be cumbersome and confusing to include provisions in the FCC regulations to maintain the existing Novice and Technician Plus privileges for those licensees for the rest of their lives. A much simpler solution is simply to assimilate them into the General class. This also makes possible a key element of the League's proposal: the so-called "refarming" of the 80, 40, and 15 meter Novice bands, to put these segments of three of our most popular HF bands to more intensive use. This will permit wider phone segments on all three bands and better provisions for data operation on 40 meters.

As we prepare for the 21st Century, it is appropriate to de-emphasize the Morse code as an examination requirement in favor of newer radiocommunication concepts. On the other hand, it is inappropriate to eliminate the code from HF licensing, because it retains a significant role in international amateur communication and will remain a requirement of the international regulations for at least the next several years. Reflecting survey results that show members generally favor a code requirement in the 10-13 word-per-minute range for a full-privilege license, the League's proposal calls for a 12-wpm exam for either an Extra or Advanced license. This conforms to what most countries require for a full-privilege license. The code requirement for General would drop to 5 wpm, easing the transition from Technician and encouraging upgrading.

The League proposes to make the standard for Morse exams more consistent by eliminating the multiple-choice exam option, limiting exams either to fill-in-the-blank or "one minute of solid copy" formats, and to take steps to ensure that medical exemptions are granted only to individuals with a *bona fide* need. Another important feature of the ARRL plan is to modify the written exams to include more on modern radiocommunications concepts and operating procedures. In a world that is going almost entirely digital, Amateur Radio is still strongly oriented to analog concepts. This must change if we're to continue to fulfill our charter to contribute to the advancement of the radio art, advance our skills in both the communications and technical phases of the art, expand the existing reservoir of trained operators, technicians, and electronics experts, and provide emergency communications in support of served agencies that are increasingly reliant on digital communications.

When the ARRL Board met in October, the directors generally were comfortable with members' reactions to the direction the majority of the Board had taken in July. However, there were lingering concerns about eliminating the Novice license without offering an alternate route to basic HF privileges and about what many saw as a growing barrier between HF-oriented amateurs on the one hand and VHF/UHF licensees on the other. To address both of these issues, the directors decided to propose limited HF privileges for Technician licensees: the use of CW only in the General class band segments where phone is not permitted, with a transmitter power not exceeding 200 W.

Are such privileges permitted under the international radio regulations? Reasonable people can differ. A strict reading of the regulations would suggest not, but we know a strict reading is not applied because the FCC does not mandate that amateurs be able to send Morse code "by hand." Some critics have painted nightmarish scenarios of CW bands filled with thousands of incompetent operators attempting to communicate in a code they do not understand. It seems more likely that the Board's proposal, if granted by the FCC, will simply provide a few motivated beginners with an opportunity to get a taste of HF CW before having to take the new written and code exams that will be required to go from Technician to General.

So, what happens next?

The FCC staff has a lot of reading to do. Hundreds of comments have been filed, and must be considered before the staff develops a recommendation for action by the Commissioners. Typically this takes a few months, at least. If they feel they have enough on which to base final rules, they can go directly to a Report and Order; otherwise there may be a Further Notice of Proposed Rule Making, or perhaps a combination Order disposing of some issues and a Further Notice inviting additional comment on others.

In short, nothing is going to happen quickly. If you're putting off upgrading or getting your first license, don't put it off any longer. The peak of the sunspot cycle may well have come and gone before the FCC ties the ribbons on Docket 98-143.—*David Sumner, K1ZZ*

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ARRL Directors

Atlantic Division
KAY C. CRAIGIE, WT3P*
5 Faggs Manor Ln, Paoli, PA 19301
(610-993-9623);
wt3p@arrl.org

Vice Director: Bernie Fuller, N3EFN
17668 Price Rd, Saegertown, PA 16433
(814-763-1529);
n3efn@arrl.org

Central Division
EDMOND A. METZGER, W9PRN
1917 Lindsay Rd, Springfield, IL 62704
(217-546-6870);
w9prn@arrl.org

Vice Director: Howard S. Huntington, K9KM, 25350 N Marilyn Ln, Hawthorn Woods, IL 60047 (847-438-3452);
k9km@arrl.org

Dakota Division
TOD OLSON, K0TO
292 Heather Ln, Long Lake, MN 55356
(612-819-0857);
k0to@arrl.org

Vice Director: Jay Bellows, K0QB
997 Portland Ave, St Paul, MN 55104
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Delta Division
RICK RODERICK, K5UR
PO Box 1463, Little Rock, AR 72203
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Vice Director: George Race, WB8BGY
3865 Gibbs Rd, Albion, MI 49224
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Hudson Division
FRANK FALLON, N2FF
30 E Williston Ave, East Williston, NY 11596 (516-746-7652);
n2ff@arrl.org

Vice Director: J. P. Kleinhaus, W2XX
29 Dirubbo Dr, Cortlandt Manor, NY 10567 (914-739-6318);
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Midwest Division
LEW GORDON, K4VX
PO Box 105, Hannibal, MO 63401
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Maryland-DC	William Howard, WB3V, 2304 Snowflake Dr, Odenton, MD 21113 (410-551-6775); **wb3v@arrl.org**
Northern New York	Leslie Schmarder, WA2AEA, RR 1 Box 236, Elizabethtown, NY 12932 (518-873-2189); **wa2aea@arrl.org**
Southern New Jersey	Jean Priestley, KA2YKN, 7158 Chandler Ave, Pennsauken, NJ 08105 (609-662-3587); **ka2ykn@arrl.org**
Western New York	William Thompson, W2MTA, 5460 Rock Rd, Newark Valley, NY 13811 (607-642-8930); **w2mta@arrl.org**
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Illinois	Bruce Boston, KD9UL, 815 E 3rd St, Beardstown, IL 62618 (217-323-9809); **kd9ul@arrl.org**
Indiana	Peggy Coulter, W9JUJ, 12330 SCR 200 E, Muncie, IN 47302 (765-288-0481); **w9juj@arrl.org**
Wisconsin	Roy Pedersen, K9FHI, 510 Park St, Juneau, WI 53039-1243 (920-386-4666); **k9fhi@arrl.org**

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North Dakota	Roger "Bill" Kurtti, WC0M, Rural Route, Box 34, Rock Lake, ND 58365 (701-266-5646); **wc0m@arrl.org**
South Dakota	Roland Cory, W0YMB, 815 2nd Ave W, Mobridge, SD 57601(605-845-2400)

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Arkansas	Roger Gray, N5QS, PO Box 166, Searcy, AR 72145 (501-729-5489); **n5qs@arrl.org**
Louisiana	Lionel A. "Al" Oubre, K5DPG, 3011 Sugar Mill Rd, New Iberia, LA 70563-8624 (318-367-3901); **k5dpg@arrl.org**
Mississippi	Malcolm Keown, W5XX, 14 Lake Circle Dr, Vicksburg, MS 39180 (601-636-0827); **w5xx@arrl.org**
Tennessee	O. D. Keaton, WA4GLS, 141 Medearis Dr, Old Hickory, TN 37138 (615-758-2329); **wa4gls@arrl.org**

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Kentucky	Bill Uschan, KC4MIS, 800 Leawood Dr. #27 Frankfort, KY 40601 (502-226-6784); **kc4mis@arrl.org**
Michigan	Richard Mondro, W8FQT, 800 Dover St, Dearborn Heights, MI 48127 (313-730-2111); **w8fqt@arrl.org**
Ohio	Joseph J. Phillips, K8QOE, 2800 Jupiter Dr, Fairfield, OH 45014-5022 (513-552-8324); **k8qoe@arrl.org**

Hudson Division

Eastern New York	Robert Leiden, KR2L, 19 Willowbrook Rd, Glenville, NY 12302 (518-399-9343); **kr2l@arrl.org**
NYC-Long Island	George Tranos, N2GA, PO Box 296, Bellport, NY 11713, (516-286-7562); **n2ga@arrl.org**
Northern New Jersey	Roy Edwards Sr, AB2RE, 1512 Seventh Ave, Neptune, NJ 07753 (732-774-1650); **ab2re@arrl.org**

Midwest Division

Iowa	Jim Lasley, N0JL, PO Box 26, Chillicothe, IA 52548 (515-935-4337); **n0jl@arrl.org**
Kansas	Orlan Q. Cook, W0OYH, 12110 West 71st St, Shawnee, KS 66216 (913-631-0423); **w0oyh@arrl.org**
Missouri	Charles Boyd, KE0K, 1010 Tyalor St, Louisiana, MO 63353 (573-754-6584); **ke0k@arrl.org**
Nebraska	Bill McCollum, KE0XQ, 1314 Deer Park Blvd, Omaha, NE 68108 (402-734-3316); **ke0xq@arrl.org**

New England Division

Connecticut	Betsey Doane, K1EIC, 92 Mohegan Rd, Shelton, CT 06484-2448 (203-929-7759); **k1eic@arrl.org**
Eastern Massachusetts	Lawrence Ober, W1MW, 113 5C Brigham St, Hudson, MA 01749 (978-567-0942); **w1mw@arrl.org**
Maine	William Woodhead, N1KAT, 63 1st Ave, Auburn, ME 04210 (207-782-4862); **n1kat@arrl.org**
New Hampshire	Alan Shuman, N1FIK, PO Box 119, Goffstown, NH 03045-0119 (603-487-3333); **n1fik@arrl.org**
Rhode Island	Rick Fairweather, K1KYI, 106 Chaplin St, Pawtucket, RI 02861 (401-725-7507); **k1kyi@arrl.org**
Vermont	Bob DeVarney, WE1U, 43 W Milton Rd, Milton, VT 05468 (802-482-4280); **we1u@arrl.org**
Western Massachusetts	William Voedisch, W1UD, 240 Main St, Leominster, MA 01453 (978-537-2502); **w1ud@arrl.org**

Northwestern Division

Alaska	David Stevens, KL7EB, PO Box 113242, Anchorage, AK 99511 (907-345-6506); **kl7eb@arrl.org**
Eastern Washington	Kyle Pugh, KA7CSP, W 5006 Houston Ave, Spokane, WA 99208 (509-327-5039); **ka7csp@arrl.org**
Idaho	Michael Elliott, KF7ZQ, 9832 W Gurdon Ct, Boise, ID 83704-4080 (208-376-3458); **kf7zq@arrl.org**
Montana	Darrell Thomas, N7KOR, 743 33rd Ave NE, Great Falls, MT 59404 (406-453-8574); **n7kor@arrl.org**
Oregon	William Sawders, K7ZM, 19821 Ponderosa St, Bend, OR 97702 (541-389-6258); **k7zm@arrl.org**
Western Washington	Harry Lewis, W7JWJ, 10352 Sand Point Way NE, Seattle, WA 98125 (206-523-9117); **w7jwj@arrl.org**

Pacific Division

East Bay	Bob Vallio, W6RGG, 18655 Sheffield Rd, Castro Valley, CA 94546 (510-537-6704); **w6rgg@arrl.org**
Nevada	Robert Davis, K7IY, PO Box 20361, Reno, NV 89515-0361 (702-856-2826); **k7iy@arrl.org**
Pacific	Ronald Phillips, AH6HN, HCR 2 Box 6637, Keaau, HI 96749 (808-982-6513); **ah6hn@arrl.org**
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San Francisco	John Wallack, W6TLK, PO Box 1115, Kenwood, CA 95452 (707-833-1873); **w6tlk@arrl.org**
San Joaquin Valley	Donald Costello, W7WN, 1900 N Ashby Rd, No. 9, Merced, CA 95348 (209-383-5739); **w7wn@arrl.org**
Santa Clara Valley	Geoffrey Ellis, KD6MFM, 212 Germaine Ave, Santa Cruz, CA 95065 (831-475-1262); **kd6mfm@arrl.org**

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North Carolina	W. Reed Whitten, AB4W, 1208 Oxford Pl, Cary, NC 27511(919-467-7464); **ab4w@arrl.org**
South Carolina	Leslie Shattuck, Sr, K4NK, 112 Park Circle, Greenville, SC 29605 (864-422-8859); **k4nk@arrl.org**
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Southern Florida	Kevin Bunin, K4PG, 3307 Lakeview Dr, Delray Beach, FL 33445 (561-496-5257); **k4pg@arrl.org**
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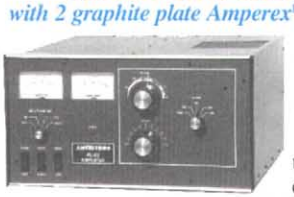

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DC Currents

By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs

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

Prospects Still Murky for the 106th Congress

In spite of some startling developments, the November elections probably shed more heat than light on the prospects for the 106th Congress. Every seat was up for re-election in the House, and Democrats picked up five seats in a major surprise to the Republican leadership. Sponsors of the ARRL's two bills last year, Michael Bilirakis (R-FL-9th) and Anna Eshoo (D-CA-14th), were re-elected.

The most significant fallout from the election may have been the abrupt departure of Speaker of the House Newt Gingrich (R-GA-6th). Gingrich found himself in a squeeze play between Republican conservatives who felt that he had compromised their principles in the last minute budget deal, and Republican moderates, who attributed the lack of productivity in the 105th Congress to Gingrich's efforts to appease the party's right wing. The new Speaker will be Robert Livingston (R-LA-1st), formerly Chairman of the powerful House Appropriations Committee. While likely as conservative as Gingrich in his politics, Livingston is anticipated to be less ideological and more businesslike in his management of the House. The Speaker has broad authority to influence the House's agenda, including the kinds of bills that ultimately make it to the floor for a vote. Livingston intervened on behalf of local hams several years ago by demanding in an Appropriations report that the FCC correct a serious local malicious interference case.

The election did not affect the composition of the House Telecommunications Subcommittee, except for the ouster of Republican Rick White of Washington (R-WA-1st), who lost to Democrat Jay Inslee. White had been attempting to carve out a reputation as the Internet guru on the committee, and his office had always listened to ARRL concerns. The other committee members on both sides of the aisle were reelected. Two members retired. It is likely that most members of this committee, one of the most powerful and collegial in the House, will wish to return.

Thirty four seats were up for re-election in the Senate, but party changes were offsetting so the Senate remains at 45 Democrats to 55 Republicans, a far cry from the filibuster-proof Senate the Republicans had wanted. The composition of the important Senate Communications Subcommittee did not change, except for the retirement of Senator Wendell Ford (D-KY). There is no word yet about the composition of the committee for the 106th Congress, but most of the current members are likely to return. How involved Senator John McCain (R-AZ) will be is a mystery for now. McCain, Chairman of the full Commerce Committee and a driving force behind the Senate's telecommunications agenda last session, is said to be mulling over a presidential bid.

It's never safe to make broad predictions about Congress before the new crew has even gotten the ship of state away from the dock. Even so, it is likely that both parties will at least make an effort to pour oil on the stormy waters that were churned up by the partisan rancor of last session. But the Clinton impeachment drive remains the storm cloud that could plunge the 106th Congress right back into the political equivalent of the Bermuda Triangle, and whether new House leadership will bring more comity or more comedy to Congress remains to be seen.

If the ship of state stays upright, some Congress-watchers expect to see an effort made to restructure the FCC, and a return visit to the issue of HDTV spectrum. It's also likely that the House and Senate Commerce Committees will continue to hash out commercial antenna siting, and may also try to pass legislation restricting cellular eavesdropping, similar to last session's controversial HR.2369. Tune in to this space in the next several months to see how the telecommunications agenda is shaping up.

Ohio Club Gets the Attention of the Folks on The Hill

• In spite of the wonders of radio technology, there's still no better way to convince a Member of Congress that Amateur Radio is important back home than by a face-to-face Congressional District meeting. James Viele, W8JV, President of the Mahoning Valley (Ohio) Amateur Radio Association, reports that his club met with their member of Congress, James A. Traficant, Jr (D-OH-17th) in August of 1998 and shortly thereafter Traficant announced he would sign-on as a cosponsor to HR.3572. The club, which will celebrate its 75th year of League affiliation this year, has met with Traficant three times in recent years to discuss Amateur Radio concerns. How they do it is a textbook example of good Congressional relations.

First, they give the Congressman plenty of opportunity to shake hands with his constituents.

"Nothing beats actually pressing the flesh," Viele says. "When our Congressman has the chance to look out in the audience and see there is a large group of people, it gets him energized." Viele notes that Traficant's style is to "work the room," trying to meet personally with every member of the club for a few minutes during the visit. The club made sure the Congressman had a copy of HR.3572 in advance of the meeting so that he could announce his support in front of an enthusiastic audience.

Second, the club tries to provide a lot of information on a personal level.

"Everybody at these meetings has the opportunity to express their thoughts," Viele says. "As a result, we've been very successful in having Representative Traficant come to the meetings to spend time with us," rather than just speak and leave. One of the key points the group tried to stress was the importance of Amateur Radio emergency communication in the tornado prone Midwest.

Traficant apparently got the message, because shortly after the meeting he wrote to Viele, "The MVARA and other amateur radio groups throughout the country provide a valuable medium of communication. It is imperative that the radio frequencies used by amateur radio operators remain available for critical weather

information and other important usage."

Third, members of the club don't just stand on the sidelines, but try to keep a foot in the door politically.

Viele credits the hard work of Adam DeSantis, AA8SU, in setting up the meetings with Traficant. He adds that members of the club get involved in local political campaigns so they get to know the candidates and, eventually, develop "inside" connections with some of the elected officials. But connections aren't strictly necessary.

"If you pick up a telephone and call your member of Congress," Viele says, "You're going to reach somebody who'll take the time to talk with you." And Viele cautions hams not to be intimidated by the prospect of talking with public officials. "If everybody thinks there's no use doing something like this, nothing will ever get done. But if everybody does their little part, it'll become part of one big part."

Finally, the club understands that political animals revel in publicity.

Viele says his club makes a special effort because the Mahoning Valley Club boasts a number of members with media connections, and that helps draw the reporters and cameras.

"When our Congressman visits," Viele says, "We make sure everybody in town knows he's there. We try to be sure there's a TV crew waiting for him in the parking lot."

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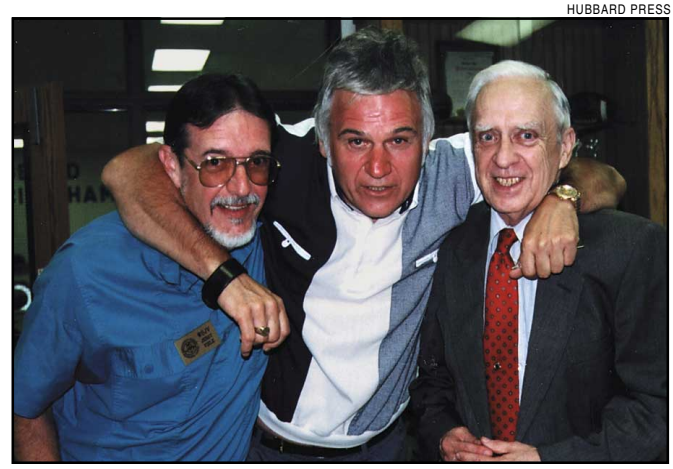

Putting the squeeze on his constituents James Viele,W8JV (left), and Elwin Muzzey (right), Congressman James Traficant, Jr (D-OH-17th) talked with the Mahoning Valley Amateur Radio Association about the need to protect Amateur Radio frequencies.

MARS Program Gets Praise, and Possible "Streamlining"

Buried in a report from the House Committee on National Security on the National Defense Authorization Act of 1998 were words that may be a harbinger for the venerable Military Affiliate Radio System (MARS) program. MARS has provided a link with home for American service personnel overseas for many years by utilizing the skills of Amateur Radio volunteers on specially assigned HF frequencies. (Information about the report was brought to our attention by the eagle-eyed P.J. McDaniels, KE4DWV.)

The Committee Report (105-532) notes that the MARS system, "in lieu of commercial or DOD [Department of Defense] resources, results in annual savings to DOD of between $11.1 million and $27.5 million," and offers support for the recommendations by Secretary of Defense William Cohen to proceed with plans to restructure the MARS program in order to realize manpower savings, eliminate duplicative efforts, improve coordination, and modernize the program through technology improvements.

Secretary Cohen's recommendations were a response to an earlier Committee report requesting that the Secretary identify how MARS was being used and recommend how to expand the program. Cohen's report, submitted to the committee at the end of 1997, recommended the consolidation of the three MARS programs—Army, Air Force and Navy/Marine Corps—into a unified management structure with a centralized administration. It also recommended modernizing the program, including measures to help members keep abreast "of the latest advances in technology affecting high frequency (HF) radio." Among the technologies Cohen noted were "the use of multiple microprocessors and Automatic Link Establishment (ALE), Digital Signal Processing (DSP), data compression techniques, and image compression and error correction capabilities…" The report notes that achieving these changes will require no additional funding. Cohen's office calculated the cost savings afforded by MARS by calculating what it would cost to establish an identical program by purchasing services on a commercial basis.

Originally founded in 1925 by the US Army Signal Corps as the Army Amateur Radio System, the program was suspended during World War II. It was reactivated after the war as the Military Amateur Radio System, and shortly thereafter became the Military Affiliate Radio System when the Air Force began to participate. The Navy and Marine Corps joined in 1962.

Please Say "Thank You" to Your Member of Congress

- "My boss will cosponsor this if we get letters from our district," said the Representative's Legislative Director as she looked over the information packet we gave her on last year's spectrum protection bill. No matter what the issue is, we get that answer frequently during the two to three hundred visits we make to offices on The Hill each year. It makes sense. Without constituent letters, a legislator has no way of knowing whether a bill is important to the voters he or she represents. And without some form of acknowledgement from the folks at home, a legislator may not be enthusiastic about signing on when the bill comes up again. In fact, we were told by one staff member that she recommended her boss cosponsor HR.3572, the Amateur Radio Spectrum Protection Act of 1998, because members of Congress get lots of mail, but "hams are the only ones who ever write thank you letters." If your member of Congress cosponsored HR.3572 (see "DC Currents" December 1998, p 15 for a complete list), please keep up the tradition and consider writing a brief thank you letter to demonstrate that what was done on your behalf was appreciated.

Media Hits

- Another excellent "Technobuddy" column on Amateur Radio appeared in Sunday's *Atlanta (GA) Journal Constitution*. Columnist Bill Husted, KQ4YA, captures the magic of getting on the air and "fishing out the voices of strangers from the static."
- A recent *Press-Telegram* (Long-Beach, CA) article highlighted the Amateur Radio station aboard the Queen Mary. The piece featured Nate Brightman, K6OSC, of Long Beach, who has run the station for more than 20 years.
- *The Santa Cruz County (CA) Sentinel* reports that Pajaro Middle School teacher Sarah Cowan has integrated Amateur Radio into the science curriculum with the help of Don Casperson, AA5PA, and the Santa Cruz Amateur Radio Club.
- *The Associated Press* reported on the activities of Victor Rivera, KU4NV, Miguel Rodriguez, KB4MCM and the Miami based American Radio Club in the aftermath of Hurricane Mitch. Rivera and Rodriguez discuss getting health and welfare messages into and out of Honduras and Nicaragua.

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- Automatic Repeater Shift (ARS)
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- 3 Selectable Scan Stop Modes with Scan Skip
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The new FT-51R Dual Band HT is state-of-the-art, and easy to use! So easy, you won't need an operating manual. Its exclusive, scrolling instruction menu located in the large, backlit display "window", guides you through total operation while simultaneously viewing the main display window.

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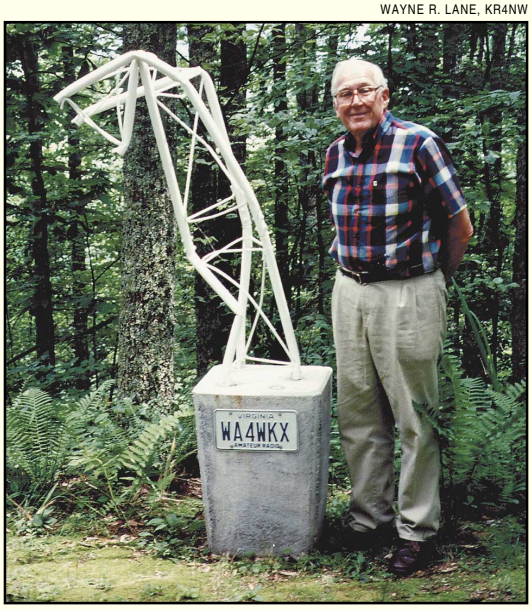
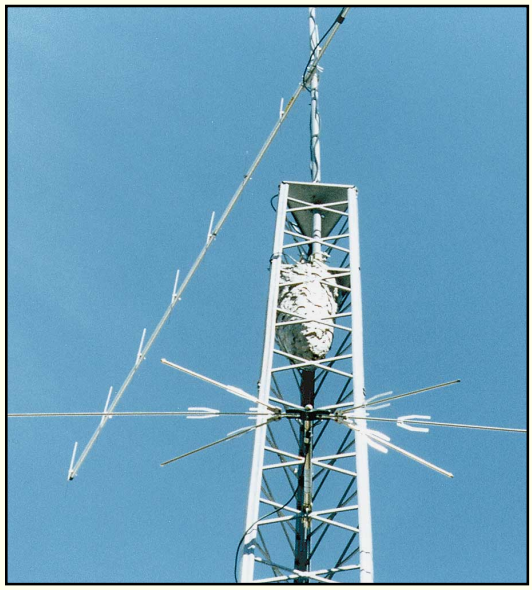
WAYNE R. LANE, KR4NW

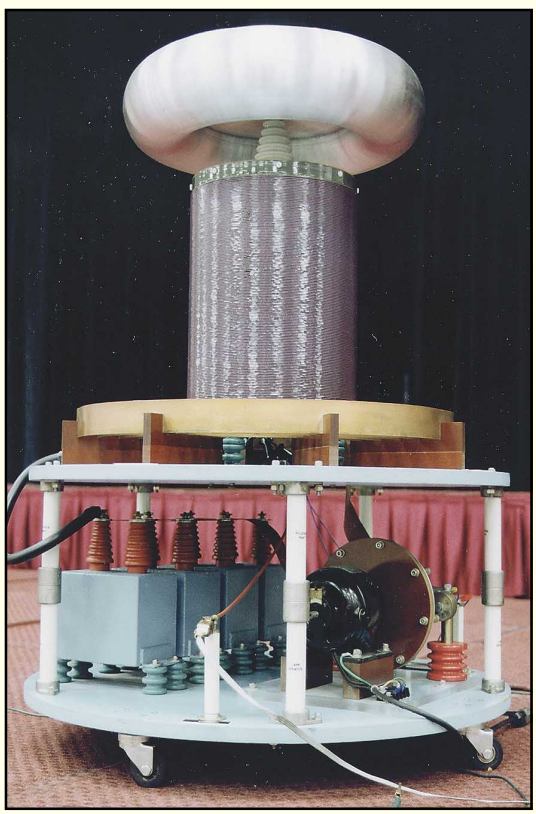


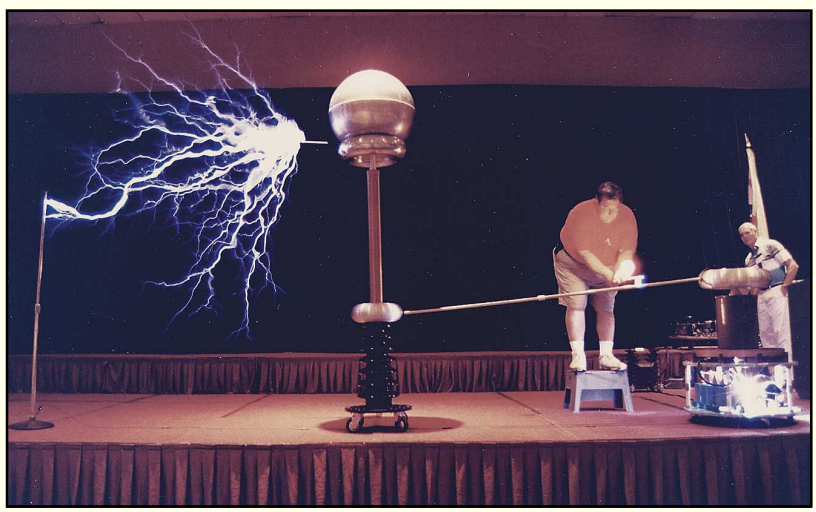
Turning disaster into art. Jim, WA4WKX, of Abingdon, Virginia lost a tower to the forces of nature some time ago. He kept one of the sections as a "twisted" momento and turned it into a potent reminder about tower safety. The *object d'art* now occupies a place of honor at the Mountain Empire Amateur Radio Society Field Day site.



What's that buzz on my signal? A colony of bald-faced hornets found the perfect location for their nest within the top section of a tower owned by Cathy Keller, N8WLK, in Petoskey, Michigan. Cathy has postponed further antenna work until later this winter when the nest and its occupants can be removed.

Can you believe this is a homebrew transceiver? It looks like it rolled off an assembly line, but it was designed and built by Bruno, I6YPK and Pier, I6WJB. The triple-conversion HF transceiver operates on all bands from 160 through 10 meters and includes computer control.





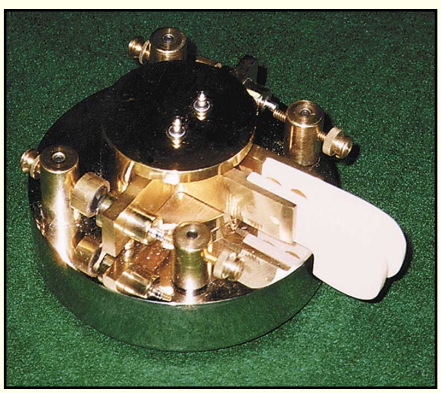
Bill Wysock, N6UXW, put on a shocking demonstration of his homebrew Tesla coils at last year's ARRL Southwestern Division Convention. Theo Benson, WA6BEJ (above), draws a brilliant arc while a massive discharge erupts from the tertiary coil. A closer view of the primary and secondary coils (left) illustrates Bill's craftsmanship.

JOTA joy. Jordan, age 10 (left) from Frisco, Texas waits for instruction before practicing Morse code while Dave Kreinberg, NR3E (right) demonstrates a keyer to Pack 298 Webelo Den during JOTA (Jamboree on the Air). If you or your club participated in JOTA 1998, you can post your report on the Web at **http://www.arrl.org/ead/jotalog/.** The World Scout Jamboree will take place in Chile from December 27, 1998 to January 1999. The Chilean authorities have awarded the special-event call sign XR3J to the station. For more information on making a contact with the Scouts visit **http://www.arrl.org/ead/#scout**. We will be updating our site as information is received.

Already an Old Timer at the ripe age of 16! Joe Kanowitz, N1KZZ, started young. At age 8 he decided to follow in the footsteps of his father, KD1NV, and become a ham. He studied *on his own* and became a Technician less than a year later. By the time he was 11, Joe had his General ticket. While still in high school Joe applied for early placement at Clarkson University in Potsdam, New York. There he joined 60 other high school seniors who attend college as freshmen while completing the requirements for their high school diplomas. In addition to his engineering studies at Clarkson, Joe assists at campus radio stations WTSC and WNTC. His father believes ham radio may have had at least a *little* influence on Joe's early success!

JOE PHILLIPS, K8QOE

Congressman Dennis Kucinich (D-Ohio) tries out the Cleveland Metro Zoo's Rain Forest Station, K8CRF. The congressman had just presented these smiling hams with the city's proclamation honoring the station's opening at the Zoo's rain forest exhibit. Joining the congressman are Fred Collins, W8ADW (top), Dwaine Modock, K8ME (center) and Ron Borkey Sr, K8VJG (bottom). Ohio Assistant Section Manager Bob Winston, W2THU, arranged for the donated equipment and the station location at the Zoo.



"Too many hours to count." That's how long it took to build this gorgeous key, according to Bob Miller, N9MU, of Northbrook, Illinois. The base is crafted from a 4-inch stainless steel disk. Tensioning is magnetic and the paddles are ivory with torrington bearings and 18 kt gold contacts. The total weight of the key is about 5 pounds.

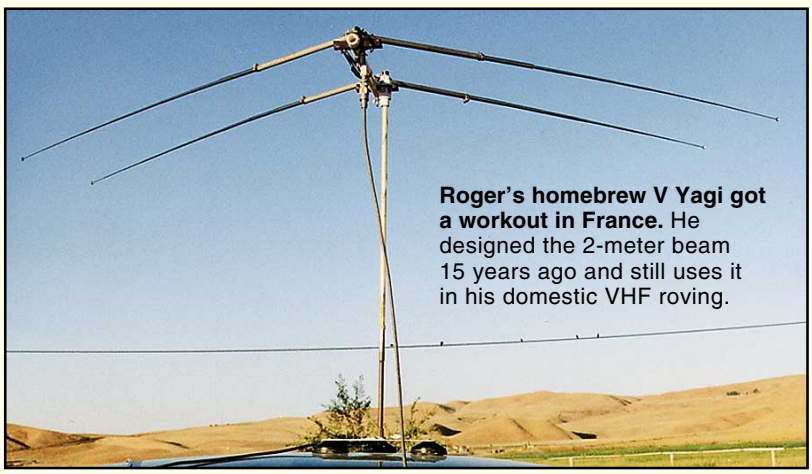
Where is Ham Heaven? Somewhere in downtown Detroit. Dan, VE3VOG, captured this glimpse of the afterlife while visiting during the Detroit Grand Prix. Maybe it's just purgatory!

The Ultimate European Road Trip?

Last summer Roger Wagner, K6LMN, celebrated his 60th birthday by operating mobile while cruising a total of 6000 miles through several nations including France, Germany, Sweden and Finland. While on the continent Roger participated in the ARRL June VHF QSO Party and even managed to operate Field Day from the Åland Islands. Although he enjoyed some HF activity, most of this time was spent on 6 and 2-meter SSB/CW. Roger reports that 6-meter activity was particularly intense. He once worked a station over a 1200-mile path with nothing more than his ICOM IC-706 transceiver and a 48-inch magnetic-mount mobile antenna.

OH0/K6LMN handing out DX Field Day contacts from Eckero in the Åland Islands.

Roger, K6LMN, packed his entire mobile station into two suitcases. In his left hand Roger is holding a collapsed 2-element, 2-meter "**V** Yagi" (see below).



Roger's homebrew V Yagi got a workout in France. He designed the 2-meter beam 15 years ago and still uses it in his domestic VHF roving.

SM2/K6LMN working 20 meters just north of the Arctic Circle near Jokkmok, Sweden. Believe it or not, this photograph was taken at *midnight* local time. They don't call it the "land of the midnight sun" for nothing!

SM7/K6LMN taking a break after working a 6-meter sporadic E opening from the front of Borgholm Castle in Borgholm, Öland, Sweden.

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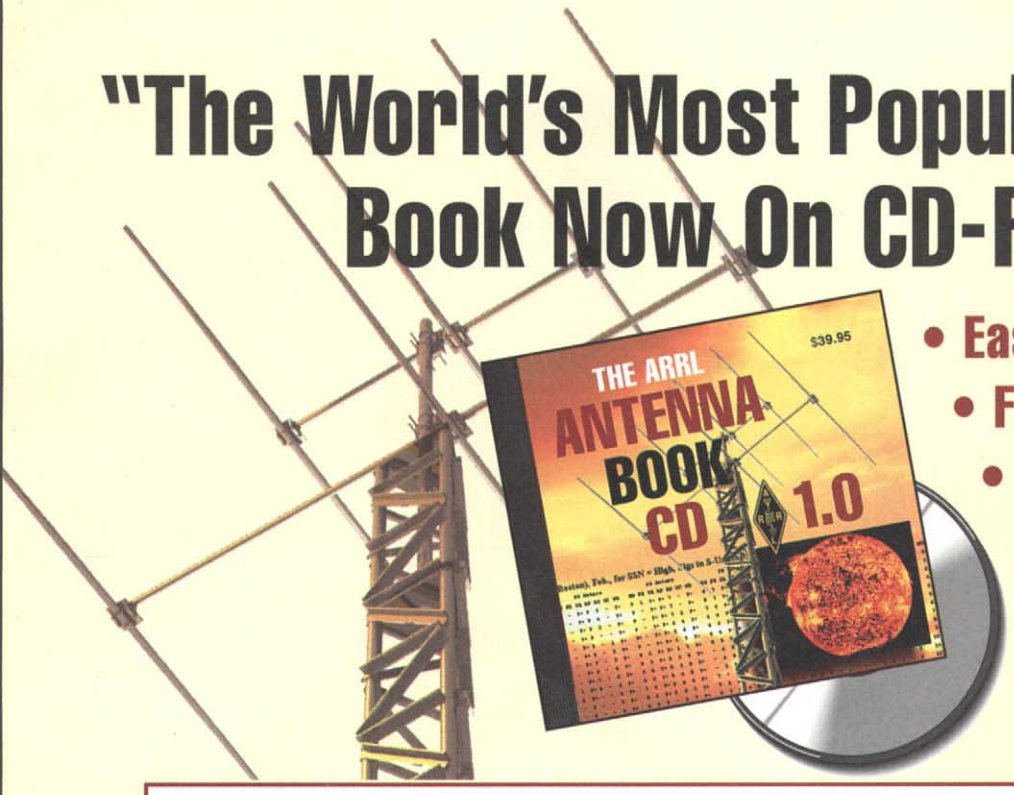

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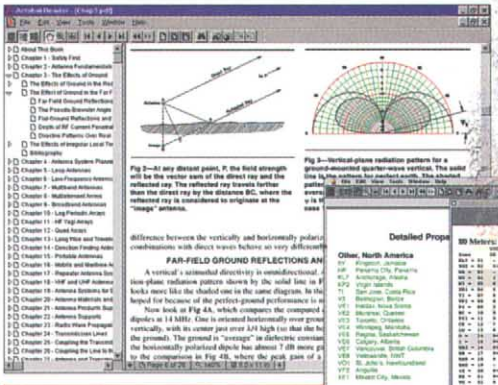

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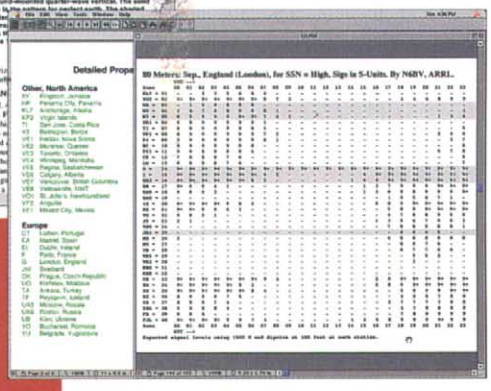

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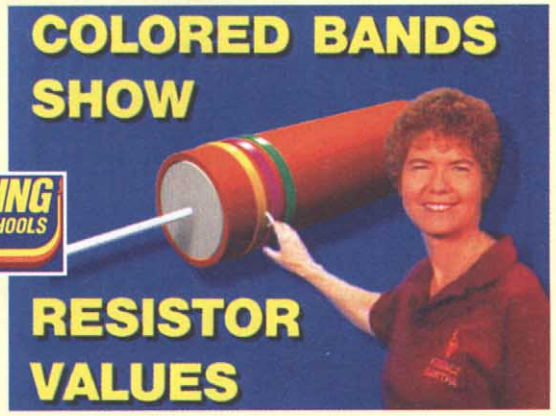

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OUT OF BAND ON 40

♦ Last October I had an enjoyable weekend working the *CQ* World Wide DX Contest. Other than disappointing propagation conditions, which are to be expected, the contest was marred by only one other problem: the apparent ignorance of US hams concerning frequency allocations.

It's common for DX stations to call below 7.100 MHz and announce a listening frequency above 7.150. A number of US mainland operators, including some who should be old enough to know better, were calling on the DX frequency below 7.100 MHz. Some of them didn't even get it when the DX stations announced that there was no "listening frequency" and that the stations calling them were operating out of band.

There were too many violations to be able to say it was just "heat of the pursuit." More likely it's the growing contempt for regulations mitigated by the progressive dumbing down of our examinations. (And to those inclined, this argument cannot be used for or against CW testing.)

Other than improved training and the certainty of frequency privilege questions on the tests, I have no answer. I do know that the disregard of regulations is another nail in the ham radio coffin.—*George Lynch, KA1TY, Tucson, Arizona*

MY GREATEST CONTACT

♦ I've only been a ham for three years and have turned into quite the "paper chaser." As such, I've had my share of thrilling QSOs. I've worked plenty of DX and "rare ones," but none quite so thrilling as the one I worked on the afternoon of July 4, 1998.

I was all tuned up on 14 MHz, ready for action. CW is my preferred modus operandi, and 1800 UTC had always been a particularly productive time for whatever award I happened to be working on. I turned my Yagi east, knowing from experience that I could make the most out of a nice east-west opening. Whatever was out there, DX or rare state, was all mine. The band was in great shape, ready for the taking!

It was then that I heard KF4JFV's CQ from Louisville, Kentucky. I said to myself, "Very shaky fist, must be a new guy! Hey, I used to be a new guy. Better help the poor kid out."

After exchanging the usual, RST, QTH and names, I learned that John had been involved in a tragic accident. He told me that he was paralyzed. He had partial movement in his right hand, the same hand he was sending with. He had been struck down in the prime of his life.

Copying John's CW was a struggle. But nothing compared to what he had been through. All I could think of was how proud I was to make his log.

We ended up exchanging QSL cards. A couple of weeks later, John wrote, "Our QSO made my 4th of July. I couldn't shoot off fireworks or BBQ like I used to, but I thank God I've got my radio. As I told you, I've been paralyzed from the neck down for 7½ years. It's friends like you that I make on my radio that keep me going. My Mom wrote this. 73. John."

When you get yourself riled up about the FCC's proposed rule change, or the League's latest proposal to lower the CW testing requirement, or how much you disagree with your club president over this or that, think about John in Kentucky. This is Amateur Radio at its best! John's dedication to the hobby is an inspiration to us all, no matter how much we have achieved. He has persevered through hardships unimaginable just for the privilege of holding an Amateur Radio license. It reminds us just how petty the politics can be. This young man's achievement is greater than any award.

So, forget about the Spratly Islands, St. Paul's Island or Kazakhstan. My greatest contact was Louisville, Kentucky, confirmed!—*David B. Larus, KQ6NS, Palm Springs, California*

GIVE THE "LITTLE" STATIONS A CHANCE

♦As we approach the solar maximum, 10 meters is finally beginning to open to Asia and Europe on a regular basis. Even so, enjoying conversations with DX stations is often next to impossible when stations on adjacent frequencies are running a kilowatt or more. Technician Plus operators can't hope to compete when they are limited to 200 W. And many of these Technicians are experiencing the thrill of HF DX for the first time.

General, Advanced and Amateur Extra operators flock to 28.300 to 28.500 MHz when the band opens because that's where the action is. This is understandable, but remember that Technician Plus stations are *restricted* to that segment when it comes to phone operation; they can't go elsewhere on the band to escape the crowd.

With this in mind, my request is simple: Please consider leaving your amplifier off when you journey to 10-meter phone. You really don't need it most of the time and you'll give the Technician Plus stations a fighting chance.—*Dave Tobin, KC7DYY, Fernley, Nevada*

YOU DON'T NEED A FANCY ANTENNA

♦I was first licensed (as a Technician) in fall of 1996, and upgraded to Technician Plus a year later. I equipped myself with a dual-band mobile rig and a 2-meter H-T, which served me well. I wanted to work on HF but didn't have the equipment for it, and practicing code with a computer is very boring. I'd prefer to improve my speed on the air.

Browsing for new rigs through *QST* advertising and other information is a disheartening exercise because the prices are way out of my range. I have two small children and don't have the free time to pick up a soldering iron and build something myself.

In August of this year I got a lucky break. I picked up a used Kenwood TS-520S. I then figured out what else I'd need: an antenna tuner, dummy load, antenna and feed line. I scraped together the funds for a new antenna tuner, a hundred feet of good ladder line, some grounding straps and a piece of RG-8X coax to connect the rig to the tuner. So far so good. I also picked up a shortwave antenna kit from RadioShack because it provided all the hard-drawn copper wire and plastic insulators I needed to build an antenna.

I wasn't sure which wire antenna design to choose (the number of ways you can arrange a piece of wire to make it radiate is nothing short of mind-bending to a newbie like me). I put my antenna parts in a bag and went to my club meeting to pick some Amateur Extra brains. They snickered at my RadioShack antenna wire, chided me for wanting to feed my antenna with ladder line and quietly told me I needed something much more sophisticated if I was going to do anything worthwhile on the air. I was crushed!

Then my November 1998 *QST* showed up. I was thumbing through its pages when I stumbled on the article by Kirk Kleinschmidt, NT0Z ("Amplifiers vs Antennas—One Ham's Opinion"). As part of his article Kirk described a simple wire dipole antenna fed with 450-Ω ladder line. What's this? A working dipole made of ladder line, wire, insulators, and an antenna

tuner on a barefoot rig? Don't worry about the length? Just put it up and start having fun? Blasphemy! If it isn't a beam, or if it doesn't have a fancy name or a three-digit price tag, it can't work, can it?

Well, if a ham ticket can't let me goof around with antennas that most Amateur Extras would laugh at, then what good is it? I went outside and strung a piece of poly clothesline between my house and a nearby tree (about 50 feet away). I took my Radio Shack antenna wire, strung it along the rope and attached it to the rope for support. I then eyeballed the middle of the wire, cut it there and twisted it around my ladder line to make a dipole. The thing was about 4 feet off the ground in the middle and with maybe 20 to 25 feet of wire on each side. I went inside, hooked it up to the tuner, powered up the Kenwood and immediately discovered that my tuner refused to provide an input SWR below 5:1. Frustration! I checked everything and finally realized I had misread my tuner's instructions on how to hook up a balanced line. Eureka! It tunes! I listened, fascinated, to Sergio, a CO2, handing out contacts on 10 meters (at S3-S5 level) to JAs (that I couldn't hear) for about a half-hour.

The next day, I raised the antenna up a bit higher by attaching the other end to a tree to get it out of reach of children and improve performance. It tuned to 1:1 at around 28.400 and I was blown away by S7 signals from all over Europe—France, Spain, Italy, Germany (this was around 1645 UTC).

My first HF contact was with Vlado, 9A1HCD, in Croatia yesterday afternoon via SSB. He gave me a 59 and said my signal was very strong. Fine business indeed! Thanks for helping me realize that you don't have to use a fancy antenna to get on the air and enjoy yourself.—*Ken Hoover, N3YER, Middletown, Connecticut*

JUST TWO LICENSE CLASSES

♦Perhaps I'm disqualifiifed from talking about the "good old days." I'm less than 60 years old, never had a QSO with Hiram Percy Maxim and got my license as one of those newfangled Conditionals. My "good old days" started in the early '60s, before *Dis*incentive Licensing, but here is what I remember.

Hams didn't bicker with each other about who was more "deserving." Nobody got a special deal because they could work a code key faster or remember more electrical formulae than someone else. We all shared the same spectrum, worked together to solve the same problems, competed in contests, passed traffic, troubleshot each other's radios and generally had fun together.

Today we are sliced and diced into six different classes. We are carefully divided into our own special frequency segments and operating modes. Worse yet, many of us are full of an overriding sense of our own elite stature and self-importance. (And Lord protect the Extra who suggests that a Technician, who didn't pass his exam in front of a stern FCC clerk and never touched a code key, might have something to contribute to our beloved Amateur Radio service.)

I respectfully propose that all current six license classes be scraped and replaced by two new classes: Beginner and Elmer.—*Hans Brakob, K0HB, Plymouth, Minnesota*

CIVILITY AND ENFORCEMENT

♦ I recently took part in a simulated emergency test with ARES here in Virginia. We used HF and VHF voice, along with VHF packet to support a DOD/VA exercise named Focus Vision.

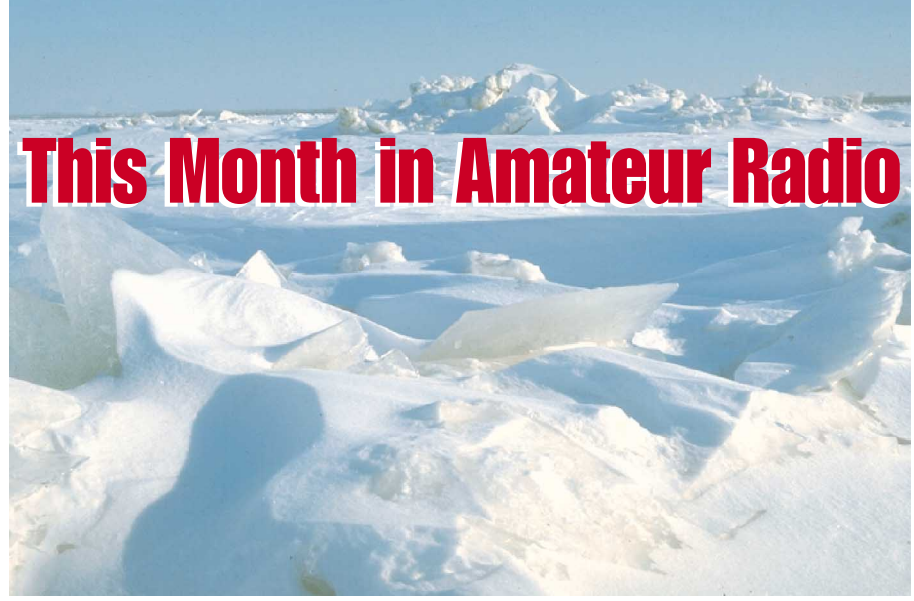
Problems were encountered on 40 meters as soon as I opened my station. After waiting for a QSO in progress to end, I came on the air and attempted to establish contact with other ARES stations in support of this exercise. Not five minutes into the exercise I was the subject of rude comments, colorful body sounds and other intentional interference. The language was foul, and of course there were no call signs. The net frequency sounded as bad, or worse, than any CB channel I have ever heard.

Through perseverance, and a change in net frequency, the exercise was carried out and completed to the satisfaction of DOD and VA officials, although I hope none of them were near our HF positions!

I disagree with ARRL petition RM-9150 advocating a private sector complaint procedure for policing our bands. The concept of self-policing our bands is a noble one, but it is one that has never, and will never work. Would we insist that the citizens of any city police themselves to save money? Certainly not! Why should our amateur bands be any different? The offensive operators who are causing us so much trouble are only afraid of swift, official government enforcement action. These outlaws laugh at the ARRL Official Observer system.

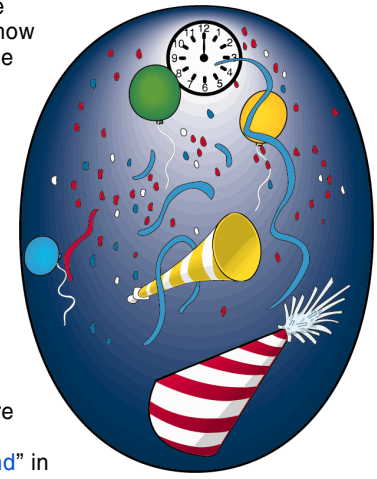
To this end, I propose a $200 annual license renewal fee be levied upon every Amateur Radio operator. This money would go directly to the FCC to support a crack system of nationwide enforcement teams whose only objective is to monitor the amateur bands, track offensive operators and confiscate all their amateur equipment on the spot. No warnings, no slap on the hand, no Mr. Nice Guy anymore. You pollute the airwaves, your equipment is confiscated in swift retribution.

If we do not do something about this problem now, then there is no hope for our hobby. As society sinks, and entry requirements into Amateur Radio are lowered even further, the hobby will be overrun by outlaws taking advantage of the fact that they can do whatever they want because there is absolutely nothing to stop them. Enforce Part 97 now, or lose our hobby.—*John Roberts, WA4JR, Linden, Virginia* QST



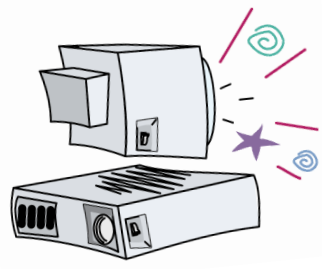
This Month in Amateur Radio

Maybe January doesn't look like this where you live (we hope not!), but this bone-chilling landscape is how January *feels* to most of us. This is the time to settle in with a warm beverage—of the liquid or skywire variety—and enjoy the best that winter hamming has to offer.



Ring in the last year of the millennium with **Straight Key Night**. The event begins at 7 PM EST on New Year's Eve and runs until 7 PM EST January 1. See your December *QST* for all the details.

There are two can't-miss events on the first weekend of January. The **ARRL RTTY Roundup** gets underway at 1800 UTC Saturday, January 2. You'll find the rules in your December *QST*. If you're wondering what this contest is all about, take a moment to read "Hot Keyboards on a Cold Weekend" in this issue. Saturday is also **Kid's Day**, an event for children—licensed or otherwise. Read the article by N6TR in this issue, then make plans to put your "junior op" on the air.

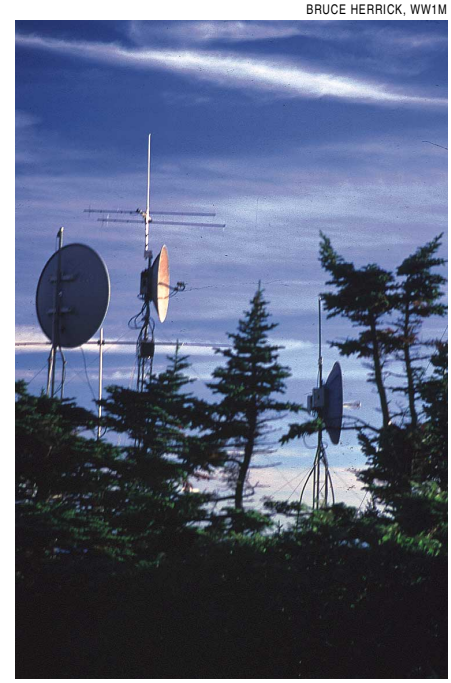


Computers will be hopping on the first weekend of January during the ARRL RTTY Roundup.

Despite the cold that grips many areas, January can be hot month for VHF. With the usual early-winter sporadic E and the possibility of F2 openings on 6 meters, anything could happen during the **ARRL January VHF Sweepstakes**. The contest starts at 1900 UTC on the 23rd. The rules are in your December *QST*.

If you're looking for a convention, the "warmest" January gathering is down South! The **Mississippi State Convention** in Jackson takes place January 29 and 30 at the Mississippi State Fairgrounds Trade Mart Building, northeast of the coliseum. Check "Coming Conventions" in this issue.

BRUCE HERRICK, WW1M



The world above 50-MHz is the place to be this month for the ARRL January VHF Sweepstakes.

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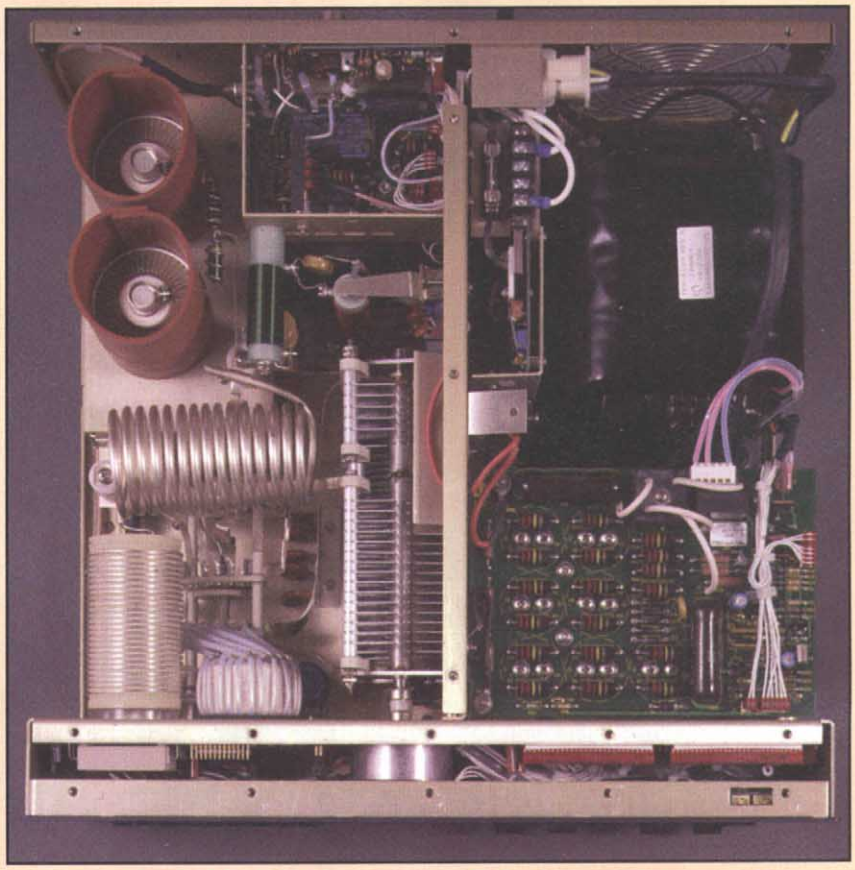

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By Lloyd Verhage, KD4STH

Ham Radio Ballooning to Near Space

Part 1—You probably can't pilot your own balloon around the world in 80 days, but you can launch experimental balloons—with fascinating and fun ham radio payloads—to the edge of space. It's a club project that's a lot like starting your very own space program!

I'd like to introduce you to the process of assembling and flying a near-space capsule and, with a little luck, motivate you to design, build and fly one of your own. Near-space telemetry is interesting and exciting for hams and non-hams alike, making it a great public introduction to Amateur Radio.

If you decide to get your feet wet, you'll send instrumented capsules into the stratosphere—"near space," which in the middle latitudes begins at about 50,000 feet. In that rarified air (or lack thereof), atmospheric pressure falls to less than 15% of that at the Earth's surface. At 100,000 feet (which can be attained by ham-launched weather balloons), the air pressure is only about 1% of surface pressure. Air temperatures are at –60ºF at the beginning of the stratosphere and reach highs of –20 ºF at 90,000 feet. At 100,000 feet, the horizon is more than 300 miles away.

At near-space altitudes the sky is black because the air is far too thin to effectively scatter or refract sunlight. Your capsule's instrumentation will see a blue-white Earth surrounded by black space, with only a thin blue band of atmosphere hugging the horizon.

In this harsh environment, conditions are similar to those found on the surface of Mars. Near space is an appropriate description!

The author (center) along with Dan Haley, KE4SLC (left) and Mark Conner, N9XTN (right), fill the near-space balloon in preparation for lift-off.

VHF/UHF is Best

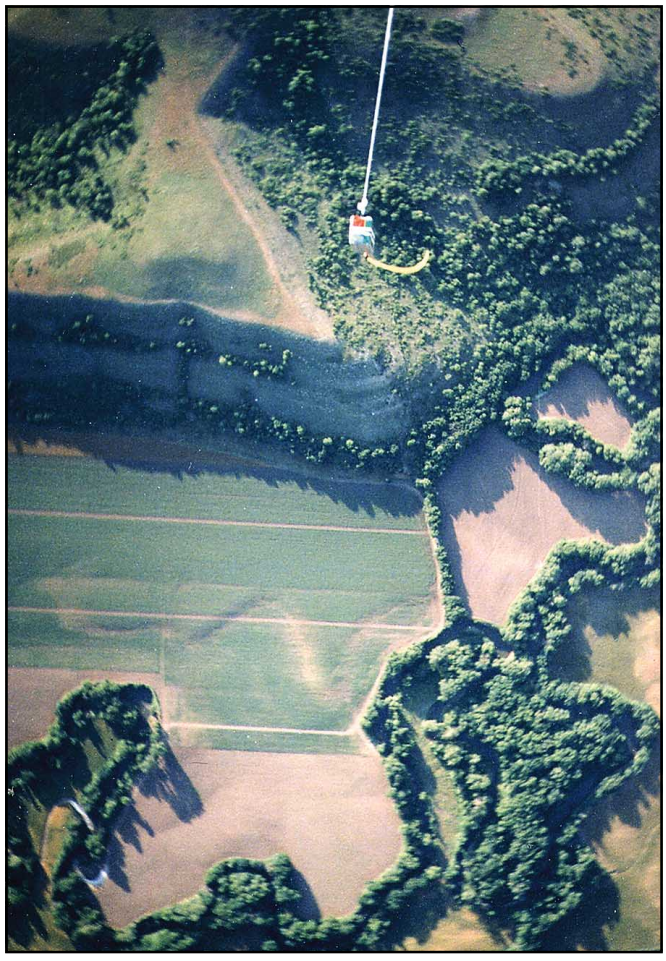
To make near-space capsules accessible to the greatest number of people, we use frequencies and modes available to Technician-class hams. Communications with balloons are, for the most part, line of sight, so VHF and UHF links are sufficient.

The primary concern in building a near-space capsule is weight—the lower the better. This makes 2-meter hand-helds ideal comm units. And with more than 2-W output, they're plenty powerful. A simple 2-meter dipole is lightweight and provides good coverage. Capsule telemetry is transmitted on 144.390 MHz, a frequency commonly used by APRS (Automatic Position Reporting System) devices. Each capsule carries a second transmitter as a backup (sometimes used for amateur television, ATV, or a separate 2-meter beacon).

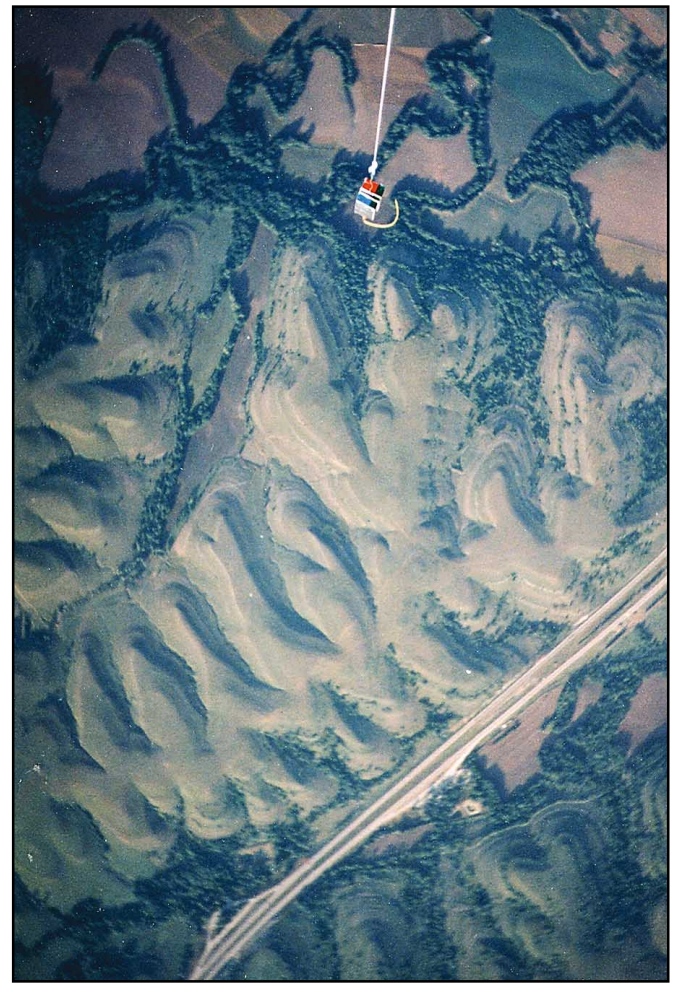
For ATV coverage we use the TXA5-RC ATV board from PC Electronics. It operates on 70 cm and has a 1.5-W output. It's small, lightweight, and its transmissions can be received on any cable-ready television. Chase vehicles carry portable TVs (don't put the TV in the front seat with the driver). Be sure to record the video sent from your capsule so it can be reviewed safely after recovery.

Ground Stations and Mobiles

Ground stations come in two flavors, fixed and mobile. Fixed stations handle most of our HF work because it's easier to mount an 80-meter beam at home than it is on your car! Also, most cable-ready televisions are made for home use, so it's easier



About two minutes after lift-off, this package has already reached 2000 feet. The object dangling in the photo is the low-power beacon package.



At 8600 feet you can pick out fascinating terrain details like these.

for fixed stations to record flight video. Ground stations act as flight control centers and provide backup for chase crews if they have problems. Finally, fixed stations are great places for curious non-hams and media reps to visit. It's almost like visiting NASA's Mission Control.

Most of our stations are mobile, as most operators are interested in chasing the balloon in the recovery process—high altitude foxhunting! Some participants, of course, are too far away to attend the launch in person, so operating a fixed station is their only option.

We depend on mobile stations to track the capsule. The chase crews are closer to the capsule, so they can usually track it at lower altitudes. Some chase crews carry cell phones for contacting the FAA, a task formerly handled by fixed station operators.

The Ultimate Chase Vehicle

As I write this, I'm building the ultimate chase vehicle. My Jeep will soon sport a dual-band antenna, a 2-meter mobile radio for ground-to-ground chase crew comms, a mag-mount 2-meter antenna, a TNC, a GPS receiver and a laptop PC for running APRS tracking software (which will indicate the position of the balloon and the Jeep).

For additional insulation we wrap our capsules in a thermal blanket made from three layers of aluminized Mylar and scrim (space blanket and plastic wedding veil material). This additional layer helps to retain internal heat. Commercial satellites use similar insulating materials.

I'll be using Delorme's *Street Atlas* maps with APRS because of their completeness. In past flights, our chase crews have been very happy about using computerized mapping software to find geographic locations indicated by the APRS GPS system. As one chaser puts it, "It's almost like shooting goldfish in an aquarium!"

Because we nearly lost capsules on two occasions, I purchased the DF Jr, a Doppler direction-finding unit, from Agrelo Engineering. I've used it twice so far, and it's worked perfectly. The Doppler unit adds four antennas to the Jeep's roof, giving it a nifty, Russian trawler look. I've also purchased some Midland VHF transceivers—with separate transmit and receive units—that I will use with the DF Jr. This will prevent me from accidentally transmitting through the Doppler unit and frying its switching electronics.

I'll get crystals for the APRS coordinated frequency (144.390 MHz) and for the KNSP (Kansas Near Space Project) beacon frequency (145.500 MHz). The DF Jr displays azimuths on its control and display unit, and it can draw azimuth lines on the APRS display. This is great for those times

Glossary

ADC: Analog-to-Digital Converter. Computers can't accept and process voltage and current information directly. These analog values must first be converted into digital values that can be numerically manipulated. An ADC is an IC that does this for computers and microcontrollers. In fact, the ADC function is so valuable that some microcontrollers have built-in ADCs.

AMU: Atomic Mass Unit. A unit used to indicate the mass of an atom. One AMU is 1/12th the mass of the Carbon-12 atom and was adopted in 1961 by chemists and physicists.

Dewar: In 1885, James Dewar developed a bottle consisting of two layers of glass with a vacuum between them. His "thermos bottle" keeps cold materials colder longer or hot materials hotter longer by inhibiting the movement of thermal energy through the walls of the bottle. The vacuum prevents conduction and convection from transporting thermal energy. By silvering the glass layers, the escape of radiation is also reduced, further slowing down the temperature change. Layers of aluminized Mylar and scrim act in the same way in a vacuum (or at the low pressures of near space) while being lighter and less fragile than glass.

FAA: Federal Aviation Administration. Think of it as the FCC for airplanes.

FAR: Federal Aviation Regulations. A set of rules published by the FAA governing the use of all flying craft, including balloons, kites and rockets.

Mole: A mole is an amount of a substance that contains 6.022^{23} particles or entities. The number, 6.022^{23}, is called Avogadro's Number. In 1811, Avogadro proposed that equal volumes of gas (at the same temperature and pressure) have the same number of molecules. Avogardo's Number turns out to be the conversion factor from molecular weight to grams (grams are really units of mass, not weight). So, a mole of any chemical contains an Avogadro's Number of particles and has a weight in grams equal to its molecular weight in atomic mass units. In gases, a mole occupies a volume of 22.4 liters at STP. Note that the full term is gram-mole, but since chemists so often deal with grams of material, they tend to drop the gram part of the name.

Molecular Weight: The sum of the atomic mass units (AMUs) of the elements in a molecule. A single hydrogen atom has approximately 1 AMU of mass. But since the hydrogen molecule consists of two atoms (diatomic), the molecular form of hydrogen has a molecular weight of 2 AMU. Helium, on the other hand, is an inert gas and does not combine with itself to form molecules, so helium gas consists of single atoms (monoatomic). Helium has an atomic weight of 4 AMU, which is the same as its molecular weight.

NOTAMS (pronounced "no-tams"): Notice to Airmen. A bulletin for pilots that informs them of airborne hazards such as weather balloons. Pilots are supposed to read these before hopping into their airplanes.

PIC (Peripheral Interface Controller): PICs are programmable microcontrollers that are often incorporated in machine controls and electronic control systems.

Skew-T: A graphical format for displaying atmospheric conditions (used by the military). The lines of constant temperature (isotherms) are drawn leaning over, or skewed, hence the name. Civilian diagrams that show isothermals as straight up and down and are called pseudoadiobatic. Both graphs depict overhead weather conditions (in temperature, pressure and relative humidity).

STP: Standard Temperature and Pressure. A reference point that chemists use when characterizing gases. STP is an arbitrary standard that everyone has agreed to use. STP occurs at 0°C (the freezing point of water) and one standard atmosphere of pressure (760 mm of mercury).

when the capsule's GPS dies or its packet telemetry is too weak to read. The lines allow crews to triangulate a capsule fix as we drive around the countryside. For recovery operations the Jeep also sports a 12-inch cable-ready TV with a built-in VCR. It's powered by a deep-cycle marine battery and an inverter.

The Chase

During chase operations I pilot the chase vehicle while my navigator sits in the passenger seat working the APRS gear via the laptop and handling communications with other chase crews and the FAA. A back-seat videographer records our adventure, operates the ATV and SSTV gear, and carries the recovery gear in case the capsule lands in a tree, or worse.

Our chase crews, which we call RAT teams (Recovery and Tracking) or Nearstars (NEAR Space Tracking And Recovery) stay close together during a balloon flight, especially during capsule descent. It's almost like a road rally. In most cases, simplex ground-to-ground comms work just fine.

In the future, I'd like to place a repeater in the capsule to coordinate chase crew activities. This would allow crews from all over the eastern half of the state to talk to one another, even if they decide to leave home only after the capsule is launched. Before that can happen, however, we'll have to work out the required command and control links and make sure the cross-band frequencies we intend to use are properly coordinated.

In a few cases, two chase crews couldn't talk to one another via 2-meter simplex, but they could relay information on 80 meters by working through Ralph Wallio, W0RPK, in Iowa. Ralph likes to predict capsule landing positions by using the balloon's current flight path. The flight gives him updated "winds aloft" data, which are the basis for his predictions. Ralph's help has been invaluable. The HF net we use is on 3.990 MHz.

ATV Challenges

In past flights, ATV operation hasn't always gone by the numbers. Typically, ATV signals are P5 (the highest quality) at launch, when the chase crews are close by, but fall to P1 (the poorest quality, mostly snow) at high altitudes. The problem stems from the high bandwidth needed by the ATV signal and the low-power transmitter module on the capsule.

To get the best possible signal we use a mini-wheel antenna made by Dave Clingerman of Olde Antenna Labs. The antenna hangs beneath the capsule, attached with a length of dacron line (we don't want the antenna hanging by its coax).

We've recently flown compact camcorders to record live video from the "capsule's eye view." In future flights we'll try recording video while transmitting ATV from the camcorder's AV output. This will let chase crews see live video (of somewhat poorer quality), and allow us to watch the crisp video after recovery.

One ATV signal-boosting experiment I'd like to try is transmitting images in black-and-white rather than in color. We'd lose some of the glamour, but the signals may be of higher quality. Another way to improve ATV quality would be to use directional antennas, but this is difficult from a moving chase vehicle!

Everyone seems to love watching video from near space, though, and having ATV onboard helps to attract attention and support for a balloon program.

Low-Power Beacons

On several occasions we've sent up low-power beacons made from computer clock crystals. These beacons are lightweight and run on 9-V lithium batteries. We've had a little trouble tracking them, but the Wichita balloon chasers group has enjoyed chasing them down.

Because some home electronic devices emit weak RF signals on the beacon frequency, we've mistaken them for the capsule's beacon (which puts out only a few milliwatts). To prevent this in future flights

I've made a beacon using the Alinco DJ-S11 H-T that sends tones and my call sign. It will be tough to mistake this beacon for the RF signature of a home security system.

The Near-Space Stack

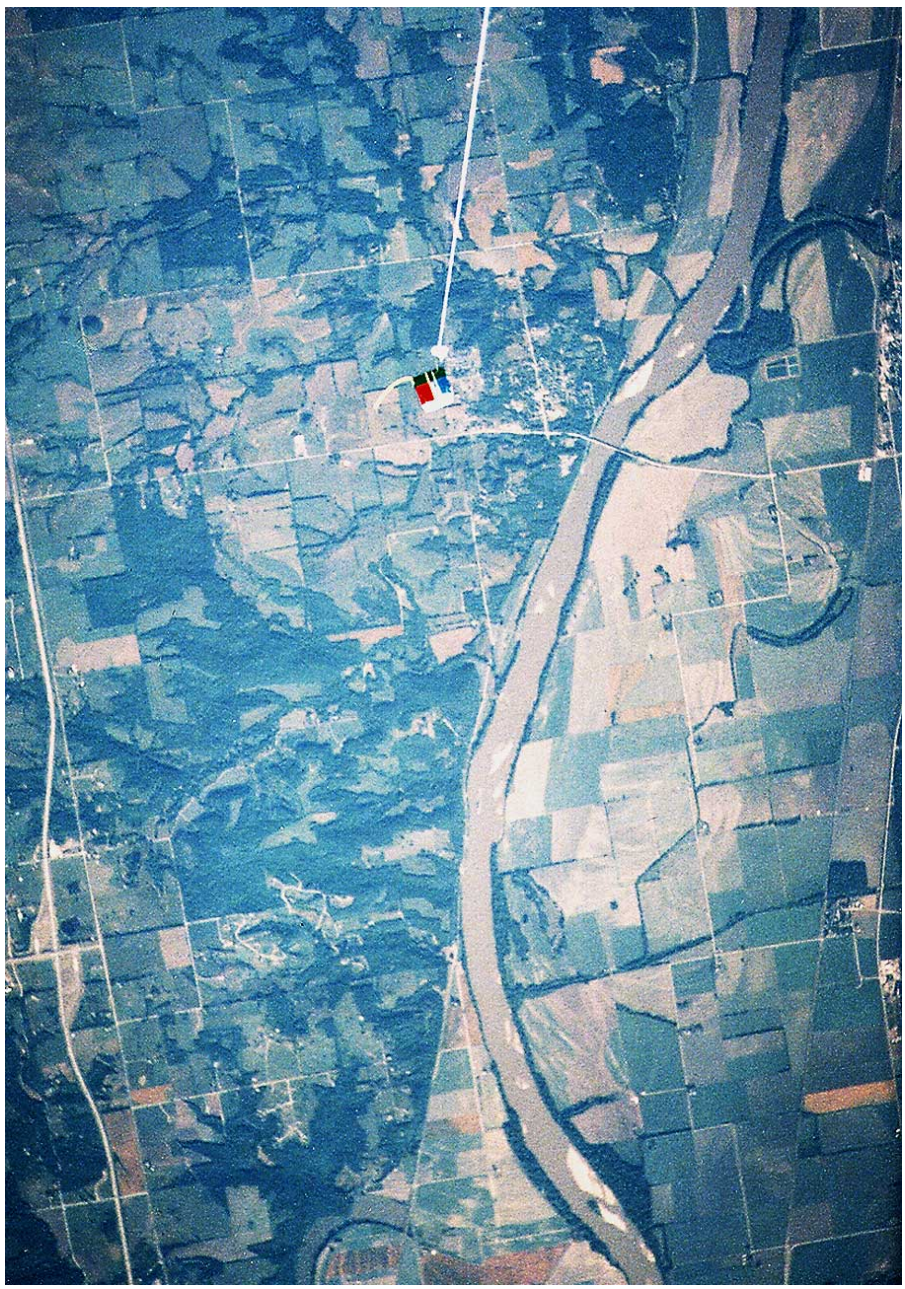
The payload of a near-space balloon flight consists of several items stacked on top of one another—the near-space stack. At the top, doing the lifting, is a latex weather balloon. KNSP has launched capsules using 1200 and 1500-gram balloons (empty weight) purchased from Kaymont, a US weather balloon distributor. The heavier the balloon, the larger its maximum volume and lifting capacity. Party balloons weigh only a few grams, so you can see that we're talking about some very large balloons.

Balloons lift payloads by displacing a volume of atmosphere with a volume of lighter-weight gas. Let's look at hydrogen and helium as examples.

A mole of helium at standard temperature and pressure (STP) weighs four grams. The atmosphere has an "average molar" weight of about 28.8 grams (80% of 28 grams for nitrogen plus 20% of 32 grams for oxygen). At STP, a mole occupies a volume of 22.4 liters, or about 0.79 cubic feet. So, every cubic foot of helium will displace and lift approximately 29.7 grams.

For hydrogen this comes out to 32.2 grams of lift per cubic foot, making hydrogen a better lifting agent (by 8.5%) per unit volume. You'll have to determine if that benefit justifies the use of a flammable, explosive gas for your near-space flights!

A near-space capsule weighing 12 pounds (the maximum weight allowed by the FAA without a waiver), along with a three-pound balloon and a one-pound parachute, requires about 243 cubic feet of helium.



Our balloon is now 45,000 feet over the Kansas River near Lecompton.

As a balloon rises, the air pressure around it drops, causing the balloon to expand. Latex balloons expand until they burst, unlike zero-pressure balloons, which vent excess helium and can loiter aloft for days. The larger the volume of gas inside a balloon at launch, the less the balloon can expand before bursting and, therefore, the lower its maximum altitude.

A balloon's initial volume is a function of the weight it has to lift (lift must be greater than the weight of the payload), so by keeping your capsule weight low you can get by with a smaller initial volume (or you can use a larger balloon).

The time it takes your balloon to reach maximum altitude can be estimated by determining the balloon's ascent rate and its maximum altitude. Balloons with greater lift values rise faster and have shorter flights. At KNSP, we put one pound of positive lift in our balloons. For example, if our capsule weights six pounds, we fill the balloon until it can lift seven pounds. At one pound positive lift we get an average ascent rate of about 700 feet per minute. This makes for a two-hour flight before the balloon bursts.

The trip down is a bit faster and depends on the weight of the capsule and the size of the parachute. Our balloons typically descend in about an hour if the parachute is large enough to safely land the capsule. We use a seven-foot-diameter parachute for our largest payload.

Fill 'er Up!

To fill the balloon with helium we built a filler hose like the one used by Pete Sias of Sky Science Over Kansas (SSOK). A 1.5-inch PVC pipe is fitted with a PVC cap and a threaded brass nut. The nut attaches a barb on the helium hose, which is attached to a regulator on the helium tank. The nozzle of the weather balloon is about 1.5 inches diameter and has a wall thickness of about $^1/_8$ inch. The PVC pipe is inserted into the balloon nozzle and sealed with two layers of gray tape. On the PVC pipe we have taped a loop of string so we can measure the balloon's lift. When filling, the regulator is fully open, which helps us dump about 250 cubic feet of helium into the balloon. Don't use a filler designed for party balloons—you'll be there all day!

Before filling we check overhead for sharp objects and for sufficient clearance. We need at least 10 feet of overhead clearance to safely fill the balloon. It's best to fill balloons indoors, but if winds are light, filling them outdoors is okay, too.

An electronic fishing scale monitors the balloon's lift as we fill (like fish, these balloons always "get away"). Inflated balloons are about eight feet tall. We limit the

At 75,000 feet we're approaching the edge of space. Notice how the tenuous upper layers of the atmosphere fade from blue to black. The curvature of the Earth is visible as well.

number of people working on and around the balloon because the balloon and helium together cost about $100 a "pop," and accidents aren't exactly welcome!

When the balloon is properly filled, one balloon dog (wrangler, handler) slightly twists the nozzle before the filler is removed. The nozzle is tied off with a cord, with a loop dangling below. The nozzle is then folded over on itself and the entire folded mass (nozzle, knot and cord) are taped with gray tape, leaving the cord loop hanging down. Because the balloon has only one pound of positive lift, we use much less than a pound of tape on the nozzle! A few wraps is sufficient.

The balloon nozzle is attached to the apex of the recovery parachute with a 30-foot load line. The FAA-required parachute prevents the capsule from damaging property or people upon landing. Besides, it's too expensive to allow the capsule to plummet to Earth after each flight! Commercial parachutes are available, but expensive. To save money, I sew my own.

Build Your Own Space Capsule

Next in the stack is the capsule itself—the reason we fly balloons. The capsule is a box (capsule bus) that contains the electronics for generating telemetry and data. The capsule bus needs to be strong and lightweight. To handle the extremely cold temperatures experienced in near-space conditions, a highly insulated bus is desirable. A styrofoam box is the perfect solution.

We could simply buy a styrofoam cooler, as some do, but we want a capsule bus that's specifically designed for our missions and electronics. We start with the styrofoam panels used to insulate houses. These $^3/_4$-inch-thick panels are lightweight and strong, and they come in a variety of thicknesses and colors. Thicker panels are quite rigid and provide better insulation. They're easily cut with a band saw or a sharp razor knife.

During assembly, the panels are cut to size and glued together using hot melt glue or epoxy. The FAA requires capsules to have less than three ounces of weight per square inch on the smallest face. So, if you make a six-pound capsule, the smallest face has to be larger than 32 square inches (at least 6 inches square in this case). This low density per face helps protect aircraft if they should collide with the capsule.

After the capsule panels are cut and glued, we cut access ports on each side. Experiments change, and we don't want to make new capsules to accommodate every one. The access ports (ours are 5.5 inches) allow changes to be made without modifying the capsule bus itself. Cables, cameras, experiments and antennas can be mounted on or through the access ports.

For additional insulation we wrap our capsules in a thermal blanket made from three layers of aluminized Mylar and scrim (space blanket and plastic wedding veil material). This additional layer helps to retain internal heat. Commercial satellites use similar insulating materials. Besides adding insulation, the space blanket makes the capsule visible to FAA radar (if the capsule bus is large enough).

The bottom of each capsule bus is covered with a 1-inch layer of foam rubber. This helps prevent damage to the capsule if it lands on a hard surface. Finally, the entire capsule is placed inside a Nylon ripstop bag—an abrasion jacket.

If a capsule is physically small or is not covered with space blanket material, a radar reflector is required. Kaymont sells a lightweight radar reflector that attaches to the bottom of the capsule. We sew a small fabric loop into the bottom of our abrasion jacket for lofting things like reflectors, strobes or beacons.

On a student experiment in 1997, a fourth-grade class tested the exposure of rubber bands to the cold, ozone, and UV radiation of near space. Surprisingly, the rubber bands held up well and didn't break. As a result, we now use rubber bands for attaching panels and covers on our experiments. This eliminates heavy, time-consuming cover bolts.

Inner Workings

The electronics live inside the insulated bus. We integrate as many circuits as possible onto a single board called the Integrated Housekeeping Unit (IHU). At its heart is a Basic Stamp II (BS2) microcontroller. The BS2 is an easy to program, PIC-type microcontroller that's available from Parallax.

The IHU also has a Serial Servo Controller (SSC) that allows the BS2 to operate up to eight servos. A Stamp Stretcher is included so we can control high-power devices (like rocket ignitors) while protecting the BS2. A Real Time Clock (RTC) is included, but not used at this time, as we can get the time of day via the GPS receiver. The SSC, Stamp Stretcher and RTC are available from Scott Edwards.

Voltage regulators and dividers are also part of the IHU. Sensor voltages are digitized using two Maxim MAX186 analog-to-digital converters (ADCs). These ADCs have eight channels, each with 12 bits of resolution. Signals from the GPS and BS2 are mixed through an **OR** gate and converted to RS-232 levels with a Maxim MAX232 IC. We use the MAX232 because the IHU operates at TTL levels (0 to 5 V, true logic), while the TNC requires RS-232 levels (–10 to +10 V, inverted logic).

Capsule telemetry consists of capsule voltages (we use several batteries in each capsule), internal and external temperatures, atmospheric pressure and positional data. Our positional data consists of two GPS strings, GGA and RMC. Both give the time of day, latitude and longitude of the capsule, but the GGA string provides capsule altitude while the RMC string provides its heading and speed.

Data is sent via packet radio. We use a Kantronics KPC3 (version 6 EEPROM) and a Yaesu FT-203 hand-held transceiver. The TNC operates in "transparent mode," so any data it receives is sent to the radio. This allows us to send GPS data and results from the onboard microcontroller.

Once we build a capsule, we test it on the ground for several hours. Our flights typically last three hours, so we test capsules and their electronics for at least that long. Once we're satisfied with the capsule design and operation, on future flights we'll test only the experiments for each launch.

Next month, in Part 2, we'll take a hypothetical balloon on a hypothetical flight!

You can contact the author at Room 101 Justin Hall, Kansas State University, Manhattan, KS 66502; **verhage@humec.ksu.edu**. QST

By Carl Markle, K8IHQ

An MC-80 and MC-85 Microphone Modification

Why use batteries to power the microphone? A dc source is readily available!

Any proud owner of a Kenwood MC-80 or MC-85 microphone will—sooner or later—forget to turn off the microphone's power after an enjoyable operating session. Your next operating session likely will not start off well because you're liable to discover that you have just traded a new DX contact for a trip to the corner store. Why? Because the microphone's battery is dead! And—of course—you don't have a spare set of four AA cells handy!

The situation can be even worse for infrequent operators. If the microphone is exposed to a cold environment—during moving or a long period of storage—and you've failed to remove the cells, they will leak and destruction begins. If you are unfortunate enough to have the microphone sitting atop an expensive piece of gear, the cost of the error increases drastically! Well, here is the answer to those problems—and a money-saving one at that.

This easy and inexpensive modification is worth taking the time to perform. If cost or time to acquire the components is prohibitive, components and completed units are available from me. An SASE to me will provide you with the information.

The need for batteries in MC-80/85 microphones is open to question because each of these microphones contains a green wire that has +8 V available on it when connected to the rig. When you remove the screws from the base plate, you can see the wire—suspended in air just waiting for you to use it! This wire can supply the voltage to run the microphone's preamplifier once an appropriate step-down voltage-regulator circuit is installed. The circuit is so simple that no PC board is needed.

Construction and Installation

Refer to the pictorial schematic of Figure 1. First, remove the four AA cells from the microphone base, then disconnect the 9 V battery connector from the battery holder. Assemble the components as shown in Figure 1, and slip a length of heat-shrink tubing over the completed assembly. (Note: The wire color of the battery snaps is not continuous from one to the other.) Connect the two battery snaps and you're done (see Figure 2). If you haven't realized it by now, here's the money-saving part of this modification: You needn't worry about buying batteries for the microphone any more!

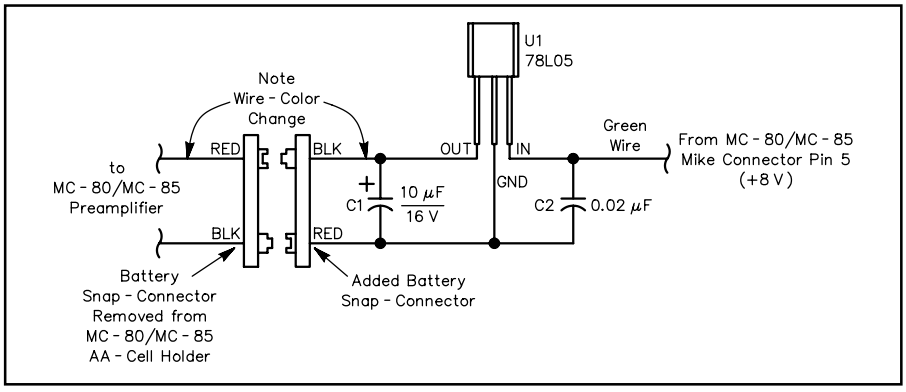


Figure 1—Pictorial schematic of the Kenwood MC-80/85 microphone modification. RS part numbers in parentheses are RadioShack

C1—10 µF, 16 V electrolytic capacitor (RS 272-1636)
C2—0.02 µF, 25 V monolithic capacitor (RS 272-1066)
U1—78L05, 5 V, 100 mA, positive-voltage regulator (RSU 11392008)
Misc: 9-V battery snap connector (RS 270-325); length of shrink tubing (2×2½ inch used here).

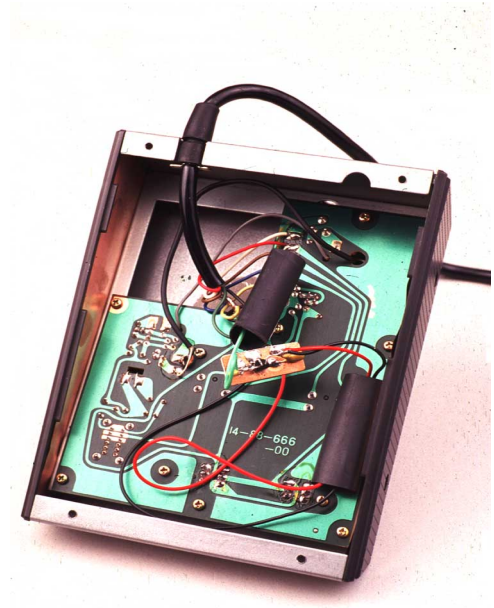


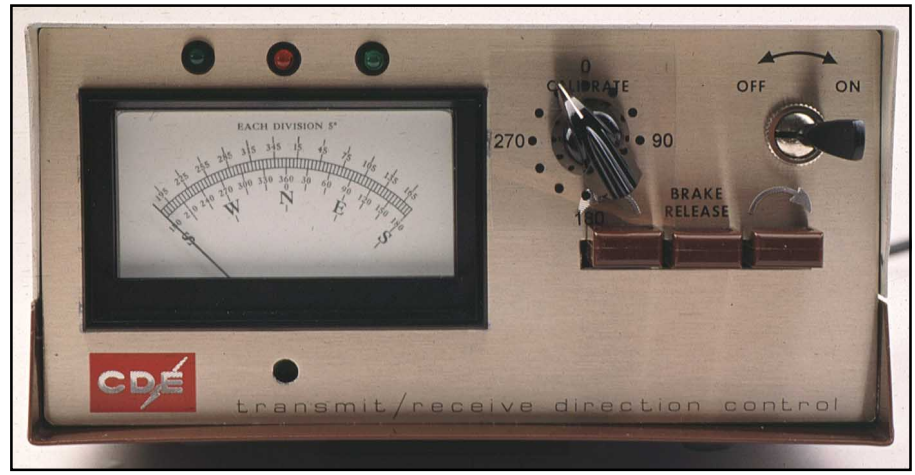
Figure 2—This is another way of assembling the components, using a scrap piece of PC board. The board is slipped into a piece of heat-shrink tubing and taped to the inside wall of the case. Another length of heat-shrink tubing covers the joined battery snap connectors.

Carl Markle, K8IHQ, has been continually licensed since 1956 and holds an Extra license as well as a commercial Radiotelegraph license. Carl is a retired military Warrant Officer and an electronic engineer. You can contact him at 11570 Taylor Wells Rd, Claridon, OH 44024-8910.

By Gerald Fasse, W8GF

Rotator Magic!

This "Look, Ma! No hands!" project is a must for anyone who owns a Ham-M series rotator! You'll love it!



The Ham-M series antenna rotators have been around nearly four decades—and for good reasons: They are rugged, reliable and relatively inexpensive. However, they tend to stick under heavy loads, are torque-limited (especially noticeable under windy conditions), require manual sequencing of the brake and direction controls and—as the rotator ages—display unstable directional readings.

Gray-beards among us will no doubt remember the older Cornell-Dubilier (CDE) rotators. Their bell-shaped rotator was designed for turning large TV arrays common in the 1950s (BC—before cable—*Ed.*). It wasn't long before hams discovered this unit and named it the "clank-box." The control unit used a 36 position switch and a stepping relay to signal a new position command to the rotator. As the rotator moved, a distinctive "clank!" emanated from the control box. These units had a tendency to get out of synchronization. Unless you constantly checked for proper sync, you could never be sure in which direction the antenna was pointing! In spite of this, the CDE rotator had one appealing aspect: You simply turned the direction-control switch to the desired compass heading and the antenna moved to that position without further attention.

The Ham-M series evolved from this modest beginning. The latest unit in the series—the Ham-4—uses a hardened-steel ring gear and brake wedge (ring gears in the older units are of cast pot metal), a higher-torque motor, improved lubricants, quick cable-disconnects, a regulated dc excitation voltage for the rotator potentiometer and several other improvements. However, the Ham-M still requires you to sequentially operate the brake release and directional controls, a procedure that often ties up a hand needed elsewhere. Eliminating that need is what this article is about.

General Description

Refer to Figures 1, 2 and 3. The rotator electronics are simple: two motor coils, a brake-release solenoid, two limit switches (S6 and S7) and a wire-wound potentiometer (R3). These components have been present since day one and have changed little. The limit switches prevent the rotator from moving past a fixed point of travel in either direction. The rotator's mechanical brake is a solenoid-operated steel wedge that engages slots along the inside periphery of the upper bell casting. Ninety-six slots limit rotator positional resolution to about 4° (360°/96 = 3.75°).

The position-indicating potentiometer (**ROTATOR POSITION**, R3) wiper is at ground potential—an inherent design compromise. The wiper engages a slot at the top of the upper bell housing and travels along the potentiometer as the rotator is turning. To ensure 360° rotation, the pot's circular bobbin is not wound on a flat plane, but tipped upward with mechanical stops at either end—a beautifully conceived concept. The wiper arm is equipped with a fairly stout spring to ensure continuous contact along the potentiometer's surface during rotation. R3's value is approximately 500 Ω.

The motor is a split-capacitor type, the capacitor (C2) located within the control unit. This motor type is somewhat limited in starting torque, but has the advantages of low starting current and overall simplicity.

Control Unit

The Ham-2, 3 and 4 control units are similar in most respects. The Ham-2 is furnished in a metal cabinet that provides protection from strong local RF fields. The latest Ham-4 units are similar—if not identical to—the Tail Twister rotator control units and use a molded plastic cabinet. These incorporate a Cinch blade-style cable connector on the rear panel that allows the control unit to be quickly detached from the rotator cable. (Older units are equipped with a barrier strip. The Cinch connector can be added to any of the Ham-2, 3 or 4 series control units and I recommend doing so.)

Two transformers are located within the original rotator control (see Figure 1). T1 supplies approximately 30 V ac to the motor windings and brake solenoid. T2 supplies 24 V ac to a rectifier (CR1) and a Zener diode regulator. (The Zener diode [VR1] is removed during this modification.) From this supply, approximately 12 V dc is furnished to the **ROTATOR POSITION** pot, R3. Because R3's wiper is grounded (as noted earlier), the supply floats above ground. (A third transformer, T3 in Figure 3, is added to furnish 5 V dc to the added circuitry discussed later.)

T1 includes a thermostatic switch (S8) to prevent transformer overheating should any of the rotator components fail. The transformer primaries are fused (F2) as is the 12 V dc excitation voltage for R3 (F1). Because the original 12 V dc regulator circuit uses only a Zener diode, the front panel hosts a 5 kΩ potentiometer (unlabeled; see Figure 1) that is used to calibrate the **ANTENNA POSITION** indicator, an analog 0-1 mA meter (I in Figure 1; M1 in Figure 3). Any substantial line-voltage shift results in a need to recalibrate the indicator!

A few more words about R3: After extended use, many operators have noticed instability of the **ANTENNA POSITION** indicator, sometime seeing it fluctuate wildly as the rotator is turning. This unstable readout is usually caused by dirt, grease and other contaminants accumulating on R3's surface and

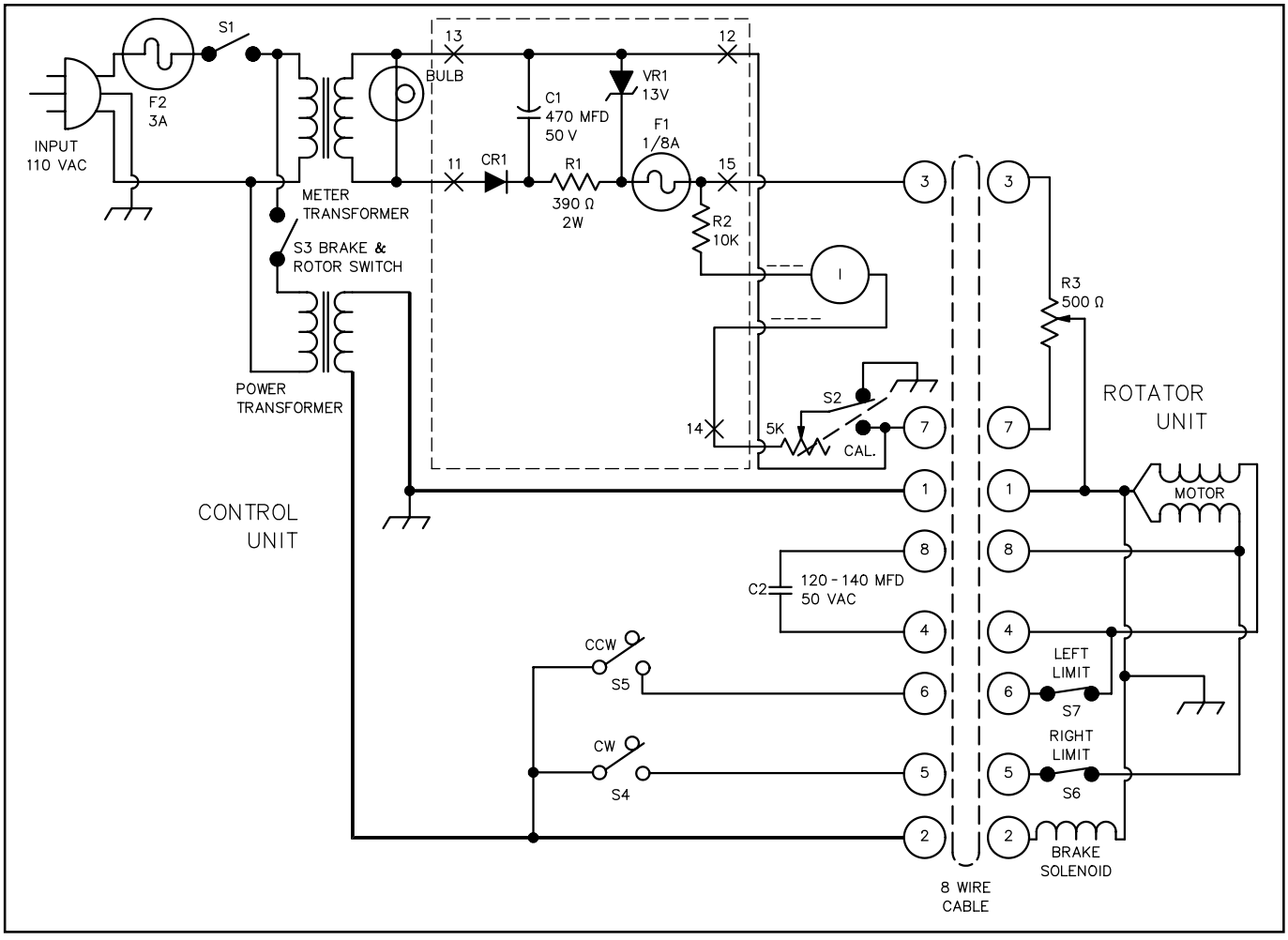


Figure 1—Schematic of the original rotator-control circuit. Where possible, component ID numbers shown here are retained in Figures 2 and 3; some component values change. The original circuit's meter-calibration potentiometer (a 5 kΩ pot) does not bear a component ID number or label. Components removed during the modification include C1, CR1, R1, VR1 and the meter-calibration pot. The power transformer equates to T1 of Figure 3; the meter transformer to T2 of Figure 3.

wiper. To clean and lubricate these surfaces, use a TV tuner cleaner such as RadioShack 64-4315. Caution: If you disassemble your rotator, be sure to follow the assembly instructions *exactly* as outlined in the user manual! R3's wiper must fit properly into a small slot at the top of the upper bell housing.

The Changes

The rotator-control unit modifications described here apply to most of the Ham-M series, including the models 2, 3 and 4. Early Ham-M control boxes are considerably more compact, but even these old units can be modified, although with diminished elegance!

Refer to Figures 2, 3. This modification retains the existing **ANTENNA POSITION** indicator and the three lever switches. Additions include a single-turn potentiometer (identified as the **DIAL** pot [R12]) to select a compass heading for automatic mode, and a group of three LEDs (DS1-DS3) indicate rotator direction and brake release: red for the brake and green for each rotational direction. The LEDs are mounted above the meter.

Solid-state relays (K1-K3) now drive the rotator motor coils and brake solenoid. Such relays offer an advantage over other methods because they switch on and off as the 50/60 Hz power cycle passes through zero, so switching transients are minimal. Conventional switches and relay contacts erode and are eventually destroyed.

A Parallax Basic Stamp is used as the digital controller (U7). U7 provides eight I/O lines, sufficient for this application. Two ADCs (U1 and U2) are used to economize on Stamp I/O ports. The ADCs cost about $1.95 each, so they're affordable. U1 handles the **DIAL** pot conversion and U2 that of the **ROTATOR POSITION POT**, R3.

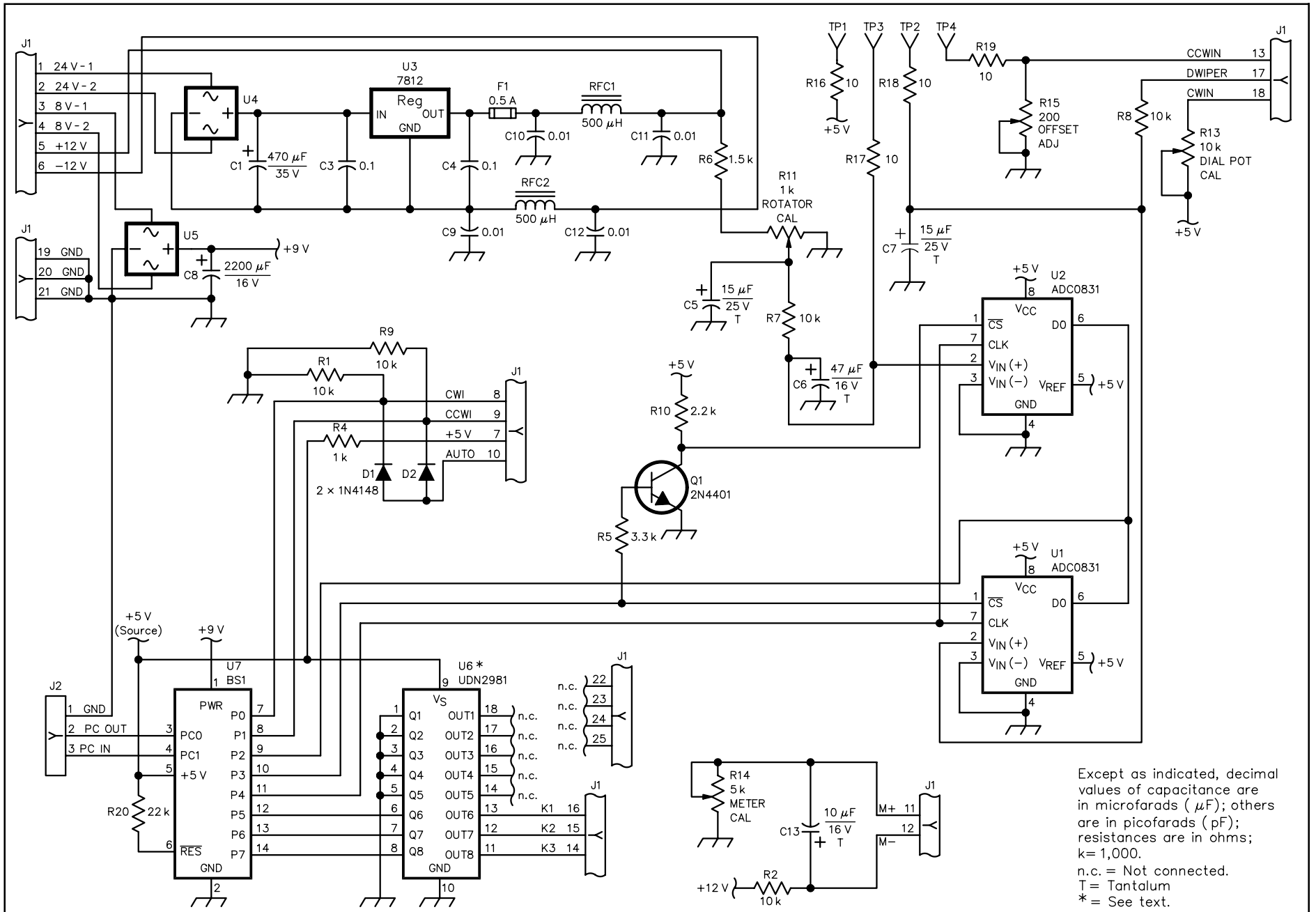
In spite of its small size, the Stamp is a full-blown computer. For this application, the eight I/O ports provided are arranged as three input ports and five output ports. Port 0 enables clockwise rotator rotation, Port 1 counterclockwise rotation, and Ports 0 and 1 combined enable automatic rotator operation (front-panel lever-switch inputs). Port 2 is the data input port from the two ADCs. Port 3 selects which ADC is active (chip select) and Port 4 provides the clock signals for the ADC routine. The remaining Ports—5, 6 and 7—via K1 through K3, handle rotator brake release and clockwise and counterclockwise motor-rotation power switching.

A voltage regulator onboard U7 provides 5 V dc not only for the computer, but also for limited external use. Current sourcing is limited to 50 mA, but it is sufficient for this application. U7's reset port is not used. Cycling the **POWER ON/OFF** switch (S1) restarts the computer at the beginning of the program.

U7 is programmed in a unique form of *BASIC* called *PBasic*. In spite of its minuscule size, *PBasic* offers an impressive set of instructions, with emphasis on control applications such as this. After crafting a program using a PC, a tokenized version of the program is loaded into the Stamp. Because the Stamp uses an EEPROM to store the program, it is permanently in residence, but can be easily altered if needed.[1] The programming cable plugs into J2 (see Figure 2) of this modification's PC board.[2]

Two of the original set of three front-panel switches on the control unit perform the same

[1]Notes appear on page 40.



Except as indicated, decimal values of capacitance are in microfarads (µF); others are in picofarads (pF); resistances are in ohms; k= 1,000.
n.c. = Not connected.
T = Tantalum
* = See text.

Figure 2—One section of the modified rotator-control circuit. Unless otherwise specified, resistors are 1/4 W, 5%-tolerance carbon-composition or film units. Part numbers in parentheses are All Electronics (AE), Jameco (JC) and RadioShack (RS). Equivalent parts can be substituted. See Table 1.

C1—470 µF, 35 V (Jameco 93817; RS 272-1030)
C2—Original part
C3, C4—0.1 µF, 50 V (Jameco 15270; RS 272-135)
C5, C7—15 µF, 25 V tantalum (Jameco 33718)
C6—47 µF, 16 V tantalum (Jameco 94123; RSU 11295763)
C8—2200 µF, 16 V (Jameco 133145; RS 272-958)
C9-C12, C14—0.01 µF, 50 V (Jameco 15229; RSU 11298163)
C13—10 µF, 16 V tantalum (Jameco 94060; RS 272-1436)
D1, D2—1N4148 (Jameco; RS 276-1122)
DS1—Red LED, T1-3/4 (Jameco 34796; RS 276-041)
DS2, DS3—Green LED, T1-3/4 (Jameco 34761; RS 276-022)
DS4—Neon lamp assembly, red (RS 272-712)
F1—0.5 A picofuse (Mouser 5761-51500; RSU 11322864)
F2—3A (Mouser 5760-12003; RS 270-1009)
J1—PC-board mount DB25S (Jameco 15165; RSU 11354412)
J2—3-pin SIP header (Jameco 109575; RSU 11323813)
J3—8-pin socket (Newark 39F224 [Cinch S308AB])
K1-K3—SPST solid-state relay, contact rating 240 V ac, 2A; control voltage, 3-28 V dc (AE SSRLY-2405 [CP Clare]; RS 275-310; Jameco 127790 [Crydom])
P1—DB25M (RS 276-1547)
P2—Part of BS-1 IC programming cable
P3—8-pin plug (Newark 39F284 [Cinch P308CCT])
Q1—2N4401 (Jameco; RS 276-2058)
R1, R2, R7, R8, R9—10 kΩ
R3—Original component
R4—1 kΩ
R5—3.3 kΩ
R6—1.5 kΩ
R10—2.2 kΩ
R11—1 kΩ (Hosfelt 38-205 [Bourns 3299W])
R12—10 kΩ, Spectrol 138-2-0-103 (Newark 96F9575; RS 271-1715)
R13—10 kΩ PC-mount trimmer (Hosfelt 38-120 [Bourns 3299W])
R14—5 kΩ PC-mount trimmer (Hosfelt 38-207 [Bourns 3299W])
R15—200 Ω PC-mount trimmer (Hosfelt 38-203 [Bourns 3299W])
R16-R19—10 Ω
R20—22 kΩ
R21-R23—220 Ω; see text.
RFC1, RFC2—500 µH (Mouser 542-70F504)
SIP1—20-pin SIP machine-tooled socket for U7 (Jameco 101282)
T3—6.3 V c.t., 0.2 A (Mouser 41FD200; RS 273-1365) RadioShack's transformer is a 12.6 V c.t. unit; use half the secondary to obtain 6.3 V.
U1, U2—ADC0831 (Jameco). Note: U1 and U2 share a common 16-pin DIP socket on the PC board.
U3—7812, 12 V, 1 A positive regulator (Jameco 51334; RS 276-1771)
U4, U5—100 PIV, 1 A bridge rectifier (Jameco 103000; RS 276-1161; ECG 5332)
U6—UDN2981A (Newark); see text.
U7—*Programmed* BS1-IC; see Note 2. *Unprogrammed* BS1-IC (Digi-Key Stamp1C; Jameco 127693) requires programming package (Digi-Key 27205; Jameco 140062).
Misc: PC board (see Note 2); T1-3/4 LED mounting hardware (Jameco 23077; RS 276-079); knob; **DIAL** pot label; IC sockets; hardware.

function as before, ie, **CW** (S4) and **CCW** (S5) direction control. The third (middle) switch (S3) was originally used to control the rotator brake. Because brake engage/disengage is now controlled by U1, S3 is now used to enable automatic operation (**AUTO** in Figure 3). For manual operation, you merely press the desired direction switch and—after an appropriate delay to allow time for the brake to disengage—the rotator moves until the switch is released, or the rotator hits the rotation-limit switch. In automatic mode, you dial the desired direction using the **DIAL** pot (R12), then press the **AUTO** switch. Then the rotator brake disengages, the rotator moves to the selected position and the brake reengages after a slight pause!

Two additional software-controlled features are employed. As any Ham-M rotator user will attest, the rotator has a tendency to stick and not move without additional control-switch activation. The usual remedy is to alternately press the **CW** and **CCW** switches (S4 and S5, respectively) until the rotator breaks loose and eventually moves in the desired direction. U7 has a built-in algorithm that *jostles the rotator in alternate directions* prior to commanding the final move. As a precaution against the event of a frozen rotator—a frequent wintertime occurrence in colder climes—the software includes a time-out feature that automatically disconnects power to the motor after a preset period of approximately 70 seconds. Under these circumstances, you can resort to the usual technique of alternately pressing the **CW** and **CCW** switches until the rotator breaks loose.

Construction

Although the circuit can be hard-wired on perfboard without difficulty, a PC board is available that contains most of the added circuitry (see Note 2). Use sockets for all ICs. When soldering on the PC board, use nothing greater than a 25 to 40 W iron to avoid lifting PC-board pads and traces.[3]

Refer to Figures 4 and 5. The best way to rewire the control unit is to gut all existing wiring and start from scratch. (The control unit is wired point-to-point and looks like a rat's nest.) As shown in the accompanying photographs, I relocated the motor capacitor (C2). This provides room to install T3, used for the 5 V dc supply. A dab of RTV sealant holds C2 in place (see Figure 4).

A neon pilot-lamp assembly (DS4) can be placed on the front panel if desired. Other options include exchanging the rotator-cable barrier block (J3) with a Cinch blade-style connector. Two slots are needed to fasten the Cinch connector to the chassis using the original barrier-block hole. A few minutes work with a round file takes care of this. The blade connector is secured with No. 6-32 hardware.

Three 17/64-inch-diameter holes are required to mount DS1-DS3 on the front panel above the meter. The 220 Ω resistors (R21-R23) are soldered directly to the respective LED's anode lead and covered with heat-shrink tubing. Several types of solid-state relays are available at reasonable prices; three are identified in the parts list. The relays available from All Electronics are compact, easily mounted and used here.

I included U6 to reduce the current loading on U7's port drivers and to provide drivers for future changes and features that may be incorporated at a later date. U6 can be omitted if desired. To bypass the IC, insert jumpers between U6 pins 6 and 13, 7 and 12, and 8 and 11, and increase the values of R21, R22 and R23 to 330 Ω.

The Spectrol pot specified for use at R13 (**DIAL POT CAL**) provides an end-to-end rotation of 340° and is equipped with mechanical stops. It is a cost compromise: A unit that provides a full 360° of rotation costs more than twice that of the pot specified. With 340° rotation, the **ANTENNA POSITION** scale is slightly nonlinear and compressed at the ends. (Actually, nearly any 10 kΩ potentiometer with a linear taper can be used if you're willing to accept beam-heading compression near the ends of rotation. Most inexpensive pots provide about 300° of rotation. With a 300° rotation pot, you'll need to add a little "Kentucky windage" when positioning the **DIAL** pot [R12] to the desired direction.) R12 is physically located in the front-panel hole previously occupied by the **CALIBRATE** potentiometer.

A *DIAL* Pot Scale

You can fashion a **DIAL** pot scale (see the title photo) several ways. The scale I used was crafted using rub-on decals on a piece of clear acetate. If a document scanner is available, use it to size the scale as required, then use a laser printer to get the final copy. As a last resort, you can do a decent job with a compass rose, pen and heavy paper available at arts and craft stores.

The PC board is mounted on the underside of the control box chassis (see Figure 5). Using the PC board as a template, mark the mounting-hole locations on the chassis. Use No. 6-32 hardware and 1/4 inch spacers (three places) to secure the board. The solid-state relays can be mounted as shown in the photos. If the Crydom solid-state relays are used, mount them on a piece of circuit board (such as RadioShack 276-150) and place them in a convenient location.

Figure 2 shows a pico fuse (F1) in series

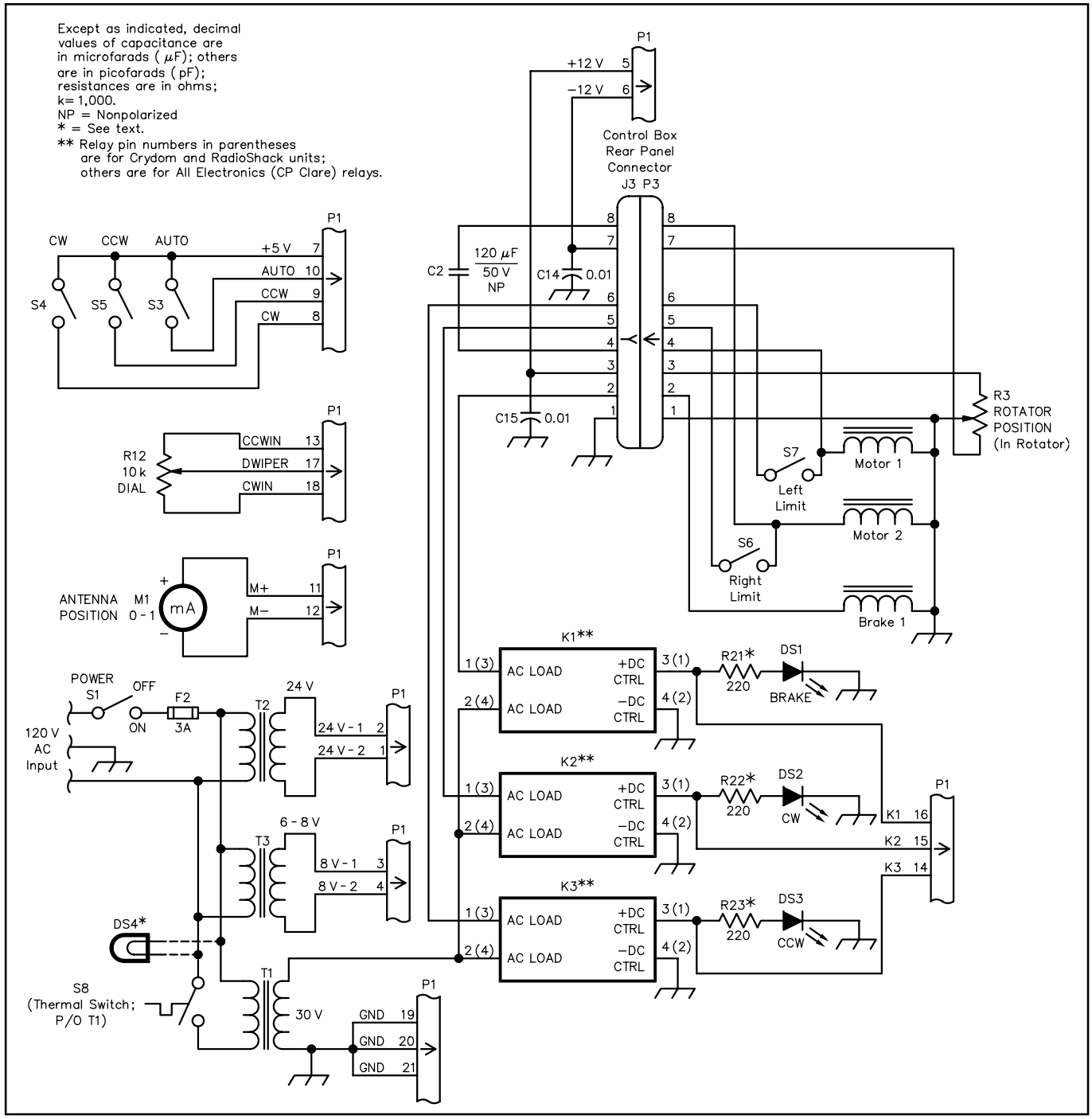


Figure 3—This is the second section of the modified rotator-control circuit. The pin numbers for relays K1 through K3 may differ depending on their manufacturer. Relay pin numbers in parentheses are for Crydom and RadioShack units; others are for All Electronics (CP Clare) relays.

with the potentiometer excitation voltage (12 V dc). Because the 7812 voltage regulator (U3) already incorporates overcurrent protection, F1 is optional. I added it because of an experience I had with RF entering the circuit when using a sloper antenna mounted atop the tower bearing the rotator. U3 went up in a puff of smoke when I applied high power to my sloper on 80 meters. The RF chokes and bypass capacitors resolved the problem, but I included F1 as additional protection. These components are an inexpensive insurance policy.

Test points on the PC board are made with vertically mounted 10 Ω resistors (R16 to R19). Bend a small hook in the unconnected resistor end to enable attachment of a DVM during calibration.

Initial Testing and Troubleshooting

Don't insert U1, U2 and U7 into their sockets until initial testing is completed. Disconnect the rotator cable from the control unit and remove the 25-pin plug from the PC board socket.

Check the PC board for solder bridges and poor solder joints. A magnifying glass and strong light make this job easier. A careful review of all work done will save time overall.

Ensure F2 is installed (3 A). Connect the power plug to the wall socket and turn S1 to **ON**. If DS4 is present, it should glow.

With your DVM set to read ac volts, check that 24 V ac appears between P1-1 and P1-2 (25-pin connector). Also check that 6 to 8 V ac appears between P1-3 and P1-4.

Check that approximately 30 V ac appears between ground and pin 2 of K1, K2

Table 1

Vendor Contact Information

All Electronics, 905 S Vermont Ave, Los Angeles, CA 90006; tel 800-826-5432, 213-380-8000, fax 818-781-2653; **http://www.allcorp.com**; **allcorp@allcorp.com**.

Digi-Key Corp, 701 Brooks Ave S, Thief River Falls, MN 56701-0677; tel 800-344-4539, 218-681-6674; fax 218-681-3380; **http://www.digikey.com**.

Hosfelt Electronics, Inc, 2700 Sunset Blvd, Steubenville, OH 43952-1158, tel 800-524-6464, 614-264-6464, fax 800-524-5414.

Jameco Electronics, 1355 Shoreway Rd, Belmont, CA 94002; tel 650-592-8097, domestic fax 800-237-6948, international fax 650-592-2503; **info@jameco.com**; **http://www.jameco.com**; catalog xdata only **ftp://ftp.jameco.com**.

Mouser Electronics, 2401 Hwy 287 N, Mansfield, TX 76062; tel 800-346-6873, 817-483-4422, fax 817-483-0931; **sales@mouser.com**; **http://www.mouser.com**.

Newark Electronics, 4801 N Ravenswood Ave, Chicago, IL 06040-4496; tel 800-463-9275, 312-784-5100, fax 312-907-5217, **http://www.newark.com**.

Parallax, Inc, 3805 Atherton Rd, Suite 102, Rocklin, CA 95765; tel 888-512-1024, fax 916-624-8003; general **info@parallaxinc.com**; technical **stamptech@parallaxinc.com**; **http://www.parallaxinc.com**.

RadioShack, tel 800-843-7422; retail sales outlets are located in most areas of the US.

and K3 (for All Electronics CP Clare style relays, otherwise, pin 4).

If all appears normal at this point, turn off the power and plug the P1 into the PC-board receptacle.

Set the DVM to read dc volts. Connect the meter to the rotator connector J3, pins 3 and 7, and check for the presence of 12 V dc.

Connect the DVM between ground and pin 1 of the Basic Stamp socket (pin 1 is identified by a square circuit pad; other pads are round). Approximately 8 to 10 V dc should appear at this point. If all is normal, turn the power off and insert U1, U2 and U7 into their sockets. U7 is a SIP with fragile leads. Use care when inserting this device! Ensure that pin 1 matches with the square circuit pad as noted earlier. If the Basic Stamp is inserted improperly and power applied, it's RIP.

Connect the rotator to the control and apply power. With the DVM set to read dc volts, the voltage measured between pin 5 of U7 and ground should be between 4.9 and 5.1 V.

Momentarily and alternately press the **CW** and **CCW** switches and check that the corresponding front-panel LEDs glow. If everything is operating correctly, the red brake release LED should light first, followed quickly by the appropriate **CW** or **CCW** green LED.

Send an observer outside to check the operation of the rotator and antenna. If things appear normal, continue with the following calibration procedure.

Calibrating the Modified HAM-M Rotator Control Unit

Two calibration methods are possible. The first requires access to the U7's source code, Basic Stamp software and a connecting cable. The second method is less direct and requires a DVM of known accuracy, but results in a superior calibration. Only the DVM approach is described here because most users won't have the necessary equipment for the other method.[4]

The control unit must be calibrated to enable proper operation with the rotator. Each rotator will likely have a slightly different end-of-rotation limit-switch setting. R3 provides a dc voltage proportional to rotator position, approximately 0 to 12 V. Because R3 uses a grounded wiper, a floating source is required to supply the excitation voltage (12 V).

Three factors limit calibration ease: (1) The modified control unit maintains the original meter-readout scheme, which indicates rotator position and operates independently of the control itself; (2) R3 (**ROTATOR POSITION)** is not necessarily at zero when the rotator is at the full counterclockwise position. Thus, a residual voltage will likely exist when the rotator position is fully counterclockwise and (3), a small but significant voltage drop appears across the two RF chokes (RFC1 and RFC2) that are in series with R3's excitation leads.

A less-important factor is the voltage drop across the control cable between the rotator and control unit. One hundred feet of typical rotator control cable has a resistance of about 2 Ω in series with R3's 500 Ω. Accrued, these errors amount to about 2 to 5% of indicated rotator position.

To compensate for these variables, a 200 Ω pot (**OFFSET ADJ**, R15) is included at the common end of the **DIAL** pot, R12. R15 is adjusted so that the zero-offset value at R3 is exactly matched (by ratio) with a similar offset value at R12.

It is critically important that these two counterclockwise voltage-offset ratios (R3 versus R15) are equal because in the automatic mode, U7's software compares these two values to determine when the rotator is at the selected counterclockwise limit. Otherwise, the rotator will open the counterclockwise limit switch S7 with the brake remaining disengaged. This situation will continue until the software timer expires (approximately one minute). Of course, the **POWER ON/OFF** switch (S1) can be cycled at any time to reset the processor and allow you to use the manual controls.

One more point before moving on: Overall rotator-positioning accuracy has additional variables: The panel meter, although of high quality, is subject to readout error caused by meter nonlinearity, movement friction and stiction as well as reading errors caused by parallax. The rotator offset error at the counterclockwise extreme will displace the meter slightly up scale when it should be resting at zero (180° indicated). In addition to this, although the **DIAL** pot (R13) has essentially infinite resolution, **ROTATOR POSITION POT** R3, being wirewound, does not. This further limits positioning accuracy, especially when in automatic mode. To compound the problem, the rotator brake has far less than 360 detents in which to engage—actually, only 96! When the brake attempts to engage a detent, a small change in rotator position occurs. This, in itself, limits rotator resolution to about 4°. Additionally, inertia—especially when turning large antennas—prevents the rotator from stopping instantly. All in all, positioning errors can be expected to be as much as 10° or more in automatic mode. The manual controls can be tweaked to improve this figure somewhat.

Calibration Procedure

You will need a DVM and a small screwdriver or pot-adjustment tool (similar to that contained in the RS 64-2230 set) to complete the calibration. *Providing the procedure is followed as specified*, no interaction of potentiometer settings will occur. Before beginning this calibration procedure, ensure that the rotator-position meter needle rests at zero with power off. If it's not, make it so by using the meter-zeroing screw located on the front panel just below the meter.

Note: Each rotator has a unique set of operating conditions. Thus, if you replace a rotator for any reason, you should repeat the calibration procedure. Ready? Let's begin...

1. Press the **CW** switch (S4) and turn the rotator to its full CW position. If the **ANTENNA POSITION** meter is not indicating 180°, adjust the **METER CAL** pot (R14) on the PC board until it does.

2. Connect a DVM between TP3 (U2, pin 2, input from the **ROTATOR CAL** pot R11) to chassis common and preset the **ROTATOR CAL** pot (R11) for a reading of 3.50 V dc on the DVM.

3. Press the **CCW** switch (S3) and turn the rotator to its full CCW position. With a DVM connected as in Step 2, record the voltage noted. It will typically be between 0.020 to 0.200 V dc. This is the **ROTATOR POSITION** pot (R3) offset voltage.

4. Connect a DVM between pins 3 and 7 of J3, the rotator-cable connector or terminal board, and record the **ROTATOR POSITION** pot (R3) excitation voltage. It will typically be 11.8 to 12.2 V dc. In my case, 11.8 V dc.

5. Divide the value noted in Step 3 by the value noted in Step 4: 0.1/11.8 = 0.0085. Record this value.

6. Measure the voltage at TP1 (the ADC's reference voltage). A typical value is 4.90 V dc. Record this value.

7. Divide the value noted in Step 4 by the value noted in Step 6: 11.8/4.90 = 2.41 (rounded). This is the ratio of rotator excitation voltage to the ADC's reference voltage. Record this value.

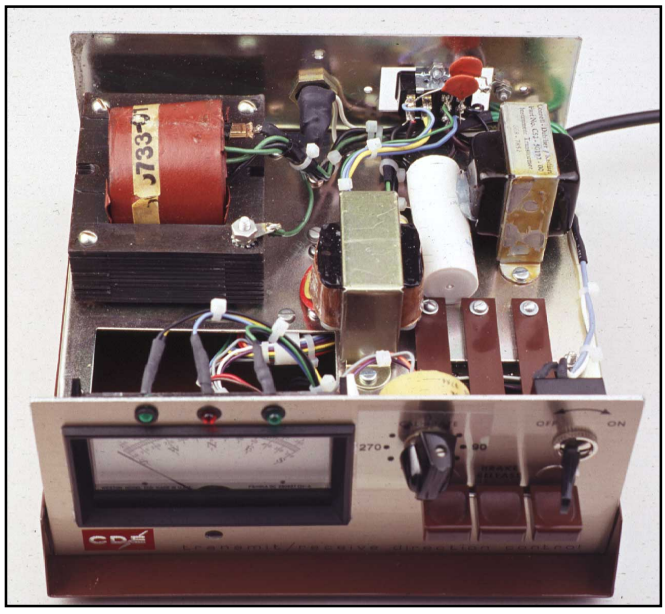


Figure 4—This top view of my HAM 2/CD44 modified CDE rotator control box shows the added transformer (T3) mounted between the three control switches and the main power transformer (T1). Relocated C2 is next to T2, held in place with a dab of RTV sealant. An 8-pin Cinch connector replaces the barrier strip originally installed in this box. The fuse holder on the rear panel contains F2.

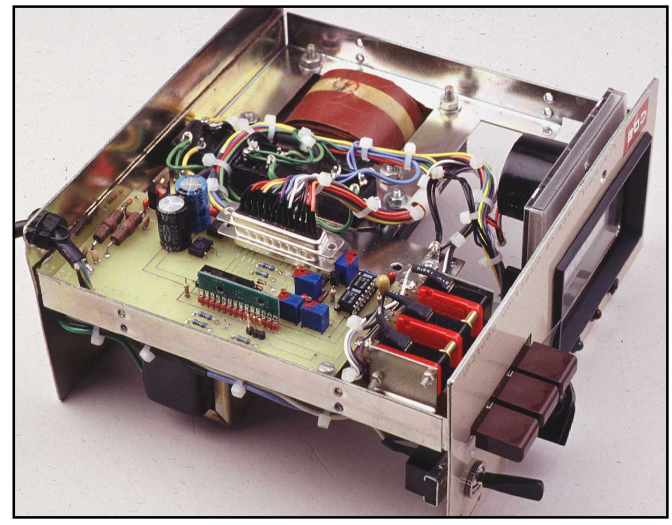


Figure 5—A well-thought-out physical arrangement, use of cable ties and neat wiring, coupled with the PC board result in a professional-looking job! The three black, rectangular modules are the solid-state relays from All Electronics. P1/J1, the DB25 connector on the PC board, is nearest the relays. Near the bottom edge of the board is the Basic Stamp, with J2 (a 3-pin SIP header) just below it. The RF chokes and regulator IC in the 12 V power supply are near the rear panel. Two full-wave diode bridges sit between the filter capacitors and J1/P1. Four trimmer potentiometers and the two ADCs are near the direction control/brake release lever switches toward the front panel.

8. Multiply the figure of Step 5 by the value of Step 6. In this case, 4.90×0.0085 = 0.0415. Multiply this result by the ratio value noted in Step 7: 0.0415×2.41 = 0.100. Record this value.

9. Connect the DVM between TP4 and ground (chassis) and adjust the **OFFSET ADJ** pot (R15) until the voltage equals the value noted in Step 8. In this case, 0.100 V dc.

10. U1 and U2 each have a total resolution of 1 part in 256. Each of these converters use the nominal regulated 5 V dc output from the on-board regulator as a dc reference. Dividing 256 by the reference voltage yields the volts/bit value that is used during the calibration procedure. For example, 4.90/256 = 0.019 volts/bit (rounded). Record this value.

To obtain maximum rotator resolution using a convenient fraction of 360° that is less than the full scale value of the ADCs, 180 was chosen. This provides an overall resolution of 2° within U7. However, because of inertial loads on the rotator and other variables noted earlier, resolution is reduced to 5° (one part in 72) for actual antenna positioning in automatic mode.

11. To properly scale the two ADC inputs, multiply the reference-voltage quotient in Step 10 by 180: 0.019×180 = 3.42.

12. Rotate the **DIAL** pot (R12) fully clockwise and connect the DVM to TP2. Adjust R13, **DIAL POT CAL**, to read the value noted in Step 11 above in this case 3.42 V dc.

13. Close the **CW** switch (S4) and position the rotator at its full CW position. Connect the DVM to TP3. Adjust the **ROTATOR CAL** pot (R11) to read the value noted in Step 11 (3.42 V dc).

This completes the calibration procedure. Properly executed, the calibration should last indefinitely.

Final Notes

Chasing DX these days is not easy for those of us well down the pecking order. Big antennas, big amplifiers and skilled operators usually prevail in the rare DX pileups. This rotator control can help in the battle with the big boys. Breaking a pileup is easiest in the early stages, as seasoned DXers will attest. With this time-saving accessory, you point the **DIAL** pot to the chosen compass heading and press the **AUTO** switch. While the antenna is moving, you are free to take care of other details such as turning on the amplifier, setting the transmit VFO to the DX listening frequency, and the myriad of other tasks in preparation for nailing down a new one. Earlier, one hand was tied up in sequencing the brake and direction controls with at least an occasional glance at the antenna-position indicator. Contesters will find this controller useful, too. After setting the **DIAL** pot and pressing the **AUTO** switch, you're free to concentrate on maintaining the QSO rate!

Acknowledgments

Thanks to my brother, Dick, W8SJ, for his comments and insight during the development stages of this hardware. After nearly 12 years, it was finally realized. Also thanks to Rich Ackerman, W8TE, who supplied the test rotator, Ted Pauck, K8NA, and Ken Schang, W8LU, for supplying the control units, and John Werner, W8QA, for help during early testing.

Gerry Fasse was first licensed in 1954 as W8UCI, later as W8PX, and now W8GF. He is a DXCC Honor Roll member and is self-employed designing machine-tool control hardware and software. During the Korean war, Gerry served with the Eighth Army, later attending the Electronics Institute of Technology and Wayne University in Detroit. You can reach Gerry at 11320 Darla Ct, Warren, MI 48089; **w8gf@aol.com**.

Notes

[1]Parallax, Inc offers a software package consisting of a floppy disk, connecting cable and instruction manual to write and load programs for the Stamp. The manual is exceptionally detailed with a number of sample programs included. The learning curve is not nearly as steep as some programming tools tend to be! The programming cable plugs into J2 on the PC board.

[2]I modified several control units using perfboard construction. Parallax offers breadboards for prototyping purposes and with care, you'll have a decent-looking product. PC boards and *programmed* Basic Stamps for this project are available from C&M Enterprises, 280 Bell Branch Ln, Fruit Cove, FL 32259; tel 904-287-6448; **http://www.atlantic.net/~cment**; visit this Web site for additional information. PC board and *programmed* Basic Stamp, $59 plus $6 shipping; PC board only: $20 plus $4 shipping; *programmed* Basic Stamp only: $38.50 plus $5 shipping. Shipping is via priority mail. Express mail and global priority mail available at additional cost; contact C&M Enterprises for details. Visa and MasterCard charge cards accepted.

Software for this project, including the source code, a calibration procedure check list and more-detailed assembly instructions are contained in *FASSE.ZIP*, which can be found on the Internet (**http://www.arrl.org/files/**).

[3]RadioShack offers an excellent soldering-iron value (RS 64-2055). This dual-heat iron has switch-selectable settings of 15 and 30 W.

[4]Information on how to perform this approach is included in the documentation as part of *FASSE.ZIP* (see Note 2).

By Manfred Mornhinweg, XQ2FOD

A 13.8-V, 40-A Switching Power Supply

Part 2—This month we describe construction details and pull all the loose ends together.

The exact size of the PC board is 120×272 mm (4.72×10.71 inches). It must be made from good quality, single-sided glass epoxy board—don't try to use a cheaper grade of board. The heavy components would stress it too much and the copper adhesion is not good enough for the heavy soldering required. A circuit board is available from FAR Circuits.[1]

Building the Magnetic Components

The biggest challenge for most home builders will be the magnetic components. To keep things simple, I used Amidon cores. The only exceptions are L1 and L3, which were made from materials found in my junk box. Both of these inductors are not critical, and suitable Amidon part numbers are included in the parts list.

T1, the main power transformer, is the heart of this circuit. I built T1 using a tape-winding technique, stacking four pairs of ferrite E cores to obtain the necessary magnetic capabilities. [Comments from HQ staffer Larry Wolfgang, WR1B, as he constructed the transformers and inductors are included in the construction details below.]

[1]Circuit boards for this project are available for $19 each plus $1.50 shipping per board. VISA and MasterCard accepted. Orders may be mailed to FAR Circuits, 18N640 Field Ct, Dundee, IL 60118, or faxed to 847-836-9148. A circuit board template for this project may be downloaded from the ARRL Web at http://www.arrl.org/notes/1816/#correx. Note: The template included in *The 1999 ARRL Handbook* is incorrect. Use this template instead.

DAN WOLFGANG

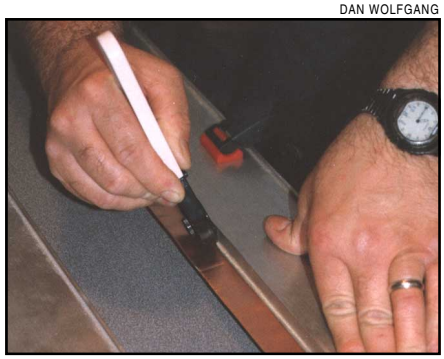


Figure 2—Larry Wolfgang, WR1B, using a 4-foot straightedge designed as a guide for hand-held circular saws to clamp the copper foil tape to a board on a tabletop. After carefully measuring to ensure a uniform 22 mm width, he cut the foil tape using a Fiskars rotary cutter. Be careful to keep the cutter wheel against the straightedge for the entire length. Move the tape in 4-foot intervals to cut the entire length.

Making T1

Because four cores are stacked there is no factory-made bobbin available for this transformer, so I made a paper bobbin. I wound the transformer using 0.1-mm thick copper strips interleaved with Mylar sheets, because a thick wire needed for the heavy current would be impossible to bend around the sharp corners of the bobbin. Instead of using a lot of thin wires in parallel, it is better to use copper strips. The whole assembly is sealed in epoxy resin, with the magnetic cores glued in place with epoxy.

Cut a piece of hardwood to serve as a form when making the bobbin. As the center legs of the four stacked cores measure 62×12 mm (2.44×0.47 inches), the wood block must be 63 mm (2.5 inches) wide and 12.5 mm (0.5 inch) thick, to allow for some play. The length of the block should be around 100 mm (4 inches). The height of the bobbin will be 28 mm (1.10 inches), so make your block long enough to hold it with the bobbin in place with room for holding on to it. I used a belt sander to trim this wood block to the exact dimensions. Try to be precise—if the bobbin is too big you will waste valuable winding space, running the risk of not being able to fit the windings. If the bobbin comes out too small, your finished winding assembly may not fit the ferrite cores, making it unusable.

Now wrap the wood block with one layer of plastic film, such as "Saran Wrap" used in the kitchen to preserve food. This material allows you to remove the bobbin from the wood block easily. Cut a strip of strong packing paper, 28 mm (1.10 inches) wide and about 1 m (39.4 inches) long. A brown-paper grocery bag is a good source of suitable paper. Mix some 5-minute epoxy glue (I used the type sold in airplane modeling shops, which comes in good-sized bottles) and apply a layer of epoxy to the paper strip. Now wind 6 layers of the paper strip very tightly around the plastic-wrapped wood block. Wrap another sheet of Saran Wrap

DAN WOLFGANG

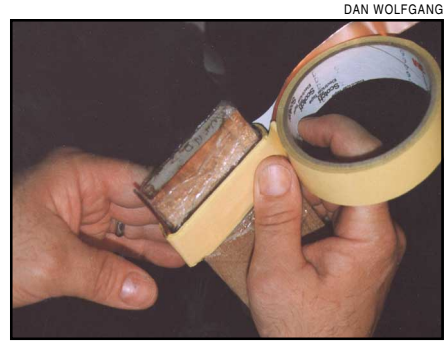


Figure 3—Winding the foil tape tightly on the epoxy-coated paper bobbin on the wooden block. The Mylar tape is unrolled and positioned over the foil layer as you wind.

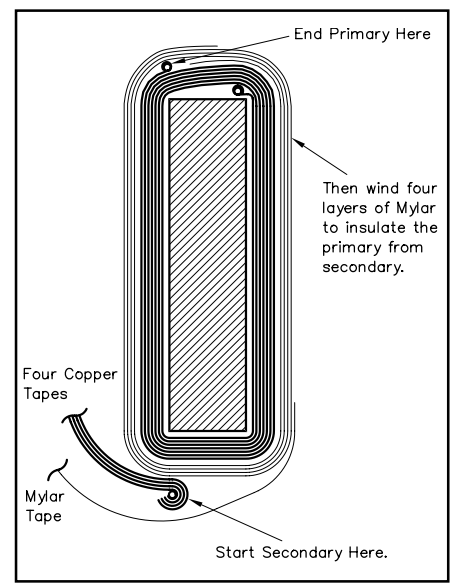


Figure 4—Primary 15 turns on bobbin, with start of 4-turn, center-tapped secondary winding.

LARRY WOLFGANG

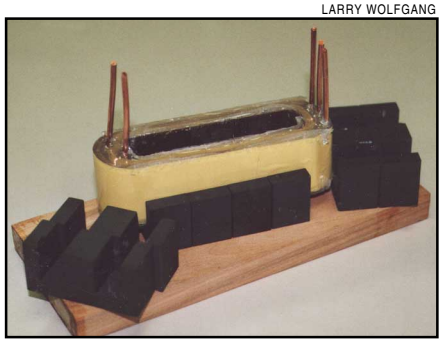


Figure 5—Photo showing how the core halves must fit into the completed transformer after it is removed from the wooden block. You will have to file off the rough edges of epoxy to allow the cores to meet properly.

around your work and press it between two wooden blocks held together with strong rubber bands or wood clamps, so the long sides of the bobbin are flat and smooth against the wood. Now place the bobbin assembly in an oven for about 15 minutes at 50°C (122° F). The epoxy sets much more quickly and becomes somewhat stronger at that temperature.

[Comments from Larry Wolfgang, WR1B: The paper I used for my T1 bobbin was cut from a 36-inch-wide length of "craft paper." This had been used to wrap some paper my wife had purchased at an art-supply store. It was about as heavy as the paper used for grocery bags. I used 30-minute epoxy for this step, providing a bit more "working time" than 5-minute epoxy allows. It takes *lots* of epoxy, because so much soaks into the paper. My epoxy was the kind with the double plunger, and equal amounts come out of both tubes as you push in the plunger. Wear rubber or plastic gloves to protect your hands. I squeezed out an amount that made a puddle of resin and a puddle of hardener each about 1 1/2 inches across and 1/8 inch or so deep. This was not enough, and I had to mix more. I used a spring clamp to hold the paper to my workbench and then held the paper in one hand while spreading epoxy with a heavy toothpick. I coated the entire length and then wrapped my plastic-covered wooden block. My electronic-controlled gas oven only allows me to set the temperature as low as 170ºF, so I had to watch the temperature and shut the oven off as the temp rose to about 150ºF, then let it cool down. I ran it twice this way to "cure" the 30-minute epoxy I used for the bobbin.—*WR1B*]

Now you will need some 0.1 mm (0.004 inch = 4 mils) thick copper tape, and some Mylar sheet of a similar thickness. Cut the copper in strips 22 mm (0.87 inch) wide, and the Mylar in strips 28 mm (1.10 inches) wide. If you can make long strips, say 2 m (6.56 feet), this is an advantage. Otherwise, you will have to solder individual copper strips together. In total, you will need about 7 m (23 feet) of copper tape and slightly less Mylar tape. [I made 7 meters of "double-thickness" tape, using two 3-mil thick, sticky-backed copper tapes that we had in the ARRL Lab. After making the 15-turn winding, I cut the leftovers in four equal lengths to make the "four-layer tape" used in the secondary. There was less than a foot of left-over tape after the transformer was completed. The Mylar tape I used was made by 3M and was 2-mil thick and 1-inch wide with adhesive backing. This thickness is sufficient for the voltages involved, provided that care is taken so that the Mylar isn't punctured by accident. If like the author, you cut strips from a sheet of copper, you should file down the edges to remove burrs. See Figure 2.—*WR1B*]

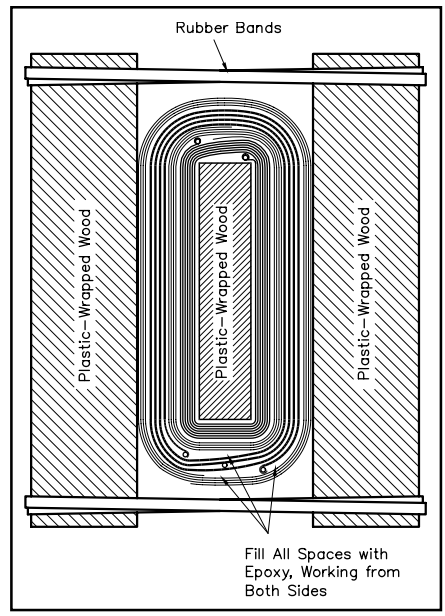


Figure 6—Clamping the T1 assembly and filling with epoxy.

Once the epoxy has had ample time to harden and has cooled, remove the rubber bands, the outer wood blocks, and the outer plastic wrapping (don't worry if it doesn't come off completely). Do not remove the plastic wrapping that separates the bobbin from the wood. You now have your wrapped wooden core and the epoxy-paper bobbin on it.

Take a 60 mm (2.36 inches) length of #12 bare copper wire. Wrap the end of one of your copper strips around the wire, so that the wire protrudes out from one side of the copper loop. Use a big soldering iron to flow some solder into the junction. Try to avoid getting solder on the outside, because this could later puncture the Mylar insulation. [I scraped the adhesive off the back of the sticky-backed tape where I soldered the wire. Otherwise, the solder won't stick to the back of the copper, and the layers may not have good conductivity between them.—*WR1B*]

Now place the copper wire on one of the narrow sides of the bobbin, so that the copper strip is centered on the width of the bobbin, leaving 3 mm (0.12 inch) room on each side. Stick the start of the copper strip to the bobbin with some thin adhesive tape. See Figure 3.

Position the start of a Mylar strip so that it covers all the copper and is centered on the bobbin, and then tape it in place. Now wind 15 turns of this copper-Mylar sandwich, as tightly as you can, keeping the Mylar aligned with the bobbin sides and the copper nicely centered. Don't lose your grip, or the whole thing will spring apart! If your copper strip is not long enough, fix everything with strong rubber bands or a clamp and solder another copper strip to the end of the first one, allowing 2 mm of overlap. Before doing this, cut the first copper sheet so that the joint will be on one of the narrow sides of the bobbin, because here you have space, while the wide sides will have to fit inside the ferrite core's window. If the Mylar strip runs out, just use adhesive tape to add another strip. Make the overlap 5 mm to avoid risk of creepage between the sheets and also try to locate the joint on one of the narrow sides of the bobbin. See Figure 4.

When the 15 turns are complete, cut the copper strip so that the second terminal will be on the same narrow side of the bobbin as the first terminal. Solder the second terminal (another 60 mm piece of bare copper wire) to the strip, position it and wind three or four layers of Mylar to make the insulation safe between the primary and secondary. [I started my primary winding with the bulge of the wire on the corner, so that I was immediately winding along the wide side. When I finished the 15 turns, I positioned the end wire so it is on the narrow side, just short of the corner of the long side. This way, the two bulges meet at the middle, but don't cross each other.—*WR1B*]

If you think this is a messy business, you are right. But it's fun too! The secondary is just a little bit messier: It is wound with a five-layer sandwich—four layers of copper and the Mylar topping layer. But it's only four turns total, so take a deep breath and do it. Solder the four copper strips together around a piece of #12 copper wire. Don't be overly worried if the outcome is not very clean; mine was quite a mess too, yet it worked well on the first try. Just be sure you don't create sharp edges or pointed solder mounds, because these may damage the insulation. See Figure 4 for details.

Now position the start of your secondary conductor so the terminal wire will come out on the same side as those of the primary, but on the other narrow side of the coil assembly. The goal is to end up with a transformer with its primary leads on one extreme and the secondary on the other, and that will also fit the printed circuit board nicely. Wind two turns, solder the center tap wire between the four copper strips, wind the other two turns, solder the last terminal wire and then wind a finishing layer of Mylar and fix it in place with adhesive tape. This finishes the worst part of making T1.

What you have now is a springy, messy coil assembly that will fall apart if you let it go. You have to seal it, but this is easy to do. Temporarily hold things together with some stout rubber bands. Wrap your two wooden blocks, the same you used to press together

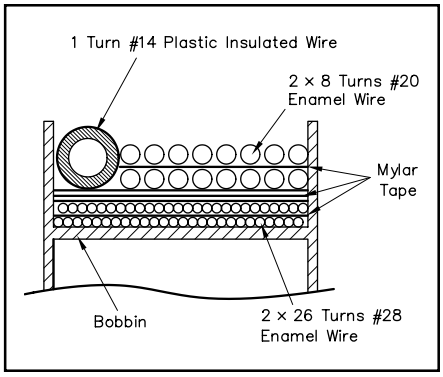


Figure 7—Cross-sectional view of T3 (not to scale), showing distribution of windings.

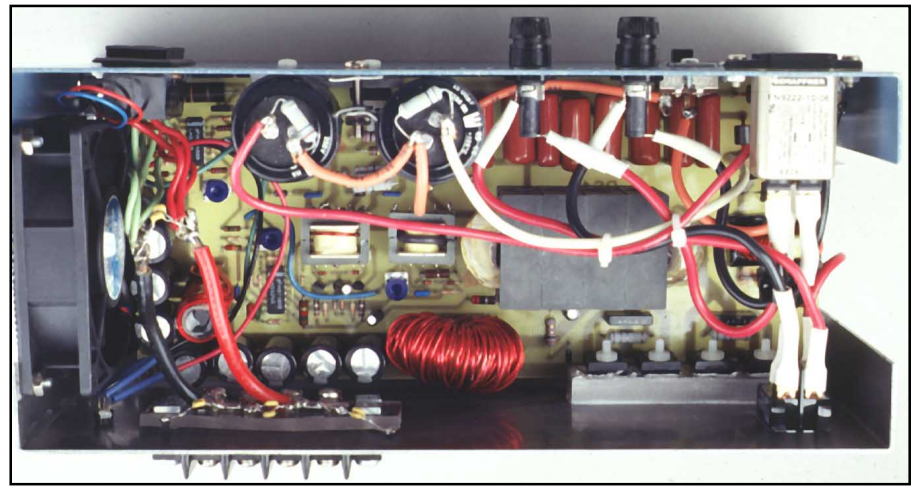


Photo of top of ARRL HQ version, showing PCB mounted in cabinet.

the bobbin, in plastic film. Place them against the sides of the coil assembly, and apply hard pressure, using a clamp or a lot of rubber bands, so that the long sides of the coil straighten out completely, and any slack is displaced to the narrow sides. Now mix a fair quantity of epoxy glue, place the coil assembly so that the pins face up, and let the epoxy run into the coil. Continue supplying epoxy until it starts to set. If it drips out from the other side, no problem. (Just don't do this work over your best rug!) When the epoxy doesn't flow any longer, turn over the coil assembly, mix a new batch of epoxy and fill the other side completely, forming a smooth surface. As the lower side is now sealed, the epoxy will not flow out there. When this epoxy has set, turn the assembly over again, mix some more epoxy and apply it to form a smooth surface there. The idea is to replace all the air between copper and Mylar sheets by epoxy, and especially to fill the room left by the copper strip, which is narrower than the Mylar. This filling is necessary both for mechanical and for electric safety reasons. See Figure 6. [My wooden "screw clamp" worked well for applying strong even pressure to the sides. I don't think rubber bands would apply enough pressure to minimize the air space inside the transformer.—*WR1B*]

Now place the assembly in the oven again. Let the epoxy harden completely, then remove the coil from the oven, remove the clamp, rubber bands, wooden blocks, wooden core and all remains of plastic film. You will be surprised how your messy and springy assembly changed into a very robust, hard, strong and nice coil. Now test-fit the ferrite cores. See if they can be installed easily, so that each pair of facing E-cores comes together in intimate contact, without pressing on the winding. If everything is right, the winding should have some play room in the assembled core. But it is easy to get too much epoxy on the coil. If this happens to you, just take a file and work the epoxy down so that it doesn't disturb the ferrite. The ferrite core *must* close properly; otherwise you will later burn out the power transistors.

When the sides fit, prepare some more epoxy, apply a very thin layer to all contact faces of the ferrite cores and mount them onto the coil assembly. You can hold them in place with adhesive tape until the epoxy sets. Again, use the oven to speed up the hardening. The last thing you have to do is bend the copper wires into the proper shape to fit the printed circuit board holes. Be sure that on the secondary winding the center tap is actually in the center position. The polarity of the other pins doesn't matter. This completes the manufacture of T1. All the other transformers and coils are just child's play after making T1!

Making T2

The current sense transformer T2 has a lot of turns but they needn't be wound nicely side-by-side. You can use a winding machine with a turns counter or you can just wind T2 by hand. Get some #36 or other thin enameled wire, solder the end to one of the outer pins of the EE24-25-B bobbin, and wind 100 turns. Don't worry if your winding is criss-crossed and ugly, and don't feel guilty if you lose count and wind a few turns more or less. As long as you don't overdo it, it will just affect the position of VR1 when you adjust the completed power supply later. Solder the wire to the center pin on the same side, then wind another 100 turns in the same sense. Solder to the other outer pin on the same bobbin side and apply one or two layers of Mylar, just to protect the thin wire.

Now take a piece of #14 plastic insulated wire, wind one single turn over the Mylar and solder the two ends to the two outer pins of the other side of the bobbin. It doesn't matter which end goes to which side. Install the EA77-250 core with a small amount of epoxy cement and T2 is finished. [I used AWG #14 house wire here. The insulation made it a bit tight for the core, but it fit.—*WR1B*]

Making T3

T3 is made using the same type of bobbin and core as T2. Wind 26 turns of #28 enameled wire. The 26 turns should fit nicely in a single layer. Study the schematic diagram to see how the windings connect to the bobbin pins. Bring the wire back to the starting side over the last half turn, for connection to the center-tap pin. Wind one layer of Mylar sheet, then put on the next 26 turns. Again, bring the wire back to the starting side over the last half turn, for connection to the bobbin pin.

Wind 3 layers of Mylar tape, to insulate the primary and secondary properly. Wind 8 turns of #20 wire, and solder the ends to the bobbin pins. Look at the printed circuit board drawing to see which wire is soldered to which pin. Wind a single layer of Mylar, then wind the other 8-turn winding over the first one. This will leave a space at one side of the bobbin big enough to take the single turn of #14 plastic insulated wire. This completes the assembly. See Figure 7 for a cross-sectional view of the windings. Now glue the core in place with epoxy cement and T3 is finished.

Making L2

L2 is wound on an Amidon T-200-26 iron-powder toroid core. As it is too difficult to bend thick wire through a toroid, and tape winding it is not practical either, I chose to make this coil with 10 pieces of #16 enameled wire in parallel.

Cut the wires to about 1.5 m (59 inches) in length and lightly twist them together. Then insert the bundle into the core, and starting from the middle of the wire bundle, wind 8 turns, using half of the core's circumference. Now wind another 7 turns, starting from the middle toward the other end of the wire bundle. The 16th turn is the one you made when you inserted the wire bundle into the core to start.

Making L3

To make L3 you must first find a suitable rod. I used a part of an old ferrite antenna rod about 10 mm (0.39 inch) in diameter and 50 mm long (1.97 inches). (An Amidon number 33-050-200 rod can be used.) Wind 10 bifilar turns of #12 enam-

eled wire. This wire is quite stiff, but it is still no problem to handle. You should wind the coil on a properly sized drill bit, allow it to spring open and place it on the ferrite core. Otherwise you could crack the ferrite trying to wind directly on it. A tapered "drift punch" helped open the turns just enough to fit the core. Fix the core to the winding with some epoxy. Bend the wires so that all four of them point down with the core pointing straight up. That's the position L3 is mounted on the PCB.

Putting It All Together

Install and solder all parts except for Q1, Q2, and D6 to D9. Before installing D1, fashion a simple heat sink from a 30×80 mm (1.18×3.15 inch) piece of 1 mm (0.039 inches) thick aluminum sheet, bent into a U shape. Drill a hole and screw the rectifier bridge onto the heat sink together with a lock washer. Then solder D1 to the board.

I made my own enclosure, using two 3-mm (0.12 inch) aluminum plates, measuring 300×120 mm (11.81×4.72 inches) for the front and rear walls. They are screwed to the fan, the PCB and to a 120-mm (4.72-inch) long spreader tube of 6-mm (0.24-inch) diameter, so that these parts become integral to the structure. The connections between the PCB, aluminum plates and fan were made with small pieces of 10×10 mm (0.39×0.39 inch) aluminum angle stock. The assembly is surprisingly rigid.

The top and bottom covers were made from 1 mm (0.04 inch) aluminum sheet and measure 126×300 mm (4.96×11.81 inches). The bottom cover has a hole for the PCB's center mount. The side covers were cut from wire mesh to allow unrestricted airflow, and measure 122×126 mm (4.80×4.96 inches). The panels are held together with 10×10 mm (0.3×0.39 inch) aluminum angle stock, running along all edges and held with small sheet-metal screws. These covers are not installed until the power supply is complete, tested and adjusted.

I painted all the panels flat black on the outside, which looks nice together with the anodized aluminum angle stock. The edges and insides were kept free of paint, in order to get proper electrical contact between the panels for good shielding.

[The version made by WR1B used a Hammond Manufacturing ventilated, low-profile instrument case, catalog number 1426Y-B. This is a rugged case that also looks very nice. Larry mounted the circuit board inside the case using a pair of steel mounting rails, also from Hammond, catalog number 1448R12.]

The components external to the PCB (P1, SW1, C3, the LED and the output screw terminal block) are mounted to the front and rear panels. Q1 and Q2 are mounted to the rear panel, using M3 nylon screws and 3 mm (0.12-inch) thick ceramic insulators. These thick insulators were used not only for safety reasons but also because they reduce the capacitive coupling of the transistors to the enclosure. Do not use metal screws with plastic washers, because this approach does not give enough safety margin to operate at the input line voltage. [The author's junk-box ceramic insulators proved difficult to duplicate for the supply we built in the ARRL Lab. Equivalent new parts would have nearly doubled the cost of the supply! Instead, for good heat-transfer properties, we used thin rubber insulators manufactured by Wakefield Engineering as PN 175-6-250-P, available from Newark Electronics as PN 46F7884. Individual aluminum spacers milled from aluminum blocks were used between Q1, Q2 and the Schottky diodes and the metal chassis. Care must be taken to make sure the surfaces of the spacers are parallel and free of burrs to ensure low thermal resistance.]

The Schottky diodes are mounted using the same kind of insulators and screws, but there is a heat spreader made from 6-mm (0.24-inch) aluminum plate between those insulators and the case. All surfaces requiring thermal contact are covered with heat-transfer compound before assembly. When installing the diodes and transistors, first do all the mechanical assembly and then solder the pins. Otherwise you could stress them too much while fastening the screws.

All wire connections are made next and the output filter is assembled by sliding the ferrite beads over the output cables and soldering the bypass capacitors C25 through C30. Be sure to use a nice thick wire for the output. A 40 A continuous-duty current is no joke.

The tracks on the PCB cannot be trusted to carry 40 A without some help. Use a big soldering iron (100 to 150 W) to solder lengths of #12 bare copper wire cut and bent to fit the shape of all the high-current paths. To prevent any failures due to vibration from the fan, place some drops of hot-melt glue anywhere a wire is connected to the board. Hot-melt glue is also excellent for fixing anything that would otherwise rattle, like ferrite beads.

Testing and Adjusting

Make sure you do a thorough visual check. Set the three potentiometers to mid position. Check that there is no continuity between the ac input and ground, between the ac input and the dc output or between the dc output and chassis ground.

Connect a variable voltage supply (you need 12 to 15 V for the tests) to the output leads, without plugging the switcher into the ac line. You should see the LED light up. Change the voltage fed into your project to see how the LED changes color. If you have a dual-channel oscilloscope, connect its two channels to the base-emitter junctions of the power transistors. [Since you are not connected to the ac power line, you will not be grounding it through the oscilloscope's ground leads connected to the emitter leads.—*Ed.*] With the external voltage at about 12 V, you should see small pulses. As you increase the voltage suddenly the pulses will disappear. If you want, you can preadjust VR2 by setting your lab power supply to exactly 13.8 V and then setting VR2 to where the pulses just disappear.

Now it's time to start up the switcher. Remove your lab supply and the oscilloscope leads and connect the supply to the ac line in series with a 60-W light bulb. This will avoid most or all damage if something is really wrong. Connect a voltmeter to the output and switch on your supply. If everything is right, the bulb will light up, then slowly dim while the power supply starts up and delivers about 13.8 V.

Now, connect a load of about 2 A to the output—a car brake light makes a good load. At 2 A output, the bulb in the ac line will probably glow, with 13.8 V dc at the output. If everything is okay so far, now comes the big moment. Remove the series bulb from the ac circuit. Startup of the supply should now be fast and you can now connect a heavier load to it. With a load of 2 to 10 A connected (the value is uncritical, given the good regulation of this supply), adjust VR2 so that you have exactly 13.8 V at the output.

Next adjust the current shutdown point. For this you need a load that can handle 40 A. You could make one by connecting a lot of car headlamps in parallel or you could use some resistance wire to build a big power resistor. I made a 13.8 V, 550 W heater for testing my supply. Connect the load and adjust VR1 so that the output voltage is just at the limit of shutting down.

The last adjustment is for the fan trigger point. Connect a 65-W car headlamp or similar load that consumes about 5 A. Let the supply run for several minutes, then move VR3 to the point where the fan switches on. Now check out the trigger function by changing the load several times between about 2 and 10 A. The fan should switch off and on between 30 to 60 seconds after each load change. You may have to readjust VR3 until you get the fan to switch on at no more than 7 A continuous load and switch off at about 4 A.

And If It Doesn't Work?

If you are building this project, you probably already have some experience in troubleshooting, so I don't need to teach you the basics. If you used substitute parts for the magnetic cores and made a bad choice, the results could be dramatic. If either T1 or L2 saturates, the power transistors could burn out before the fuse has a chance to open. The protective light bulb in the ac line will avoid damage in this case, so by all means use that bulb for initial testing!

Another possible error is reversing the phase of a winding in T3. If you get one of the 8-turn windings reversed, the results will be explosive unless you have the light bulb in series. If you reverse the 1-turn winding, the power supply will simply not start.

Please note that several resistors are shown with incorrect values in the *Handbook* schematic diagram. The schematic shown in last month's *QST*, however, is correct. A corrected schematic is also available on the ARRL Web site.

You can contact Manfred at Buenaventura Osorio 720 DptoI, La Serena, 112 Chile; **mmornhin@eso.org**.

By Sam Ulbing, N4UAU

Getting More Voltage Out of a Regulator IC

Stuck without the proper regulator IC for your project? This work-around may be just what you need!

I use a lot of battery-powered equipment when I'm operating maritime mobile. Because batteries are expensive—and need to be replaced often—I prefer to use my boat's 12-V system to power as many pieces of gear as possible. Recently, I needed a 9-V source to replace six D cells in a radio. Although 9-V regulators are available,[1] I had none in my collection.

Normally I would have used an LM317T, a three-terminal *adjustable* regulator to get the required 9 V, but I was out of those, too! What I did have were a few LM7805 5-V, 1 A regulators left over from an earlier project. I was pleased to discover that I could use a 5-V regulator to get the needed 9 V—and other voltages as well!

The LM7805 is a three-terminal, fixed-voltage regulator in a TO-220 case. You can apply as little as 7 V and up to 35 V between the **INPUT** and **GROUND** pins and obtain 5 V between the **OUTPUT** and **GROUND** pins.[2] Other than for a couple of low-value capacitors, that's all that's needed for 5 V.

One way to increase the output voltage of an LM7805 is to insert a diode between the **GROUND** pin of the IC and the common (ground) line between the input and output (see Figure 1A). Because the IC keeps 5 V between its **OUTPUT** and **GROUND** pins—and because about 8 mA flows out of the **GROUND** pin (this is quiescent current used to run the IC)—there is a forward-bias voltage drop (about 0.6 V) across the added diode. The voltage between the **OUTPUT** and **GROUND** is now 5.6 V.

I could have used six or seven diodes in series to get 9 V output, but that seemed awkward (to say the least). Figure 1B shows a better approach. By properly selecting the values of R1 and R2, the regulator's output voltage can be made to be any value between 5 V and 1.5 V less than the voltage applied to the regulator's input. This lets you use the 5 V regulator just like an adjustable regulator.

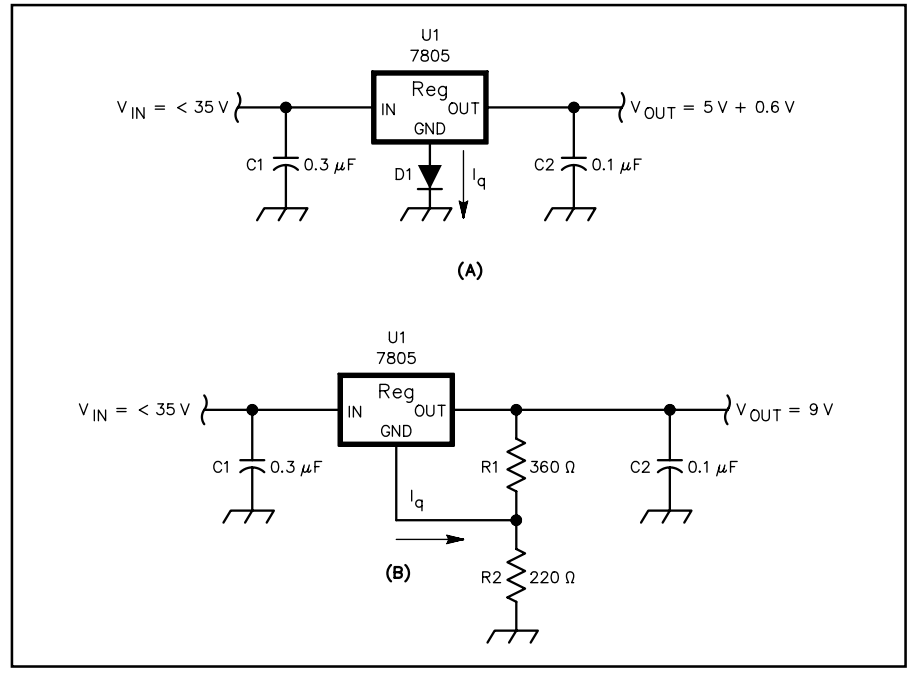


Figure 1—At A, one way to increase the output voltage of an LM7805 (or other fixed-voltage regulator) is to insert a diode between the **GROUND** pin of the IC and common. By properly selecting the values of R1 and R2 (B), the LM7805's output voltage can be made to be any value between 5 V and 1.5 V less than the voltage applied to the regulator's input. Unless otherwise specified, resistors are 1/4 W, 5%-tolerance carbon-composition or film units.

The output-voltage equation is:

$$V_{OUT} = 5\ V + (5\ V/R1+I_q)\times R2 \qquad \text{(Eq 1)}$$

I_q is the quiescent current of the regulator. Operation is easy to understand. The 5 V impressed across R1 generates a current through it. This current—and the quiescent current from the IC **GROUND** pin—flow through R2, resulting in the voltage drop that is added to the 5 V out-put of the regulator itself.

I_q varies somewhat with input voltage, temperature and with individual devices. For this reason, it is wise to make the I_q portion of the current through R2 as small

(continued on page 65)

[1]Notes appear on page 65.

By Larry "Tree" Tyree, N6TR

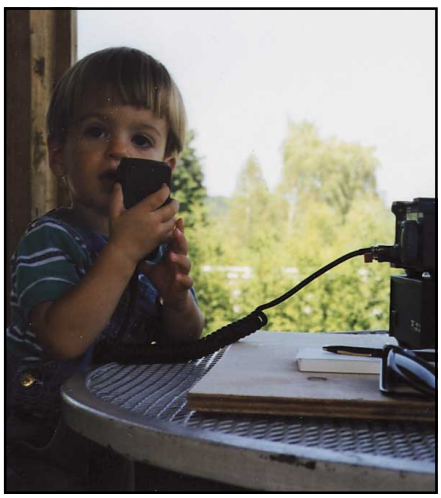
Kid's Day!

In just a couple of weeks you'll have a rare opportunity to make an immense difference in the life of a child.

Did you know that the age of the average ham is over 50? Have you heard that Amateur Radio is viewed by many people these days as an "old man's hobby"?

Let's face it. The amateur population is aging and the oldest of the Old Timers are marching right off the actuarial tables and into the Big Shack in the Sky. We're becoming a geriatric hobby because very few young people are joining our ranks. As we age and eventually become Silent Keys, we aren't being replaced in sufficient numbers. We're seeing the results now with the gradual decline of the active ham population—a decline that's likely to accelerate during the next decade. You don't have to be a statistician to realize that our very survival depends on attracting more young people to Amateur Radio.

There is a lot of talk on the air and on the Internet about the bleak future we face. Talk is cheap, though. Anyone can spew their opinions through a microphone or pontificate from a keyboard. The challenge is to roll up your sleeves and actually *do something*. That's why the Boring (Oregon)



Joseph Kolk has obviously spent some time watching his dad, W1ZN. Kid's Day offers a chance for children like Joseph to actually get on the air.

Kid's Day Rules

Purpose: The Kid's Day operating event is intended to encourage activity by younger people (licensed or not) using Amateur Radio. The goal is to give unlicensed young people some hands-on experience on the air, so they might develop an interest in pursuing a license in the future. It is also intended to give hams a chance to share their stations with their children.

Dates: January 2 and June 19, 1999.

Time: 1800 to 2400 UTC. No limit on operating time.

Suggested exchange: Name, age, location and favorite color. You are encouraged to work the same station again if either operator has changed. Call "CQ Kid's Day."

Suggested frequencies: 14270 to 14300 kHz and 28375 to 28400 kHz.

Be sure to observe third-party traffic restrictions when making DX QSOs.

Reporting: Logs and comments may be posted via the Internet to **kids@contesting.com**. You may review these postings by visiting **http://www.contesting.com/kids/**.

Those without Internet access may forward their comments to the Boring Amateur Radio Club. A summary of the postings will also be sent with your participation certificate.

Awards: All participants are eligible to receive a colorful certificate. Send a 9×12 SASE to the Boring Amateur Radio Club, PO Box 1357, Boring, Oregon 97009. More details may be obtained from the Boring Amateur Radio Club at the above address, or on the Web at **http://www.jzap.com/k7rat/**.

Sarah (background) and Lisa (foreground) Wolbert enjoyed Kid's Day from the shack of their father, K6XX.

Nine-year-old Alyssa, KB9THU, showed extraordinary skill during the 1998 Kid's Day event. She is the youngest member of the Society of Midwest Contesters.

Rebecca, KB0VVT, joined the June 1998 Kid's Day outdoors!

Amateur Radio Club sponsors the Kid's Day Operating Event. These events were started a few years ago, mostly advertised on the Internet. It has been very gratifying to see increased participation with some of the kids reporting hundreds of QSOs.

Getting Our Children on the Air

Kid's Day is a six-hour period when we make a special effort to invest in our future. The goal is simple: Get the children on the air. There are two Kid's Days each year. In 1999 they'll occur on January 2 and June 19 (see the "Kid's Day Rules" sidebar).

Think of the children in your life—your son, daughter, niece, nephew, granddaughter or grandson. Whether they already have ham licenses or not, this is your opportunity to introduce them to the magic of radio. Kid's Day is your chance to put children on the air and create memories that they'll treasure for the rest of their lives.

A Kid's Day contact starts with a brief exchange: the child's name, age, location and favorite color. That's the only requirement. If your child has a case of "mike fright," don't push them to speak on the air. I remember my three-year-old totally freezing up when she tried to make her first contact. However, after an hour or two of watching her older sisters make lots of QSOs, she overcame her stage fright when she heard "another Sarah" on the radio. With this in mind, don't be suprised if you hear the control operators whispering what to say to the "junior ops."

An interesting statistic is that the ratio of girls to boys participating in Kid's Day is almost equal. This is much different than the distribution of actual hams. Could it be that Amateur Radio will be saved by increased representation thanks to an influx of girls?

Kid's Day is not a contest; long-winded contacts are definitely encouraged! Let the children explore and ask questions. If you're not used to working with children, remember that patience is paramount. If they are not experienced operators, they are going to make a lot of mistakes. This isn't the time to correct them or conduct a heavy-handed tutorial. Just control the radio and make sure the identifications are transmitted at the proper times to keep everything legal. Beyond that, let the children enjoy the event on their own terms.

Of course, if the child is a ham and he or she wants to take matters into their own hands, just step back and let them go! It's okay to fade into the background and become a silent, watchful control operator. This is, after all, *their* day. Maybe they don't have access to a station like yours, so this might be a rare treat. Let them relish the experience!

Your junior op probably won't stay on the radio for six hours straight. Children tend to have short attention spans. Don't be disappointed if they only make a couple of contacts; they'll remember the experience and that's what counts most on Kid's Day. If they want to move on to other distractions, that's fine. Perhaps you can suggest another "session" a couple of hours later.

And If You Don't Have Children...

At least get on the air and talk to the Kid's Day operators. Ideally they will be working other children, but this may not always be possible. If you hear someone calling "CQ Kid's Day" and another child doesn't respond, answer the call yourself. Ask questions about the child's interests, about school or anything else you wish. And remember to *smile*—smiles can be heard as well as seen!

You can contact the author at 15125 SE Bartel Rd, Boring, OR 97009; **n6tr@teleport.com**.

Kid's Day Memories

Last year dozens of children and families sent in their Kid's Day reports. Here are excerpts from just a few of the comments I received:

Lisa (3) and Sarah (6) had a good time during Kid's Day. They both argued over who would spend the most time on the air, with Sarah complaining the event would only last six hours!—*Robert Wolbert, K6XX*

I've been meaning to get my oldest (age 6) into this for awhile. She has previously enjoyed casual QSOs with my gang. When I mentioned "Kid's Day" she was ecstatic. I told my boss, Nick Sanvoisin, KM5DJ, about it. He and his 7-year-old son joined us. The two kids had a ball! When they weren't working the contest, they ran outside and played. We ordered a pizza and KM5DJ and I enjoyed a cold six pack while coaching the kids along. It was great fun!—*Paul Blumhardt, K5RT*

I see that blue is the color of the year. Seems like red was big last year. Since trying it in the last event, my Rachel prefers to CQ.—*Dan Violette, KI6X*

This was the Kid's Day effort of the Liberty Radio Explorers, an "explorer" class at Liberty Elementary School in Liberty, Illinois. None of the six operators had ever been on the air before, and most had witnessed only one or two QSOs. I made up "cheat sheets" with scripts for the basic conversations. The kids were uniformly good about following the script when possible and not getting flustered when it was necessary to depart from the norm in response to repeats and questions. The girls outnumbered the boys among the junior ops we worked. There are some really good operators coming on out there!—*Jim Funk, N9JF*

The kids had a great time and were really into it. Diana (age 11) had 112 contacts and Laura (age 8) made 111 contacts for a combined total of 223. The funniest part of the event was trying to teach Laura to say QRZed—she couldn't quite master it, but got very close several times.—*Bud, Diana and Laura Trench, the AA3B Multi-Multi Team!*

The results for my daughter Sara are 62 QSOs in about 2½ hours of operating time. All operation was on 20 meters. This activity was a great time and Sara had a blast. She did a nice job handling the pileups, too. Sure made her Dad proud!—*Richard Saeger, K3OO*

This was Karin's first attempt at ham radio. Thanks very much to Sarah, the real operator at K5RT, for helping her get started. Of all the fun stuff Karin did over the holidays, she tells me that operating Kid's Day on the radio was one of the "funnest." However, she did say that she wants to be louder for next time! I think the next generation of contesters will be better than the current crop. Based on the participation, how long will it be before a woman wins CQ World Wide?—*Clarke Greene, K1JX*

Well, the kids had a great time this go-around. I had Alyssa, 9, and Chase, 4, do a multiop from our home. I thought that they did a great job and had fun, too. Alyssa started the contest with a 30-minute gabfest. She hooked up with Sarah at K5RT's. They hit it off and talked for a long time. She is getting this radio stuff down pretty good. Chase did pretty well for a 4-year-old. I had to prompt him occasionally, but when the exchange was done, he always ended with a big "Over!" He's a pretty mike shy little guy, but when he saw his sister, he couldn't resist. The only problem with Chase is when he doesn't have the mike in hand, he usually is flipping a switch or turning a knob, the usual 4-year-old stuff. He also hit the power switch on the transceiver when his sister was in QSO! We made about 40 QSOs total.—*Greg Clark, K9IG*

Q Richard Bauer, K5RB, asks, "Do you have any cures for HF interference caused by the computer in my shack?"

A Computers are notorious RF generators. Even computers with grounded metal cases can leak RF by various routes.

The first thing to do is to narrow down the list of suspects. Turn on your computer system and your radio. Listen to an interference signal, turn off your PC, unplug a peripheral cable, and turn the PC back on. (Peripheral cables include those to your monitor, printer, scanner, mouse and even your keyboard.) If the interference suddenly disappears or drops sharply, investigate either the cable you just disconnected or the device it is attached to. A ferrite choke on the offending cable may help. Or, relocate the "leaky" device.

If you've disconnected all the cables but the interference remains, suspect either the computer's switching power supply or RF coming from bus cards or the motherboard itself.

Fixing a noisy power supply would entail installing a device that replaces the existing female ac socket with one that has a built-in filter. You may find these in computer-supply stores. This is done to try to prevent the RF generated in the power supply from getting to the ac line and using the cord as an antenna.

But if the noise is coming from the internal circuitry, you have few options left. Some hams have gone as far as covering the outsides of their PC cabinets with grounded copper mesh, but this is a bit extreme! The other option is to move your antenna if possible. Most computer interference is received at the antenna, so relocating the antenna may help.

Take a look at Chapter 18 in *The ARRL Handbook*, or pick up a copy of *The ARRL RFI Book* for more suggestions.

Q Charlie Fortner, KF4GJQ, asks, "I've just bought a new digital multimeter (DMM), but I notice that it doesn't measure capacitance or inductance. Is there any way to measure these quantities with a standard DMM?"

A A DMM cannot tell you the inductance of a coil, which is the coil's most important characteristic. If you attempt to measure the coil's *resistance*, you're likely to discover that it is so low that your DMM will read a dead short (zero ohms or something close to it).

By the same token, a DMM cannot divine capacitance directly. If you attempt to measure the resistance of a nonpolarized capacitor, you may see a very quick "bump" in the meter reading as the capacitor charges up to the voltage available across the meter's probes. The DMM should very quickly indicate close to infinite resistance for a good nonpolarized capacitor.

In the case of a polarized capacitor such as an electrolytic, you will probably see more pronounced and prolonged charging activity when you first put the probes across the capacitor (evidenced by a low-resistance reading while the cap charges). The resistance will gradually rise to several hundred thousand ohms when fully charged.

The best approach may be to build outboard adapters that will allow your DMM to measure inductance or capacitance. See page 26.22 in either the 1997 or 1998 editions of *The ARRL Handbook*. If you want a commercial device that's specifically designed to measure inductance and capacitance, you'll need to purchase an LCR meter. LCR meters offer a fair degree of accuracy, but good ones will set you back $200 to $300. That makes the home-brew *Handbook* adapters look pretty attractive!

Q Craig Cochran, N5KYF, asks, "I have a receiver that I like to power with NiCd batteries. But since the radio can operate over a very wide range of supply voltages, the batteries are exhausted before the radio starts to sound weak. (It takes six 'D' cells but seems to work okay down to 4 or 5 V.)

"So, I need to build a circuit that will turn the radio off (disconnect the batteries)when battery voltage drops below about 6 V. I also need a circuit that will not draw much current (the whole idea is to save the batteries!). Could I use a 6-V Zener diode and a switching transistor?"

A If you were going to make a circuit that switched off your radio, the energy to measure the voltage and perform the switching function would come from where? The battery!

It is an ironic fact that any kind of battery indicator ultimately runs the battery down faster than if it weren't there at all. Users of H-Ts who like the security of a built-in battery checker beware! I'm not saying the amount of current drain is significant, but it's there nonetheless.

I think a better approach is to use an indicator that draws very little current and leaves the act of shutting off the radio to you. That way you can at least have a little control over the process.

The lowest current-drawing indicator that I can think of is a single segment of an LCD display. Although it would draw current itself in the act of monitoring the battery voltage, the amount should be miniscule. Just think of how long the LCD watch face on your wristwatch runs off that tiny cell inside.

In the October *QST* there is a also nifty little circuit for monitoring the condition of your battery. It draws very little current. See "A Battery-Voltage Indicator" by Donald G. Varner, WB3CEH, on page 50.

How about an extreme "low tech" approach? It could be something as simple as putting a subminiature momentary contact switch in series with the battery so that it only works for the split second when you press the button. A tiny meter movement could take the reading for you. You could accurately measure the battery voltage and it wouldn't be drawing anything except during the moment you pressed the button. Even then the current drain would be insignificant.

Q James Pirkle, KR4QN, asks, "The National Weather Service has recently started transmitting SAME in the Atlanta area. How can I learn more about this technology?"

A SAME—Specific Area Message Encoding—allows the National Weather Service to broadcast warnings and other weather information for specific counties. You simply program a SAME-compatible radio with the code for your county. Once the radio is programmed, it will remain silent until it hears a bulletin specifically intended for your area.

Of course, the trick is knowing which SAME code to program in your receiver. Fortunately, the National Weather Service has made it easy to get this information on-line. They operate an excellent Web site at **http://www.nws.noaa.gov/nwr/** and they include a table of SAME codes for all counties in the US where the transmissions can be currently received. According to the NWS site, the SAME code for your county (DeKalb) is 013089 and the

NWS station is KEC80 on 162.550 MHz.

If you listen to the actual tones that go out on the air when a weather alert is transmitted, you will hear the familiar long tone first, followed by some short bursts of data that sound like packet information. The first tone is used to activate the "conventional" weather alert radios and the packet-like bursts are the SAME warnings.

At present there is only one manufacturer producing consumer- grade weather radios with the SAME decoder in them, and that is Radio Shack. No doubt other manufacturers will jump on the bandwagon soon.

Q John Duncan, WA5ZVE, asks, "I currently have a 52 foot crank-up tower that is about 5 feet from the back of my house. Additionally, I live on a lot that is about 65 × 110 feet. I am looking at replacing my existing tower with a 72-foot model. I also want to make sure that both my current and future installations are in compliance with the new RF safety regulations. When I read the RF-exposure regulations, I noticed that they require hams to know their peak power, but then they talk about average power and average exposure. I also noticed that there is a 500-W limit on some bands. This appears to mean that I can't run my 1500-W amplifier with either installation and still be in compliance. Did I miss something?"

A Determining RF safety compliance can be confusing, which is why we published the *ARRL RF Exposure Book*. (Please excuse the shameless plug!)

Acutally, there are two power levels that you need to consider. The first is the peak output power to your antenna. This level determines if you need to do a station evaluation. On 160, 80 and 40 meters those stations that run 500 W PEP or less do not have to be evaluated. On 30 meters, the level is 425 W. On 20 meters the level is 225 W, on 15 it is 100 W and on 10 it is 50 W. This doesn't mean that you can't run more power, but greater output *would* require an evaluation.

When you do your evaluation, you can use your average power. To calculate this, start with PEP. Multiply that by the duty factor of the mode you are using: 20% for SSB with no processor, 40% for CW or heavily processed SSB, 100% for RTTY or FM. Multiply that result by the percentage of time you might be transmitting during the averaging period. Let's talk uncontrolled/general public exposure, so we will use 30 minutes. As an example, if you are a high-power conversational CW operator, you should probably use 400 W (1500 W × 40% × $^2/_3$ [20 minutes on out of 30]). From that level, you can do your evaluation.

There are a lot of ways you can do an evaluation. The FCC published Supplement B that has a number of tables. These tables show you how far you need to be from your antenna to comply. For example, on 10 meters, the HF band with the most stringent requirements, if you are running 500 W average power to a typical 3-element Yagi, your neighbors must be 54 feet away from your antenna, diagonally. In your case, they would be, so the dreaded evaluation is over and you just passed! You may have other antennas to analyze but, as an example, again using the simple FCC tables, 500 W average power to a 40-meter dipole requires 6.9 feet separation between the antenna and neighbors. That's an easy "pass," too.

It looks like you can use your amp with either the 50 or 70 foot tower. What you probably can't do, at least with the shorter tower, is transmit a 30-minute continuous carrier at full output on 10 meters. That would require that your neighbors be 95 feet from the antenna, so you can only do it when your neighbors are not standing for 30 minutes on the property line. Of course, there is also the issue of potential damage to your amplifier, your reputation on the air and so forth!

Q Kaehu Shaprio, WH6WW, asks, "I have about 130 feet of $^3/_4$-inch 75-Ω CATV Hardline that I'd like to use for 2 meters and 70 cm. I looked in *The ARRL Antenna Book* and found a description of a broadband transformer, but it's only for 3 to 30 MHz. I also saw an article in the September 1998 *QST* on how to make a matching transformer, but it seems to only work on one frequency or band. Is there another matching transformer I could build so that I could achieve a 50-Ω match to my transceiver on both of these bands at the same time?"

A I do not recommend that you use 75-to-50 Ω transformers in this application. At 2 meters the loss in your CATV Hardline, if perfectly matched, would be 0.8 dB/100 feet, or a total of 1.02 dB. If you operate this line at a 1.5:1 SWR, the additional loss caused by the SWR would be 0.07 dB. It is very unlikely that you could obtain less than 0.07 dB of total loss between two matching transformers—one on each end. Instead of building transformers, why not simply use the Hardline as it is? The SWR on the line will be approximately 1.5:1 and the loss, even at 70 cm, will be negligible. Most likely, your transmitter will be perfectly happy to deliver full power into that load.

Q We have an idea to promote greater participation in our club activities. We'll videotape events (such as contest operations, public service events and so on), use a computer "capture card" and software to digitize and edit short video clips, then post the video clips on our club Web site (as Video for *Windows* AVI files) to show everyone else what they missed. What do you think?

A I think it is a fine idea. In fact, a number of clubs are already doing what you describe. My only suggestion would be to consider another format rather than AVI. As you've probably discovered already, AVI files can be huge. Depending on the frame capture rate and other factors, you could be looking at a *megabyte per second of video*, or even more. A 60-second video clip would be about 60 Mbytes, a big download to say the least!

I'd recommend that you post the clips to your site as MPEG files. MPEG (pronounced EM-pehg), the Moving Picture Experts Group, is actually a committee that evolves standards for digital video and digital audio compression. MPEG-compressed video files are smaller than AVI files, and most of your club members should be able to view them using the *Media Player* bundled with *Windows 95/98*, or by using commonly available shareware viewers. (You could even provide a link on your page for members to download a viewer if they don't already have one.) You don't mention what video editing software you are considering, but make sure it can generate MPEG files. Some of the less expensive video editing packages do not include this feature.

Q Is there software available that will allow me to copy ACARS packet transmissions using my PC's sound card as the analog-to-digital converter?

A For those who may be unfamiliar with the term, ACARS refers to packet data transmissions sent to and from commercial airliners and other ACARS-equipped aircraft. Flight crews use ACARS to report conditions aloft, request information, report minor problems, receive information from their companies and so on.

In the US you'll hear the 2400-baud AM FSK bursts at 131.550 MHz, with 130.025 and 129.125 MHz as alternate frequencies in busy areas. Interest in ACARS monitoring has increased somewhat in recent years because so many hams own radios capable of receiving in the aeronautical band. ACARS transmissions sound like 1200-baud amateur packet, but at a higher audio pitch. The bursts are also much shorter in duration.

The Doctor knows of at least one freeware ACARS decoder for *Windows* that utilizes SoundBlaster-compatible sound cards. It requires a Pentium-class PC, but not a speed-demon computer. The software is known as *WACARS* and you'll find it on the Web at **http://www.mike.mcmail.com/acars.html**.

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, or doctor@arrl.org QST

By Robert H. Johns, W3JIP

Roll Your Own Dipole

Tired of dealing with tricky, convoluted multiband dipoles and **V**s for portable operation? Why not simply wind the excess wire on spools? It makes sense logically—and electrically—as you'll see here!

Although superstitious hams may tell you that coiling wire at the ends of dipole or **V** antenna legs is some how taboo, winding the excess wire on small spools is a convenient and effective way to make antennas that are physically and electrically adjustable.

To make a dipole antenna that can be easily lengthened or shortened, simply wind the unused wire at the ends of the elements onto spools. If you use insulated antenna wire, the coils act as high-impedance chokes that have little effect on the antenna. Uninsulated "end coils" are "blobs of conductor"—small capacitance hats at the ends of the wire elements.

Figure 1 shows a portable dipole with a center insulator and two spools of wire, each containing about 65 feet of insulated, stranded copper wire. By unwinding the proper lengths, a dipole for any band from 6 through 80 meters can be produced. And by configuring the system as an inverted **V**—with the ends close to the ground—it's easy to change bands. "End spooling" also makes it easy to adjust feed points and leg lengths for off-center-fed dipoles.

Construction

Insulated wire is preferred for portable antennas. In addition to increased electrical safety, the insulation minimizes the effects of wet bushes or trees that antenna wires must often pass through. The spools in the photo are from Home Depot, which sells #12 and #14 stranded copper wire in 50 and 100-foot lengths. Smaller spools are available from RadioShack. I prefer the larger spools because they're easier to wind. Three-quarter-inch wooden dowels make good handles and axles, and a short nut-and-bolt makes a crank handle on the outer edge of a spool. A loop of bungee cord wrapped around the spool, as shown in Figure 1, will prevent the wire from unwrapping.

It's convenient to mark the spooled wires so it's easy to determine exactly how much wire has been unwound. I mark each foot with a permanent marker pen, place a black electrical tape "flag" every five feet and a bright yellow numbered flag every 10 feet.

Any reasonable center insulator will do. The one in the photo was made from a small PVC cap.

Inverted V center insulators use a rope or line to support the weight of the antenna elements and the feed line. I use $^1/_8$-inch nylon or polypropylene rope for the main support line (and for the guy lines at the ends of the antenna). I simply throw a line over a high tree branch or other available support to raise the center insulator skyward. Of course, scout the area carefully beforehand and make sure there aren't power lines nearby.

Be sure to attach the guy ropes several feet in from the ends of the antenna elements to allow for easy adjustments and length changes. Figure 2 shows an easy knot to tie for just such an installation. Figure 3 shows variations on what to do with the extra wire. You can stretch it out along the guy rope, fold it back and hang it from the antenna, or run it off to some bush or tree in another direction. The idea is to have it readily accessible from the ground.

Harmonics

For portable operations it'd be nice to have a lower-frequency antenna that can work effectively at higher frequencies. Thanks to the harmonic nature of antennas and amateur bands, these double-duty combos can work on 40 and 15 meters, or 75 and 10 meters, for example. This is possible because half-wave dipoles are reso-

Figure 1—A portable dipole or inverted V antenna. The wire is unrolled from the spools as needed while the rest of the wire remains coiled at the ends. A short transmission-line matching section is connected to the center insulator.

Table 1

Leg Lengths and Resonant Frequencies of Inverted V antennas with Element Ends Approximately Six Feet Above Ground. Numbers in Parentheses are SWRs at the Indicated Frequencies.

Leg length (feet)	*Frequency MHz (SWR) Fundamental*	*3rd Harmonic*	*5th Harmonic*	*7th Harmonic*
21	**10.1 (1.2)**	33.0 (1.3)		
23	9.3 (1.3)	**28.7 (1.6)**		
30	**7.2 (1.2)**	22.2 (1.7)		
31	7.0 (1.3)	**21.5 (1.4)**		
48	4.5 (1.1)	**14.0 (1.2)**	23.6 (1.0)	34.3 (1.2)
53	4.0 (1.0)	12.6 (1.2)	**21.4 (1.0)**	31.1 (1.2)
56	**3.8 (1.1)**	12.0 (1.4)	20.5 (1.2)	**28.4 (1.1)**
64	3.4 (1.1)	10.9 (1.3)	**18.3 (1.2)**	26.4 (1.2)

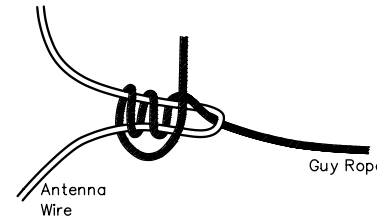


Figure 2—A knot to attach guy ropes to antenna wires.

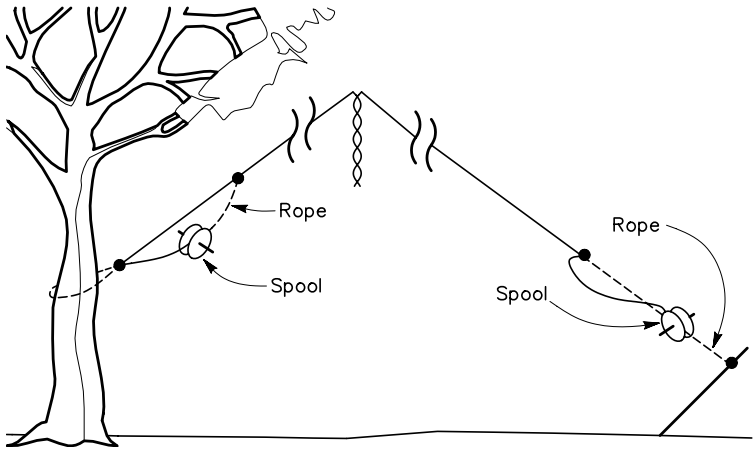


Figure 3—There are several ways to support the element ends. Two methods are shown here.

nant at odd multiples of their fundamental frequencies.

There are, however, two difficulties in using a 40-meter dipole on 15 meters. The 15-meter resonant frequency will be slightly above the band, and the SWR there will be about 2 to 1. An inverted **V** with adjustable end coils takes care of the first problem. Simply lengthen the antenna a bit when going from 40 to 15 meters.

Fixing the high SWR is also possible. A short segment (about 6 feet) of transmission line can be added between the antenna and the 50-Ω coax feed line. Its impedance is probably somewhere between that of the coax and the higher impedance of the 3/2-wavelength antenna on 15 meters. This transmission line is shown in Figure 1. It's a twisted pair of #14 or #12 stranded insulated copper wires with an SO-239 coax connector at the lower end. At the top, each wire is connected to one dipole leg at the center insulator.

I have used many different kinds of wire for these transformer sections, and the insulation type isn't critical. This simple addition reduces the SWR of HF dipoles and **V**s while operating on odd harmonics. See Table 1.

Operation

Table 1 shows leg lengths for three inverted **V**s with fundamental frequencies in or near the 30, 40, and 80-meter bands. The frequencies of the odd harmonics are also shown, as are the SWRs (in parentheses) measured by an MFJ Model 249 Antenna Analyzer. Table 1 is useful for determining leg length changes necessary when switching between fundamental and harmonic frequencies.

For example, if you've been operating in the 40-meter phone band (with your 40-meter **V** or dipole), you would add one foot to each leg to operate on 15 m. The lengths in the table are a starting point. Height and ground conditions at your location will influence your results.

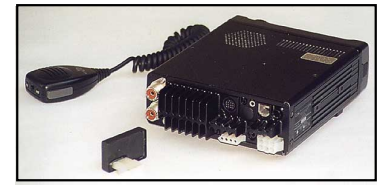
Notice that an 80-meter inverted **V** provides access to five bands with only minor changes in leg length, plus the ability to move anywhere in the 75/80 meter band. The bandwidths of the harmonic bands are very broad.

So, instead of cutting and testing several dipoles for Field Day or your next radio outing, why not "roll your own" truly versatile antenna?

Box 662
Bryn Athyn, PA 19009
ksjohns@mindspring.com

New Products

BETTERRF'S TUNE CONTROL FOR THE IC-706



◊ BetterRF has released a new accessory for the ICOM IC-706 (both the original and MkII versions) that provides a convenient way to instantly activate a low power RF carrier for tuning antennas, antenna tuners or for checking SWR. The Tune Control is a small PC board that simply plugs into the four-pin Molex connector on the back of the transceiver. No radio modifications are required.

A single press of the '706's **TUNE/CALL** button will now switch the transceiver into transmit and provide a steady 10 W RF carrier and a sidetone from the ICOM's internal speaker or your external speaker. Press the button twice more and the radio reverts to its previous mode and power settings.

Tune Control works on 10 through 160 meters. Price: $32.95 plus $3 shipping/handling US and Canada ($8 elsewhere). For more information, contact The BetterRF Co, LLC, 43 Dusty Trail, Placitas, NM 87043; tel 800-653-9910 or 505-771-4000; **http://www.qth.com/BetterRF**.

Next New Product

By Steve Ford, WB8IMY

Hot Keyboards on a Cold Weekend!

Radio excitement is just a *click* away during the ARRL RTTY Roundup.

It's 1800 UTC January 2, 1999. The Holiday Season is over. Colorful decorations have returned to their musty boxes and ill-conceived (but well-intended) gifts have returned to their retail outlets of origin. Your New Year's hangover is a mercifully fading memory. You stare through frosty panes of glass with your hands in your pockets, wondering what in the world you'll do now that life has returned to normal.

You can plunge into the depths of Seasonal Affective Disorder as you watch snowflakes swirl out of slate-gray skies. Or … you can warm yourself up with a contest!

The ARRL RTTY Roundup

The ideal contest for the laid-back operator—or HF digital neophyte—is the ARRL RTTY Roundup. There are a number of HF digital contests throughout the year, but the RTTY Roundup is the most popular.

Despite its name, the RTTY Roundup incorporates *all* HF digital modes, although Baudot RTTY is *numero uno*. When you look at the various modes available, you'll understand why. In any contest the goal is to work the most stations in the least amount of time. Other HF digital modes such as PACTOR, AMTOR, CLOVER, GTOR and packet require stations to synchronize with each other and create *handshaking* links. This means that your rig has to switch rapidly between transmit and receive so that the data signals can go flying back and forth in proper fashion. The result is error-free communication, but it also burns up precious contest time. RTTY, on the other hand, does not use handshaking protocols. There is no error detection—what you see is what you get—and the exchange of information is strictly rapid fire. That's critical during a contest!

The Joy of Steam RTTY

"Steam RTTY," as some affectionately call it, is easy on your brain and your transceiver. Virtually any SSB transceiver ever made can operate RTTY because there is no need for millisecond-quick transmit/receive switching.

RTTY is easy to set up at your station. Without going into mind-numbing detail (that's what books and equipment manuals are for!), you route the receive audio, PTT (push-to-talk) and transmit audio lines from your transceiver to the HF digital decoder of your choice. You can purchase external multimode boxes such as those offered by MFJ, Kantronics, HAL or Timewave. Check the advertising section in this issue, or give your favorite dealer a call. You can take a minimalist approach with a Hamcomm-style interface such as those made by TigerTronics, or you can let your PC's soundcard do the work with software such as *RITTY* or *WriteLog* (both have been reviewed in *QST*).

In Figure 1 you'll see a crude drawing of a crude RTTY setup. The bottom line is that your decoder acts as the middleman between your computer and your radio. It takes the data from your PC and converts it to audio tones for transmission. The decoder also takes the receive audio and converts it to data that the computer can comprehend. Think of it as a radio modem, if you wish.

RTTY is simple to operate.

1. Push TRANSMIT key
2. Type text
3. Push RECEIVE key

This isn't rocket science; anyone of just about any age can do it. Why not enlist some of your more curious friends and family members to help?

RTTY can be delightfully quiet. You'll preserve household harmony by slipping on the headphones and enjoying the musical signals by yourself. No one will mind the gentle clicking of your keyboard. If you begin to hear whispering voices or Michael Bolton songs among the *deedle-deedles*, however, be careful. The persistent babble of RTTY may be disrupting your cerebral cortex. Remove the headphones immediately.

RTTY brings easy gratification. You can earn a certificate in the ARRL RTTY Roundup for making 50 measly contacts. Unless our sun decides to become a premature Red Giant and blast away the ionosphere (along with the rest of the atmosphere), this should be a piece of cake. Of course, should the sun really opt for this type of sudden expansion, contesting will be the least of your concerns.

Contest Tips

If you want to be a RTTY Roundup *winner*, you'll need excellent antennas, veteran contesting skills and lots of free time. Sorry, but I don't meet most of those qualifications, and you probably don't either.

But if you want to have some *fun*, and test the performance of your station and yourself, I do have some tips that may help you!

• Carefully read the RTTY Roundup rules in the December issue of *QST*. The contest begins at 1800 UTC January 2 and ends at 2400

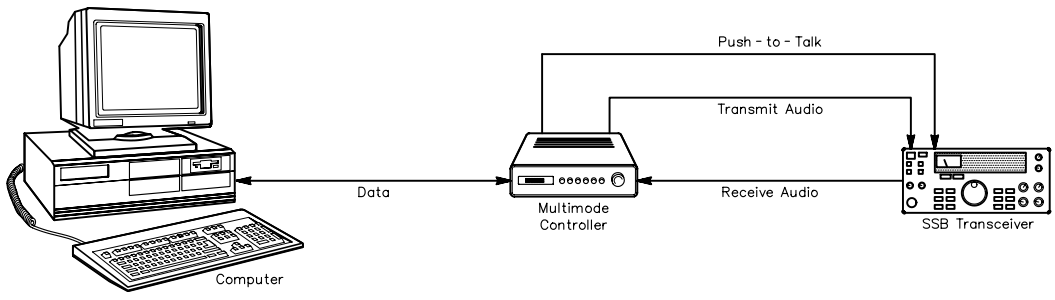
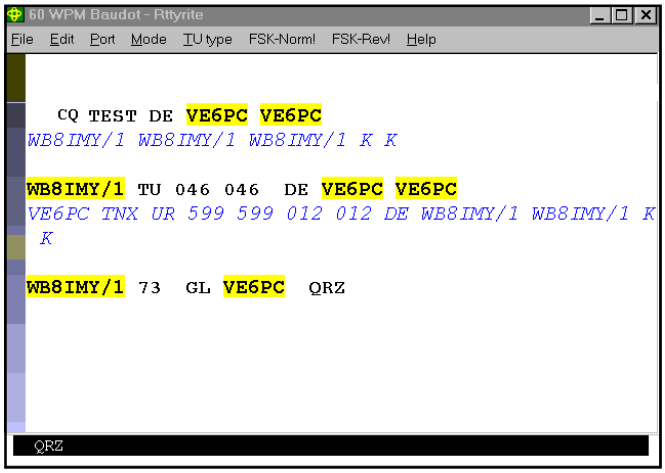
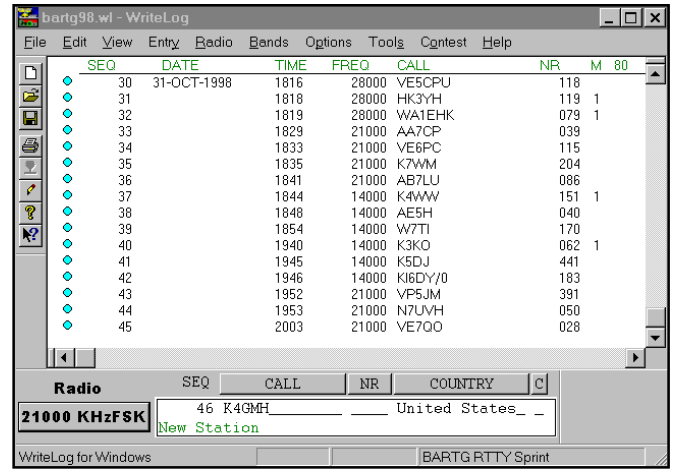


Figure 1—A simplified drawing of a typical HF digital setup using an external multimode controller. (It really isn't much more complicated than this, though!)



RTTY contesting in action! This is an actual exchange I had with VE6PC during the BARTG Contest last October.



Logging software helps maintain your sanity. This is a screen "capture" from *WriteLog*.

UTC January 3. You cannot operate more than 24 hours total, and you must enjoy two documented rest periods. (I told you this was an ideal contest for laid-back hams!) You'll find rules and entry forms on the Web at **http://www.arrl.org/contests/**.

- Since you're already using a computer, you might as well use a logging program. Buy either a contest-logging package, or find shareware on the Web.
- Watch your output power. If you're running RTTY, chop your RF output by about 50% unless your radio (and antenna tuner, if you use one) is rated to handle *continuous* maximum power.
- Use a receive filter if possible. You'll be dealing with a cacophony of signals; you need something to help your hapless decoder separate one transmission from another. Personally, I love narrow IF filters (500 Hz) for RTTY contesting, but not every radio can accommodate them. So, if a narrow IF filter is not in the cards, try an outboard audio filter. Some of the DSP models are outstanding at separating RTTY signals.
- Understand propagation and plan your operation accordingly. For example, 10 meters is probably not the best band to choose at 11 PM Saturday evening. But between about 10 AM and an hour or so after your local sunset, 10 meters may be fertile ground for some quick contest points from throughout the nation and the world. At the opposite end of the HF spectrum, 80 meters is a desert when the sun is shining. During the hours of darkness, however, 80 may be one of your best bands. Twenty meters will probably be open around the clock, but it will also be the most crowded band. Try not to spend all of your time there.

RTTY Contesting Resources on the Web

Multimode Controllers

HAL Communications: **http://www.halcom.com**
Kantronics: **http://www.kantronics.com**
MFJ Enterprises: **http://www.mfjenterprises.com**
SCS: **http://www.scs-ptc.com/**
TigerTronics: **http://www.tigertronics.com**
TimeWave: **http://www.timewave.com**

Software

WF1B (home of the popular *RTTY* contest logger): **http://www.wf1b.com/**
WriteLog (a logger that also sends and receives RTTY): **http://www.contesting.com/writelog/**
N1RCT (an outstanding RTTY Web site with links to *lots* of software) **http://www.megalink.net/~n1rct/**

- Seek ye the *multipliers*. You want to work as many different states and countries as you can. They are the multipliers that boost your overall score. Propagation planning is critical when you're stalking multipliers. If I'm looking for distant West-Coast multipliers, such as stations in California, Oregon or Washington, I'll probably find them on 10 and 15 meters during the daylight hours. I might bag them on 20 meters, although the competition will be greater. For "local" multipliers such as the states nearest me, I may wait until I can visit 80 meters after sunset.
- Get in, exchange signal reports and states, and get out. This is not the time to ragchew. A typical RTTY Roundup exchange looks something like this …

CQ CONTEST CQ CQ CONTEST DE N1RL N1RL N1RL K K

WB8IMY WB8IMY K K

WB8IMY UR 599 599 CT CT QSL?

N1RL TNX UR 599 599 OH OH DE WB8IMY K K

73 QSL ES QRZ DE N1RL K K

Notice that the critical information, such as call signs, signal reports and state abbreviations are repeated. Remember that RTTY does not have error detection. You may need to repeat the information to make sure the other station receives it intact, especially if conditions are poor.

- Don't be afraid to call CQ. If you're a little pistol like me, hunting and pouncing is always best. But sometimes you'll find that you've pounced on every signal on the band. That's when it is time to try a CQ. Just grab a clear spot and let 'er rip! Don't give up after one blast; send several CQs and then change frequency and try again. If you still don't get responses, it may be time to move to another band.
- Don't ignore Novices and Technicians on 10 meters. This is one of my pet peeves. We all want new hams to try HF digital, but when it's contest time where do we operate? Below 28.100 MHz! It doesn't take much effort to spin through 28.100 to 28.150 MHz and work some Novices and Technicians. This is the only chunk of HF digital spectrum they have. Call CQ and see if you can coax a few out of the woodwork.
- Buy a copy of *Your HF Digital Companion* from your dealer or ARRL HQ and read it before the contest. Yes, this is another shameless plug from yours truly. No, I don't receive royalties.

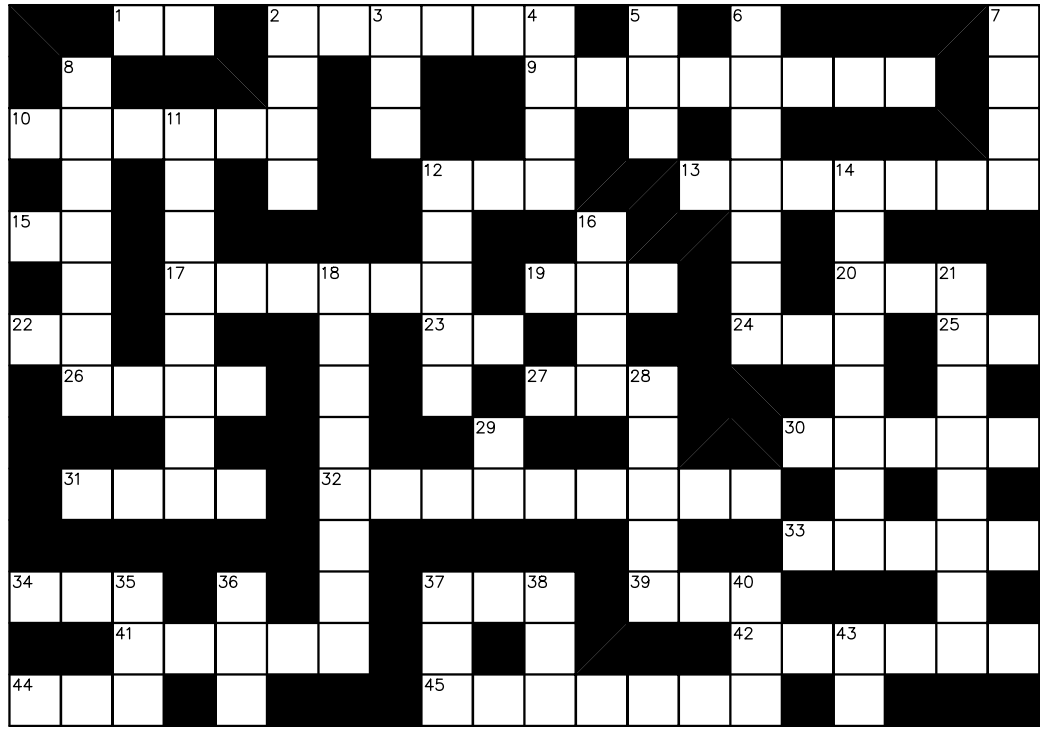
If you're reading this article in mid-December, you have about two weeks to get ready. That's plenty of time to buy a multimode box or RTTY software and work out the inevitable bugs. Make some contacts to get the feel of HF digital operating.

I'll be looking for you January 2. (Especially if you are in Alaska, Hawaii, Delaware, North Dakota … okay, *anywhere!*) QST

By H. Ward Silver, N0AX

Test Your Knowledge!

Bit, Snak, Nybl and Byte—a digital crossword!



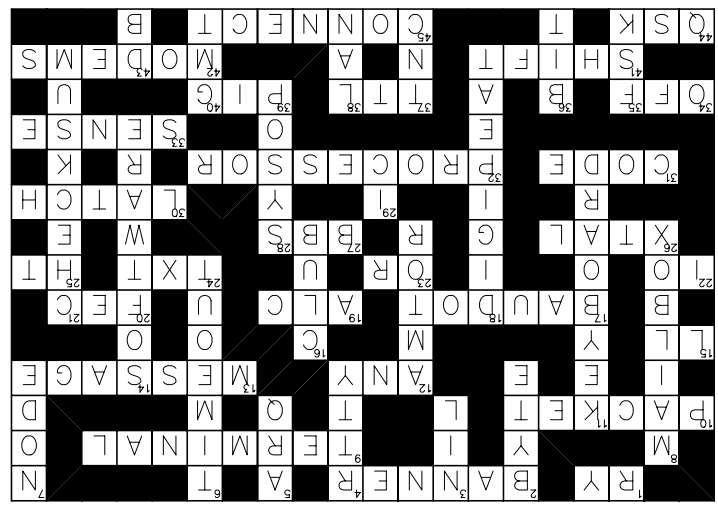
Across

1 Alternating teletype mark-space
2 Sign-on message
9 Dumb device
10 Group of bytes transporting data on a network
12 Opposite of none
13 Passed as "traffic"
15 Landline (abbr)
17 Invented teletype code
19 Controls level automatically (abbr)
20 Allows error correction without retry (abbr)
22 Computer data export
23 Opposite of AND
24 Filename extension for text files
25 Hand-held radio (abbr)
26 The ham's "rock"
27 Bulletins post here (abbr)
30 Captures data
31 Patterns of symbols
32 A micro_____
33 Detect (synonym)
34 Not on
37 Logic family
39 Another type of ham
41 Change from numbers to letters
42 These modulate and demodulate (plural)
44 Full break-in keying (Q-signal)
45 Establish a link

Down

2 A pair of nybls
3 Nothing
4 Oldest electromechanical mode (abbr)
5 Request repeat automatically
6 Too long of a wait
7 Network junction
8 Keeper of message
11 Human data entry device
12 Digital HF mode (abbr)
14 The brains behind the operation
16 Group of enthusiasts
18 Digital relay
21 Error checking calculation
28 The person who runs the system
29 Miniature electronic device (abbr)
35 Encode by changing frequency (abbr)
36 Smallest quantity of information
37 Controller for packet radio (abbr)
38 Wired network (abbr)
40 Olde English time (abbr)
43 Popular type of RS-232 connectors

Answers:



22916-107th Ave SW
Vashon, WA 98070

Edited by **Joe Bottiglieri, AA1GW** • Assistant Technical Editor

The ICOM IC-2100H 2-Meter FM Mobile Transceiver

Reviewed by George Beloin, WA1PIX

I've owned a couple of dual-band mobile rigs over the years. I was very satisfied with them, but rarely used them on 70 cm. In the area of New England where I live, the vast majority of FM activity is still primarily found on 2 meters. Having 70-cm band transceive and the ability to set up for crossband repeat *are* neat features (I actually did operate crossband once), but these are capabilities that I just do not use.

Lately, we've been seeing a trend toward additional band coverage in both the VHF and HF markets. Attractive pricing on the "one band at a time" dual-band VHF/UHF mobiles has led to a noticeable decrease in the street prices of the single-banders. I decided to take full advantage of the present market conditions. Prices on all of the currently available 2-meter FM mobiles seem downright reasonable!

The Selection Process

I decided to begin my radio selection process by making a list of a few of the basic features I consider essentials. Economy was an important factor.

I wanted a radio with a minimum of 50 memories. Radios with fewer memories that I've owned in the past seemed to fill up quickly. Expanded receive capability was also important. I enjoy listening to the commercial and public service communications that are found just to either side of our 2-meter band.

Built in CTCSS decode would be a nice bonus—it can sure come in handy when monitoring shared public service frequencies. Adding this ability later with an optional accessory board can be an expensive proposition. (All of the currently available 2-meter FM mobiles now include CTCSS encode; decode is still an option on some.)

Thumbing through the pages of May 1998 *QST*, I came across a full-page advertisement for the ICOM IC-2100H. As I read through the specifications and the features lists a few points quickly stood out. Here was a 2-meter mobile rig offering 100 "regular" memories, with 13 additional tossed in for things such as call channel and scan edge pairs. The receiver covers 136-174 MHz and CTCSS decode is built in. Power output is rated at 55 W and most of the enclosure is made up of a large integrated heat sink. This radio looked plenty rugged!

Admittedly, these were the first items that caught my eye, but I found the IC-2100H had some additional attractive features as well. Like its predecessor, the IC-2000H, the '2100 has a large easy-to-read display and offers the ability to tag memories with up to 6 alphanumeric characters, a very handy feature for identifying both ham and public service frequencies.

Labels for six of the radio's eight front panel control buttons appear in the lower part of the LCD display, a very nice aid for locating specific controls under limited lighting conditions. The display background color can be toggled between amber and green, and the brightness is adjustable.

Another notable feature shown in the advertisement is the HM-98S multifunction microphone. The mike has well labeled backlit keys that can provide control of most of the radio's capabilities.

This transceiver was definitely in the running. I had a look back through some previous *QST* Product Reviews (incidentally, members can view these on-line on our Members-Only Web site at **http://www.arrl.org/members-only/**) and contacted a few dealers for up-to-the minute pricing on the '2100 and some alternatives. The IC-2100H had the features I wanted and the price seemed very reasonable. It was time to take the plunge.

Luckily, I have a ham radio dealer in my area. I had the opportunity to spend a few minutes playing with a variety of display models before putting down my hard-earned cash. Based on my specific requirements, the information I had gathered from various advertisements and *QST* Product Reviews, my brief evaluation of the display models and some price comparisons, I decided to purchase the IC-2100H. (We purchased a second unit for *ARRL* lab testing and independent evaluation. The performance data appearing in Table 1 is from our product review unit.—*Ed.*)

The Bottom Line

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.

Out of the Box

When I got home and liberated the new radio from its box, I began to wonder how long it would take me to get the rig into some state of operation and maybe even work a repeater or two. I hooked it up to my discone antenna and dc power supply.

Without peeking in the manual, it took about three minutes for me to figure out the basic operations. I decided to skim through the manual so that I could quickly set up some of the more advanced operating parameters. The manual is well organized and the instructions are clear and easy to follow. While I should have spent the time to read it through from cover to cover, I was anxious to get on the air. I'd save that for later.

One programming detail that may confuse some first-time ICOM purchasers is

Table 1
ICOM IC-2100H, serial number 04132

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive, 136-174 MHz; transmit, 144-148 MHz.	Receive, as specified; transmit, 140-150 MHz.
Power requirements: 11.7-15.9 V dc; Receive, 1.0 A (max audio); transmit, 12.0 A (max, high power).	Receive, 0.6 A; transmit, 9.9 A, tested at 13.8 V.
Size (height, width, depth): 1.6×5.5×7.1 inches; weight, 2.6 pounds.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: 12 dB SINAD, 0.18 μV, 144-148 MHz.	For 12 dB SINAD: 0.16 μV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 73 dB*. 10 MHz offset from 146 MHz, 93 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 73 dB.
Spurious response: 60 dB.	IF rejection, 118 dB; image rejection: 85 dB.
Squelch sensitivity: 0.13 μV.	0.08 μV at threshold.
Audio output: >2.4 W at 10% THD into 8 Ω.	2.7 W at 10 % THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output (H / M / L): 55 / 10 / 5 W.	53 / 9.4 / 4.7 W.
Spurious signal and harmonic suppression: ≥60 dB.	66 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 200 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	140 ms.

*Measurement was noise-limited at the value indicated.

the radio's lack of a "function" button for accessing the secondary operations of the front panel's push button controls. On this radio (and most of ICOM's other recent offerings), you simply press and hold a button to activate its secondary function. Many of the features that can be controlled using the front panel controls are also accessible from the microphone keypad. Some control operations performed when using the microphone keys do require using a function button located on the mike's keypad.

First I wanted to adjust the rig's output power to minimum. The available levels are 5, 10 and 55 W. These can be selected with a few quick presses of the front panel **DUP/LOW** button. Three individual dedicated power level buttons are also available on the microphone keypad.

Next thing on my "must do" list was to turn down the brightness of the display. This requires entering the "set" mode. The set mode contains menu items for display brightness and color, individual settings for the CTCSS encode and decode tones, repeater offset, tuning steps and scan resume condition settings. Quick presses of the **LOCK/SET** button cycle through the menu selections. When the appropriate menu title appears in the LCD display you dial up the desired setting using the main tuning knob or step through the choices with the mike **UP** and **DOWN** buttons. I punched up the item titled "DIM" and cranked down the brightness a bit. A quick press of the **SCAN/V/MHZ** button lets you exit the set mode.

A similar "*initial* set mode" menu is accessible by holding the **LOCK/SET** button while turning the power on. This menu includes settings for a time-out timer, automatic repeater offset, automatic power off, DTMF playback speed for autodial and a beep feature for the keys. You'll also find a squelch delay that can help limit some of the annoying squelch cycling that can occur on weak fluctuating signals. You press the **POWER** button to exit the initial set mode.

It was time to try programming some repeater frequencies into the memories. This can be done using the front panel buttons and the tuning dial. You can also enter the frequency digits directly and perform the programming steps using only the microphone keys. The procedure was not particularly intuitive and did send me back to the manual for some additional information. A bit of practice and I had it down pat. I programmed in my three favorites and was eager to get on the air. I'd finish loading it up with more ham and scanning frequencies later.

On each of the repeaters I worked I received good transmit audio reports with no comments such as "Sounds a little tinny." or "Maybe a little more modulation would be nice." The receive audio sounded great and seemed plenty loud enough for my intended mobile application.

This radio was definitely a "keeper." I decided to load up all the memories, tag them with alphanumeric labels, and program some phone numbers into the autodial memories (this unit offers 14!). I settled back in my comfortable chair and gave the manual pages and the programming buttons a good workout.

This more thorough look through the manual turned up some interesting additional features. Some of the more notable ones include automatic scratch-pad memories. In VFO mode, the radio will remember the last three simplex and repeater frequencies you transmitted on. Later you can transfer these back to the VFO, then write them to a regular memory channel.

An unusual feature worth mentioning is "one-touch PTT". When this is activated, a quick press of the PTT button toggles the radio between transmit and receive. While this may be handy in some applications, be careful. This seems like a personal invitation to "open mike night" to me! If you decide to engage this feature, you'll certainly want to activate the unit's "time-out timer" as well. Another feature, "repeater lockout," will prevent the transmitter from engaging if the receiver detects activity on the frequency. You'd no longer be the guilty party in a "double."

For those, *like me*, who enjoy scanning, this radio has more than just loads of memories to offer. There are three scan types: full band scan (136-174 MHz), programmed scan with three sets of programmable scan limits and memory scan with memory channel skip capability. Five different scan resume conditions are selectable from the set menu.

Some scanner enthusiasts may find the lack of AM aircraft receive capability a bit of a disappointment. This was not a major consideration for me.

The built in CTCSS decode board provides tone squelch, pocket beep and tone scan. A priority watch feature is also included that checks for activity on a specific memory channel or your programmed "call" channel while you're in the VFO mode. You can even set it up to watch for activity as it scans through memories while you're in the VFO mode.

PC programming software and cabling and radio to radio cloning cables are available as optional accessories from ICOM. I did all my programming manually. Speaking of optional accessories, ICOM's HM-90 wireless remote control microphone will work with the IC-2100H. A quick release-mobile mounting bracket is also optional. (The radio comes with a bolt on mobile mounting bracket.)

It was time to try this transceiver in the car.

Intermod Rejection

Connecticut has a fairly high population density. In our high-tech society there is a direct correlation between population and RF density. High-powered paging systems and an ever-increasing number of commercial transmitters operating in and near the VHF frequencies can wreak havoc with some receivers, causing them to emit all manner of squeaks and squawks. It's difficult to predict how a particular radio will behave in a specific RF environment. (Nearly anyone who's connected a gain antenna to the average H-T can fill you in on this.)

I decided to take this radio for a ride through my own local "intermod alley." I was totally delighted with the results. Only once did I hear a paging system's beep tones coming in on top of a distant repeater that I was monitoring. Although this is certainly not a scientific test, I commute through this area each workday. For my application, this unit proved plenty intermod resistant!

A look at the ARRL Lab data for the receiver two-tone, third-order IMD dynamic range reveals some very good numbers for 10-MHz offset, and respectable 20 kHz offset performance as well. These specifications are typically good indicators of a radio's overall intermod rejecting capabilities.

ICOM designed the squelch system to automatically engage an increasing amount of attenuation as the squelch control is turned past 12 o'clock. This simple arrangement doesn't significantly affect reception of strong signals, and adds even more intermod fighting capability for local repeater or short range simplex operation.

Some Minor Details

I tend to install and remove the radio from the car on a fairly regular basis. One minor annoyance is the location of the antenna connector and the external speaker jacks. Those nice cooling fins can make installing and removing the connectors a bit tough. Depending on your particular installation, the bottom-firing speaker may be partially blocked. I use an external speaker in my car.

Those wanting to use this radio on 1200-baud packet will find very little discussion of this in the manual, just a brief caution on keeping the squelch delay set to "short." The RJ-45 style microphone connection wiring diagram is included. This probably provides sufficient information for most experienced packeteers.

Overall, I'm very satisfied with my IC-2100H. ICOM has included all the features that I was looking for at a reasonable price. A look at *QST's* previous 2-meter mobile product reviews, including the comparison review that appeared in November 1996 (which features several of the currently available alternatives, but not Alinco's latest model, the DJ-140) will help you determine for yourself how this radio stacks up against the competition.

Manufacturer: ICOM America, Inc, 2380 116th Ave NE, Bellevue, WA 98004, tel 425-454-8155; fax 425-454-1509; **http://www.icomamerica.com**. Manufacturer's suggested retail price: IC-2100H, $244. Typical current street price, $200.

The Alinco DJ-280T and the Pryme PR-222/PR-52 Handheld FM Transceivers

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

The 1.25-meter band has long had a reputation for high priced equipment. Only a relatively small number of the world's hams, those within ITU Region 2 (the Americas), enjoy frequency allocations between 220 and 225 MHz. In Regions 1 and 3 (including the UK, Europe, Asia, Africa, Russia, Australia and New Zealand, to name a few) these frequencies are assigned instead to a variety of commercial, government, broadcasting, aeronautical, radionavigation and location services.

This relatively limited market and the associated reduction in profit potential have conspired to discourage Amateur Radio manufacturers from producing a sufficient volume of 1.25-meter equipment to drive transceiver prices down. Amateur radios manufactured for 2 meters and/or 70 cm will have sales potential in all three ITU regions, making these much more lucrative products.

While many manufacturers will still offer a limited selection of gear for 1.25-meter operators, the uninitiated, especially newly licensed Novices eager to purchase 222 MHz FM equipment, are typically shocked when they see the price difference between these radios and nearly identical transceivers for 2 meters or 70 cm.

With the recent introductions of the DJ-280T from Alinco and the Pryme PR-222 from Premier Communications, Region 2 hams are finally seeing the price of 1.25-meter H-Ts dipping into the range one might even consider "affordable."

The Alinco DJ-280T

The DJ-280T is essentially a 222 MHz version of Alinco's DJ-180/480 single-band 2-meter and 70-cm H-Ts. It shares the same enclosure, battery options and accessory lines. Even the owners manual included with the '280 is written for the '180/480. A one page "*DJ-280 Supplementary Sheet*" provides only an appropriate specifications table.

Two versions are available in the US—the DJ-280T and the DJ-280TH. The T indicates that CTCSS is installed. The H or "high power" version includes a 12 V 700 mAh battery for 4 W output in the high power setting. We purchased the TH version for this review.

The earlier '80 series radios were once very popular models in Alinco's US product line. The 2-meter version first appeared in *QST* ads in the fall of 1992. These ads included a small inset with a picture of a DJ-180 under a car's tire, exemplifying its durability (included, of course, was the requisite "don't try this at home" warranty disclaimer). Since that time, Alinco has released a new generation of 2-meter single-banders. Their current models are the sleek and feature-packed DJ-191T and a similar "stripped down" version, the DJ-190T.

This lineage has led to a radio that, at least by today's standards, might be considered a bit large and mildly unsophisticated.

Perhaps the relative simplicity and the generous dimensions of this "new" H-T are actually blessings in disguise!

Unlike many contemporary hand-held transceivers, actual rotary control knobs are provided for the volume, squelch and frequency encoder. The volume and frequency knobs are nearly $^5/_8$-inch tall and $^3/_8$-inch in diameter. The truncated squelch knob is tucked in close to the BNC antenna connection and has a grooved top surface. It's unlikely that you'll disrupt the squelch setting accidentally. Turn the volume control fully counterclockwise and the power switches off with a distinctive click.

The front panel has a total of 22 push buttons and a small LCD display window. Unlike most modern transceivers, *none* of the 16 buttons that make up the DTMF pad provide access to secondary functions. Even direct frequency entry from this keypad is not available. This leaves only six front panel buttons, a function button and the rotary knobs for controlling all of the radio's various parameters. Each of the remaining six buttons serve a primary and a secondary control function and are clearly labeled with both of their assignments—primary in white, secondary in light blue.

A vertical column of three buttons for the more often-used operations—**LAMP/KL.PL**, **MONI/H/L** and **TONE/MW**—is located just to the right of the DTMF pad. The function button is on the left side of the radio, above the PTT button, and allows activation of the

The Bottom Line

Find an oasis from the crowded conditions on the busy 2-meter and 70-cm frequencies with a visit to 1.25 meters, or expand your horizons with the enhanced propagation you'll find on 6 meters. The Alinco DJ-280T, the Pryme PR-222 or the Pryme PR-52 can take you there—without taking you to the "cleaners!"

Table 2

Alinco DJ-280TH, serial number T000855

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive, 220-225 MHz; transmit, 222-225 MHz.	Receive and transmit, as specified.
Power requirements: 5.5-13.8 V dc; current consumption not specified.	Receive, 0.12 A; transmit, 0.83 A, tested at 13.8 V.
Size (height, width, depth): 7×2.3×1.3 inches; weight, 16.8 ounces.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: 12 dB SINAD, 0.16 μV.	For 12 dB SINAD: 0.19 μV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 223.5 MHz, 64 dB*. 10 MHz offset from 223.5 MHz, 80 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 223.5 MHz, 64 dB.
Spurious response: Not specified.	IF rejection, 103 dB; image rejection: 82 dB.
Squelch sensitivity: Not specified.	0.1 μV at threshold.
Audio output: Not specified.	263 mW at 10% THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output (H, low not specified): 4.5 W†.	3.7 / 0.45 W.
Spurious signal and harmonic suppression: Not specified.	70 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 170 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	50 ms.

*Measurement was noise-limited at the value indicated.
†Current advertising specifies the maximum power output at 4 W.

secondary features. These keys control the display backlighting, keypad and PTT locks, receive monitor, power output level, CTCSS encode and decode and the memory write function.

The three remaining buttons, slightly smaller and partially protected in a recessed area to the right of the display, are **V/M/OFF-SET**, **SCAN/STEP** and **CALL/APO**. These provide access to the VFO or memory, duplex offset, scan, tuning step size, call channel and an automatic power off feature.

The display window is small but the frequency digits are large enough to allow reasonably easy viewing. A single lamp located under the center of the translucent green display background supplies excellent backlighting. Tiny icons are provided for the usual suspects (hi/low power, tone/tone squelch, duplex direction, low battery indicator, memory channel number, etc). No signal strength or relative RF power output metering is included. **BUSY** and **ON AIR** icons indicate receive and transmit.

Most moderately experienced operators should be up and running, at least in the VFO mode, without cracking the manual. Storing frequencies in the memories, while not difficult, will probably require a glance at the manual.

The manual is surprisingly brief, including only about 10 pages of actual programming instructions. The procedures are simple and clearly explained, and once performed, most programming sequences are easy to remember.

One section of the manual that may lead to some confusion involves references to the CTCSS encode and decode capabilities. US versions of this radio come with the "optional" EJ-17U encode and decode board installed. Provisions for programming independent tones for transmit and receive on the same frequency or repeater frequency pair, however, are not included.

The DJ-280 comes with 10 memories. Alinco also offers optional plug-in memory units that replace the included memory board and provide your choice of either 50 or 200 total memories. Installation is easy and instructions are included in the last few pages of the manual.

I've never owned equipment for 222 MHz. It took a few minutes to turn up my worn copy of the *ARRL Repeater Directory* and to program in a sampling of our local repeaters. I set the unit into scan to listen for activity. While I did scare up a handful of contacts over the review period, 1.25-meter activity in this area today is only a fraction of that found on the 2-meter and 70-cm bands. That's quite a change from 20 years ago, I'm told, when the greater Hartford area was a hotbed of 220 activity. Some of these contacts were through repeater systems with links from 1.25 meters to other VHF and UHF bands.

Transmit audio reports were always good. The receive audio level and clarity is plenty adequate for most hand-held use, but as with almost all H-Ts, this unit would benefit from a larger external speaker for mobile applications.

Some of the more advanced features that we've come to expect in the typical example of "new generation" H-Ts are not included on the '280. You won't get direct keypad frequency entry, keypad backlighting, DTMF autodial memories, tone scan, alphanumeric memory naming and tiers of hidden menus loaded with "features" of questionable utility. What you will get is a simple, easy to program, durable and reasonably priced H-T with all the important capabilities included, for a band that definitely deserves more attention.

Manufacturer: Alinco Electronics, 438 Amapola Ave Suite 130, Torrance, CA 90501; tel 310-618-8616; fax 310-618-8758; http://www.alinco.com. Manufacturer's suggested list price: DJ-280T/TH, $250/$280. Typical current street prices, $200/$230.

The Pryme PR-222 and PR-52

Premier Communications first entered the US Amateur radio market about five years ago with a line of accessories. These were soon joined by a 2-meter H-T—the ADI AT-200, and a 2-meter FM mobile—the AR-146.

Since that time, Premier has released a succession of transceivers: a pair of single-band VHF and UHF handhelds—the AT-201 and 400; a dual-band 2-meter/70-cm handheld—the AT-600; and a 70-cm FM mobile—the AR-446. All of these units carry the ADI label. These have earned Premier a reputation for providing radios with good performance and advanced features at a reasonable price.

Premier continues to expand their growing equipment line with the introduction of single-band handhelds for 1.25 and 6 meters. Information on their Web site indicates that the makers of their ADI products also manufacture the Pryme transceivers. The PR-222 and the PR-52 are virtually identical in appearance and features. Let's consider the Pryme PR-222 first.

The Pryme PR-222

The PR-222 1.25-meter FM H-T is a short, stout little handheld. Unlike most of the slim "shirt pocket" H-Ts on the market today, it will stand upright on a desktop with reasonable stability. The included high-power 12 V 600 mAh NiCd battery attaches to the back side of the radio. It's about a 50/50 split of transceiver to battery pack.

On the top of the unit there's a single knob that provides volume and power on/off control. You'll also find external speaker and

Table 3
Pryme PR-222, serial number 000058

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive and transmit, 222-225 MHz.	As specified.
Power requirements: 5.0-16.0 V dc; receive, 25 mA (stand by); transmit, 0.95 A (max, high power) at 13.8 V.	Receive, 0.19 A (max volume, no signal); transmit, 1.1 A, tested at 13.8 V.
Size (height, width, depth): 4.3×2.0×0.8 inches; weight, 14.6 ounces.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: 12 dB SINAD, 0.16 μV.	For 12 dB SINAD: 0.25 μV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 223.5 MHz, 65 dB*. 10 MHz offset from 223.5 MHz, 74 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 223.5 MHz, 65 dB.
Spurious response: Not specified.	IF rejection, 74 dB; image rejection: 41 dB.
Squelch sensitivity: Not specified.	0.17 μV at threshold.
Audio output: 300 mW at 10 % THD into 8 Ω.	405 mW at 10% THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output (H / M / L): 5 / 2.5 / 0.5 W.	5.2 / 2.3 / 0.46 W.
Spurious signal and harmonic suppression: Not specified.	70 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 140 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	160 ms.

*Measurement was noise-limited at the value indicated.

microphone jacks, a BNC antenna connector and an LED transmit/busy indicator. Surprisingly, the microphone jack also serves as the connection point for the battery charger.

On the upper third of the front panel there's a speaker grill with a vertical column of four control buttons along the right edge. The primary function of each is labeled in white just above each key; secondary functions are labeled diagonally to the lower right of the button, in yellow. These buttons are **UP/LOCK**, **DOWN/LAMP**, **CALL/M.S** and **MR/MW**. On the upper left side of the radio, just above the PTT button, is a **FUNC** button that provides access to the secondary functions.

The center section of the front panel contains the display. The display background is a matte gray—the LCD segments appear in black. Light green lamps behind either end of the display panel can be switched on to provide backlighting. Each time you turn on the power, the LCD comes up in a "test mode" activating the backlighting and all the segments. Six rectangular segments along the bottom of the display window make up a bargraph style signal strength and RF power output meter.

The lower third of the front panel contains the typical four-row by four-column DTMF keypad. The large rubberized pushbuttons are mounted nearly flush. This arrangement works very well to prevent your fingertip from accidentally activating neighboring keys. No keypad backlighting is provided.

While in receive, the number buttons (**0-9**) on this keypad can be used to directly enter frequencies. The six remaining buttons—**SAVE/STEP**, **MHz/s/SEL**, **Bz/CHG**, **SFT/COPY**, **MHz▲/F/CH** and **MHz▼/ENT**—control a wide variety of features and programming.

When the radio is in transmit, all 16 of these keys provide the usual DTMF tones. The vertical column of white control keys along the right edge will now activate the DTMF "A," "B," "C" and "D" tones. The two buttons in the bottom row, to the left and right of the **0** button will activate the "*" and "#" tones. These particular keys are only labeled with their primary and secondary control functions, not these DTMF assignments. No provisions for memorizing sequences for DTMF autodialing are included.

A handful of unusual programming sequences and initial setting can make trying to "hack" your way onto the air without breaking out the owner's manual an exercise in futility. This is not to say that the unit is particularly difficult to program. Carefully follow the steps given in the manual and you'll do just fine.

When we first received this radio from the dealer, the box contained both a manual and a one-page addendum sheet covering several corrections. Since that time Premier has put together an updated version of the manual with several additional corrections. If you need a copy of the new manual, or if you wish to look through the manual before you purchase the radio, you can download a copy from their Web site; **http://www.adi-radio.com/**.

Once you charge up the battery and take a quick look through the manual, you'll probably want to start out by deactivating the CTCSS tone squelch function. When you turn the power on for the first time (or after you reset the microprocessor), the unit will come up in the VFO mode at 223.00 MHz (the display will read 23.00, the leading digit is not shown). You'll also notice two display icons, **TONE** and **SQL**, in the upper right of the LCD. These indicate that both CTCSS tone encode and tone *squelch* are on.

Press the **MHz/s/SEL** (*select*) button. The first press will bring up the tuning step size (in kHz). You can change the setting with the **UP** and **DOWN** buttons in the upper right corner of the front panel. This menu item can also be accessed using the **SAVE/STEP** key. A second press of the select button displays the CTCSS encode tone (the default setting is 88.5 Hz, the decimal point is not shown). You can deactivate the transmit tone by using the **UP** or **DOWN** buttons to change this setting to 000. Now—the important one—press the select button a third time. The number now displayed is the CTCSS receive tone—again 88.5 Hz. If you don't start out by deactivating this one, you won't hear any of the signals you receive unless the transmitting station *just happens* to be transmitting a CTCSS tone of 88.5 Hz! Use the **UP** or **DOWN** buttons to set this to 000.

A fourth press of the select button brings up the repeater offset setting. You can change the offset value with the **UP** or **DOWN** buttons, and set the duplex to positive, negative or simplex with the **Bz/CHG** button. You can also access this menu item by holding down the **FUNC** button and pressing the **SFT/COPY** key. Incidentally, for most programming procedures you have a maximum of 5 seconds between each keystoke. If you pause too long the radio reverts to the frequency display mode.

A fifth press of the select button will bring up a setting for DTMF group paging identification. I'll leave it to you to read up on this capability.

If you are in the memory program mode when you enter this select menu, you'll find three additional menu items. These include a "Busy Lock" which will prevent transmitting on an active frequency, a "PTT Lock" which prevents transmission altogether and a "Channel Lockout" for locking a memory channel out in the scan mode. The state of all of these settings can be programmed into any of the unit's 40 memories. You toggle between the VFO and memory mode with the **MR/MW** button.

In VFO mode, to enter a frequency using the keypad be sure to start with **0** for the leading digit. Though this leading digit does not show up in the display when you enter it, it's necessary to include it. When you finish punching in the digits, make sure you press

Table 4
Pryme PR-52, serial number 000086

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive and transmit, 50-54 MHz.	As specified.
Power requirements: 5.0-16.0 V dc; receive, 25 mA (stand by); transmit, 0.95 A (max, high power) at 13.8 V.	Receive, 0.16 A (max volume, no signal); transmit, 0.93 A, tested at 13.8 V.
Size (height, width, depth): 4.3 ×2.0×0.8 inches; weight, 15.4 ounces.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: 12 dB SINAD, 0.16 µV.	For 12 dB SINAD: 0.20 µV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 52 MHz, 67 dB*. 10 MHz offset from 52 MHz, 98 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 52 MHz, 67 dB.
Spurious response: Not specified.	IF rejection, 96 dB; image rejection: >144 dB.
Squelch sensitivity: Not specified.	0.15 µV at threshold.
Audio output: 300 mW at 10 % THD into 8 Ω.	281 mW at 10% THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output (H / M / L): 5 / 2.5 / 0.5 W.	5.8 / 2.8 / 0.57 W.
Spurious signal and harmonic suppression: Not specified.	63 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 150 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	160 ms.

*Measurement was noise-limited at the value indicated.

the **MHz▼/ENT** key to enter the frequency. You can also tune the VFO by your preset frequency step setting using the **UP** and **DOWN** buttons, or by 1 MHz steps by holding in the **FUNC** button and pressing the **MHz▲F/CH** and **MHz▼/ENT** keys. In memory mode, the **UP** and **DOWN** buttons allow you step through the memories.

One notable feature, or lack thereof, is an adjustable squelch. The original manual contained information and adjustment instructions for a menu-based squelch level control. The updated manual does state that the squelch level is fixed.

While there was quite a bit of speculation before the field evaluation concerning the viability of a fixed squelch level, in actual use the preset level seemed to work out very well. It is set sufficiently low to open up on all but the weakest signals, but is still high enough to stay closed on most levels of band noise. Those trying to work extremely weak simplex signals can toggle the squelch off with a **SQL OFF** button conveniently located below the PTT. It worked fine for all our repeater operations.

The available power output levels with the included battery are 1, 2 or 5 W. These are adjusted while transmitting by pressing the **UP** or **DOWN** buttons.

Transmit audio reports on simplex and over repeaters were consistently very good to excellent. Receive audio was clear and the volume level was adequate for most handheld applications. Battery life between recharges was surprisingly good, even when operated at high power. A beep will sound every 5 seconds when the battery is nearly depleted.

Those who take the time to learn this H-T's somewhat unique programming sequences will be richly rewarded. With 40 memories, independent CTCSS encode and decode tones, direct keypad frequency entry and three power output levels, the Pryme PR-222 offers some attractive features for an equally attractive price.

The Pryme PR-52

The Pryme PR-52 6-meter FM H-T is nearly an exact duplicate of the PR-222. The most noticeable difference is its longer 6-meter rubber duck antenna. You'll also find that the antenna connector used on the '52 is a female TNC type (this is very similar to the BNC, but has a threaded outer section instead of the "bayonet" studs). While this connector is not as common as the BNC, it provides firm attachment for the heavier antenna and will probably prove more durable in this application.

The two units share the same manual and programming procedures (so you'll probably want to start out by disabling the CTCSS tone squelch on this transceiver as well!).

While the repeaters on most of our other VHF and UHF bands use fairly standard offset values and duplex directions, you'll find a wide variety in use on 6 meters. Keep a copy of the *ARRL Repeater Directory* handy when trolling for new repeaters.

When directly entering frequencies from the keypad, you will *still* need to enter a leading digit—in this case **0**—before punching in the digits for tens of megahertz, megahertz, etc. For example, if you wish to enter 52.525, you press **0-5-2-5-2-5**—and don't forget to finish with the **MHz▼/ENT** key.

I handed this unit off to one of HQs most experienced 6-meter operators—Pete Budnik, KB1HY.

After some confusion related to the initial CTCSS tone squelch setting (I decided not to warn him), and a short adjustment period to the "unique" programming procedures, Pete began to fall for this little H-T.

He gave the radio quite a workout, operating from his shack, mobile and while hiking. Pete sums it up this way:

"Once I got used to the programming scheme, I found it very easy to program and operate. The 40 memories are more than adequate for loading in lots of repeaters and simplex frequencies. I went a whole week and then some on one battery charge. Just add a mag-mount antenna and it makes a great mobile set-up. I'd give it a 9 out of 10."

It broke his heart to turn it back in…

Several additional accessories for both the PR-222 and the PR-52, including a car cord, a mobile battery charging cable and a *DOS*-based PC programming software and cabling kit should be available shortly. Contact Premier for details.

Distributor: Premier Communications, 480 Apollo Suite E, Brea, CA 92821; tel 714-257-0300; fax 714-257-0600; **premier@adi-radio.com**; **http://www.adi-radio.com/**. Manufacturers suggested list price: PR-222, $299; PR-52, $299. Typical current street price (either model), $220.

FEEDBACK

Due to a measurement error, some of the image rejection figures published in the data tables appearing in *Product Review* in *QST* October 1998 and November 1998 were incorrect. Please note the following corrections:

Alinco DJ-C5T: UHF image rejection, listed as ">144 dB," should have read 67 dB. (See *Alinco's Amazing Credit Card H-Ts*, October 1998, p 74.)

ICOM IC-207: UHF image rejection, listed as ">142 dB," should have read 71 dB.

Kenwood TM-V7A, VHF image rejection, listed as "126 dB," should have read 105 dB.

Kenwood TM-G707, UHF image rejection, listed as ">133 dB," should have read 75 dB.

Yaesu FT-8100: UHF image rejection, listed as ">146 dB," should have read 92 dB.

(See *QST Compares: Dual Band FM Mobile Transceivers*, November 1998, p 62) QST

Hints & Kinks

*Edited by **Bob Schetgen, KU7G** • Senior Assistant Technical Editor*

A USE FOR JUNK-BOX CRYSTALS

◊ If you are like me, your junk box has accumulated, over the years, a variety of surplus crystals of dubious origin and/or value that are too good to throw away, yet seldom end up in any workbench projects. Frustrated with a drifting, low-budget signal generator that simply would not hold a frequency long enough to perform a receiver alignment, I turned to my "rock collection." Somewhere in there was probably a crystal with a harmonic very close to my band of interest, but what a job to find it! Visions of hours spent with a calculator, figuring out harmonics from 1 to *n*, where *n* = "lots" held no appeal. Enter the computer.

Most spreadsheet programs bundled with a computer for the average ham shack are a solution looking for a problem. This, however, might be the exception. Spreadsheets cheerfully calculate harmonics beyond any reasonable application. Furthermore, most spreadsheets have a "sort" function that will arrange our rock collection in ascending order, making it much easier to evaluate the possibilities.

Open a blank spreadsheet, then enter your crystal frequencies in column 1, in the order that they fall out of the jam jar. Use the spreadsheet's sort function to arrange them in ascending order. For the first entry row, create formulas in columns two to whatever you like: R1C1 × 2, R1C1 × 3, etc. Copy the first-row formulas into the remaining rows of your list and you are in business! See Figure 1.

I suggest that you work out the fundamental frequencies of all overtone crystals and enter those frequencies into the spreadsheet. Overtone crystals quite cheerfully oscillate on their fundamental, albeit somewhat low in frequency. If the fundamental is not obvious from the case markings, calculate the fundamental and inscribe it on the case using some relatively permanent means, like a scratch awl. Tack a column onto the end of your spreadsheet for notes like "HC-25, marked 42R525" or suchlike.

In signal-generator service, you will generally want to use the lowest harmonic possible; especially for receiver alignment, where the sensitivity and condition of the patient is unknown. This means visually searching the spreadsheet from lower left to upper right—something you will learn rapidly by doing, rather than reading about it.

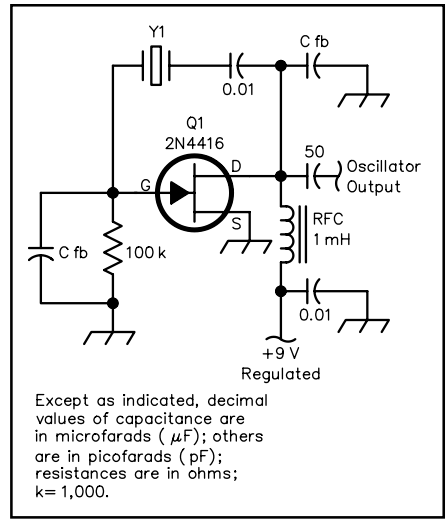


Figure 2—An example crystal oscillator (from *The 1994 ARRL Handbook* Figure 5B, page 10-3). Y1 is a 3.5 to 20 MHz crystal. Cfb should be about 100 pF (possibly greater at lower frequencies). RFC should be self-resonant below the operating frequency.

What kind of oscillator should you use? Just about anything will do, though I consider operation from 100 kHz to about 20 MHz without circuit changes a major bonus. I use the hoary old bipolar Pierce circuit that has shown up in countless QRP projects and ancient *ARRL Handbooks* (see Figure 2). Avoid the temptation to build elaborate oscillator/multiplier contraptions that resemble transmitters more than casual-use test oscillators—I have yet to come across an application where weak signal at the harmonic frequency was an issue. Quite the contrary, actually. What I lack in precisely calibrated attenuators, I make up with physical separation. When you seriously contemplate parking the car, complete with test oscillator, in the next block, you have truly "arrived" in the weak-signal world.

In practical terms, how high can you go? My spreadsheet currently tops out at ×27, a common multiplier in old Motorola boat-anchors. As I write, however, the 81st harmonic of a 16-MHz microprocessor crystal provides a signal source for long-term testing of a failing 1296 MHz rig. The signal isn't very strong, but it is definitely usable and surprisingly stable.

You've examined your rock collection, and it yields nothing even remotely suitable? Check out "The Great Xtal Swap Page" at http://www.chubs.demon.co.uk/xtals.htm and arrange a swap. Better yet, append column 1 from your spreadsheet to an e-mail message and add to the list—the next person to benefit could be me!—*John Kirk, VE6XT, 2029 Third Ave NW, Calgary, AB T2N 0K3, Canada;* ve6xt@amsat.org

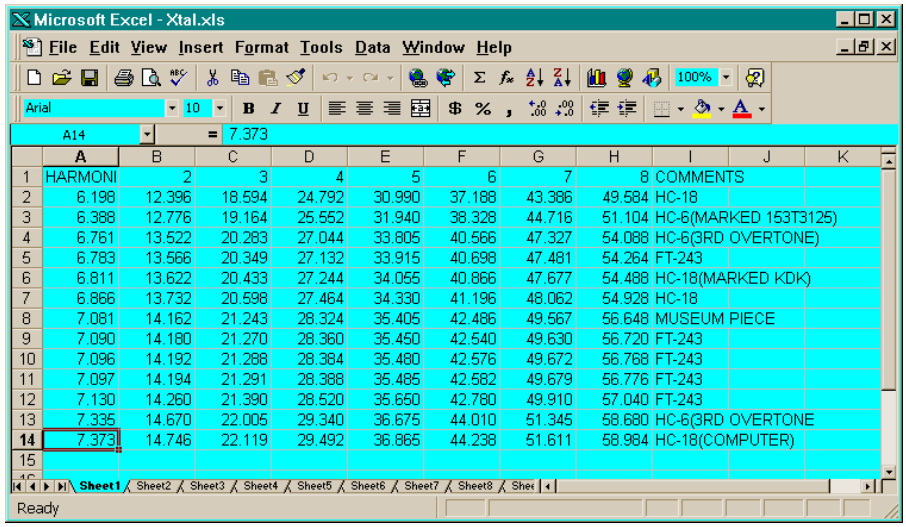


Figure 1—VE6XT's crystal-frequency spreadsheet.

SIMPLIFIED ANTENNA CURRENT MONITORING

◊ In some cases, it is useful to monitor antenna current when adjusting a transmatch.[1] Here's a simple way to add a current monitor to your tuner: Working inside a tuner, a simple one-turn loop at the output antenna connector or the output toroid can pass through the center of a small toroid (eg, a T-37-2). Use about 24 turns of #24 enameled wire for the secondary. Add a germanium diode (1N34, 1N60, etc) and a bypass capacitor to one side of the secondary and run this outside the enclosure to a 0-200 μA meter and a 100 kΩ potentiometer. (Any sensitive meter up to about 1 mA

[1]Maxwell, M. Walter, W2DU, "Another Look At Reflections, Part 7," *QST*, Aug 1976, pp 15-20.

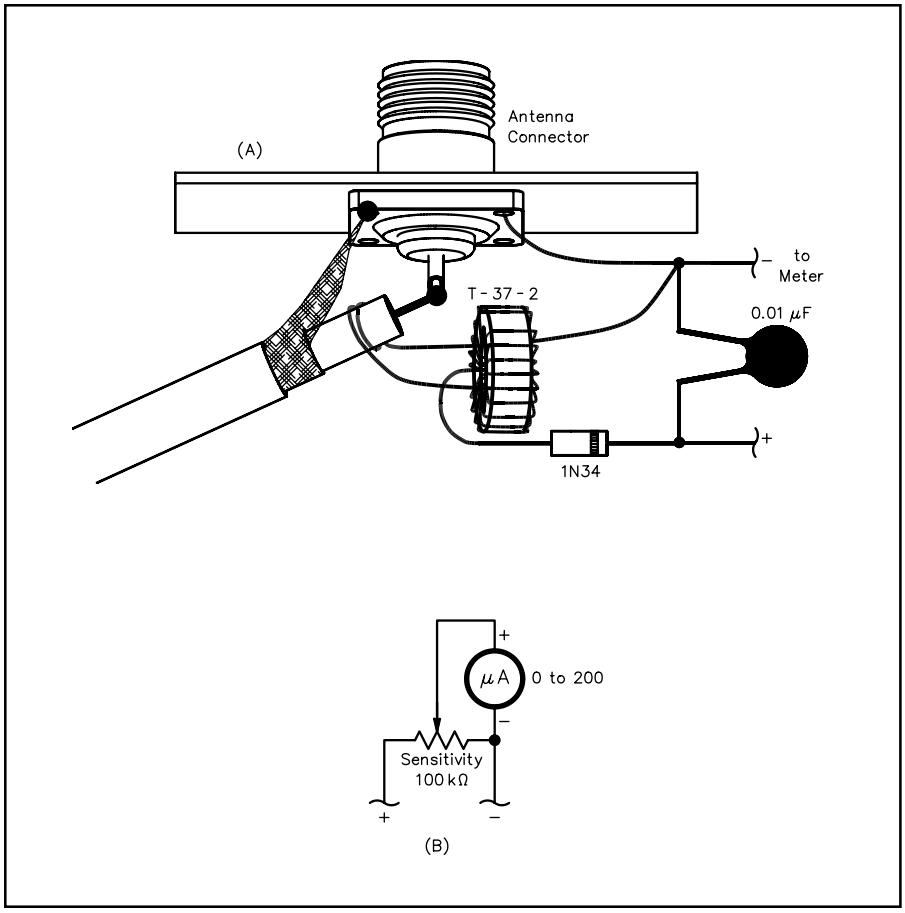


Figure 3—A current monitor installed in an ATU. The darker wire is the primary, with one turn around a coax center conductor and a few turns around a T-37-2 toroid core. The secondary connects to a diode and capacitor that rectify the RF. The dc result is carried to a meter outside the equipment cabinet. B shows the meter circuit used with the sampler. See text for construction details.

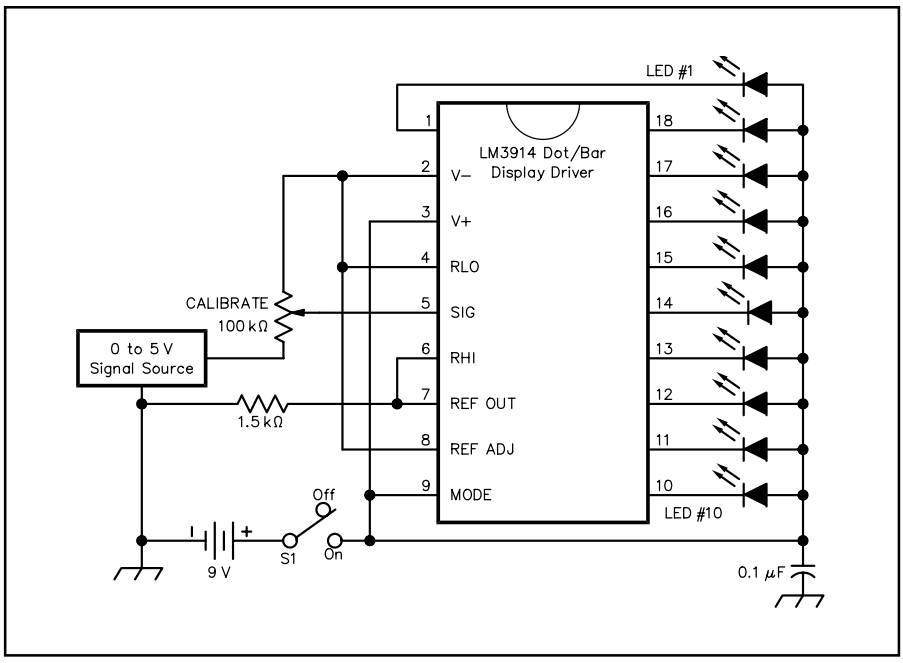


Figure 4—An LED metering circuit that displays the dc sampler output on an LED bar graph. Resistors are 1/4 W, 5%-tolerance carbon composition or metal film units. Equivalent parts may be substituted.

should work just fine.) For simplicity, I glued the potentiometer on the bottom face of the meter. Calibrate the meter by feeding 100 W output to a resonant antenna and marking the needle location. Establish other power levels by reducing transmit power and marking the needle position. Tuner adjustment is now a simple matter of monitoring for maximum antenna current.

An LED circuit can be easily built to show the relative output current. Using an LM3914 IC on a small piece of perf board, this *LED meter* shows up very well in any light, and it works on a dashboard. The LM3914 is nice because it was designed to replace an analog meter, and it is very easy to get working. It does require a battery, however. Figure 4 shows the LM3914 metering circuit.

Mount an 18-pin IC socket on the front of the perf board with pin 1 in the lower left corner. This puts the LED pins on the top going left to right. Also, mount the 100-kΩ potentiometer on the front of the board. Note that this circuit drains about 3 mA, so a battery switch is desirable.

With a current sampler for ATU tune up, I have now eliminated the SWR bridge from my system when mobile and simply tune for maximum output. Since I know that my tuner can provide a match, this setup is adequate.—*Patrick Wintheiser, W0OPW, 12251 S E59th -#106, Bellevue, WA 98006;* Patrick.Wintheiser@PSS.Boeing.com

MORE ON SOLDERING-IRON CONTROL

◊ When editing Jerry Hemby's item for the December, 1998, column (p 62), I added an erroneous description of the power reduction afforded when the diode is in the circuit. Because the diode cuts the duty cycle in half, but the current level remains unchanged when the diode conducts, the soldering-iron power is reduced by 50%, not 75%.—*Ed.*

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 rschetgen@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

Strays

I would like to get in touch with...

◊ Anyone who has a manual/schematic for a Lafayette HE-80 receiver. Morgan Godwin, W4WFL, 166 West 87th St, #901, New York, NY 10024.

Next Stray

Technical Correspondence

*Edited by **Paul Pagel, N1FB** • Senior Assistant Technical Editor*

CALCULATING WIRE LENGTHS FOR WINDING TOROIDS

By Robert Olson, WD4OHD, 6838 Hampton Wood Cir, Hixson, TN 37343

◊ Many "homebrew" projects specify use of toroidal inductors wound on powdered-iron or ferrite cores. The articles usually provide the much-needed information on core types and the number of turns needed to approximate a given value of inductance. However, they don't generally tell you what *length of wire* you need to wind each toroid.

Here's an easy way to calculate the lengths of wire needed for most commonly used toroidal cores with single wire, single layer windings. In Table 1, IPT stands for *inches per turn*. Simply multiply your core's IPT value times the number of turns to be wound on the core and add three inches to the result:

Inches of wire needed =
(IPT×turns) + 3 inches (Eq 1)

Then round off the result to the next-larger number. By using the information given in Table 1 and Eq 1, you'll be able to conserve your supply of enameled wire each time you wind a toroidal inductor.

Table 1

Common Toroidal Core Types	IPT Value	Common Toroidal Core Types	IPT Value
T-12	0.163	T-400	3.050
T-16	0.202	T-400A	4.350
T-20	0.252	T-520	3.720
T-25	0.327	FT-23	0.230
T-30	0.412	FT-37	0.438
T-37	0.426	FT-50	0.595
T-44	0.529	FT-50A	0.688
T-50	0.577	FT-50B	1.188
T-68	0.700	FT-82	0.809
T-80	0.800	FT-87	0.835
T-94	1.006	FT-87A	1.335
T-106	1.364	FT-114	1.045
T-130	1.394	FT-114A	1.070
T-157	1.760	FT-140	1.500
T-184	2.300	FT-140A	1.692
T-200	1.850	FT-150	1.250
T-225	1.950	FT-150A	1.750
T-225A	2.850	FT-193	1.930
T-300	2.080	FT-193A	2.180
T-300A	3.080	FT-240	2.000

USING THE ICOM IC-ML1 WITH YOUR H-T

By Gerd Jerochim, WA7DDT, 1220 6th Ave S, Edmonds WA 98020; **erkmon@nwlink.com**

◊ I recently tried to use my new H-T in my car and found the output power was insufficient to access most of the repeaters I wanted to use. After installing a 2-meter whip antenna on my car, I still could only reach the local repeaters. My solution was simple: Add "boots" (a power amplifier) to the H-T.

I did not want to spend $100 or so to buy a commercial unit and my junk box was running on empty from earlier projects. Fortunately, at a local Mike and Key Club swap meet, I found used amplifiers for $25 to $200 depending on their output power and condition. That was still a little high for my Scotch blood because I only wanted to boost the power level to 10 or 20 W. At one of the tables, I found an ICOM IC-ML1 for $5; the seller was honest, telling me he simply could not get it to work. At that price, the amplifier was too good to pass up! I bought the amp and later found a couple of other ML1s whose sellers had the same story: They could not get the amplifier to work.

After contacting ICOM and examining the service manual, I found the IC-ML1 to be a sophisticated little rig. It requires a driving power of 2.3 W and provides a minimum power output of 10 W. The ML1 also has an automatic power protection circuit (APC) to protect it from high SWR. The unit is designed to run on 13.8 V dc and draws 2 A.

What's the Problem?

A bench test showed the amplifier did not work. After half an hour or so of troubleshooting, I could find nothing wrong! Studying the schematic again, the reason why the amplifier wouldn't work became evident: The ML1 is designed to operate with a ICOM 2AT H-T, which superimposes 5 V dc on its RF output jack. The ML1 uses this voltage to activate the APC circuit, which turns on the amp! Well,

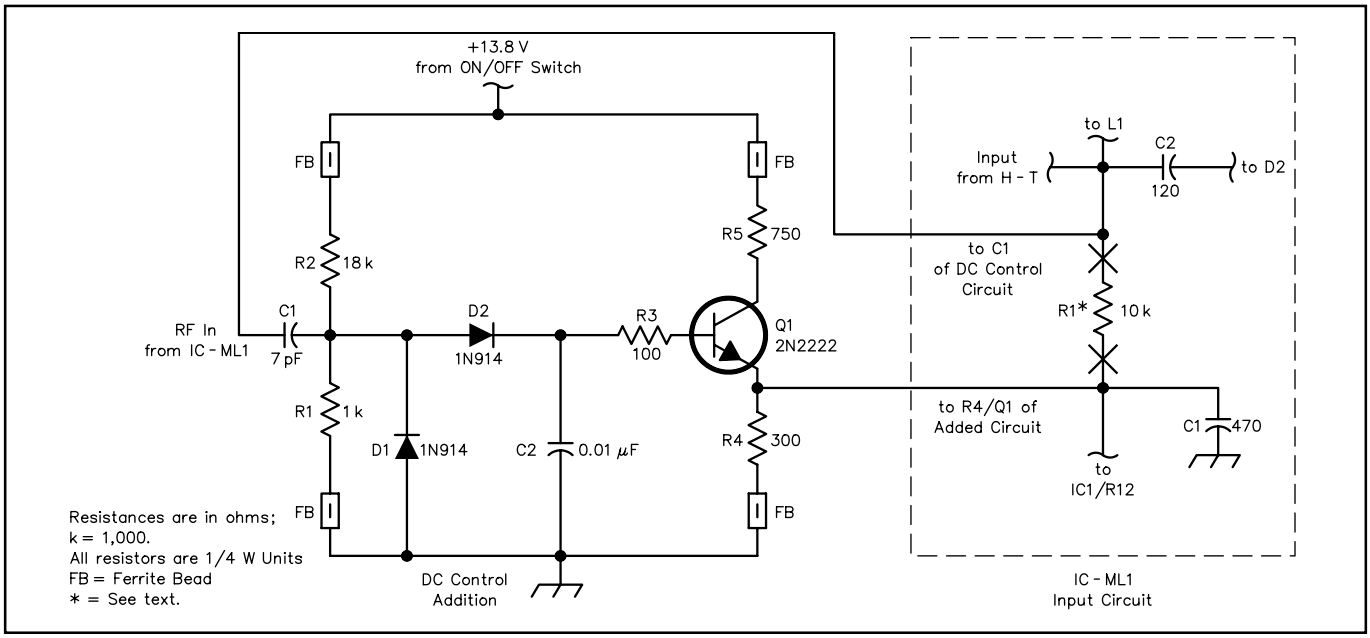


Figure 1—This modification to the ICOM IC-ML1 enables it to be used with virtually any H-T. I removed R1 from the IC-ML1 PC board to prevent loading the APC circuit and allow connection of the dc control circuit. All parts needed for this modification (including the glue) are available at your local RadioShack store.

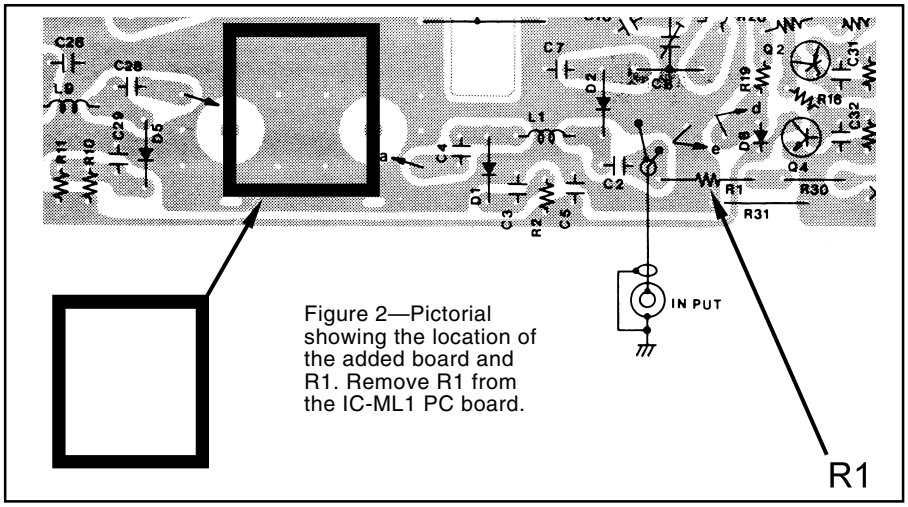


Figure 2—Pictorial showing the location of the added board and R1. Remove R1 from the IC-ML1 PC board.

my H-T (and possibly yours) doesn't deliver the required voltage, so I improvised the circuit shown in Figure 1 and installed it inside the amp. Now I can use my ML1 with virtually *any* low power H-T!

The dc-control circuit occupies a 1×5/8-inch piece of perfboard and sits inside the ML1 above the open area of the PC board next to the power transistor; see Figure 2. A 1/4-inch-long Nylon stand-off glued between the perfboard and the ML1's circuit board prevents shorts. I removed R1 (10 kΩ) in the ML1 to prevent loading the APC circuit. Connecting the dc-control circuit to the amp is simple. The RF sense voltage for the added circuit is taken from the RF-input side of the ML1's R1 position (that point connected to the **RF INPUT** jack and C2). The dc trigger voltage is delivered to the APC end of the ML1's R1 position (the junction of C1 and IC1/R12). Run a short length of wire to the switched side of the ML1's **POWER** switch to derive the 13.8 V needed for the added circuitry. Now, try your boots!

UPS—"UNIVERSAL" POWER SUPPLY

By Robert B. Whitaker, KI5PG, PO Box 1266, Victoria, TX 77902-1266;
rbw@tisd.net

◊ An uninterruptible power supply (UPS) is designed to provide a continuous source of power for a personal computer in the event of an ac-line power failure. With a couple of modifications, these devices can be transformed into a back-up power supply for your ham gear. Here's how you can adapt a UPS to supply 120 V ac and 12 V dc for a wide variety of applications.

All UPSes contain 120 V ac power-line conditioners and surge-protection circuits, a dc-to-ac inverter and a battery. (See Figure 3.) Power-line conditioners protect the equipment attached to the UPS from such irregularities as power-line voltage spikes and surges. The inverter provides 120 V ac power from the battery during power failures. The back-up battery can also be used as a 12 V dc supply for radios and other equipment.

What and Where

Computer salvage dealers and ham- and computerfests are probably the best places to shop for a used UPS. Try calling the service department of some computer dealers and computer-repair services to see what they have on hand. With luck, for a lot less than you'd pay for a new UPS, you may be able to pick up one or more older UPSes in which the battery has failed or were traded in during upgrading. I picked up a number of failed UPSes for a few dollars from a local computer-salvage dealer.[1]

Look for a UPS that can be forced into the inverting mode without needing to be disconnected from an active ac line. Most medium-size UPSes have an on/off switch and a test/alarm disable switch. On the American Power Conversion (APC)[2] UPSes I tested, there are secondary DIP switches labeled **TEST** and **ALARM DISABLE**. On these models, the unit switches to the inverter mode without the need to disconnect it from the ac line. This is accomplished by closing the on/off switch and pressing the **ALARM DISABLE** button. Higher grade UPSes, such as the APC Back-Ups Pro series, have a single on/off power pushbutton. These models can usually be forced into the inverter mode by pressing and holding the pushbutton for a few seconds. (I have a couple of small (250 W) UPSes for my home that have only a single on/off switch. I have not yet discovered the trick for forcing these units into the inverter mode.)

If you have the luxury of picking and choosing among several UPSes, test the units to see if there is any life left in the battery. If the UPS emits a whine from the inverter—even briefly from a dying battery—you probably have a UPS you can work with.

If you have the opportunity, determine what type of back-up battery is used. Most medium or small UPSes use a single 12 V gel cell. Larger UPSes may use two 6 V batteries or two 12 V batteries in a 24 V system. A 12 V system can easily be configured for use with an external standard automotive or deep-cycle battery.

Modifying a UPS

This is an easy job. If the UPS's battery is beyond revival, discard it. (Batteries are considered hazardous materials and must be disposed of properly.—*Ed.*) With the battery removed, test the charging circuit by plugging the UPS into a 120 V ac outlet and checking the voltage at the battery leads. With a 12 V system, the charging voltage should be around 13.85 V. Although you don't have to replace the battery to use the UPS as a line conditioner, you can increase its usefulness by doing so.

[1]ATCI Consultants, 600 S Sherman St #102, Richardson, TX 75081; tel 972-699-9878, fax 972-699-1858; **http://www.dallas.net/~atci**. (Contact Alex Laclette for availability and prices.)

[2]American Power Conversion, 132 Fairgrounds Rd, West Kingston, RI 02892; tel 401-789-5735, fax: 401-789-3710; **apcinfo@apcc.com**; **http://www.apcc.com/**.

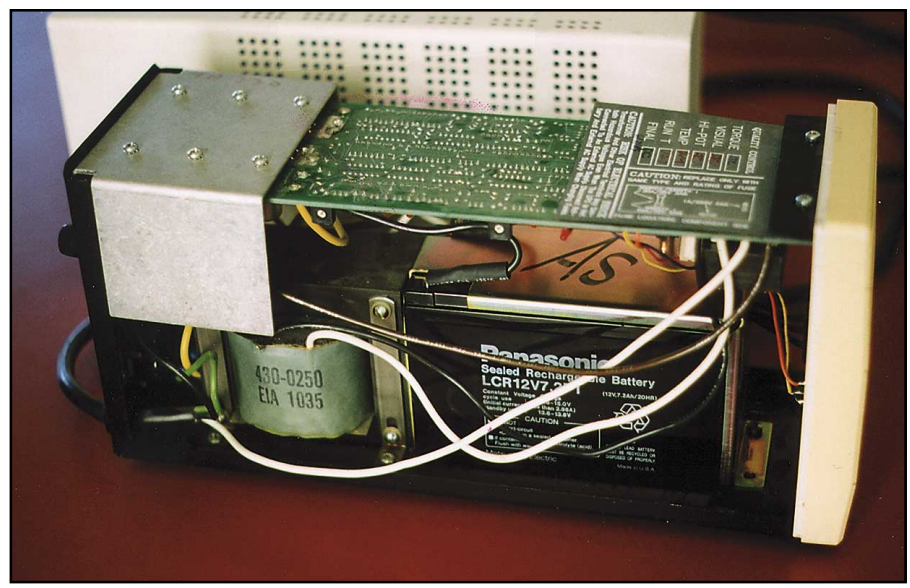


Figure 3—UPS with cover removed to show internal layout. All UPSes have line conditioning components, a battery and a dc-to-ac inverter.

Figure 4—Rear-panel view of a UPS showing an added pair of binding posts and a fuse holder. *Carefully* position and drill the mounting holes for the added components so that you don't damage existing parts. Ensure the placement of the added components will not interfere with existing parts. A Unibit (see "Tool Tips," Technical Correspondence, *QST*, Dec 1998, pp 63.) is ideal for cutting through the 1/8-inch thick steel rear panel.

Used and new replacement batteries are usually not too expensive ($8 to $20). See Table 2 for a short list of suppliers. To attach a battery to the UPS, simply bring the battery-lead connections outside the case. I installed terminal posts on the back panel of my UPS (see Figure 4). To protect the battery from a short circuit, I installed a chassis-mounted fuse holder in series with the 12 V dc positive terminal post. A 15 or 20 A fuse should be sufficient to provide adequate current with a margin of safety at the same time.

Table 2
Replacement-Battery Sources

B. G. Micro
PO Box 280298
Dallas, TX 75228
800-276-2206
http://www.bgmicro.com/

E. H. Yost and Company
2211-D Parview Rd
Middleton, WI 53562
608-831-3443
ehyost@midplains.net

W & W Associates
800 S Broadway
Hicksville, NY 11801
800-221-0732
http://www.wwassociates.com

Many UPSes have a DIP switch, one section of which disables the power-failure alarm. You may want to permanently disable the alarm by unsoldering the alarm or cutting a PC board trace. I opted to leave the alarm in place because it sounds a warning again when the internal battery voltage approaches too low a level.

Tip: Carry extra fuses (taped inside or outside the case) for the 120 V ac input and the 12 V dc output lines. A fuse will likely blow when you don't have any spares—and at the worst possible time! Don't let a careless mistake and blown fuse deprive you of power when you need it the most!

The uninterruptible power supply converted into a universal power supply can be used as a:

- Portable 120 V ac power source using the internal UPS battery
- Portable 12 V dc power source using the internal UPS battery
- 120 V ac power source, with dc for the inverter taken from an external 12 V dc automobile or deep-cycle battery
- Base-station 12 V dc power supply and 120 V ac back-up supply
- Battery charger (12 V) using 120 V ac line input

This power supply is intended for medium-power output for short-term usage. Don't expect the internal-battery-driven inverter or the battery alone to power your 100 W HF rig for a week. You can, however, expect to power your VHF/UHF mobile radio at medium or high power for a day or more during an emergency situation. If you are using an H-T, you probably can operate it on high power for weeks!

Adding a hefty gel cell or deep-cycle marine battery in parallel with—or independently from—the internal back-up battery will prolong the power-delivery cycle. Be sure that you do not draw more power than your UPS's rated output. If you must draw power at or near the rated power output, use a fan to force air inside the case to help dissipate heat.

How Long Will it Last?

A test may help you estimate how long you can expect to use the UPS's battery-driven inverter with a given load. (A 60 W light bulb draws 0.5 A at 120 V. Two parallel-connected 60 W light bulbs will draw 1 A.) Use a voltmeter to record the battery's voltage at the beginning of the test and at intervals of 5 to 15 minutes. Log your data on a graph with the time line along the horizontal (X axis) and the battery voltage along the vertical (Y axis).

Letters for this column may be sent to Technical Correspondence, ARRL, 225 Main St, Newington, CT 06111, or via e-mail to **ppagel@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 a work, please send the author(s) a copy of your comments. The publishers of *QST* assume no responsibility for statements made herein by correspondents. QST

GETTING MORE VOLTAGE OUT OF A REGULATOR IC

(continued from page 45)

as possible compared to the current through R1. For good regulation, the current through R1 must be at least three times the quiescent current.

$$5\ V/R1 > 3 \times I_q \qquad \text{(Eq 2)}$$

The output voltage regulation will be less than obtained when using the regulator in its standard configuration:

$$\Delta V_{OUTMOD} = ((R1+R2)/R1) \times \Delta V_{OUTUNMOD} \qquad \text{(Eq 3)}$$

The LM7805 (the TO-220 case version of the IC) has a *maximum* I_q of 8 mA and a load regulation of 10 mV typical (50 mV maximum). Better regulation requires R1 to have a low value—and that of R2 even lower—which reduces efficiency by increasing the total quiescent current. The resistance values I used are shown in Figure 1B. Although the R1 current is somewhat less than three times the maximum I_q, the circuit works well and the total standby current is increased by only 14 mA. Note that the values I used are not exactly those you obtain from the equations because I used 5%-tolerance resistors. As is often the case, the equations got me in the ballpark, and I tweaked the resistance values until I obtained the voltage I wanted.

No circuit board is required. I soldered the two resistors and monolithic capacitors directly to the IC's leads. Even with a small heat sink on the IC (my application requires a maximum current drain of 300 mA, giving a power dissipation of 2 W), my 9-V regulator easily fits in the battery compartment of my radio.

Notes

[1] *Editor's Note:* Voltage regulators are available from Digi-Key and other suppliers. The 7809 is a 9 V, 1 A regulator in a TO-220 case. (Digi-Key Corp, 701 Brooks Ave S, Thief River Falls, MN 56701-0677; tel 800-344-4539, 218-681-6674; fax 218-681-3380; http://www.digikey.com.)

[2] There must be at least a 1.5 V differential between the input and output voltages to maintain regulation.

Sam Ulbing, N4UAU, has a BEE (1964) and an MBA from Cornell University. He has contributed a number of project articles to QST, QEX *and* 73 Amateur Radio Today Magazine. *Most of these articles have described low-power, 12-V-based projects because Sam is one of the growing number of sailors who take their ham gear along while sailing. A recent* QST *article of his,* which describes a project used to increase the voltage available from a battery, is popular with many boating hams who use their laptop computers aboard ship. When Sam's not on his boat, you can contact him at 5200 NW 43rd St, Suite 102-177, Gainesville, FL 32606;* **n4uau@afn.org**.

*Sam Ulbing, N4UAU, "My All-Purpose Voltage Booster," QST, Jul 1997, pp 40-43. QST

Edited by **Rick Lindquist, N1RL** • Senior News Editor

Ballots Counted in ARRL Board Races

Two incumbent ARRL directors and three incumbent vice directors were among the successful candidates for contested seats on the ARRL Board of Directors. In addition, two new vice directors were elected as ballots were tallied November 20 at League Headquarters. (See sidebar, "Board of Directors Balloting," for the vote tally for each candidate.) More than 27,000 ballots were received from members.

Retaining their ARRL Board seats were Central Division Director Edmond A. Metzger, W9PRN, and West Gulf Division Director Jim Haynie, W5JBP.

Metzger outpolled two other candidates—Henry B. Ruh, KB9FO, and Richard David Klatzco Jr, N9TQA. Incumbent Central Division Vice Director Howard S. Huntington, K9KM, beat back a challenge from Mike Hoshiko, W9CJW. Metzger and Huntington will serve two-year terms.

Haynie successfully overcame a challenge from Lawrence S. Higgins, W5UQ, but the West Gulf Division will have a new vice director. Oklahoma Section Manager Coy C. Day, N5OK, defeated incumbent vice director Barney J. Boone, KJ5AE. Haynie and Day will serve three-year terms.

Day says he was surprised and elated to get the call from ARRL President Rod Stafford, W6ROD, that he'd been elected. First licensed in 1957 as K5LMG, Day's been known as N5OK since 1976.

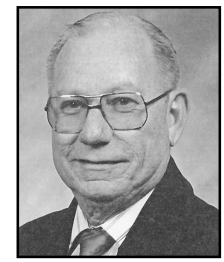
RICK LINDQUIST, N1RL

ARRL HQ staff members Margie Bourgoin, KB1DCO (left) and Frances Bramon were among those who helped open and count the more than 27,000 ballots for contested director and vice director seats.

"In my early days in Oklahoma City, I was active with the ARRL as an Official Relay Station, Official Bulletin Station and as an Official Observer," he said. He's also served as an Emergency Coordinator and repeater trustee and has been instrumental in forming a couple of clubs. Three years ago, after his retirement as an Air National Guard Commander, Day and his wife, Judy, relocated to Union City, Oklahoma, where he is the currently the deputy director and communications officer for the Union City Civil Defense Office.

An avid DXer, DXCC Honor Roll member, and past president of the Oklahoma DX Association, Day also is an active contester. He's a life member of the ARRL and also a QCWA member, as well as an ARRL Volunteer Examiner and Instructor. His children, Edie and Clif are amateurs—WB5YHG and WB5TFM, respectively—"and I'm working on the grandchildren," he reports.

Day says communication is his top priority, and he plans to work closely with Haynie in keeping in touch with members throughout the division. "Jim is a good friend and I plan on supporting him to the fullest," he said. Day says he'd like to develop a Web site for the Division similar to the one that he's found to be successful in the Oklahoma section (**http://www.telepath.com/n5ok/**). Since a vice director cannot also be a Section Manager, a replacement for Day will be appointed to complete his current term.



West Gulf Vice-Director elect Coy Day, N5OK

There's also a new vice director in the Rocky Mountain Division, but he's not a newcomer. Current Rocky Mountain Director Marshall Quiat, AG0X, outpolled Marvin C. Zitting, W7MR, for the vice director's slot. Quiat effectively swapped places with current Vice Director Walt Stinson, W0CP, who ran unopposed for the Director's slot. Stinson and Quiat will serve three-year terms.

Incumbent vice directors also won their races in the New England and Northwestern divisions. In the New England Division, Michael Raisbeck, K1TWF, defeated Andrea T. Parker, K1WLX, for a two-year term. Raisbeck was appointed last June to complete the remainder of the term of former Vice Director Don Haney, W9WW (ex-KA1T), who resigned when he moved out of the division. In the Northwestern Division, sitting Vice Director Greg Milnes, W7AGQ, defeated Mary E. Lewis, W7QGP, for a two-year term.

Board of Directors Balloting

The ARRL Committee of Tellers for the election of directors and vice directors met at ARRL Headquarters November 20 to count ballots. Here are the results. In each case, the candidate receiving the greatest number of votes was declared elected. Terms begin at noon January 1, 1999.

Central Division, director, two-year term:
Edmond A. Metzger, W9PRN, 1846
Henry B. Ruh, KB9FO, 1468
R. David Klatzco Jr, N9TQA, 1297

Central Division, vice director, two-year term:
Howard S. Huntington, K9KM, 2748
Mike Hoshiko, W9CJW, 1849

New England Division, vice director, two-year term:
Michael Raisbeck, K1TWF, 2469
Andrea T. Parker, K1WLX, 1463

Northwestern Division, vice director, two-year term:
Greg Milnes, W7AGQ, 2930
Mary E. Lewis, W7QGP, 1609

Rocky Mountain Division, vice director, three-year term:
Marshall Quiat, AG0X, 1391
Marvin C. Zitting, W7MR, 816

West Gulf Division, director, three-year term:
Jim Haynie, W5JBP, 2113
Lawrence S. Higgins, W5UQ, 1602

West Gulf Division, vice director, three-year term:
Coy C. Day, N5OK, 2330
Barney J. Boone, KJ5AE, 1346

FCC CRACKS ITS ENFORCEMENT WHIP

The FCC's renewed Amateur Radio enforcement initiative, begun last fall, has yielded some early results. In its most prominent action, the FCC levied a $7500 fine on a New Jersey ham who allegedly interfered with a net operation on 40 meter SSB. James C. Thompson, KA2YBP, of Waretown also was ordered off 40 meters until further notice after the October 18 incident. The case against Thompson, 58, stemmed from interference complaints from other amateurs, including the Association of North American Radio Clubs (ANARC), which conducts a Sunday morning net on 7240 kHz.

The FCC charged Thompson with illegally retransmitting programs from a Standard Broadcast (AM) station on 40 meters and willfully interfering with the net. The FCC also said Thompson failed to properly identify.

FCC personnel used a combination of long-range and local monitoring and tracking to zero in on Thompson's QTH as the source of the interfering signal, then conducted an inspection of Thompson's station. FCC officials found an AM receiver "positioned adjacent to the Amateur station's microphone and tuned to 1450 kHz," the FCC said.

The FCC issued an Official Notice of Violation October 21. In replying to the NOV, Thompson admitted the violations, the FCC said November 9 when it issued the Notice of Apparent Liability. Thompson had 30 days to pay the fine or appeal it.

The Thompson case marked the Commission's first amateur enforcement action since the FCC announced it would consolidate amateur enforcement within the Compliance and Information Bureau. The FCC's point man in the war against Amateur Radio scofflaws, Riley Hollingsworth, K4ZDH, urged hams to keep the enforcement calls coming. By the first week of November, Hollingsworth reported having received 118 calls on the FCC's Amateur Enforcement Line, 202-418-1184.

Other complaints now in the works could lead to enforcement action, said Hollingsworth, who remains upbeat about the prospects of improving the FCC's admittedly dismal enforcement record. "I really think we can get there," he said.

The FCC has beefed up enforcement on other fronts as well, and at least three hams face citations for non-amateur violations. In early November, the FCC named two hams among the operators of four unauthorized HF broadcasting operations in Massachusetts, Illinois, Texas, and California—all transmitting on 6955 kHz. An FCC official identified the two hams as 41-year-old Richard F. Jurrens, KC5RGK, a Technician licensee who lives in Katy, Texas, and 46-year-old Henry Lee Landsberg, WB6MEU, an Advanced class licensee who lives in Sierra Madre, California. The names of the others cited still were being withheld as of press time.

The amateur licenses were "in jeopardy," the FCC official said.

The busts, coordinated out of the FCC's Columbia, Maryland, Operations Center, involved on-site visits by FCC agents from the Boston, Chicago, Houston and Los Angeles offices.

Also in November, the FCC and the FBI announced the arrest of a Georgia ham for allegedly interfering with radio communication between aircraft and air traffic controllers in Northern Georgia. An FBI statement said that Kevin M. Kelly, N2BYE, an Advanced class licensee, was arrested without incident at his Cumming, Georgia, home by FBI agents accompanied by FAA and FCC agents. The arrest followed a search of Kelly's residence. The FBI described Kelly, 46, as "a highly experienced electronics engineer" who was said to have been "extremely upset" about air traffic noise above his home.

2000 METERS AND UP? ARRL PETITIONS FOR LF BANDS

The ARRL has petitioned the FCC to create two low-frequency Amateur Radio allocations at 136 kHz and at 160 kHz. "These allocations will permit experimentation with equipment, antennas, and propagation phenomena in a small segment of the radio spectrum that has not been available to the Amateur Service for many years," said the League's petition, filed with the FCC October 22.

Specifically, the League has proposed permitting CW, SSB, RTTY/data, and image emissions for amateurs in a 2.1-kHz "sliver band" from 135.7 to 137.8 kHz and in a 30-kHz segment from 160 to 190 kHz. The 135.7 to 137.8 kHz band adheres to the European Conference of Postal and Telecommunications Administrations (CEPT) band plan.

The ARRL has proposed allowing a transmitter output in both LF segments of 200 W PEP, but in no case greater than 2 W EIRP (effective isotropic radiated power). The League's petition points out that poor antenna efficiencies and ground-loss characteristics likely would keep EIRPs at less than 1 W. The two bands would be available to General and higher licensees.

Unlicensed experimenters—some of them hams—currently operate on LF in the US under the FCC's Part 15 rules. These limit transmitter input power to 1 W and impose substantial restrictions on the size of the antenna. The proposed allocations "will provide the only low-frequency allocation for amateur use and will accommodate more flexible experimentation than is permitted under current Part 15 regulations," the League's filing said.

Hams would be secondary to the Fixed and Maritime Mobile services in the 136-kHz allocation, and secondary to the Fixed Service in the 160-190 kHz band. The League said its engineering surveys suggest that hams could operate in the two segments without causing problems to power line carrier (PLC) systems already active in that vicinity or to government assignments. Unallocated, Part 15 PLC systems are used by electric utilities to send control signals, data and voice.

Calculations included with the League's filing demonstrate how inefficient even relatively large radiators can be on LF (136 kHz is approximately 2205 meters). For example, at 200 W TPO (transmitter power output) and a 200 foot vertical radiator, efficiency is only in the range of 1%, yielding up to 2 W EIRP. A more practical setup—200 W TPO into a 100-foot vertical radiator (efficiency of 0.2%) would yield an EIRP of between 100 and 400 mW.

Several countries throughout the world already enjoy LF allocations.

The article "Exploring 136 kHz" by Peter Dodd, G3LDO, in the November 1998 *QST*, discusses practical equipment and an antenna system for the allocation. Dodd also is the editor of the *LF Experimenter's Source Book* (2nd ed) published by the RSGB and available from the ARRL.

A copy of the ARRL petition is available on *ARRLWeb*, **http://www.arrl.org/announce/lf-pet.pdf.**

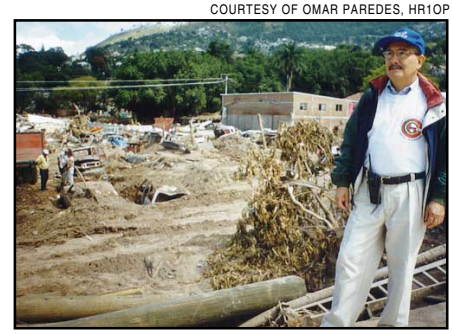
AMATEUR RADIO PROVIDES CENTRAL AMERICAN LIFELINE

Ham radio has been playing a major role in rescue and relief efforts in storm-ravaged Central America. Hams throughout the US were reported active handling health-and-welfare traffic to and from Honduras and Nicaragua, both of which suffered death and devastation as a result of Hurricane Mitch. The storm left more than 10,000 dead and one million homeless in Honduras, Nicaragua, Costa Rica and Guatemala and destroyed much of the communications and public utilities infrastructure.

ARRL radio gear that saw service several years ago in Puerto Rico after Hurricane Hugo and in Hawaii after Hurricane Iniki was rushed to Honduras. Portable and mobile VHF transceivers shipped by the ARRL arrived in mid-November in the flood-stricken nation to help in the ongoing relief effort.

"Thank you for all your support and help on this great ordeal our country has been forced to undertake," said Omar Paredes,

COURTESY OF OMAR PAREDES, HR1OP



Omar Paredes, HR1OP, equipped with an ARRL-provided H-T, views the devastation in the Barrio Abajo area of downtown Tegucigalpa. Where houses once stood is now sand, mud, cars and debris. Parque la Concordia, where generations of Honduran children played, is gone.

HR1OP, in an e-mail message to ARRL Headquarters. Paredes is secretary of the Club de Radio Aficionados Central de Honduras (CRACH) in Tegucigalpa, which accepted the equipment. The shipment included several VHF hand-held transceivers plus two VHF mobile-base transceivers.

"We have installed all the base radios in communities where they are being of great help," Paredes added.

Hams in Honduras who still have operational stations or gear have been using Amateur Radio to maintain communication. "We are working very hard trying to provide communication within our country as well as with families abroad that need to know about their relatives," Paredes said. Stations in Honduras have been operating from batteries or gasoline generators.

The League also sent a 2-meter repeater, duplexer and antenna to a club in La Ceiba to restore communication between the mainland and the islands of Roatan and Guanaja. The equipment is part of the League's disaster communications inventory.

As the storm approached and then stalled off the Central America coast, the Hurricane Watch Net initiated around-the-clock sessions to keep track of the Hurricane.

Relief agencies from the US and elsewhere have been undertaking massive efforts to feed, clothe, and shelter the thousands of flood victims, and some agencies have been making use of Amateur Radio for communication. The Salvation Army Team Emergency Radio Network (SATERN) has been providing an information service to help families search for missing relatives, relaying information between Central and North America. SATERN also has been handling logistical and emergency needs traffic. The Texas Baptist Men relief group is coordinating its efforts via ham radio in Nicaragua and Honduras.

At one point, the FCC declared the SATERN 14.265 MHz frequency off-limits for several days to hams who were not involved in handling emergency traffic.

Lidice Paredes, HR1LPS/W4, in Miami, has been in touch with her brother, HR1OP, on a regular 20-meter schedule. "Every day is worse," she said of the news was getting from home via ham radio in early November. "The city is in complete devastation." Potable water was in very short supply. Flooding and mudslides isolated some residents. Others were still awaiting rescue from trees and rooftops days after the storm passed.

"A lot of ham radio operators lost their homes, their equipment," Lidice Paredes said, but hams like her brother who remained on the air were attempting to coordinate the disaster response. "It has not been very easy. It's taking a long time," she said.

The disaster revived the phone patch in this Internet era. "Since my involvement, I've handled about 10 phone patches between the folks in Honduras and various places from Maine to Washington state," said Harry Bryant, AA2WN, in New Jersey, who was active on SATERN. Charles Lassiter, KD5AHW, in Texas, reports that he and Bob Sanford, KC5SMC, relayed traffic to and from the Mercy Ships/Mercy Ministries in Tyler, Texas, to their orphanage and mission in Honduras.

The America Radio Club in Miami reports it was asked by the Consul of Honduras to assist with health-and-welfare traffic.

On its home page, HRN, "The Voice of Honduras" broadcasting system, declares in Spanish: "SOS to the world! Honduras needs your help!" The site, **http://www.hrnradio.com/index.htm**, contains numerous images of the destruction and suffering in Honduras.

CLARK MAGNESS, NI1U, SK

Clark Magness, NI1U, of Guilford, Connecticut, died November 7 after a long illness. He was 47. Magness had served as Connecticut SEC since 1991 and had been an ARRL member for 16 years. "He was a dedicated ARRL volunteer who did a lot to develop the ARES program here in the state," said ARRL Field Services Manager Rick Palm, K1CE. Connecticut Section Manager Betsey Doane, K1EIC, expressed her sadness at Magness' passing. "His life was certainly a wonderful gift to all of us," she said.

SECTION MANAGER ELECTION RESULTS

Ballots have been counted in contested section manager races, and Missouri has a new section manager. Charles Boyd, KE0K, edged out John Seals, WR0R, 579 to 508 votes, to replace Roger Volk, K0GOB, who decided not to run for another term as Missouri SM. The only other contested race was in the Southern New Jersey section, where incumbent Jean Priestley, KA2YKN, defeated T. J. "Skip" Arey, N2EI, 463 to 243.

Candidates in six other sections, all incumbents, ran unopposed and were declared elected. They are Lawrence Ober, W1MW, Eastern Massachusetts; Bill McCollum, KE0XQ, Nebraska; George Tranos, N2GA, New York/Long Island; Leslie Schmarder, WA2AEA, Northern New York; Leslie Shattuck Sr, K4NK, South Carolina; William Edgar, N3LLR, Western Pennsylvania

All elected candidates take office January 1, 1999.

SPUTNIK 41/RS-18 LAUNCHED FROM *MIR*

Russian cosmonauts launched another mini-Sputnik satellite November 10 during a spacewalk from the *Mir* space station. The launch of Sputnik 41—also being called RS-18—came just over a year after the launch of Sputnik 40, which commemorated the launch of the first artificial Earth satellite by the USSR in 1957.

Following the launch, reports poured in from around the world from those who were able to monitor the spacecraft's 2-meter voice and tone transmissions. Some reported they were able to copy Sputnik 41/RS-18 on a hand-held transceiver.

The Sputnik had arrived on *Mir* aboard a Progress supply rocket in late October. *Sputnik 41* was financed by the *Aeroclub de France* to mark its centennial as part of a program of satellites made in a collaboration of Russian and French students. AMSAT-France cooperated with the education department of the Russian Aeronautic Federation to make this latest Sputnik reprise possible.

Sputnik 41 broadcasts pre-recorded voice greetings in three languages, French, English, and Russian. One, read by 14-year-old Constantin Sambourov, declares in Russian-accented English: "1998 was the International Year of Air and Space." Sambourov is the son of Sergei Sambourov, RV3DR, who manages Amateur Radio activity aboard *Mir*. A second English message read by Victor Kourilov of the Russian Aeronautic Federation states "International Space School Sputnik Program." The French and Russian messages convey the same greetings.

Like its predecessor, Sputnik 41 is just under 8 inches in diameter and weighs almost 9 pounds. It carries a 200 mW transmitter that transmits on or about 145.812 MHz (±5 kHz and Doppler shift). The spacecraft has no solar cells. It was expected to have an operational lifetime of approximately 30 days, although Sputnik 40 outlasted the same estimated lifespan by nearly three weeks.

In addition to the vocal greetings and a "bip-bip" beacon, the frequency of an audio tone, transmitted every 90 seconds, indicates the satellite's internal temperature.

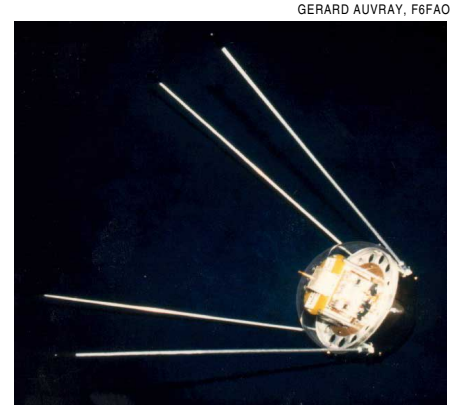
Sputnik 41 reception reports go to AMSAT-France, QSL Spoutnik 41, 14 bis rue des Gourlis, F-92500 Rueil-Malmaison, FRANCE.

The 1998 International Year of Air and Space page is at **http://www.ccr.jussieu.fr/physio/Satedu/sputnik41.html**.

NEW AMATEUR SATELLITES NOT YET READY FOR PRIME TIME

Two Amateur Radio satellites—SEDSAT-1 and PANSAT—were launched in late October, but neither was available for general use at press time. Efforts to es-

GERARD AUVRAY, F6FAO



The Sputnik 41/RS-18 spacecraft.

tablish an uplink to the troubled SEDSAT-1 Amateur Radio satellite were unsuccessful as of late November. Chris Lewicki, KC7NYV, of the University of Arizona Student Satellite Project said attempts involving stations in several parts of the world to uplink to the satellite would continue.

Launched October 24, SEDSAT-1, was fabricated by students at the University of Alabama-Huntsville. After fewer than two dozen orbits around Earth, problems arose with the spacecraft's batteries and solar panels.

As matters stood at press time, the satellite was "cycling" through periods of about one day when it is broadcasting telemetry and half-day periods of silence, apparently in an effort to recharge its batteries. Lewicki said the downlink frequency is around 437.914 MHz. He encouraged stations sending telemetry reports to continue doing so.

The SEDSAT package contains a Mode L digital store-and-forward transponder and a Mode A analog transponder. Also aboard are cameras to photograph views of Earth and its atmosphere.

Project Coordinator Mark Maier, KF4YGR, at UAH, has said that any hope of useful recovery depends on establishing uplink communication and "the sooner the better." The uplink frequency is 1268.2125 MHz.

For more information, visit the SEDSAT Web site at **http://www.seds.org/sedsat/**.

PANSAT, the Petite Amateur Navy Satellite, was launched October 30 over Australia from the space shuttle *Discovery*. The 150-pound Amateur Radio satellite carries a spread-spectrum communication package fabricated by student officers and faculty members at the Naval Postgraduate School in California.

The NPS says the spacecraft will provide store-and-forward digital packet communication using direct-sequence spread-spectrum modulation with a center frequency of 436.5 MHz, a bit rate of 9842 bps and 9 MB of message storage. Ground stations will be able to utilize PANSAT via a bulletin-board type user interface.

PANSAT Project Manager Dan Sakoda, KD6DRA, said in mid-November that ground controllers had successfully contacted the satellite and would proceed with commissioning. Sakoda indicated that PANSAT would not be available to the amateur community until early 1999.

For more information, visit the official PANSAT Web site, **http://www.sp.nps.navy.mil/pansat/** or see **http://131.120.25.103/pansat/danspans/dspansat.html**.

In Brief

• **Vanity update:** The FCC says it received 1412 vanity applications during October, down only slightly from September when the fee dropped to $13. More than 80% of applications filed in recent months have been electronic. Over the more than two-year life of the current vanity call sign program, the FCC has received more than 36,250 applications for new call signs.

• **FCC sets exam fee reimbursement maximum:** The FCC has announced that the 1999 maximum Amateur Radio volunteer examination reimbursement fee will be $6.49, based on a 1.5% Consumer Price Index increase between September 1997 and September 1998. The 1999 ARRL/VEC test fee will be $6.45. The 1998 ARRL/VEC test fee is $6.35. ***Note:*** Elements 1(A) and 2 are always free of charge at ARRL/VEC examination sessions.

• **New FCC Secretary mailing address:** The FCC's Office of the Secretary has relocated to The Portals, 445 Twelfth St SW, Washington, DC 20554. The Commission expects to complete its relocation to The Portals within the next six months. For information concerning paper filings, etc, see **http://www.fcc.gov/Daily_Releases/Daily_Business/1998/db981023/pnmc8062.txt**

• **Hiram BBS, on-line service accounts terminated:** Effective January 1, the ARRL will terminate the Hiram Bulletin Board System (860-594-0306) because of declining use. Effective immediately, the ARRL has canceled its on-line service accounts with Compuserve and America Online. These services were deemed no longer necessary because of the availability of the now-expanded *ARRLWeb*, **http://www.arrl.org/** and e-mail service.

• ***QST* Cover Plaque Award:** The *QST* Cover Plaque Award winner for October was John A. Hansen, W2FS, for his article "Using PIC Microcontrollers in Amateur Radio Projects." Congratulations, John!

• **OD5LE elected as Lebanon's president:** Another radio amateur has become a head of state. Lebanese Army General Emile Lahoud, OD5LE, was elected Lebanon's president October 15. All 118 members of the parliament present voted for Lahoud, who heads Lebanon's army. Lahoud, 62, officially succeeded President Elias Hrawi November 24. He will serve a six-year term. A naval officer, Lahoud trained in the UK and speaks English fluently.

• **RAC cuts dues, tightens belt:** A major restructuring plan is under way at Radio Amateurs of Canada. RAC says it's immediately rescinding a recent $10 membership fee increase, returning annual dues to $39.95. RAC says it will extend the membership of those members who paid the $49.95 rate. RAC plans to cut its operating expenses by $80,000 through "reductions in paid staff, decrease in office floor space rental, and costs of publishing *The Canadian Amateur*." For more information, see the RAC Web site, **http://www.rac.ca**.—*RAC*

Section Manager Election Notice

To all ARRL members in the Maryland/DC, Nevada, New Hampshire, Northern New Jersey, Rhode Island, San Joaquin Valley, Utah, and West Texas sections. You are hereby solicited for nominating petitions pursuant to an election for section manager (SM). Incumbents are listed on page 12 of this issue.

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

(Place and Date)

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

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

(Signature__ Call Sign___ City__ ZIP __)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on March 5, 1999. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before April 1, 1999, to full members of record as of March 5, 1999, which is the closing date for nominations. Returns will be counted May 18, 1999. Section managers elected as a result of the above procedure will take office July 1, 1999.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning July 1, 1999. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the July 1999 *QST*. A section manager elected through the resolicitation will serve a term of 18 months. Vacancies in any section manager's office between elections are filled by the Field Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Richard Palm, K1CE, Field Services Manager*

Public Service

Rick Palm, K1CE • *Field Services Manager*

Served Agencies Focus on Future Needs at Midwest Regional Public Service Conference

Emergency telecommunication technology has seen great advances in the last few years, changing the field we as amateurs have played on for a long time. More developments arrive every day. New global mobile satellite systems are serving more emergency managers, both here and abroad. The new Iridium system, for example, has 66 satellites blanketing the globe, providing instant telephone service anywhere on the surface of the Earth, with little on-the-ground hardware to be taken out by a disaster.

So the question is raised, is this the end of Amateur Radio as an emergency communications resource? The answer is "no," because of the unique characteristics of the amateur service, not the least of which is decentralization. That is, we radio amateurs are already geographically dispersed throughout the areas to be affected by a disaster. We're already everywhere that relief agencies would like to be, but can't, because of practical and budgetary limitations.

There are other reasons, too, but new telecommunication tools will still affect the needs of our served agencies in the not-too-distant future. We cannot become complacent. We must change to meet them or we face diminished opportunities to serve. That translates to less relevance, and a weakened position when it comes time to defend our spectrum needs in the face of increasing pressure from other interests.

The League's Executive Committee thought that the issue was important enough to warrant discussion on a regional basis, in regions most affected by natural disaster. As a result, the ARRL sponsored four regional public service conferences in 1998 to try to identify the specific future telecommunication needs of served agencies and the corresponding capabilities of our ARES organization. The question we wanted to try to answer is, how will Amateur Radio continue to play an important role in providing emergency telecommunications in the future? And what can our served agency representatives tell us to help us adapt to their changing needs?

The first two conferences, held in Seaside, Oregon, and Atlanta, Georgia, were reported earlier (August *QST*, page 86, and September *QST*, page 84, respectively). The third was held in conjunction with the Kansas State Convention, at Wichita, on October 3, with 45 in attendance. Representatives from the American Red Cross, the National Weather Service, Kansas State Emergency Management, and Sedgwick (Kansas) County Emergency Management, as well as ARRL Field Services Manager Rick Palm, K1CE, Johnson County EC June Jeffers, KB0WEQ, and Kansas SEC Joseph Plankinton, WD0DMV, were all on hand as presenters.

Palm led off with a welcome and introduction of the basic issues, and discussed ARRL Headquarters support functions. He was followed by Dick Elder of the National Weather Service, who recounted his agency's good experience with amateurs during several tornado situations. He cited amateurs' efforts in maintaining communications for NWS with all counties in the state. For the future, Elder said he would like to see amateur operators maintain communications between NWS offices in neighboring states, to promote inter-jurisdictional severe weather reporting during power outages and normal communication disruptions. Elder's assistant staff was also present to lend support to the NWS presentation.

Elder was followed by Sharon Powell-Quincy, Assistant Director, Midway-Kansas Chapter, American Red Cross. She was assisted by John Sullivan, KG0MZ, chairman of the communications sub-committee of the Disaster Advisory Committee, Red Cross. Powell-Quincy reported that the chapter was "rebuilding" its relationship with the regional amateur community, and that she envisions a more active role for Amateur Radio in the near future. She expects that amateurs will be employed more for traveling into the field with the chapter's mass care and damage assessment vehicles. Amateurs would send back information to assist staff in positioning the vehicles. Powell-Quincy also invited amateurs to take Red Cross training on specific functions such as mass care, sheltering and damage assessment, thereby increasing their utility and value to the chapter.

Powell-Quincy concluded that radio communication is a new priority for the chapter, as evidenced by the installation of Sullivan, who spoke on Red Cross communication assets and the role of ARES in the overall communications plan. Sullivan wants to see more training on ARES nets.

Next was Kansas State Emergency Management Operations Officer Sandy Johnson, who introduced the function of her agency vis-a-vis the role of the county emergency

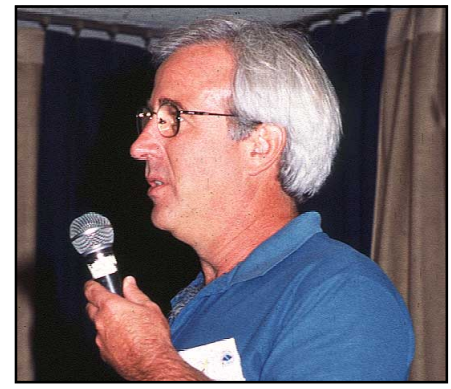
Hosting Kansas Section Emergency Coordinator Joseph Plankinton, WD0DMV, thanked the speakers and attendees on behalf of the section.

Presenting the perspective of the local ARES group was Johnson County EC June Jeffers, KB0WEQ.

John Crosby, KB0SQK, of Sedgwick County emergency management felt that training across functions and agencies will put amateurs in position to cement their role for the future.

Kansas State Emergency Management Operations Officer Sandy Johnson spoke of the new priority in emergency management: mitigation of terrorism.

Sharon Powell-Quincy, Assistant Director, Midway-Kansas Chapter, American Red Cross, said Amateur Radio was being rejuvenated as an important Red Cross asset.



Dick Elder of the National Weather Service said he would like to see amateur operators maintain communications between NWS offices in neighboring states.

management agencies: her agency steps in when a disaster overwhelms the capabilities of the counties. She listed state telecommunications assets, including HF radios for FEMA and Federal Highway Administration purposes. She believes that for the future, Amateur Radio will still be a valuable asset when normal communications between the county agencies and her state agency are disrupted. Amateur Radio can be invaluable for keeping county EOCs in touch with the state's EOC at Topeka, she said. Johnson cited the new priority in emergency management: defense against terrorism.

John Crosby, KB0SQK, of Sedgwick County emergency management followed with the county perspective. He felt that training across functions and agencies will put amateurs in position to cement their role for the future. He cited a county program entitled Community Emergency Response Training (CERT). Crosby also sees the amateurs' packet/digital capabilities as increasing in importance and value to county EMA, as the need for "secure" modes increases. "Unfortunately," Crosby said, "traditional amateur packet radio seems to be dying."

Amateur Television (ATV) has also been used by the county to excellent effect in monitoring drills, exercises and actual incidents. In one drill, the county EOC had a live feed from the disaster site, and could see problems as they cropped up in real time. Crosby encouraged amateurs to develop additional ATV capabilities accordingly.

Along with the expansion of the systems mentioned above, Crosby said not to forget APRS, the Automated Packet Reporting System, which has been used successfully in SKYWARN programs, allowing forecasters to see with precision where reports were coming from.

Finally, Crosby recommended that amateurs get trained in related disaster functions, such as shelter management. When coupled with their communications capability, amateurs increase their utility to the agency.

Presenting the perspective of the local ARES group was Johnson County EC June Jeffers, KB0WEQ. Since assuming the position in January, 1998, Jeffers has seen her ARES program grow to 62 members, with three AECs including two for logistics, and packet radio.

Like Crosby, Jeffers also sees a great demand by served agencies for packet/digital communications by amateurs. She cited the Salvation Army and the Johnson County EMA as examples. Accordingly, she has instituted packet and "conference mode" training on a weekly basis. Jeffers' ARES group also undergoes hazardous materials, downed power lines, and first responder training.

Looking to expand her client base, Jeffers has been working with district schools in establishing an emergency communication network, with a permanent station at district HQ. She also works with the March of Dimes and other charities for communications support of fund raising events, thus affording more hands-on training for her group.

Hosting Kansas Section Emergency Coordinator Joseph Plankinton, WD0DMV, thanked the speakers and attendees on behalf of the section, and turned it back to Palm for a wrap-up. Palm summarized the conference findings: More cross-training in other disaster relief functions is needed to add value to the Amateur Radio contribution. He said development of digital modes, with an emphasis on VHF packet, and ATV should be prioritized in response to present and future served agency needs. Palm concluded by citing the returns we can expect from agencies: as examples, he reported that both APCO and FEMA had filed comments opposing the Land Mobile Communications Council's petition to reallocate the 430-440 MHz segment of the amateur 70 cm band. In APCO's case, the organization had broken ranks as an LMCC member to do so.

The fourth and final regional public service conference was held at Tampa, Florida, on November 21. Watch for a report on conference results and a wrap-up article in a future issue.

New Section Managers descended on Denver, Colorado, for a training workshop conducted by Rick Palm, K1CE, on September 12-13. Shown in back row l to r, are Section Managers Don Costello, W7WN (San Joaquin Valley); Geoffrey Ellis, KD6MFM (Santa Clara Valley); Joe Phillips, K8QOE (Ohio); Dave Stevens, KL7EB (Alaska); Don Thomas, KA1CWM (North Texas); Mike Elliott, KF7ZQ (Idaho); Rick Palm, K1CE; and in front are Charlie Royall, WB5T (West Texas); Joe Knight, W5PDY (New Mexico); and Bill Sawders, K7ZM (Oregon). Behind Bill is Tuck Miller, K6ZEC (San Diego). Malcolm Keown, W5XX (Mississippi); is behind the camera!

ARRL Recommended Precedences

All messages handled by Amateur Radio should contain precedences—that is, an evaluation of each message's importance, made by the originating station. A precedence is an "order of handling." There are four precedences in the ARRL message form: Emergency, Priority (P), Welfare (W) and Routine (R), in that order of handling. When and as they appear on a net or any other kind of circuit, messages will be handled in this order.

EMERGENCY—Any message having life and death urgency to any person or group of persons, which is transmitted by Amateur Radio in the absence of regular commercial facilities. This includes official messages of welfare agencies during emergencies requesting supplies, materials or instructions vital to relief to stricken populace in emergency areas. During normal times, it will be very rare. On CW, RTTY and packet this designation will always be spelled out. When in doubt, do not use this designation.

PRIORITY—Use abbreviation P on CW, RTTY and packet. This classification is for important messages having a specific time limit, official messages not covered in the emergency category, press dispatches and emergency-related traffic not of the utmost urgency.

WELFARE—This classification, abbreviated as W on CW, RTTY and packet, refers to either an inquiry as to the health and welfare of an individual in the disaster area or an advisory from the disaster area that indicates all is well. Welfare traffic is handled only after all emergency and priority traffic is cleared. The Red Cross equivalent to an incoming Welfare message is DWI (Disaster Welfare Inquiry).

ROUTINE—Most traffic in normal times will bear this designation. In disaster situations, traffic labeled Routine (R on CW, RTTY and packet) should be handled last, or not at all when circuits are busy with higher-precedence traffic. The precedence will follow, but is not a part of the message number. For example, a message may begin with NR 207 R on CW, "Number Two Zero Seven, Routine,, on phone.

Handling Instructions

Handling instructions (HX) are less used but quite useful in handling messages. They serve to convey any special instructions to handling and delivering operators. This "prosign,,, when used, is inserted in the message preamble between the precedence and the station of origin. Its use is optional with the originating stations, but once inserted is mandatory with all relaying stations. The following definitions apply:

HXA— (Followed by number) Collect landline delivery authorized by addressee within... miles. (If no number, authorization is unlimited.)

HXB— (Followed by number) Cancel message if not delivered within...hours of filing time; service originating station.

HXC—Report date and time of delivery (TOD) to originating station.

HXD—Report to originating station the identity of station from which received, plus date and time. Report identity of station to which relayed, plus date and time, or if delivered report date, time and method of delivery.

HXE—Delivering station get reply from addressee, originate message back.

HXF—(Followed by number.) Hold delivery until...(date).

HXG—Delivery by mail or landline toll call not required. If toll or other expense involved, cancel message and service originating station. Example: NR 207 R HXA50 W4MLE 12...(etc).

If more than one HX prosign is used, they can be combined if no numbers are to be inserted, otherwise the HX should be repeated thus: NR 207 R HXAC W4MLE...(etc). On phone, use phonetics for the letter or letters following the HX, to ensure accuracy.

Field Organization Reports

Public Service Honor Roll
October 1998

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

839 NM1K
393 K9RTB
300 K7BDU
293 KB8ZYY
282 N5NAV
272 NZ4O
240 N2LTC
228 K5MC
223 KB5WEE
215 WB4GM
214 KE4AZL
213 W7TVA
209 N2YJZ
204 KB2WII
203 WB5NKC
198 KD4GR
194 N5OUJ KU4IJ
190 KA2GJV
189 WA4GQS
187 N2GJ
185 WA5AA
184 W0OYH
183 K7VVC
181 N2CCN N4ZNO KA4FZI
180 W5ZX
178 N5IKN WB5ZED AD4DO
176 KA2ZNZ WA1TBY
175 W9RCW
174 N2JBA
173 WA9VND
172 W4EAT
170 W4PIM
169 K4SCL
168 K5IQZ N1VXP WD4JJ W5YQZ KD4PDQ N9BDL K9FHI KB5TCH
165 KC2ACL W6IVV KC5QZZ
164 KT1Q
163 K4IWW N2RPI
162 K2DN N3XPK K2CSS
161 WX8Y W2AKT W9CBE
160 WA6ODQ
159 KL5T W3YVQ AF4HE K4RBR
158 WA7EES
156 K5DPG N2XOJ
155 N2WDS
154 KC2AHS
153 KR4MU KF1L N2OPJ
151 KC5OZT
150 AB7NK KC5QGI
149 WA4QXT KE4OAV
148 W5GKH K9PQ
147 WB0ZNY W4CAC KD5CRX W7NWP W7ZIW
146 W3BBQ N2AKZ W9YCV WN0Y K5AO
145 W4ZJY WA1FNM
144 N3WKE AF4GF KT6A
143 KB5W N5XGI KD4PWK N0KJ
141 K5WOD KL7Q WB2ZCM
140 WO0A

W0LAW N1LKJ
139 K2BCL KB2KLH N5JZ
138 K4CWZ KE4JHJ W3OKN W2MTA W7GB KC5PNM
137 KF4HJW KC4ZHF N7YSS
136 N4JAQ K2GNZ
135 K2BTP KB2VVB NZ1D
134 N8FWA N3WK WA8DHB W2RJL KO6RZ
133 AA2ED KF4TQX
132 K4AIF KA1GWE WB4TVY KA8KLZ W1PEX NR2F W7GHT
131 K7GXZ W2EAG KD7ME
130 KO4OL AF2K NN2H KA4UIV
129 W4FBE K6AGD
128 NY2V KJ3E WA0TFC N9PF
WX4H KF4NFP W7LG
127 N7AIK W2JHO W6QZ KE4DNO
126 KG2D WB2QIX WB2GTG N2XJ N1DHT
125 KE1AI W9ZY K4FQU KA7TTY
124 KJ7KL N5JUU
123 KE0K
122 K0IBS N2IKR WA1JVV
121 W7WAT
120 K9GBR KC5VLW
119 KI4YV N3WAV WA4DOX WI2G KC4RNF WB1GXM N7DRP KA7AID
118 K4MTX KB2UQZ K0PIZ WB0WNJ W4CKS W2MTO N1CPX AE4UB W7VSE WA5I K5MXQ
117 N3RB N9KHD W2PII
KA0DBK
116 KC4TLG
115 KB2VVD AG9G
114 WB5NKD WJ3K
113 N8DD W1ALE KC6SKK
112 KO4A KG0IV N4GMU
111 WA8EYQ KB9GGA KA1WCD WA4EIC AA4HT
110 KC3Y KC8GMT
109 KE4PAT W4BNY AA8SN K7MQF
108 KB2ETO AC4CS WB2IIV KT4SJ KU4LY
107 AB5RV WD0GUF
106 KA4LRM
105 KD1SM KA5KLU AE4EI
104 AA3GV
103 W4CC K4BW WR8F K8VFZ KB2YUR KH6GR W5MEN
102 AA8PI KB2GEK
101 WB4UHC W4RRX K2PB WA8SSI KB8UEY
100 WA1QAA W5CTZ KI0JO KE4WBI
99 W4DGH KA1OTN KD4HGU
98 KB0DTI KE3OX N4YYQ
97 K5DMC WD5AAH
96 KD4JMV
95 K8ZJU
94 WD4MIS N2TOY KC8HTP KJ4N
93 N8VES KB4WBY
92 K0PY KG5GE WB4ZNB WI8K N1SGL
93 W4XI W2CC
91 W8TDE K8IG KD6YJB
90 KA1VEC KF4FXT AE4WP KC4PZA
88 N2JRS
KD5GM K2VX
87 WD9FLJ N1IST
86 N3ZKP KE3FL K3UWO WA5FXQ K1SEC W0MZI
84 W2CS W4JLS K5UCQ W2LJM
83 WB4PAM
82 KF6RDI WB9GIU
81 WA2GUP KK3F W7EP K8LEN WB7YVH
79 N5LF
78 K8AI N2UOD
77 KE4CAP
76 KC5VOG W4ZBA KA1VAX K8SH WA4EYU
75 WA4GLS
73 AD4BL N8FPN
72 KB3AMO N5HK N1LAH N4MM
71 AA2NX
70 W7UVP KA9FVX

The following stations qualified for PSHR during the month of September, 1998, but the results were not reported: KE4WBI 83.

Section Traffic Managers Reporting
October 1998

AL, AZ, CO, CT, EMA, ENY, EWA, IA, ID, KS, KY, LA, MDC, MI, MN, MS, NC, NFL, NH, NLI, NM, NNJ, NTX, NV, OH, OK, OR, ORG, SC, SD, SDG, STX, VA, VT, WI, WNY, WPA, WWA.

Section Emergency Coordinator Reports
October 1998

There are 41,897 ARES members accounted for in SEC records. The following section emergency coordinators reported: CO, EWA, CT, IN, MDC, OH, SD, SFL, TN, VA, VT, WMA, WV, WWA.

Brass Pounders League
October 1998

Call	*Orig*	*Rcvd*	*Sent*	*Dlvd*	*Total*
KE4DNO	5	340	1914	5	2264
NM1K	715	343	934	10	2002
WX4H	4	714	1152	10	1880
N2LTC	0	904	912	32	1848
KK3F	12	794	794	32	1632
KI0JO	0	658	809	0	1464
W4EAT	0	669	571	4	1181
WA6ODQ	89	458	547	2	1096
WB0WNJ	0	491	599	0	1090
K7BDU	103	417	543	19	1082
W6DOB	29	484	468	56	1037
K9JPS	0	522	32	351	905
W1PEX	6	122	709	12	849
K7VVC	23	371	442	2	838
K1TQY	257	144	364	5	770
W9IHW	4	436	44	245	729
N5IKN	0	374	110	237	721
W5YQZ	0	338	370	0	708
KT6A	5	337	304	1	647
W7AMM	51	173	367	18	609
KA2ZNZ	2	298	250	36	586
K9RTB	0	286	57	235	578
N2YJZ	10	263	274	21	568
W9CBE	0	300	259	3	562
WA9VND	7	288	251	8	554
N0KJ					542
WB5NKC	57	148	323	10	538
KA1VEC	15	247	257	3	522

BPL for 100 or more originations plus deliveries: NZ4O 190, K9GU 171, KF4VEX 152, W9RCW 124, K5MC 114.
The following station qualified for BPL in September, 1998, but was not listed last month: KO6RZ 504.

Edited by **Bernie McClenny, W3UR**

Campbell Island DXpedition—January 1999

Captain Frederick Hasselburg discovered Campbell Island while seal hunting in January 1810. The island was named after his employer, Robert Campbell and Company of Sydney. Campbell Island is located at 52° 33' South, 169° 9' East, measures 114 square kilometers (44 square miles) and is about 600 kilometers (372 miles) south of New Zealand.

Auckland and Campbell Islands both count as the same DXCC Entity. The islands ranked 18th on the ARRL DXCC most wanted list in 1996 and 15th in 1997. Recent operations have mostly been from Auckland Island and include ZL9YL (1991), ZL9DX (1991/97), and ZL9/K8VIR (1997). Auckland (IOTA OC-074) and Campbell (IOTA OC-037) do count separately for the Radio Society of Great Britain's (RSGB) Islands On The Air (IOTA) award.

The Kermadec DX Association (KDXA) is a group of amateurs who are no strangers to the DX world after their May 1996 DXpedition to Raoul Island in the Kermadec Island Group. These guys pulled off an amazing 34,000 QSOs at the bottom of the sunspot cycle in May 1996 and were chosen to receive the ARRL's 1996 "DXpedition of the Year Award." In the late summer of 1997 Ron Wills, ZL2TT, announced to the DX world that the KDXA would operate from Campbell Island. Their new slogan was "ZL9 in 99."

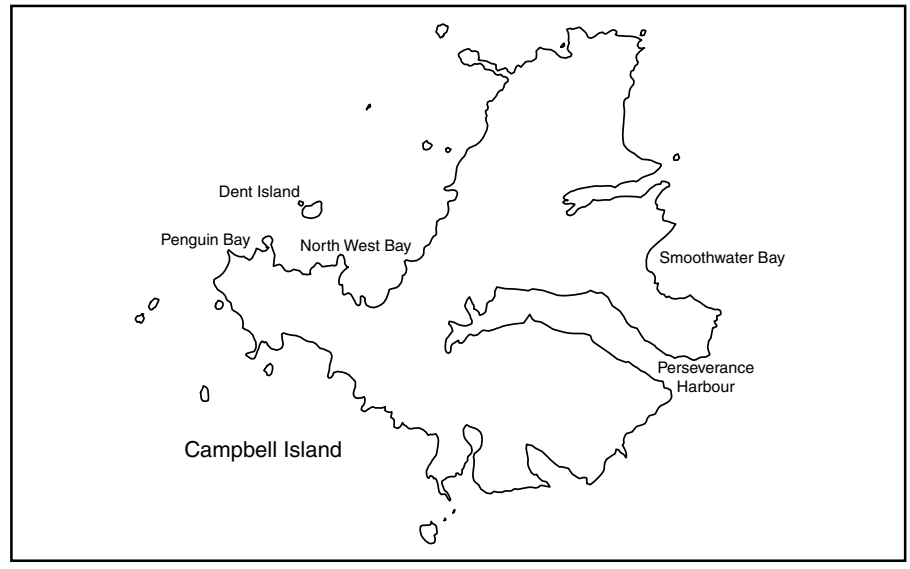


Table 1
Sunrise and Sunset on Campbell Island

Date	*UTC Sunrise*	*UTC Sunset*
January 10	1636	0905
January 24	1659	0851

Table 2
Planned ZL9CI Transmit Frequencies (kHz)

Band	*SSB*	*CW*	*RTTY*
10	28475	28024	—
12	24945	24894	—
15	21295	21024	21085
17	18145	18074	18105
20	14195	14024	14085
30	—	10104	10140
40	7065	7007/7022	7030
80	3799	3507/3522	—
160	—	1826	—

Also, SSTV on 14230

A New Year Departure

A 117-foot diesel-powered vessel called the *Bravehart* was secured in July of this year. The multinational crew of operators includes Ken Holdom, ZL2HU; Ron Wills, ZL2TT; Lee Jennings, ZL2AL; Chris Hannagan, ZL2DX; Brian Biggings, VE3XA; Al Hernandez, K3VN; Declan Craig, EI6FR; Mike Mraz, N6MZ; Jun Tanaka, JH4RHF; Andrew Williamson, GI0NWG; Jason Christensen, ZL2URN; Murray Woodfield, ZL1CN; and James Brooks, 9V1YC.

On January 1, 1999 the group will leave New Zealand and expects a voyage of approximately six days. Once on the island, the group will set up six complete stations which should all be operational by January 10. Look for ZL9CI to be active on all bands from 6 to 160 meters on CW, SSB, RTTY and possibly SSTV if time allows.

Future Amateur Radio activities from Campbell and other southern-most islands of New Zealand may be impeded due to New Zealand's Department of Conservation restricting access. Ken, ZL2HU, worked very hard with the highest level of government from New Zealand in order to get permission to go to Campbell Island. With this in mind DXers, whether just beginner or veteran, should try to work them on each band and mode as it may be many years before the next DXpedition takes place from this remote island.

Pilot Stations

West Coast—AC7DX, Ron Lago; ronlago@efn.org

East Coast—N1DG, Don Greenbaum; don@aurumtel.com

Europe—GI0KOW, Rob Cummings; gi0kow@gi0nwg.demon.co.uk

Japan—JJ3PRT, Joe Aoki; joeaoki@hi-ho.or.jp

When sending a message to them make sure you are polite, brief and to the point as they will be receiving lots of e-mail.

Logs on the Web

You can visit the ZL9CI home page at http://www.qsl.net/zl9ci/ for more information about the island, operators, press releases, sponsors, pictures, weather conditions and an on line log. Yes, that's right, you will be able to look up your QSOs one or two days after the QSO to confirm you are in the log. The ZL9CI logs will be sent via PACTOR to New Zealand where they will be put on the log server. QSL cards and donations may be sent to Ken Holdom, ZL2HU, Kermadec DX Association, PO Box 56099, Tawa, New Zealand.

Special thanks to N1DG, ZL2DX, ZL2HU and ZL2TT for information used in this article.

GOODBYE PROP CHARTS

Effective with this issue, *QST* will no longer publish the "When are the Bands Open?" propagation charts. With a high percentage of League members owning computers and running their own propagation software, and with an equally high percentage obtaining their propagation information from the Web, the printed charts have outlived their usefulness. The charts will still be available on the ARRL Web site at http://www.arrl.org/.

Until next month, see you in the pileups!—*Bernie, W3UR.*

*3025 Hobbs Rd
Glenwood, MD 21738-9728
howsdx@arrl.org

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				
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				

EFFECTIVE JANUARY 2, 1999

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, $7^1/_2$, 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 W6OWP, with K6YR as an alternate. 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 4 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.

Special Events

Edited by ***George Fremin III, K5TR****

Coloma, CA: El Dorado County Amateur Radio Club, AG6AU, 1600Z **Jan 23** to 2100Z **Jan 24**, Celebrating the 151st anniversary of the discovery of gold in California. 14.060 and lower 25 kHz of 40, 20 and 15-meter General phone bands and the 10-meter Novice/Technician Plus phone band. QSL. El Dorado County ARC, PO Box 451, Placerville, CA 95667.

St. Louis, MO: St. Louis Area Amateur Radio Clubs, W0K, 0000Z **Jan 26** to 2359Z **Jan 27**, Commemorating the visit of Pope John Paul II, 80-10 meters. QSL. Mike Dieckmann, KA0IAR, 703 Third St, Hillsboro, MO 63050.

San Diego, CA: Challenger Middle School ARC, KI6YG, 1600 to 2400Z **Jan 28**, Commemorating the space shuttle *Challenger* tragedy. 14.225 21.355 28.355 146.52. QSL. Frank Forrester, KI6YG, 10810 Parkdale Ave, San Diego, CA 92126.

Jean, NV: BioRem Area 3 ARC, AL7LS, 1400Z **Jan 31** to 0200Z **Feb 1**, Commemorating the completion of the Salt-Lake-City-to-Los-Angeles Railroad in 1905. 3.990 7.090 7.290 14.103. Certificate. Bruce Rossi, 2127 Sierra Stone Ln, Las Vegas, NV 89119.

Punxsutawney, PA: Punxsutawney Area Amateur Radio Club, K3HWJ, 1300 to 2000Z **Jan 30**, Annual Groundhog Day Special Event Station. 7.045 14.045 14.290. Certificate. Punxsutawney Area ARC, PO Box 20, Big Run, PA 15715.

Special Events Announcements: You can submit your special event information on-line at http://www.arrl.org/contests/spevform.html. Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; ie, a special event listing for **Dec** *QST* would have to be received by **Oct 1**. Submissions may be mailed to George Fremin III, K5TR, at the address shown at left; faxed to ARRL HQ at 860-594-0259; or e-mailed to events@arrl.org. QST

*RR1, Box 322
Johnson City, TX 78636
k5tr@arrl.org

New Products

THE 'BUG TAMER' FROM VIBROPLEX

◊ As any Old-Timer will tell you, sending slow Morse code on an original Vibroplex "bug" is all but impossible. Because of mechanical factors, the speed range is fixed from about 20 to 60 WPM. Designed to let anyone use a traditional bug, Vibroplex has introduced its Bug Tamer, a mechanical add-on that extends the bug's pendulum and allows code speeds as slow as 10 WPM, maybe slower, all set with the units' standard speed weights.

Price: Chrome version—$24.95; Brass version—$20. For more information, contact Vibroplex, 11 Midtown Park E, Mobile, AL 36606-4141; tel 800-840-8873, fax 334-476-0465, w4oa@vibroplex.com.

BRAND ELECTRONICS DIGITAL AC POWER METERS

◊ Brand Electronics offers two affordable digital ac power meters. The Model 4-1850 will measure true power consumption from 1 to 1850 W and the power used over time, from 1 Watt-hour to 9999 kilo-Watt-hours.

The Model 20-1850 offers the same capabilities as the 4-1850 but will also read rms voltage, rms current, power factor, volt-amps, reactive power and peak watts.

Both models are also available for other voltages (220 V for example) and higher maximum current/power ratings.

For more information on the 4-1850, the 20-1850 and additional power measurement products, contact Brand Electronics, 421 Hilton Rd, Whitefield, ME 04353; tel 207-549-3401; (orders) 888-433-6600, ebrand@mint.net; http://www.mint.net/~ebrand/. Manufacture's suggested retail prices: 4-1850, $149.95; 20-1850, $249.95. QST

Edited by **Steve Ewald, WV1X** • Assistant Field Services Manager

A Walk Down Memory Lane

In 1998, the Wheaton Community Radio Amateurs of Wheaton, Illinois, celebrated its 50th anniversary as a club. To help celebrate and honor this occasion, the club published a special 50th anniversary issue of their monthly newsletter under the editorship of Ron Hensel, K9ZZE.

The April/May 1998 issue of *Hamletter* shows an interesting blend of club news from the past 50 years up to the present day. The growth and changes in Amateur Radio are apparent through photographs, old magazine advertisements, and articles written by founding members of the club. Thanks to the Wheaton Community Radio Amateurs (WCRA), affiliated with the ARRL since 1961, for sharing this anniversary issue with us. It represents an outstanding effort.

Remembering When..., written by WCRA Historian John Lauder, N9LIN, captures the highlights of club activities, public service and personalities through five decades. Here's a brief excerpt from John's article.

"**April 1948 to April 1958:** Early in February, 1948, sixteen licensed Amateur Radio operators met to discuss the possibilities of forming an organization. They met in the old DuPage County (Illinois) Courthouse to discuss future plans. One phase to be developed was a service group to train new operators interested in mastering the code requirements. In addition, they discussed a desire to coordinate their activities with the local law enforcement agencies. They also planned to be affiliated with the American Radio Relay League. Craig Allen, W9IHT, was appointed to draft a constitution for consideration. The group represented a range of ages from high school freshmen to old timers whose early days included spark transmissions. The Wheaton Community Radio Amateurs (WCRA) was formally organized on April 15, 1948, with 22 members."

The *Hamletter* honors all past and present WCRA officers by showing a chart with the person's name and call sign and the office he or she held from all 50 years. On another page, the WCRA shows their past Field Day results. According to the editors, "All data was gathered from the pages of *QST*. We waded through about 35 years of hard copy when, thankfully, Dick Schwanke ended the torture and loaned us his 50-year collection on microfiche along with his viewer. Thanks, Dick. Our present call sign, W9CCU, has been used since 1966." Gary Henle, N9VLL, promoted the 1998 Field Day event with a look back at the club's past participation.

The special edition of *Hamletter* featured an article by David Gauger, W9CJS, a founding member of WCRA, about the early days of the club and his first several years of being a licensed radio amateur. Foxhunting has been a favorite club activity over the years, and Ray Norberg, W9PYG, and Tom Geletka, N9CBA, reported on the past and present status of direction finding in the Chicago area.

"The WCRA history has been full and fruitful," John Lauder, N9LIN, wrote. "Hundreds of hams have had an opportunity to participate and share in the fellowship, training, service to our communities, technical advancement, and the general promotion of the Amateur Radio hobby through club membership. A review of the club history shows why WCRA is a well-respected club and a group we can all be proud to be a part of. The broad range of WCRA activities during the past 50 years only begins to suggest what the future holds for us all."

Harry Blesy, N9CQX, provided the radio gear and memorabilia to recreate a typical 1948 Amateur Radio station for the cover picture of the WCRA special anniversary newsletter.

HAMLETTER

Published Monthly by the Wheaton Community Radio Amateurs
Issue 420 Founded 1948 April / May 1998

W9CCU

The Daily Journal
Wheaton, Illinois DuPage County February 18, 1948

Sixteen radio amateurs, all holding government licenses to transmit on the amateur bands, met recently to discuss the possibilities of an organization for Wheaton. The meeting was held at the DuPage county courthouse and the evening was spent in getting acquainted and in talking of plans for a future amateur radio club.

Known as hams, not from the connotation as used on the stage to denote strictly underrate performances, but from the English attempt to pronounce the word amateur, these sixteen represented a range from freshmen in high school to old-timers whose early days included spark transmissions. Most of the group have known each other over the air for some time, but the meeting offered the first chance for them all to become personally acquainted.

Many Notable Amateurs

When the club perfects its organization, it will include some notable amateurs who are well known around the world. *Frank Golder, K9AAM*, of Warrenville, has been in radio for many years but only recently joined the amateur ranks. He has run up a total of 74 countries, contacted through his work on 20 meters, one of the allotted amateur frequencies.

Bill Newcomb, W9QES and his wife, *Alice, W9QMS*, have friends all over the world through their work on 20 meter phone. *Emerson Squires, W9BRX*, has a call which dates back to his high school days at Wheaton Community High School. Emerson is presently most active on the amateur radio 20 meter phone band.

Awarded Trophy

During the McMillan expedition in the early 20s, W9BRX was awarded a large trophy cup for his outstanding work in handling messages from that expedition. His station was first in the United States in this proficiency.

Ed Duncan, W9MWY, and *Paul Borter, W9LIF*, both operate part of the time on the 80 meter band. Both the 80 meter and the 20 meter band can be heard by radio fans having an all-wave radio set. *Dave Gauger, W9CJS*, is a freshman in high school and his activity is at present limited to code work on the 80 and 40 meter bands. The rest of the time on the 10 meter band which is above the range of most all-wave sets, so they are seldom heard in Wheaton.

Continued page #4

APRIL 1948

Wheaton Community Radio Amateurs
1948 50TH ANNIVERSARY ISSUE 1998

Get on the Air Program Update

The **Get on the Air Program** was introduced in the November 1998 "Club Spectrum" column. If you and your club are interested in learning more about this program, contact ARRL New England Division Director Tom Frenaye, K1KI, by e-mail: **k1ki@arrl.org**, and/or by telephone as listed on page 10.

ARRL Special Service Clubs Recognized

Administered by Vicky Armentano

Congratulations to the following ARRL Special Service Clubs. This reflects activity from September and October, 1998.

Renewing SSCs, September 1998
Amador County ARC, Pine Grove, CA
Chicago FM Club, Arlington Heights, IL
Fox River Radio League, Aurora, IL
Hot Springs ARC, SD
Mesilla Valley Radio Club, Las Cruces, NM
Radio Association of Western New York, Tonawanda, NY
Snohomish County Hams Club, Marysville, WA
Two Rivers ARC, Inc, McKeesport, PA
Valencia County ARA, Belen, NM
Ventura Co ARC, CA

New SSCs, September 1998
Cape Fear ARS, Fayetteville, NC
Nanticoke ARC, Inc, Seaford, DE

SSC Renewals, October 1998
Denton Co ARA, TX
Garden City ARC, MI
Holmesburg ARC, Philadelphia, PA
Long Island Mobile ARC, Long Beach, NY
Lynchburg ARC, Inc, VA
Maryland Mobileers ARC, Inc, Hanover, MD
Mason County ARC, Ludington, MI
Raleigh ARS, Inc, NC
Sierra Foothills ARC, Auburn, CA
Stones River ARC, Murfreesboro, TN
Temple ARC, Inc, TX
Top of Panhandle ARC, Booker, TX

New SSCs, October 1998
Five Flags ARA, Gulf Breeze, FL
North Shore Radio Club, Northbrook, IL

QST

The World Above 50 MHz

Emil Pocock, W3EP*

Can You Do that Using FM?

The simple answer is yes, it is possible to make unusual long distance (DX) contacts and duplicate some of the other feats reported in this column using FM. It is not the ideal transmission mode for pushing the limits of communications in the world above 50 MHz, but there is nothing inherent in the FM modes that prevents signals from traveling more than 100 miles—or 160 km.

FM and FM-based digital modes (like packet) have clear advantages for reliable local communications at VHF and higher. The equipment is relatively inexpensive and simple to operate, especially compared to sophisticated CW and SSB transceivers. Sound quality is generally good and largely free from noise. Receivers are designed to respond primarily to strong, local stations.

Indeed, distant stations that do somehow make it to FM receivers and repeaters are treated as curiosities at best and as unwelcome intruders at worst. Yet, such distant stations are sometimes heard on repeaters and simplex channels. This suggests that DX is possible using FM.

You Can Work DX Using FM

The unusual propagation conditions that give rise to DX are not dependent on the transmitting mode. Tropospheric ducting, sporadic E, meteor scatter, aurora and other forms of propagation affect SSB, CW, FM and AM radio signals about the same. The distance a signal travels, in other words, does not depend on the transmitting mode. Even ordinary 2-meter FM stations can participate in making DX contacts when conditions are favorable.

Thus from time to time, unusual 2-meter FM contacts are reported in this column, such as the recent QSO between Florida and Honduras, the 4,000 km contacts between California and Hawaii (with full quieting signals) or even the astounding 6,000 km simplex hook-ups from Argentina to Venezuela and the Caribbean. Alert FM operators can make such contacts more often, even though FM does have some inherent characteristics that limit its potential for DXing.

The Bandwidth Problem

One of the major limitations involves receiver bandwidth. All other things being equal, a received signal will be appear stronger in a narrow receiver passband than a wider one. Narrow-band FM requires at least 12 kHz of bandwidth to keep speech intelligible, but that means a good deal of noise accompanies the desired signal. FM signals must be relatively strong to override the noise and produce a full-quieting effect.

In contrast, SSB requires only a 1.8 kHz bandwidth. This reduction in bandwidth increases signal-to-noise ratio by more than 8 dB, equivalent to 1 or 2 S-units in signal strength. CW can be comfortably copied in a 500 Hz bandwidth (or less), for an even greater 2 or 3 S-unit advantage over FM. No increase in transmitter power is necessary to realize this apparent gain.

The Capture Effect

The capture effect also limits FM weak-signal capabilities. FM receivers are designed in such a way that only the single strongest signal within the receiver passband can be heard. Any weaker stations that might be using the same channel or adjacent frequencies are completely overridden. This is great for reducing interference, but makes it impossible to pick out weaker and perhaps more-distant signals on a busy frequency.

Antennas

Vertical polarization has become standard for FM activity, while horizontal is used for SSB and CW. This convention was established many years ago, probably as a matter of practical convenience more than anything else. There is little inherent advantage to one or the other, as vertically and horizontally polarized signals do equally well for sporadic-E, aurora, tropospheric ducting and other unusual propagation.

In most day-to-day operations, stations must use the same polarization or suffer up to 20 dB reduction in signal strength, the equivalent of 3 or 4 S-units. Tropospheric ducting also preserves the polarization of radio signals, so antenna polarization must match there, as well. In contrast, it simply does not matter what antenna polarization is used at either end of a DX path that relies on sporadic E, meteor scatter, aurora and other forms of ionospheric propagation. This is because the ionosphere thoroughly mixes up the orientation of radio signals before they return to Earth.

FM DX

In spite of the limitations, it is possible to make long-distance FM contacts on the bands above 50 MHz. Signals will never be as strong as similarly equipped SSB and CW stations and there may be problems with distortion. Sporadic E is useful on 50 and 144 MHz at distances from 800 to 2300 km. Tropospheric ducts are capable of transmitting strong signals from 50 to 1295 MHz and higher over very long distances. Even worldwide 50 MHz contacts—via the F-layer—can be made when conditions are exceptional. FM will often yield good results with these propagation modes, even with simple equipment.

Meteor scatter typically produces very short bursts of weak- to moderate-level signals on 50 and 144 MHz, which are not well suited to FM operating. Ironically, meteor scatter may be useful for FM packet simplex. Signals may not be strong, but a packet transmission requires only a second or so to complete. That is often all you get on an unpredictable meteor burst, but the computer can keep repeating a message until it gets through.

Operating Suggestions

If you pursue FM DX, some simple operating principles can enhance your chances for success and at the same time reduce the possibilities of interference to established activities. Use one of the designated FM simplex channels—never a repeater frequency. If a favorite channel is busy (as 146.520 MHz often is), move to the adjacent one. Remember the capture effect. You will not hear a weaker and more distant station if someone already occupies the channel, and it is generally counter productive to get into a shouting match with another station.

A good technique is to scan the channels. When you discover an opportunity to make a DX contact, keep your transmissions short and to the point. If you are looking for distant stations, call "CQ DX" so others know your intentions, give your call two or three times phonetically and then listen carefully. You can often attract the attention of operators who routinely scan the popular FM channels this way.

This Month

January 3	Quadrantids Meteor Shower Peaks
January 23-25	ARRL VHF Sweepstakes

*Send reports to Box 100, Lebanon, CT 06249. Leave voice messages at 860-642-4347, or fax 860-594-0259 or w3ep@arrl.org.

FM and SSB/CW are entirely incompatible modes. An FM signal takes up 12 kHz of bandwidth, enough for half a dozen SSB stations and double or triple that number of CW signals. A single FM carrier will wipe them all out. Thus, do not operate in the portions of the band where SSB/CW activity is established, such as 144.100 to 144.300 MHz and even higher. It may sound quiet down there, but there are lots of operators straining to hear those weak signals you will just not hear on FM. Use the same guideline for the other VHF and UHF bands.

There is Always SSB

Finally, if you have a multimode rig, try SSB when conditions seem unusual. Except for tropospheric ducting, it may not matter that you have a vertical antenna. SSB activity is not confined to channels and certainly not to the established calling frequencies! Tune around above and below 144.200 MHz (the 2-meter calling frequency) and try answering some of the stronger stations. You may be surprised at how much better you can do on SSB, even with 10 W and a mobile whip.

ON THE BANDS

October is capable of producing a great tropospheric ducting session, and operators in the mid-section of the country were not disappointed by conditions in early October. Six meters continued to tantalize the band watchers with some early-cycle DX. There were some interesting 144-MHz TE contacts over 5,000 km, and a few stray days of sporadic E.

Some of the summaries relied on the reports of N3PJU, KF4DZV, WA4LOX, K7ICW, N9BJG, KF9WM, CO2KK, HP3XUG, JA1VOK and LU6DRV; the *50 MHz DX Bulletin* and the *Internet Six News*, which are otherwise not credited. Dates and times are UTC. Distances are in km (multiply by 0.6 to get an approximate equivalent in miles).

Six-Meter DX

Activity on 50 MHz continued to follow a pattern typical for so early in a new solar cycle. Primarily north-south transequatorial (TE) contacts from southern Europe to Africa, the southern US and Caribbean to South America, and Japan to Australia and the South Pacific were nearly daily events. East-west paths adjacent to the equator provided opportunities for even longer contacts across the Pacific, including contacts from South America to southern Japan and from the southwestern US to Australia.

DX from the United States

US stations—primarily those across the southern tier of states—worked LU (Argentina) and CX (Uruguay) via TE on at least a dozen days of the month. WA1OUB, W3EP and other New England stations found LU2DEK and LU6DIH on October 13, probably via a sporadic-E hookup. HC1BI, HC5K and HC2FG worked widely throughout the central states from Texas to Illinois on October 25, probably via normal F-layer propagation.

N5WS and other W5s worked Hawaii on October 20. The afternoon of October 25-26 was probably the best of the month for the western states. The W5s again found Hawaii after 2300, N6XQ worked four ZL3 stations in New Zealand after 2350, and K0GU (Colorado) hooked up with five VK4s on the northeastern coast of Australia between 0050 and 0125. These were all undoubtedly via normal F-layer propagation.

DX from South America

In addition to a dozen days of TE north to the Caribbean and the southern US, South Americans were also well placed to work Europe, Africa and across the Pacific. Nearly every day of the month, LU (Argentina), PY (Brazil), and other South American stations worked into southern Europe and Africa. The most common prefixes in the South American logs were CT3 (Madeira), EH8 (Canary Islands), CT (Portugal) and EH (Spain). Among the more unusual stations that South Americans worked were CN2UN and CN8LI (Morocco), D44BC (Cape Verde), TZ6VV (Mali), 3C5I (Equatorial Guinea), and 9G1BJ (Ghana).

The transequatorial path had become so routine and signals so reliable that Nestor Zucchi, LW5EJU, tried sending some slow-scan pictures to KP3A on October 20. Two crisp color pictures of Nestor and his station arrived in Puerto Rico!

Europe to Africa

The southern Europe-to-Africa TE connection remained quite active during the month as well. New calls that appeared in the extensive reports since last month included OD5PN (Lebanon), 4Z5JA (Israel), 5B4/EU1AA (Cyprus) and OK1FFD (Czech Republic).

Pacific Area

The Japan-to-Australia TE path continued to be lively. Japanese stations were also busy with a half-dozen Indonesian stations (YB and YC), V63AO (Micronesia), BG7OH (China), many from Hong Kong (VR) and several each from Taiwan (BV), the Philippines (DU), Korea (HL) and West Malaysia (9M2). Among other Pacific-area stations participating in the early-cycle DX in October were A35SO (Tonga), AH0/KH2K and KH0/JA4KFA (Marianas), V73AT (Marshall Islands), FK8CA (New Caledonia), FO5DR (French Polynesia), FK8CA (New Caledonia), P29KFS and P29KPH (Papua-New Guinea).

In addition, Japanese stations made some remarkable contacts to the east into the Indiana Ocean and Africa. On October 3 around 1150, JR6VSP heard 7Q7RM. JR6VSP and others in the Ryukyus worked VQ9QM (Chagos) on October 14 after 1330. Finally, On October 22, Japanese stations again hooked up with A45ZN (Oman).

ZK1AA (Cook Islands) reported hearing Hawaiian beacons on two out of three days during the month, but apparently no contacts were made.

144 MHz Transequatorial

LW5EJU made several 2-meter contacts with KP3A, WP4O and KP4EIT on October 14, 15 and 16 via transequatorial field-aligned irregularities (TE). The distances were about 5700 km—not unusual for this mode, even at 144 MHz. KP3A managed the contact with 20 W and a 13-element Yagi; KP4EIT was running just 10 W! On October 16, PY5CC made a similar 144-MHz TE contact with 8P6ER. These contacts follow closely the report last month that JH4JPO heard the VK8VF two-meter beacon via TE. There will be more such contacts in the coming years.

Record-Breaking Tropospheric Duct Over the Midwest

One of those archetypal tropospheric ducting events covered a wide area of the Mississippi Valley on October 9 to 12. The effects were felt from Minnesota and the Great Lakes to Mexico and the Gulf Coast, nearly as far east as Florida. Contacts on 144, 222 and 432 MHz were widespread throughout this area. The longest contacts were made from Michigan to south Texas and Mexico at distances greater than 2000 km—exceptional!

John Butrovich, W5UWB (EL17) in south Texas, completed some of the longest contacts of this event on October 11, shortly after 0000. On 144 MHz, he hooked up with VA3AEC (EN82) and K2YAZ (EN74), both over 2,000 km away, and K8BHZ (EN75) for his longest distance at 2252 km. His 222-MHz contact with K2YAZ has probably set a new continental tropo distance record of 2162 km. W5UWB also made it with K2YAZ on 432 MHz as well, for his longest contact on that band. Naturally, John made other QSOs throughout the Midwest from Minnesota and Iowa west to Indiana.

From the other end of the duct, Mark Dabish, K8MD (EN82) in southeastern Michigan, also made some remarkable contacts on October 11 and 12. His best DX on 144 MHz—and a new country—was with XE2OR (DL98), at 2195 km. Other 2-meter contacts in excess of 2,000 km included N5WS, and W5VY (EL09) and W5UWB (EL17). On 222 MHz, K8MD found K5VH and W3XO/5 (both EM00) at about 1950 km. On 432 MHz, Mark's longest contacts included W5VY, W5UWB, K5VH and W3XO/5.

Ed Fitch, W0OHU (EN34), made more than half a dozen 144 and 432 MHz contacts on October 10, including those with W5UWB at 1839 km for his best of the session. Dick Hart, K0MQS (EN31), was probably too close to the center of the duct to cover exceptionally long paths, but what he lost in distance he made up in grids. Dick worked stations two dozen grid locators over the evening of October 10-11, as far south as the Texas coast, about 1600 km away.

As is typical of exceptional opening like this one, it does not take high power to participate. Matt Powell, W3UUM (EL29), worked as far north as K2DRH (EN41), 1360 km distant, on 432 MHz with just 25 W and a single Yagi at 48 feet. KC8CCD (EM79) in southwestern Ohio, near the eastern edge of the opening, hooked up with W3XO/5 at 1600 km, running just 10 W on 144 MHz with a 13-element Yagi at 58 feet.

Jon Jones, N0JK, found some upper-air data for the morning of October 11 on a WWW site. The plots of temperature and dew point (a measure of water-vapor content) versus altitude for a reporting station in Illinois show a very sharp temperature and dew-point inversion between 1300 and 1500 meters (about 4200 to 4900 feet) altitude. Properly interpreted, these graphs could provide excellent forecasts of ducting events. Sounding balloons are sent up twice a day from about 100 weather stations nation wide.

VHF/UHF/MICROWAVE NEWS

World Microwave Records Broken

New world distance records at 24 and 47 GHz were set this past September and October, according to accounts in the *RSGB Microwave Newsletter* for October 1998. JM3KMO, on Mt Norikura on Honshu Island, made a 24 GHz contact with JR3EDZ, on top of Mt Tsurugi on Shikoku Island, in early September. This distance was 402 km, which exceeds the existing world record of 397 km that had stood since 1993. The North American record of 267 km was set in 1997. JM3KMO used 100 mW to a 90-cm dish and JR3EDZ had 200 mW and a 60 cm dish. The contact took two hours to complete on SSB.

The new 47-GHz mark of 221 km was established on October 3 by F6BVA, operating from Mt Chian (JN33du), and F5CAU, on Mt Aigoual (JN14sc). The weather was wet and foggy with the temperature just above freezing. The previous record of 203 km was set in Italy earlier in 1998. In contrast, the North American record has stood at 105 km for more than ten years.

Microwave Standings

Microwave standings are compiled each November 1 for publication in the January *QST*. US stations must contact at least five grids or a minimum distance—which varies by band—for inclusion in the listings. Information must be submitted within the previous two years to insure that the standings reflect recent activity. Calls with multiple listings reflect activity from different locations, as defined by VUCC rules. Any stations dropped for lack of timely information will be reinstated with a current report. You do not have to work additional states or grids to remain in the standings, but please confirm your continued interest at least every two years. You can e-mail your reports to **standings@arrl.org**, or send an SASE for a reporting form to: Steve Ford, WB8IMY, 225 Main St, Newington, CT 06111.

33 cm (902-928 MHz)

(Minimum terrestrial DX = 250 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	16	2	41	970
AF1T*	NH	14	1	19	621
K1UHF	CT	13	1	27	858
W1JR	NH	10	3	28	634
W1VT	VT	8	2	25	613
W1GHZ	MA	8	1	10	558
K1MAP	MA	4	1	4	312
K2DH*	NY	21	2	40	1400
N2WK	NY	12	2	46	950
K2AN	NY	9	2	27	1401
N2DKP	NY	5	2	12	601
WA3AXV	PA	14	—	31	664
W3ZZ	MD	12	1	26	659
K4RF	GA	8	1	9	1045
N4CH	VA	6	1	13	420
WB4JEM	FL	3	—	3	1430
W5LUA*	TX	20	2	56	1725
W5ZN	AR	13	1	38	1150
AA5C	TX	11	1	33	1503
W5RCI	MS	6	1	11	—
K5LLL	TX	5	1	15	1041
N5QGH	TX	4	1	15	1062
N6CA	CA	4	3	18	3978
N6XQ	CA	2	2	5	4060
KE7SW	WA	2	1	9	260
N7YAG	OR	2	1	4	329
N3CEV/7	WA	2	1	4	328
KE8FD	OH	13	2	32	1402
K8MD	MI	11	2	29	592
K2YAZ	MI	11	1	30	960
KU8Y	MI	7	1	19	615
NQ8A	MI	7	1	16	1205
N8ZJN	OH	3	1	6	348
N8XA	OH	3	1	6	—
N8KOL	OH	2	1	5	142
K3SIW/9	IL	17	2	54	1200
WB9SNR	IL	10	1	22	614
W0UC	WI	8	1	28	738
N0LL	KS	13	1	43	1321
WA0BWE	MN	10	2	27	1353
N0HJZ	MN	6	1	12	480
W0ZQ	MN	5	1	11	—
K0RZ	CO	4	1	16	450
W0LD	CO	4	—	4	615
WQ0P	KS	3	—	4	367
VE3KDH	ON	14	2	10	447
VE4MA*	MB	5	2	8	619

23 cm (1240-1300 MHz)

(Minimum terrestrial DX = 250 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	17	2	41	1010
K1FO	CT	16	2	38	1256
K1UHF	CT	14	2	33	858
W1JR*	NH	13	4	36	1054
WA1OUB	NH	12	3	39	987
W1VT	VT	10	2	28	733
K1ZE	RI	10	2	18	954
AF1T	NH	10	2	15	564
W3EP/1	CT	7	2	10	485
W1GHZ	MA	6	1	8	558
K1MAP	MA	5	1	6	312
W1AIM	VT	4	2	10	493
K2DH*	NY	33	29	112	2148
WA2LTM	NJ	20	2	54	1458
N2WK	NY	16	3	54	1201
W2CNS	NY	16	2	48	1154
K2LME/1	CT	15	2	36	906
K2AN	NY	11	2	34	1401
K2OS	NY	11	2	16	1230
W2FCA	NY	8	2	20	650
N2DKP	NY	7	2	15	1165
W3HHN/2	NY	6	1	13	345
KB3PD*	DE	27	9	53	—
W3XS	PA	20	2	—	1280
WA3AXV	PA	18	—	49	1123
W3ZZ	MD	15	2	38	1140
K3UA	PA	14	2	26	700
NO3I	PA	10	1	23	—
KH2CY/4	VA	8	1	13	450
K4MRW	AL	20	1	46	1300
K4RF	GA	17	1	28	1067
WB4JEM	FL	12	1	38	1647
K4ZOO	VA	11	1	25	642
NA4I	GA	9	1	14	1023
AA4ZZ	NC	8	1	18	751
N4CH	VA	6	1	15	608
W5LUA*	TX	38	36	211	2060
WD5AGO*	OK	36	25	200	1240
W5RCI	MS	17	1	61	—
AA5C	TX	17	1	55	1562
W5ZN	AR	18	1	52	1500
K5SW	OK	15	1	53	1583
W5DFU	OK	15	—	49	1658
N5QGH*	TX	14	7	45	1545
WA5TKU	TX	12	—	40	758
W5AL	TX	8	1	34	1100
W5VY	TX	8	—	35	1832
W5UWB	TX	3	1	4	1620
N5BBO	TX	3	—	14	1756
N6CA*	CA	8	11	44	3978
K6QXY	CA	4	2	18	3794
N6XQ	CA	2	3	10	4060
N7STU	CA	2	1	15	444
WB4AYE	CA	1	1	8	320
KK6TG	CA	1	—	1	771
W7CS*	AZ	10	16	38	410
N7LQ	NV	4	1	16	467
W7PUA	OR	3	1	18	605
WA7GSK	ID	3	—	10	—
KE7SW	WA	2	2	13	408
N7YAG	OR	2	1	10	329
K7XC	NV	2	1	6	369
N3CEV/7	WA	2	1	6	328
N8DJB	OH	21	1	56	—
KE8FD	OH	20	2	59	1402
K2YAZ	MI	18	2	56	1300
K8MD	MI	17	2	45	592
NQ8A	MI	12	1	22	1205
KU8Y	MI	11	1	29	945
N8KOL	OH	10	2	24	765
N8ZJN	OH	8	1	16	968
N8XA	OH	3	1	6	—
K3DMG	OH	3	1	4	386
K3SIW/9	IL	20	2	70	1207
W9ZIH	IL	19	1	34	1184
WB9SNR	IL	16	2	51	1250
W0UC	WI	11	1	45	1180
K9KL	WI	8	2	27	900
W9EME	WI	4	1	4	300
K9SM	IL	3	1	5	675
N0JK	KS	18	1	52	—
N0HJZ	MN	15	1	44	1530
WQ0P	KS	14	—	59	1300
N0LL	KS	13	1	46	1321
WA0BWE	MN	12	2	46	960
K0RZ*	CO	8	3	40	678
W0ZQ	MN	8	1	21	788
W0LD	CO	7	—	19	615
NT0V	ND	6	2	10	1284
WA2VOI/0	MN	6	—	8	—
KB0IKP	MN	4	1	8	450
N0KE	CO	3	1	5	500
W0PHD	MN	2	2	10	—
N0UK	MN	2	1	3	514
WB0LJC	MN	2	1	1	740
VE4MA*	MB	27	30	133	1287
VE1ALQ*	NB	17	20	60	700
VE6TA*	AB	15	14	45	300
VE3KDH	ON	3	—	13	345
XE2/N6XQ		3	2	8	142

13 cm (2300-2310, 2390-2450 MHz)

(Minimum terrestrial DX = 250 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	11	1	16	486
W1JR	NH	9	2	11	414
W1VT	VT	8	1	15	413
K1UHF	CT	8	1	11	353
AF1T	NH	5	1	7	374
K1MAP	MA	4	1	4	312
K2DH*	NY	16	8	56	1535
WA2LTM	NJ	14	1	24	705
N2WK	NY	10	2	31	950
WA3AXV	PA	14	—	25	1079
W4HHK*	TN	10	—	16	936
K4MRW	AL	8	1	8	925
K4RF	GA	4	1	5	293
W5LUA*	TX	20	19	81	1533
W5ZN	AR	9	1	25	850
W5RCI	MS	8	1	15	—
AA5C	TX	7	1	18	1082
W5DFU	OK	6	—	13	885
N5QGH	TX	4	1	12	1013
WA5TKU	TX	2	1	10	169
N6CA	CA	3	3	15	978
W6HCC	CA	1	1	10	266
W7PUA	OR	2	1	11	605
N3CEV/7	WA	1	1	1	463
K2YAZ	MI	5	1	21	600
N8DJB	OH	2	1	6	—
K3SIW/9	IL	13	1	44	1041
W9ZIH	IL	9	1	10	1184
W0UC	WI	6	1	10	738
WB9SNR	IL	6	1	9	812
WA0BWE	MN	9	2	25	1353
N0HJZ	MN	7	1	14	1086
W0LD	CO	3	—	7	457
K0RZ	CO	2	1	11	238
NT0V	ND	1	2	3	400
VE4MA*	MB	12	16	45	619
XE2/N6XQ		1	1	3	508
ZS6AXT*		—	16	14	—

9 cm (3300-3500 MHz)

(Minimum terrestrial DX = 200 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W1VT	VT	6	1	12	419
K1TEO	CT	5	1	6	360
AF1T	NH	4	1	3	374
K2DH	NY	10	2	18	943
WA2LTM	NJ	9	1	13	705
N2WK	NY	4	2	19	950
K1MAP	MA	3	1	3	312
WA3AXV	PA	6	—	8	664
K4RF	GA	2	1	2	293
W5LUA*	TX	9	4	27	1353
W5ZN	AR	6	1	16	850
AA5C	TX	5	1	14	1048
N5QGH	TX	3	1	7	294
W5DFU	OK	2	1	5	350
WA5TKU	TX	1	—	6	—
N6CA	CA	3	3	12	978
W6HCC	CA	1	1	10	223
W6OYJ	CA	1	1	2	344
W7PUA	OR	2	1	7	418
N3CEV/7	WA	1	1	1	463
W9ZIH	IL	11	1	26	943
K3SIW/9	IL	9	1	29	880
WB9SNR	IL	5	1	8	518
WA0BWE	MN	4	2	16	1353
W0LD	CO	4	—	6	517
K0RZ	CO	2	1	6	130
N0HJZ	MN	2	1	5	200
VE4MA*	MB	3	3	8	619
XE2/N6XQ		1	1	1	986

5 cm (5650-5925 MHz)

(Minimum terrestrial DX = 200 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W1GHZ	MA	6	1	8	367
W1VT	VT	5	1	9	419
K1MAP	CT	1	1	2	312
K2DH	NY	7	1	13	943
N2WK	NY	3	2	11	892
WA3AXV	PA	3	—	6	366
NO3I	PA	1	1	1	334
W5LUA*	TX	7	11	36	1187
W5ZN*	AR	7	3	19	850
AA5C	TX	5	1	17	1134
WD5AGO	OK	2	1	5	138
N5QGH	TX	1	1	6	256
N6CA	CA	3	3	20	978
W6HCC	CA	2	1	10	239
W6OYJ	CA	1	1	1	344
N3CEV/7	WA	1	1	1	463
K2YAZ	MI	3	1	5	600
W9ZIH	IL	11	1	31	943
K3SIW/9	IL	8	1	29	800
WB9SNR	IL	5	1	7	614
W0KRX	MN	5	1	7	620
K0RZ	CO	2	1	5	125
WA0BWE	MN	2	1	2	672
VE4MA	MB	1	6	7	35
XE2/N6XQ		1	1	1	613

3 cm (10-10.5 GHz)

(Minimum terrestrial DX = 150 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
AF1T	NH	9	1	11	425
W1GHZ/1	NH	8	1	13	549
W1GHZ/1	VT	8	1	11	501
W1VT	VT	7	1	16	352
K1UHF	CT	7	1	11	272
K1MAP	MA	7	1	8	241
W1AIM	VT	6	1	10	388
K1AE	NH	7	1	10	486
K1AE	MA	7	1	8	238
N1RWM	MA	7	1	8	238
W1VT	NH	6	1	8	549
N1RWM	NH	6	1	8	486
K2DH	NY	6	2	15	943
WA2LTM	NJ	4	1	5	296
N2WK	NY	3	2	9	892
W2EV	NY	2	2	9	266
KB2VGH	NY	1	1	6	—
WA3AXV	PA	7	—	11	548
K4RF	GA	1	1	2	153
W5LUA*	TX	9	12	35	510
AA5C*	TX	6	9	25	475
N5QGH	TX	3	1	11	382
W5ZN	AR	2	1	3	510
WW2R/5	OK	2	1	2	151
W6HCC	CA	5	2	40	865
WA6CDR	CA	3	2	28	813
WB6CWN	CA	3	2	18	1123
K6OW	CA	2	2	23	864
N6CA	CA	2	2	16	987
W6YLZ	CA	2	2	16	812
W6OYJ	CA	2	2	13	657
N6XQ	CA	1	1	11	400
KK6TG	CA	1	—	7	771
W7PUA	OR	2	1	12	605
W9ZIH	IL	10	1	22	898
K3SIW/9	IL	7	1	15	464
WB9SNR	IL	5	1	10	742
K0RZ	CO	3	1	8	216
W0LD	CO	1	—	1	165

12 mm (24-24.25 GHz)

(Minimum terrestrial DX = 1 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
KA2MCU	NY	2	1	2	80
W2EV	NY	1	2	4	66
KB2VGH	NY	1	1	5	38
K2DH	NY	1	1	2	16
WA2BAH	NY	1	1	1	2
W4SW	VA	1	1	2	66
K5RHR	NM	1	1	3	37
W5LUA	TX	1	1	2	47
N5QGH	TX	1	1	2	23
W5ZN	AR	1	1	1	47
AA5C	TX	1	1	1	11
W6HCC	CA	1	1	6	170
N6CA	CA	1	1	5	167
K6OW	CA	1	1	5	147
KK6TG	CA	1	1	1	256
W6OYJ	CA	1	1	1	133
N6XQ	CA	1	1	5	175
K3SIW/9	IL	1	1	3	60
W9ZIH	IL	1	1	2	70
WB9SNR	IL	1	1	1	113
W0LD	CO	1	1	2	75

6 mm (47-47.2 GHz)

(Minimum Terrestrial DX = 1 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W2SZ/1	MA	3	1	7	106
W2EV	NY	1	1	4	38
W2SZ/4	VA	1	1	5	114
WA1ZMS/4	VA	1	1	1	66
K2AD/4	VA	1	1	1	66

2.5 mm (119.980-120.020 GHz)

(Minimum Terrestrial DX = 1 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
WA1MBA	MA	1	1	1	1.5

2.0 mm (142.0-149.0 GHz)

(Minimum Terrestrial DX = 1 km)

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
WA1MBA	MA	1	1	1	3.8

—Information not supplied
*Some stations worked via EME (moonbounce)
†Terrestrial distance

Stan Horzepa, WA1LOU*

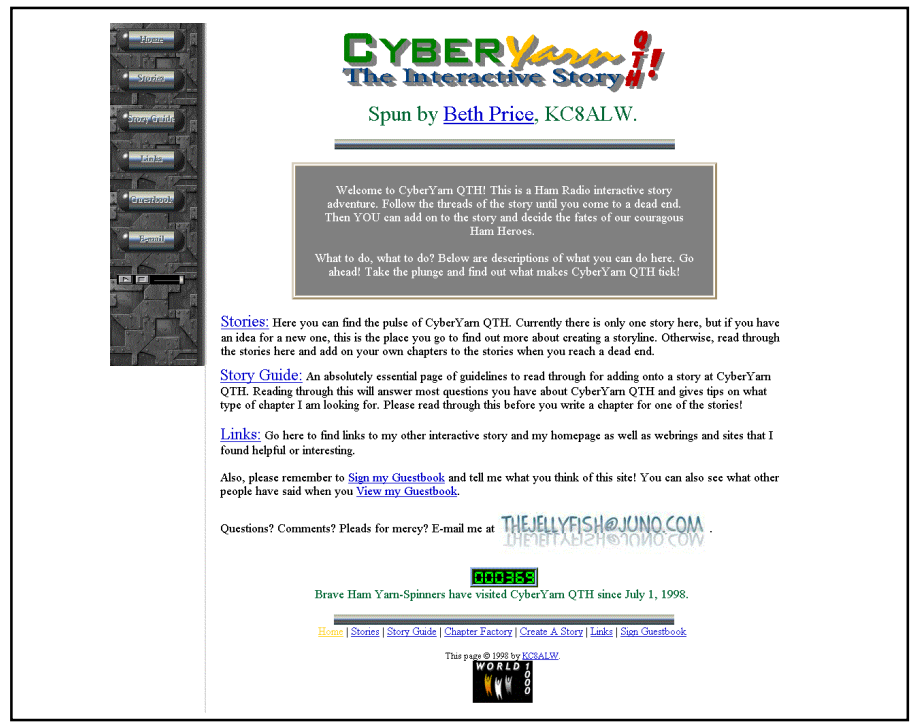
Web Page Building: One More Thing!

Judging by your mail, the three Digital Dimension installments (Sep-Nov, 1998) about building your own Web page were a big hit. Early on in that series, I wrote that you need a site for your Web page. I mentioned that some companies provide free space for your Web-page masterpieces. Some have strings attached (like ad insertions on your page); some do not.

Folks wrote to tell me about their free Web-site providers, like Greg Stilwell, AE9W, who suggested that I mention XOOM (http://xoom.com/home/), which offers 11 megabytes of free space for noncommercial Web pages. Beth Price, KC8ALW, wrote to point out "a very cool site that allows ham-radio operators to get Web pages with unlimited space for free—just because we're hams!" The address of this site is http://www.qsl.net/. After receiving Beth's message, I received another message mentioning QSL.net, which was followed by a stream of messages extolling the virtues of QSL.net.

I decided that I had better surf over to QSL.net and check it out. Sure enough, I found that QSL.net is "dedicated to the sole purpose of furthering the abilities and interests of the Amateur Radio community. If you are a licensed Amateur Radio operator you are invited to reserve your free space on this server now. Sign up and you will receive free e-mail, with forwarding to your existing service, along with free server space to move your homepage to this server, mirror your existing one, or lose all those excuses and finally start one." (By the way, QSL.net is funded by Alan Waller, K3TKJ, and by contributions from its users.)

The site seems too good to be true, but it really exists! There are already hundreds of ham-radio Web pages there. I know that if I was starting a ham radio Web page today, QSL.net is the place where I would build it.



Now for something completely different in Amateur Radio Web pages: KC8ALW's CyberYarn QTH at http://www.qsl.net/kc8alw/.

Wireless Web Sites of the Month

In addition to mail about free Web site providers, I also received messages from folks asking me to check out their own Web pages. Since we are in the midst of the holidays, I decided to be generous this month and list all the Web sites that you folks sent in response to my Web-page-building series.

Amateur Radio World at http://www.mindspring.com/~jjweinb/arworld/arwindex.html is Jeff and Michelle Weinberg's (W0QO and WA4WSP) digital world on the Web.

CyberYarn QTH at http://www.qsl.net/kc8alw/ is a ham-radio interactive story adventure run by Beth Price, KC8ALW. Follow the threads of the story until you come to a dead end. Then you can add on to the story and decide the fates of our courageous ham-radio heroes.

N1QQ (Richard Ward) calls http://www.qsl.net/n1qq/ his home.

The N6QAB (Kevin Kelly) Radio Direction Finding Web Site can be found at http://www.qsl.net/n6qab/index.htm.

OM International Sideband Society (OMISS) has their Web page at http://www.omiss.net and Greg Stilwell, AE9W, is its Webmaster.

The RTTY Web Site at http://www.megalink.net/~n1rct is run by Dick Stevens, N1RCT. It is a warehouse of RTTY resources.

V63PD (Peter Denman) from Chuuk (formerly Truk) in Micronesia has a stateside Web site at http://www.qsl.net/v63pd/.

W4RLD (Rick Daniel) has his site at http://www.geocities.com/Augusta/7117.

WA6DFG (Al Pantalone) has his page at http://www.c-zone.net/alp/.

Digital Reading

The papers from the annual ARRL and TAPR Digital Communications Conference always represent Amateur Radio beyond the state of the art. As such, I always look forward to the publication of the papers.

The 1998 installment of the papers is now available from ARRL headquarters, and they address the future of spread spectrum, APRS, high-speed packet and even a new vision for the Amateur Radio service. This is *must* reading for digitally active hams, as well as every ham looking to the future of the service.

The Big Two-Oh

It's hard to believe, but this year marks the twentieth year that I have had the honor of writing a column for *QST*. I hope my columns have made Amateur Radio more enjoyable for you (I know I enjoy writing them). I hope I will be able to keep writing them for a long time to come.

In closing, I want to extend best holiday wishes to all of you from all of us at WA1LOU: Stan, Laurie, Hayley and Q.T. Pie (woof-woof). QST

*One Glen Ave
Wolcott, CT 06716-1442
stanzepa@ct2.nai.net
http://www.tapr.org/~wa1lou

ITU 1998 Plenipotentiary Conference in Minneapolis

By Larry E. Price, W4RA, and Paul L. Rinaldo, W4RI

Secretary-General Y. Utsumi

Deputy Secretary-General Roberto Blois

Director, Radiocommunication Bureau, Robert Jones, VE3CTM

The International Telecommunication Union (ITU) convenes a Plenipotentiary Conference every four years. Plenipotentiary means *all powerful* or *omnipotent*—your choice. A Plenipot is like a board of directors and full stockholders' meeting all wrapped into one. Most ITU Member States come to these Conferences. The Plenipot is *competent* (that word is used a lot) to revise the ITU's Constitution, Convention, Resolutions, Decisions, and budget, elect officials, schedule World Radiocommunication Conferences (WRCs) and even change their agendas.

Paul Rinaldo participated in the Conference as a member of the United States delegation representing the ARRL. This was his second Plenipot, the first one being at Kyoto, Japan in 1994. One would have thought that Larry Price attended his first Plenipotentiary Conference as an observer from the International Amateur Radio Union (IARU), which is usually who he represents. However, through an apparent oversight when the Convention was last revised, organizations in the same category as the IARU, including the Red Cross and about 45 others, were omitted from the list of observers to Plenipots. Instead, because of a longstanding relationship between the IARU and the United Nations office responsible for disaster services, he joined the UN observer group as a senior advisor.

Why were we there? A principal goal was to modify the basic charter of the ITU to permit the IARU to participate in future Plenipotentiary Conferences. Thanks to the New Zealand and United Kingdom delegations, the Convention was modified to permit the IARU and the other 46 international organizations to be observers at future Plenipots. We also were able to meet with ITU officials and delegates from many countries—many of the same people who represent their countries at WRCs. This was done both in formal sessions and in the many informal receptions and other gatherings throughout the four-week conference.

ARRL President Rodney Stafford, W6ROD, and Executive Vice President David Sumner, K1ZZ, were at the conference for two days as corporate visitors of the US Delegation to hold informal meetings with delegates. Dakota Division Director Tod Olson, K0TO, and Vice Director Jay Bellows, K0QB, headed up the host Amateur Radio committee that installed and operated special-event station W98ITU throughout the conference from a special room located on the second floor of the conference center. This provided delegates with an opportunity to see Amateur Radio in action. Amateurs involved in W98ITU and N98ITU included K0BUD, K0CBH, K0CJ, K0CVD, K0HB, K0IVO, K0JA, K0JE, K0RGK, K0SF, K0TK, K0VPR, K0XQ, KB0PXF, KC0BH, KG0BP, KG0DK, KI0DN, N0BGO, N0BM, N0ISL, N0JPG, N0JPH, N0MGQ, N0XB, W0AUS, W0HW, W0MBD, W0TN, W0UC, W0VNE, W0XV, W0ZQ, WA0RSE, WA0TDA, K3WT, KD3SG, WB8BZH and W9WW. Apologies to anyone we may have left out; the hospitality extended by the Twin Cities area amateurs was above reproach. A second station, N98ITU, was operated during the CQ World Wide DX Contest on the last weekend of October from the nearby station of W0AIH.

Other happenings of interest at Minneapolis included:

• Election of two radio amateurs, Hugh Railton, ZL2MT, and John Tandoh, 9G1TR, to the ITU Radio Regulations Board.

• The introduction and adoption of UN-originated Resolutions relating to the Tampere Convention on emergency telecommunications and protection of humanitarian workers and radio operators when providing assistance in disaster situations.

• Protection of the rights of the IARU to participate in WRCs, Study Groups and Working Parties.

• Scheduling of the next Radiocommunication Assembly and WRC in May-June 2000 in Turkey.

• Enhancing the observer status of Palestine in the ITU, particularly authority for the Secretary-General to issue a block of call signs and telephone country code.

We congratulate the new team of ITU elected officials:

Secretary-General: Mr Y. Utsumi (Japan)

Deputy Secretary-General: Mr Roberto Blois (Brazil)

Director, Radiocommunication Bureau: Mr Robert Jones, VE3CTM (Canada)

Director, Telecommunication Standardization Bureau: Mr H. Zhao (China)

Director, Telecommunication Development Bureau: Mr H. Toure (Mali)

Will ITU Charge for Amateur Satellites?

The Conference decided to charge fees for notification of satellite networks to the ITU Radiocommunication Bureau. The Plenipot established a Satellite Network Cost Recovery working group and scheduled a meeting for January 25 - 29, 1999 in Geneva to work out the details. The Conference debated, but did not approve, an exemption for government or non-profit satellites.

Notification is a process whereby administrations of various countries advise the ITU the details of planned satellite networks. The ITU then publishes the information to other administrations to give them an opportunity to raise concerns about potential interference to other satellites or terrestrial stations.

The State Department is holding several preparatory meetings to develop the US position. At stake are notification costs for all new US Government, commercial and non-commercial satellites. Whether cost recovery will be imposed on amateur-satellite pre-space notifications required under section 97.207(g) of the FCC Rules is not yet known. QST

Exam Info

*Edited by **Bart J. Jahnke, W9JJ** • ARRL/VEC Manager*

1999 ARRL/VEC Test Fee: $6.45

The FCC has announced that, effective January 1, 1999, the maximum allowable reimbursement for an amateur operator license examination is $6.49. This amount, up from $6.39 in 1998, is based upon a 1.5% US Department of Labor Consumer Price Index (CPI) increase between September 1997 and September 1998.

Volunteer examiners (VEs) and volunteer examiner coordinators (VECs) may charge examinees for out-of-pocket expenses incurred in preparing, processing, administering or coordinating examinations for amateur operator licenses. The amount of any such reimbursement fee for any one examinee at any one examination must not exceed the maximum reimbursement fee.

Accordingly, the ARRL/VEC has set its 1998 test fee at $6.45 for each examination (except for those examinations consisting of only Element 1A, Element 2, or both for which there is no charge—an ARRL/VEC policy). Any questions may be directed to the ARRL/VEC by calling 860-594-0300, or by sending e-mail to vec@arrl.org.

All Question Pool Updates on Hold

With Amateur license restructuring the current topic of much debate, the Question Pool Committee of the National Conference of VECs has announced that all question pool updates (including the Advanced pool update scheduled for 1999 use) have been put on indefinite hold until the restructuring debate has been resolved.

There is no specific FCC-announced timeline for their determination to be made public (aside from the Reply Comments deadline of January 15, 1999). Our best estimate is that nothing will be known regarding the outcome of the restructuring proposals until at least the summer of 1999, and possibly as late as the winter of 1999 or early 2000.

In the meantime, all present question pools will continue to remain in effect until further notice. The current question pools can be found on the ARRL Web at http://www.arrl.org/arrlvec/pools.html. If you need to find an exam location in your area, try our ARRL Web Exam Search page at http:/www.arrl.org/arrlvec/examsearch.phtml.

ARRL Spring and Fall National Exam Days for 1999

- **Spring National Exam Days—Saturday and Sunday, April 24-25, 1999**
- **Fall National Exam Days—Saturday and Sunday, September 25-26, 1999**

Most areas across the US have regularly scheduled examination opportunities. While the less populous areas may have tests each month or so, metropolitan areas may have exams each week, and/or on some weeknights.

For people who stay in touch with the amateur community, the dates, times and locations of local exams are fairly well known. For others, especially newcomers, this information may be difficult to find. Many of these prospective hams may not even know whom they can contact.

For these, and other newcomers and upgraders, the ARRL sponsors Spring and Fall National Exam Days. This year's events are scheduled for full weekends in the spring, on Saturday and Sunday April 24-25, and in the fall on Saturday and Sunday, September 25-26. These are the last Saturday and Sunday of their respective months.

If you are looking for information regarding exams to be held in your area, or the questions pools, see that ARRL/VEC Web site at http://www.arrl.org/arrlvec/ or call 860-594-0300. For instructors and club info, contact the ARRL at 860-594-0200. The ARRL can provide media kits for your use in publicizing your Spring and Fall 1999 ARRL National Exam Days. Contact Jennifer Gagne, N1TDY, at ARRL HQ at 860-594-0328 or e-mail jgagne@arrl.org. QST

Strays

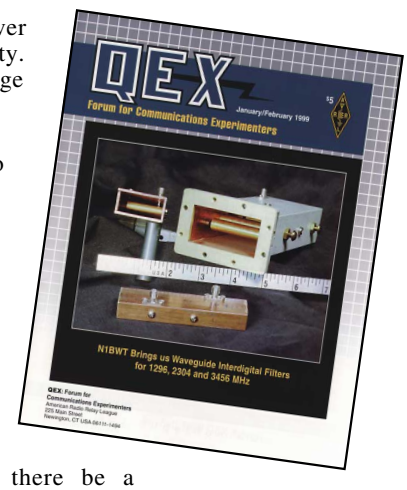
I would like to get in touch with...

◊ anyone who has 7-pin in-line sockets for subminiature 5702 tubes. Lewis Stafford, W4LGK, 2353 Kilkenny Way, Marietta, GA 30066.

RADIO DESIGNER TUTORIALS

◊ "ARRL Radio Designer and the Circles Utility," by William E. Sabin, W0IYH, appeared in the September/October and November/December issues of *QEX*. If you missed this informative tutorial, you can download the entire series (in Adobe *Acrobat* PDF format) from the ARRL Web at http://www.arrl.org/files/ard/. The file is **circles.pdf**.

Have you seen the new QEX?—WOW!



QEX's content is broader and deeper than ever before. It's a forum of active discussion and variety. The mix includes useful projects and a wide range of technical articles for hams at *all* skill levels.

In the Jan/Feb issue you'll see:

- Wind Loading and Yagis—What will it take to blow your beam down?
- A Handy Coil Winder—Nimble mechanics wind straight coils quickly.
- A Cheap Sweep—generator from a junk box.
- Tune SSB Automatically—See how DSP can tune a signal within 2 to 3 Hz.
- Identifying Spurs—Tips for UHF/Microwave beginners.
- A Compact Mobile Tuner—Small and efficient.
- Standard Programming Interfaces—Should there be a hamradio.dll?
- A Low-Distortion Front End—How about a +30 dBm third-order intercept?
- Phase Noise—measure it with simple equipment.
- A Temperature-Compensated DDS VFO—a great update to WB2V's popular project.
- Waveguide Interdigital Filters—easy microwave filters.

At 64 pages bimonthly, *QEX* offers you over four times the technical content of a single *QST*. Ham radio is alive in the new *QEX*. Check it out at http://www.arrl.org/qex/.

At the Foundation

*Edited by **Mary E. Robertson, N7IAL** • Secretary, ARRL Foundation Inc*

Youthful Contributors to Amateur Radio's Future

Spectrum defense is essential to the perpetuation of Amateur Radio enjoyment. Every ham knows this fact and many work to see that we keep our precious frequency allocations. But what if hamming had no newcomers, no new blood to enrich our tradition? What then?

Fortunately, more children are exposed to Amateur Radio's unique appeal than ever before, thanks in large part to club and classroom activities. Your support of the Victor C. Clark Youth Incentive Program means that many more kids can get a hands-on chance to sample the hobby of a lifetime. You can help preserve our future with a tax-deductible donation to *The ARRL Foundation VicYIP Program, 225 Main St, Newington, CT 06111.*

BRUCE D. WEAVER, K3LTM

The members of the Cowanesque Valley School Amateur Radio Club, of Westfield Area Elementary School, Westfield, Pennsylvania.

Cowanesque (Westfield) Valley School ARC Students Talk to *Mir*

By Bruce D. Weaver, K3LTM

Our school would once again like to thank the ARRL Foundation for the grant we received through the Victor C. Clark Youth Incentive Program. We have had a very successful year thanks to the grant and fundraising efforts of our members. We purchased the *ARRL Technician Video Course*, review software and extra study manuals. As a result, we now have two Technicians and one Technician Plus. We also purchased a new tri-band antenna and gave it a good workout during the School Club Roundup. We more than doubled our 1997 point total with 147 contacts!

We were also able to buy a new TNC that allowed our successful connect with the *Mir* space station packet mailbox and we sent a message to astronaut Andy Thomas, KD5CHF, when he was aboard the station. Two days later we received his reply—a thrill for students and teacher alike!

Our goal is to get the new licensees on the air using our club equipment until they can purchase their own. Thanks again for your support. You have helped us sow the seeds of many more Amateur Radio efforts at Westfield Area Elementary School.

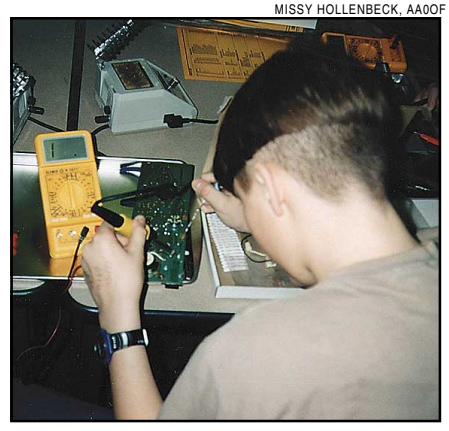
In Andover, Kansas, They Solder for Success!

By Missy Hollenbeck, AA0OF, and Kurtis Boughton, N0UGJ

On behalf of our middle school students, area Amateur Radio operators, and faculty members of Andover Middle School, we would like to thank you for your generous gift to fund our project, *Soldering for Success*. As anticipated, our Introduction to Amateur Radio class was a success. The grant funds were used to purchase individual AM radio electronics kits for each student.

We wish we could say that all 25 students are now licensed, but we can at least say that several students passed the Novice theory exam. All of our students have an increased awareness, respect and understanding of Amateur Radio. Many students plan to keep studying for their licenses.

MISSY HOLLENBECK, AA0OF



An Andover Middle School student hard at work on an AM radio project.

Probably one of the best things that happened with this project was that members of the Flint Hills ARC helped the students with their soldering projects. Dick, N0TGR, and Brian, KB0ZRN, developed close mentoring relationships with the students as they worked collaboratively on the projects. Our radio class is successful due to the team spirit of fellow Amateur Radio operators—locally and far away.

Cody, one of our seventh graders, exclaimed, "Mrs Hollenbeck, this is the *best* class I've ever taken!" A teacher remarked, "Boy, you Amateur Radio operators sure are a close-knit group." Amazing—Amateur Radio operators working together to encourage today's young people to do their very best!

Thank you, ARRL Foundation, for making a difference in the lives of 25 students who experienced the mystery and magic of Amateur Radio. QST

Silent Keys

By Kathy Capodicasa, N1GZO

It is with deep regret that we record the passing of these amateurs:

W1AN, John A. Curran, Palmetto, FL
KA1CDP, Lili P. Hnilicka, Harvard, MA
W1GDG, Vincent L. DeLaurentis, Orange, CT
W1HOP, Leon L. Kramer, Manchester, CT
W1IWP, Benedict J. Parisi, Onset, MA
W1IXA, Roger Sweetser, Sharon, VT
W1JPL, Edmund F. Kinsman, Norwood, MA
*AB1N, Kenneth E. Palm, Lexington, MA
K1PBL, Robert M. Fraser, Lincoln, MA
K2AQB, George P. Epstein, West Palm Beach, FL
*K2BF, Benjamin J. Friedland, Mendham, NJ
*WB2BNH, Harold J. Parks, Yonkers, NY
*K2CN, Arthur H. Benner, Watchung, NJ
N2DBR, Denise B. Remmert, McKinney, TX
KA2EFF, Robert Shevlin, Rochester, NY
WA2FMD, Marvin C. Goodfellow, Albuquerque, NM
W2IXX, Alfred Guthenberg, Hicksville, NY
W2MGQ, Jerome Kaye, Far Rockaway, NY
WA2OLJ, Paul M. Cook, Whippany, NJ
N2RHS, Richard W. Curles, Trenton, NJ
W2RSD, Howard D. Bard, East Syracuse, NY
WA2SEF, John H. Kahrs, Long Lake, NY
N2VGK, Benjamin F. Pearsall, Slingerlands, NY
N2WW, Frederick K. Ritter, Evansville, IN
NB3C, Thomas F. Carr, Silver Spring, MD
WB3EMB, William D. MacDonald, Malvern, PA
KC3EN, Robert H. Stover, New Oxford, PA
W3HGD, Irving C. Klepper, Severna Park, MD
W3JWH, William Gray, Milford, DE
N3KMA, John F. Fitz, Myersville, MD
N3KWG, Howard Monnin, St Petersburg, FL
N3NAG, Harold M. Farnham, Bethesda, MD
W3SSY, W. R. Hague, Colonial Beach, VA
W4BP, Reid O. Martin, Tavares, FL
KF4CCL, Halbert L. Blair, Asheville, NC
KK4CR, Ronald I. McLean, Zephyrhills, FL
KC4DC, Fincher C. Powell, Avondale Estates, GA
WA4DW, Richard S. Wilkins, Port Saint Lucie, FL
WD4ELY, Gene C. Mills, Theodore, AL
KA4EOF, Frances E. Asher, Eustis, FL
K4GHJ, Donn Dieter, Raleigh, NC
W4GNG, Archie F. Buckhalt, Dothan, AL
KI4IM, Chester Hajek, Port Saint Lucie, FL
WD4MOI, John T. Tucker, Eastman, GA
W4NLN, Leo C. Williams, Louisville, KY
K4NMF, John W. Crowley, Wilmington, NC
KD4OLA, Carl W. Brorup, Sanford, FL
*KB4PEX, Patricia T. Fagan, Pickens, SC
KE4QQV, W. Mark Maynard, Spartanburg, SC
KC4XF, Julian L. Hudson, Fort Myers, FL
KB4ZUQ, Frances M. Litke, Melbourne, FL
WD5CLK, Marvin L. Garrett, Fort Worth, TX
K5HMN, Paul B. Vandenberg, Elephant Butte, NM
*W5IHL, Louis C. Lechenger, Houston, TX
WA5IND, Robert L. Fitzpatrick, Las Cruces, NM
W5IRH, Ted J. Howell, Muldrow, OK
KA5NMM, Henry G. Threlfall, Cherokee Village, AR
W5OL, Robert A. Huffhines, Cockrell Hill, TX
KB5QHD, Donald S. Hickman, Plainview, TX
W5QNR, George Burke, Albuquerque, NM
W5RPJ, Basil A. Phillips, Georgetown, TX
K5TGE, Joseph J. Sarno, Arlington, TX
N5UBH, Jimmy C. Cox, Roswell, NM
KB5WDX, Jo Ann Little, Arlington, TX
WA5WYN, Martin R. Hukill, Altus, OK
KC5ZMN, Christopher J. Flitter, Summit, AR
W5ZU, G. M. Sayre, Roswell, NM
WA6BBY, Robert A. Hutton, Ventura, CA
N6CAE, Arnold M. Cowan, Long Beach, CA
‡W6CKU, Richard G. Schroeter, Woodland Hills, CA
W6DDL, James E. Vaughan, Lakewood, CA
K6DG, Vernon C. Hadley, Long Beach, CA
W6EMT, Roy H. Gregson, Bremerton, WA
K6IL, Joseph A. O'Brien, Rancho Palos Verdes, CA
K6MHY, Kenneth M. Snapp, Golden, CO
N6MWI, Warren G. Stanton, Stuart, FL
KE6PSO, Frank I. Thrift, Rncho Pls Vrd, CA
W6QEN, Weaver M. Slape, Concord, CA
KB6TOK, Kemble R. Crowder, San Diego, CA
K6TW, Elliot J. Secondari, San Francisco, CA
KB6WZR, Russell E. Bowen, Clements, CA
K6YJZ, Edwin S. Powell, Pasadena, CA
*WA6YNQ, Ramon J. Wallenborn, Vista, CA
N7BQE, Paul M. Jacobs, Kanab, UT
N7ESE, William M. Conner, Sun City, AZ
KC7EVX, Sam M. Bailey, Corvallis, MT
*W7KZE, Larry R. Luchi, Everett, WA
N7TUA, Jennifer C. Nugent, Reno, NV
KC7VTS, Robert A. Osman, Phoenix, AZ
KB7XW, Harner Selvidge, Sedona, AZ
W8AUT, Paul W. Nutson, Davison, MI
KC8AV, Edwin G. Bilz, Fairfield, OH
K8DHN, John E. Hewitt, Lansing, MI
KA8EAI, Russell E. Schworer, Grafton, OH
W8EYU, Thomas E. Beal, Crossville, TN
N8FGH, George C. Bloomfield, Detroit, MI
W8GSN, J. G. Freeland, Martinsburg, WV
KA8IMU, Anthony Romano, Garfield Heights, OH
K8JFI, Howard E. Simmons, Burton, OH
N8LMN, Gregory M. Browne, Sandusky, OH
W8NEP, M. L. Vest, Morgantown, WV
KA8NWW, James B. Foote, Gnadenhutten, OH
WD8PLL, Parnell Cole, Hamilton, OH
W8RLW, L. T. Jones, Trotwood, OH
KA8RWM, James S. Desy, Manistee, MI
WA8YEI, Avril O. Wilson, Fayetteville, WV
W8YHA, Norman J. Frisch, Oshkosh, WI
KB8ZDM, Carl L. Diefenbach, Mount Gilead, OH
W9BNZ, Fred J. Klotter, Chicago, IL
W9BPP, Robert C. Queen, Neoga, IL
W9CRY, Terry Parker, Madison, IL
K9FAB, William E. Bradley, Cedar City, UT
W9FNW, Wayne Merideth, Carthage, IL
W9GKJ, Frank J. Mayer, Wausau, WI
W9MPE, Nathaniel J. Rubens, Joliet, IL
N9UJX, Steven W. Welch, Chicago, IL
W9UWX, Kenneth F. Galitz, Chicago, IL
K9WWW, Albert J. Baier, Oshkosh, WI
WA9ZZG, Voyle R. Dawson, Naperville, IL
KB0BFC, Angela M. Biondi, Saint Peters, MO
WB0BXE, Horace W. Johnson, West Liberty, OH
W0CZU, Clifford D. Holland, Perryville, MO
KB0DFT, Marjorie A. Kramer, Arvada, CO
KB0EPN, F. A. Dodd, Colorado Springs, CO
WD0FCO, Ed J. Meyer, Trinidad, CO
K0GDS, Delmer L. Hybertson, Centerville, SD
KA0GFM, Michael H. Weihrauch, Saint Paul, MN
KE0OW, Roxy V. Van Houtan, Colorado Springs, CO
W0PQ, Charles L. Lundblad, Kansas City, MO
*WB0PZJ, Glen T. Rowen, Commerce City, CO
W0RHQ, Phay M. Hussey, Goodland, KS
KB0TKW, Sherry L. Heinrich, Williston, ND
*VE2ALE, Joseph Unsworth, Vaudreuil, QC, Canada
SM7CX, Hans Fahlstrom, Vienna, Austria
UA3CR, Leonid M. Labutin, Moscow, Russia

*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

75, 50 and 25 Years Ago

January 1924

◊ The cover drawing by Clyde Darr, 8ZZ, and S. Scott, 9CCW, takes a prophetic look at what DXing will be like in the future—1930—with QSLs on the wall from all over the world! Under the heading "Achievement," the editorial speaks of "hot news…breaking every day" and "amateur records …being smashed to smithereens, including the first 100-meter transatlantic work by anybody." The editorial also addresses the lawlessness of some hams and unlicensed operators.

The lead article, "Transatlantic Amateur Communication Accomplished!", reports on 1MO and 1XAM working French 8AB: "1MO Wins QST's Brown Derby for Feat; One Hundred Meters Does the Trick." John Reinartz, 1QP-1XAM, tells about "1XAM's Transmitter," which made the transatlantic hop. Lewis Hull discusses "Anti-Regenerative Amplification," which will keep tuned RF stages from oscillating.

"New World's Relay Records" are detailed, with message traffic being relayed from France to Connecticut to California to British Columbia to Greenland, among other paths. Don Mix, 1TS, still near the North Pole on the schooner *Bowdoin*, was among the record-setting ops; some of his radio work was also reported in "Splendid Contact with the *Bowdoin*." "Who's Who in Amateur Wireless" gives "a few close-ups of the A.R.R.L. Headquarters Staff, and how they spend their time."

January 1949

◊ The cover photo shows a rig built by Ed Tilton, W1HDQ, using the widely available surplus "doorknob tubes" on 420 Mc. The editorial discusses "The 21-Mc. Band," which will be made available to hams after the international radio conference's work is completed. The editorial guesses that the new band will be opened to hams in October.

By Goodman, W1DX, describes "The 'Basic' 'Phone Exciter," which provides "single or double sideband or P.M. from one transmitter." Richard Smith, W1FTX, tells about his 20-watt phone and c.w. rig for mobile, portable-emergency and fixed-station use in "80 and 40 on Wheels." "Propagation and Antennas above 50 Mc.", by M. R. Ludwig, tells the reader what distances to expect on 6 and 2 meters, and Calvin Hadlock, W1CTW, tells about "Making the Higher Frequencies Pay Off," with discussion of antenna performance at v.h.f. and higher. Ed Tilton, in the cover article, "A Doorknob Oscillator for 420 Mc.", describes a simple rig that provides up to 50 watts input. "The Black Box" tells about a rig built by Albert Hayes, W1IIN—a compact two-stage 80 and 40 meter transmitter with a 6L6 VFO and an 807 output stage.

Herb Brier, W9EGQ, tells about "TK," who promises "I Will Do It in '49!" TK is hooked by the ARRL DX Competition, and had been scoring well in each year's DX contest. He decided he was going to push for the *top* score in 1948. After problems and misadventures in abundance, TK put together a great score—but then learned that nearby ham friend Jim had beaten him! Thus, the promise stated by the title.

January 1974

◊ The cover collage of photos shows the "Year in Review," including topics such as 1973 Field Day Results, "ARRL Fights 224-225 MHz CB," the earthquake in Managua, amateur repeater WR9AAA, and satellite DX achievements. The editorial, "A Not-Too-Fond '73' to 1973," discusses regulation and the attack of amateur frequencies during the year, and commends the unity of the ham community in fighting those attacks.

The lead article, "Interdigital Converters for 1296 and 2304 MHz," by R. E. Fisher, W2CQH, describes the design and construction of modern, low-noise, interdigital converters that avoid the need for careful measurement and tweaking. James Hagan, WA4GHK, describes "A Crystal-Controlled Converter and Simple Transmitter for 1750-Meter Operation," and Edward Meade, K1AGB, tells about "A 2-KW Amplifier for 144 MHz." HQ's Doug DeMaw, W1CER, details "HW-7 QRP Transceiver Modifications" for that popular Heathkit rig. "Recent Equipment" takes a look at the Drake R-4C receiver and the KLM log-periodic antenna.

"In the Public Interest…" tells about the presentation of New England Ham of the Year awards to teenage hams Hans and Roger Strauch, WA1NRV and WA1KZE, for their outstanding emergency communication work following the Managua earthquake. A photo in "OSCAR News" shows W1BIH/PJ9JT and W1FTX waiting at the rig for the next OSCAR pass over Curacao. Elsewhere in the issue, John Thompson, W1BIH, tells about "The World's Best DX location," with a photo showing the three ops (K4JTS, W4GF, and W1BIH) that made 5500+ contacts during the 1973 ARRL Phone DX Contest. —*Al Brogdon, W1AB* QST

Contest Corral

Edited by **George Fremin III, K5TR***

FEEDBACK

The **1998 International DX Contest** Multiop, Single Transmitter plaque winner for Europe should be listed as **TM9C** with 2,500,848 points. The club score for the **Central Texas DX and Contest Club** in the 1998 International DX Contest should have been listed as a Local rather than a Medium Club. **9A9D** (9A4KK op) should have been listed as single band 15 meters instead of 20 meters.

The **1997 CW November Sweepstakes** Hudson Division Multiop winner should be listed as **NA2N** with a new division scoring record of 168,170 points.

LZ4BU was omitted from the **1998 RTTY Roundup** report with a total of 5060 points. In addition, **DL4RCK** with 20,020 points and **F6IFY** with 17,750 points were also omitted.

W7AH was omitted from the **1997 10 Meter Contest** results scoring 131,740 points in the AZ section. **K6SE**'s score was omitted and should read 150,272 points in the High-power, CW-only category for the LAX section.

W1AW Qualifying Runs are 10 PM EST Thursday, January 7, and 9 AM EST Friday, January 22. The **West Coast Qualifying Run** will be at 9 PM PST on Wednesday, January 6. Check the W1AW schedule for details.

January

1

ARRL Straight Key Night. See your December 1998 *QST*, page 97.

2-3

ARRL RTTY Roundup. See your December 1998 *QST*, page 96.

Kid's Day Operating Event. See "Kid's Day!" by Larry "Tree" Tyree, N6TR, in this issue.

8-10

Japan International DX Contest, CW, low-band portion. Sponsored by *Five Nine Magazine*, from 2200Z Jan 8 until 2200Z Jan 10 (high-band CW portion is 2300Z Apr 9 until 2300Z Apr 11; phone is 2300Z Nov 12 until 2300Z Nov 14.) Work JAs only. Low bands are defined as 160/80/40; high bands are 20/15/10. Operate no more than 30 hours (JAs operate full 48). Single operator multi/single band, high (>100 W) or low (<100 W) power, multi-single, or maritime mobile. Exchange RS(T) and CQ Zone; JA stations exchange prefecture number (1-50). Score 4 pts/QSO on 160; 2 pts/QSO on 80 and 10; and 1 pt/QSO on 40, 20 and 15. Multipliers are JA prefectures worked per band (max 50). Final score is QSO points × multipliers. Electronic entries accepted. Awards. Send logs postmarked by Feb 28 (high-band, May 31; phone, Dec 31) to JIDX Contest, c/o *Five-Nine Magazine*, PO Box 59, Kamata, Tokyo, 144 Japan or e-mail them to jidx-log@dumpty.nal.go.jp; http://jzap.com/je1cka/jidx/.

Meet The Novices and Technicians Day, sponsored by YLRL, from 1500Z Jan. 9 to 0500Z Jan. 10. CW and phone. YLs only, use only Novice/Technican HF subbands along with 6 meters, 2 meters and 70 centimeters (no repeater contacts). Exchange RS(T), name, QTH, license class. 3.676, 7.133, 21.133, 28.176, 28.333 MHz. Score 3 pt/QSO for each YL Novice/Technician worked; 2 pt/QSO for each General or Advanced YL worked; and 1 pt/QSO for each Amateur Extra YL worked. Final score is total QSO points. Awards. Send logs postmarked within 30 days of contest to Cleo Bracket, K0JFO, 810 Town Square Dr, Fremont, NE 68025.

Hunting Lions in the Air Contest, sponsored by the International Association of Lions Clubs, from 0900Z Jan 9 until 2100Z Jan 10. Operate no more than 24 hours; off periods must be at least 1 hour. Single op all band and multi-single. Multi-singles have a 10-minute rule. 80 40 20 15 10 meters. Work stations once per band, regardless of mode. Exchange RS(T) and serial no. Lion/Lioness/Leo Club members will also send name, district and QTH of the club, and must sign "/L" or "Lion"; members of the Melvin Jones Memorial RC must sign "Melvin" or "/LM"; the Melvin Jones Memorial station will sign W7YU/MJM. Score 1 pt/QSO w/own country; 2 pts/QSO w/other country in same continent; and 3 pts/QSO w/different countries. Bonus points: Add 5 pts/QSO w/Lion members in the same country and 10 pts/QSO w/Lion members outside own country; 5 pts/QSO w/Melvin Jones Memorial RC members; and 5 pts/QSO w/W7YU/MJM. Multiplier is the total of different prefixes worked × 2. Final score is QSO points × multiplier. Awards. Send logs by Feb 14 to Lion Rad Handfield-Jones ZS6RAD, Lions Club of Midrand, PO Box 1584, Halfway House 1685, South Africa; http://home3.swipnet.se/~w-33991/hlita.htm.

QRP ARCI Winter Fireside SSB Sprint, sponsored by QRP ARCI, 2000-2400Z Jan 10. Single band, all band, high band (20-6) or low band (160-40). Work stations once per band. Exchange RS, state/province/DXCC country, and QRP ARCI number if member (nonmembers exchange power output). 1.860 3.865 7.285 14.285 21.385 28.385 50.130. Score 5 pts/QSO w/ARCI member, 2 pts/QSO w/nonmember on same continent, and 4 pts/QSO w/nonmembers on different continents. Bonus points: 2000 pts for using homebrew transmitter; 3000 pts for using homebrew receiver; and 5000 for using homebrew transceiver. Final score is QSO pts × states/provinces/DXCC countries × power multiplier (< 500 mW, ×15; < 2W, ×10; <10 W, ×7; >10 W, ×1) + bonus points. Send entries by Feb 19 to Cam Hartford, N6GA, 1959 Bridgeport Ave, Claremont, CA 91711, or e-mail them to CamQRP@cyberg8t.com.

North American QSO Party, CW, sponsored by the *National Contest Journal*, from 1800Z Jan 9 until 0600Z Jan 10 (phone is 1800Z Jan 16 until 0600Z Jan 17). Single op (no spotting nets) and multi-two. Single ops may have only one transmitted signal at a time; multi-twos have a 10-minute rule. All entries must use <150 W output power. Multiops may operate for the full 12 hours, Single ops may operate 10 hours, with off times at least 30 min long and marked in the log. Work stations once per band. CW in cw subbands only (phone in phone sub bands only). Exchange name and state/province/DXCC country. If your name or location change during the contest the change must be clearly marked in the log. Multipliers are states (including KL7/KH6), provinces, and other North American countries. Non-North American stations may be worked for QSO credit, but not multipliers. Final score is QSOs × multipliers. Team competition. Awards. Electronic awards accepted. Send CW logs to Bob Selbrede, K6ZZ, 6200 Natoma Ave, Mojave CA 93501; w9nq@ccis.com. Send phone entries to Bruce Horn, WA7BNM, 4225 Farmdale Ave, Studio City, CA 91604; bhorn@hornucopia.com.

15-17

North American QSO Party, phone. See Jan 8-10 listing.

22-24

ARRL January VHF Sweepstakes. See your December 1998 *QST*, page 96.

29-31

CQ WW 160-Meter DX Contest, CW, sponsored by *CQ Magazine*, from 2200Z Jan 29 until 1600Z Jan 31. (phone is 2200Z Feb 26 until 1600Z Feb 28), single op and multi-single. Single ops can be QRP (<5 W), low power (<150 W), or high power (>150 W). Use of spotting nets or PacketCluster makes you a multiop. Exchange RS(T) and state/province/DXCC country. Score 2 pts/QSO w/own country; 5 pts/QSO w/countries on same continent; and 10 pts/QSO w/different continents. Maritime mobiles count 5 pts/QSO, but do not count as multipliers. Multipliers are US states (48), Canadian call areas (13), and DXCC countries. KH6/KL7 are considered DX. US and VE do not count as countries. Final score is QSO points × multipliers. Awards. Electronic entries accepted. Club competition. Send logs by Feb 28 (Mar 31 for phone) to David L. Thompson, K4JRB, 4166 Mill Stone Court, Norcross, GA 30092; cq160@contesting.com.

REF French Contest, CW, sponsored by Reseau des Emetteurs Français, from 0600Z Jan 30 until 1800Z Jan 31 (phone is 0600Z Feb 27 until 1800Z Feb 28). Work French, French military, French overseas territorial and department stations. Single op all band/single band, and multi-single. 80 40 20 15 10 meters. Exchange RS(T) and serial number; French stations give RS(T) and department number or prefix (for territories and overseas department stations). Score 1 pt/QSO w/stations in the same continent, 3 pts/QSO w/stations in different continents. Multipliers are French departments, French territory and overseas stations and F6REF worked per band. Final score is QSO pts × multipliers. Awards. Send logs by Mar 15 (Apr 15 for CW) to Reseau des Emetteurs Français, REF Contest, BP 7429, 37074 Tours Cedex, France.

UBA Contest, phone, sponsored by Unie van de Belgische Amateurzenders and the EC Commission for Communication, Information and Culture, from 1300Z Jan 30 until 1300Z Jan 31 (CW is 1300Z Feb 27 until 1300Z Feb 28). 80 40 20 15 10 meters only. Single op single band, all-band QRP or multi-single. PacketCluster use by single ops is allowed. All stations must remain on a band for 10 minutes. Exchange RS(T) and serial no. Score 10 pts/QSO with ON stations, 3 pts/QSO with other EC member stations, and 1 pt/QSO with stations outside the EC. Multipliers are ON provinces, ON prefixes, and EC-member DXCC countries. Final score is QSO pts × multipliers worked per band. Awards. Electronic entries accepted. Send logs postmarked within 30 days to UBA HF Manager, Carine Ramon, ON7LX, Bruggesteenweg 77, B-8755 Ruiselede, Belgium. See their HF contest Web page at http://www.uba.be/.

YL International QSO Party, CW, Sponsored by YL International SSBers Inc, 0000Z Jan 30 to 2359Z Jan 31, (SSB 0000Z Feb 27 2359Z Feb 28. Use general CW bands. Open to all with emphasis on member-to-member contacts. Exchange report, state, country, name, and YLISSB number. All logs must be received by March 31, 1999. Send SASE for entry and summary forms and address questions, comments, entries to Roger Livingston, N4ZGH, or Rhonda Livingston, N4KNF, 2160 Ivy St, Port Charlotte, FL 33952.

Kansas QSO Party, 1800 UTC Saturday January 30 to 1800 UTC Sunday January 31. All amateur bands except 30 17 12 meters. Single Op, Multiop. HF, VHF+ or combined. Kansas stations exchange RST and county on HF or grid square on VHF. Non-Kansas stations exchange RST and state or country on HF, RST and grid square on VHF. Count HF 1 point for SSB; 2 points for CW; 3 points for RTTY, SSTV, or other digital HF mode. Multiply total points by different states worked (max 48) multiplied by different DX countries worked (DXCC list). VHF+ 1 point per contact on 2 meters, 2 points per contact on 6 meters or 220 MHz. Three points per contact on 440 MHz. Five points per contact above 1 GHz or any contact in the VHF or UHF bands using ATV, digital (including packet) or moonbounce. Multiply total points by number of different grid squares worked. Add HF score to VHF+ score for High Overall Score. Add 1000 bonus points for contact with K0S on each band. Awards. Send logs no later than March 1, 1999 to: Kansas QSO Party, c/o Rick Carver, WA0KS, 13425 West 56th Terrace, Shawnee, KS 66216; http://www.sky.net/~rcarver/ksqso.html.

*RR1, Box 322
Johnson City, TX 78636
k5tr@arrl.org

Coming Conventions

*Edited by **Gail Iannone** • Convention Program Manager*

MISSISSIPPI STATE CONVENTION

January 29-30, 1999, Jackson

The Mississippi State Convention, sponsored by the Jackson ARC, will be held at the Mississippi State Fairgrounds Trade Mart Building, NE of the Coliseum; exit I-55 at High St (Exit 96-B), go W to second traffic light, turn left into main entrance of Fairgrounds, Trade Mart is first building on left. Doors are open for setup Friday noon, Saturday 6 AM; public Friday 5-8 PM, Saturday 8 AM to 4 PM. Features include flea market, forums (MARS, packet, satellite, electrical safety, traffic nets), VE sessions (Saturday 1:30 PM, Ramada Inn, all classes), RV camper space available on fairgrounds (hook-ups $10). Talk-in on 146.76. Admission is $5. Tables are $15 (non-dealer flea market), $20 (dealers). Contact Ronald Brown, AB5WF, Box 55643, Jackson, MS 39296-5643, 601-956-1448 or 601-982-0101; fax 601-982-3385; ab5wf@juno.com; http://www.jxnarc.org.

SOUTHERN FLORIDA SECTION CONVENTION

February 6-7, 1999, Miami

The Southern Florida Section Convention (39th Annual "Tropical Hamboree"), sponsored by the Dade Radio Club of Miami, will be held at the Dade County Fair and Exposition Center, 10901 SW 24th St (Coral Way). Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 4 PM. Features include major manufacturers' exhibits, commercial vendors, over 900 swap tables, "Welcome to Amateur Radio" display, alternate interest displays, programs, forums (ARRL, Youth, APRS, DX, AMSAT), demonstrations, 2-meter hidden transmitter hunt, VE sessions (two license exam sessions), on-site campground for 300 RVs, free parking, refreshments. Talk-in on 146.76. Admission is $5 in advance (by Feb 5), $7 at the door, under 10 free when accompanied by a registered adult (tickets are valid for two days entrance). Contact Evelyn Gauzens, W4WYR, 2780 NW 3rd St, Miami, FL 33125, 305-642-4139, fax 305-642-1648, w4wyr@bellsouth.net; http://www.hamboree.org.

1999

February 12-14
Northern Florida Section, Orlando

February 27
Vermont State, Milton

February 27-28
Great Lakes Division, Cincinnati, OH

March 5-7
Nebraska State, Norfolk

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

*Edited by **Gail Iannone** • Convention Program Manager*

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 **January 1** to be listed in the **March** 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 (Greenville)—Jan 30. Jerry McCullough, KE4ERO, 334-382-7644.

†**Arkansas (West Memphis)—Feb 6**, 9 AM to 4 PM. *Spr:* Dixie AR Group. Eugene Woods Civic Center, 212 W Polk. Army MARS meeting, VE sessions. *TI:* 147.15, 444.775. *Adm:* $5 per person or 5 for $20. Tables: $10 ($20 with outlet). Kellye Farris, KB5RCE, 432 Ross Ave, W Memphis, AR 72301, 870-732-8724, DixieFest@media-two.com; http://www.media-two.com/DARG.

Colorado (Loveland)—Jan 9. Jeanene Gage, N0YHY, 970-351-7327 or 970-352-5304.

†**Florida (Arcadia)—Jan 30**; set up Friday 1-8 PM, Saturday 6 AM; public 8 AM to 4 PM. *Spr:* DeSoto ARC. DeSoto County Fairgrounds, 1/2 mile S of Hwy 70 on Hwy 17. Tailgating (6 AM, free with price of admission), vendors, VE sessions (10 AM, all classes), refreshments. *TI:* 147.075. *Adm:* $4. Tables: $10 (all tables have electricity). Doug Christ, KN4YT, Box 1352, Nocatee, FL 34268, 941-494-5070 or 941-993-4834; kn4yt@cyberstreet.com.

†ARRL Hamfest

Florida (Miami)—Feb 6-7, Southern Florida Section Convention. See "Coming Conventions."

†**Illinois (Villa Park)—Jan 24**, 8 AM to 2 PM. *Spr:* Wheaton Community Radio Amateurs. Odeum Exposition Center, Villa Ave, 1/2 mile N of Rte 64 (North Ave). Hamfest/Electronic flea market, commercial booths, computers and software, seminar by special guest speaker Gordon West, VE sessions, acres of parking, free bus service from free remote parking, handicapped accessible. *TI:* 145.39. *Adm:* advance $6, door $8. Tables: $25. Make check payable to WCRA and send with business size SASE by Jan 8 to WCRA, Box QSL, Wheaton, IL 60189. Pat Byrne, K9JAU, 414 N Park Blvd, Glen Ellyn, IL 60137, 630-545-9950, k9jau@juno.com; http://www.w9ccu.org/.

†**Indiana (South Bend)—Jan 10**, set up 6 AM; public 8 AM to 3 PM. *Spr:* Michiana Valley Hamfest Assn. Century Center, US 33 N at Jefferson Blvd. Hamfest and Computer Expo, flea market, manufacturers, dealers, equipment, computer hardware and software. *TI:* 145.29. *Adm:* advance $4, door $5. Tables: $5 (5-ft round), $15 (8-ft rectangle), $20 (8-ft rectangular wall), $26.25 (electric power). Make check or money order payable to MVHA and send with business size SASE to Bob Denniston, KA9WNR, 21970 Kern Rd, South Bend, IN 46614; or call 219-291-0252 eves.

Iowa (Montour)—Feb 6. Jerry Morrison, N0LEM, 515-484-6036.

†**Kansas (Mound City)—Feb 6**, 8:30 AM to 3 PM. *Spr:* Mine Creek ARC. Mound City Fairgrounds 4-H Building, US-69 to K-52 W to Mound City; at junction of K-52 and K-7 go N 1/4 mile to Fairgrounds. *TI:* 147.285. *Adm:* $1. Tables: $10. Bill VanKirk, W0PT, Box 83, Mound City, KS 66056, 913-795-2080; bvkirk@kanza.net.

†**Louisiana (Hammond)—Jan 16.** *Spr:* South East Louisiana ARC. SLU Center, I-55 N to Exit 32, go E 2 miles, University is on left. MARS, ARES, weather, VE sessions. *TI:* 147.0. *Adm:* Free. Ned Shipman, KC5IHR, Box 1324, Hammond, LA 70404, KC5IHR, 504-796-0177, kc5ihr@nternet.com; http://www.i-55.com/~creolepb/selarchamfest.html.

†**Maryland (Odenton)—Jan 31**, 8 AM to 1 PM. *Spr:* Maryland Mobileers ARC. Fire Station Hall; from 295 take 175 E to Odenton Fire Hall. VE sessions. *TI:* 146.805. *Adm:* $4. Bill Ziegler, KA6TYY, 1307 Ashburton Dr, Millersville, MD 21108, 410-987-2384; ka6tyy@juno.com.

Michigan (Flint)—Jan 16. Clay Hewitt, KF8UI, 810-233-7889.

Michigan (Hazel Park)—Jan 17. Hazel Park ARC, Box 368, Hazel Park, MI 48030.

Mississippi (Jackson)—Jan 29-30, Mississippi State Convention. See "Coming Conventions."

Missouri (Nevada)—Jan 30. Dennis Kimrey, W0HL, 417-667-5033.

†**Missouri (St Joseph)—Jan 16**, 8 AM to 3 PM. *Sprs:* Missouri Valley and Ray-Clay ARCs. Ramada Inn, I-29 and Frederick Ave (Exit 47 off I-29), just 47 miles N of Kansas City. Indoor flea market, dealers, major commercial exhibitors, VE sessions, free parking. *TI:* 146.85, 444.925. *Adm:* advance $2 ea or 3 for $5; door $3 ea or 2 for $5. Tables: $10 ea (first 2 tables). Northwest Missouri Winter Hamfest, c/o Gaylen Pearson, WB0W, Box 1533, St Joseph, MO 64502, WB0W@IBM.Net; John Winkler, WB0VRA, 816-424-6484.

†**Nebraska (Kearney)—Jan 9**. *Spr:* Midway ARC. Buffalo County Fairgrounds Extension Building, 34th St and Avenue N. Forums (MARS, ARES, antenna building), VE sessions (preregister by

Jan 5; testing begins 8:30 AM, no walk-ins). *TI:* 146.625. *Adm:* $3. Tables: $8 (includes admission). Bob Mayo, KB0YTO, 205 E 31st St, Kearney, NE 68847-3003; 308-236-7320.

New Mexico (Albuquerque)—Jan 30. Tom Ellis, K5TEE, 505-291-8122.

New York (Lockport)—Jan 30. Albert Gritzmacher, AE2T, 716-433-3396. (Auction).

†**New York (Marathon)—Jan 9**, 7 AM. *Spr:* Skyline ARC. Civic Center, Rte 81, Exit 9, follow signs. VE sessions. *TI:* 147.18. *Adm:* $2. Patrick Dunn, KC2BQZ, 1907½ W Genesee St, Syracuse, NY 13204; 315-468-5909.

†**New York (Yonkers)—Jan 17**, 9 AM to 3 PM. *Spr:* Metro 70cm Network. Lincoln High School, NY State Thruway, Exit 2 to Yonkers Ave, W to St Johns, 2 blocks to Teresa Ave, right to Kneeland Ave. VE sessions, free coffee. *TI:* 146.91, 449.425 (156.7 Hz), 223.76 (67 Hz). *Adm:* $6. Otto Supliski, WB2SLQ, 53 Hayward St, Yonkers, NY 10704; 914-969-1053.

†**North Carolina (Winston-Salem)—Jan 23**; set up 6-8 AM; public 8 AM to 1 PM. *Spr:* Forsyth ARC. Dixie Classic Fairgrounds, Deacon Blvd, Gate 5; US Hwy 52 to Akron Dr, left on Reynolds Blvd, left on Shorefair, right on Deacon Blvd, left into Gate 5. Hamfest/Computer/Electronics Show, indoor flea market (Home and Garden Bldg), dealers, paved tailgating ($3 per space), overnight RV parking Friday $15 (self-contained units welcome in tailgate area; full hook-ups available at fairgrounds), refreshments. *TI:* 146.64, 145.47. *Adm:* $5. Tables: $10 (electricity available). Tom Gallagher, N4IOZ, Box 11361, Winston-Salem, NC 27116-1361, 336-723-7388, n4ioz@ibm.net; http://members.xoom.com/w4nc/.

†**Ohio (Dover)—Jan 24**; set up 6 AM; public 8 AM to noon. *Spr:* Tusco ARC. Ohio National Guard Armory, 2800 N Wooster Ave, exit I-77 at Exit 87 (Strasburg), turn right at stop sign, head S on County Rd 74 to first traffic light, continue through traffic light intersection, Armory is on right. Dealers, ARES forum, refreshments. *TI:* 146.73. *Adm:* $2. Tables: $8 (bring your own extension cords). Howard Blind, KD8KF, 6288 Echo Lake Rd NE, New Philadelphia, OH 44663; 330-364-5258.

Ohio (Lorain)—Feb 7. Mike Willemin, W8EU, 440-324-4574.

†**Ohio (Middletown)—Jan 16**, 9 AM to 4 PM. *Spr:* Dial RC. Miami University, Thesken Hall; from I-75 exit at SR 122 (Exit 32), go W toward Middletown; continue to Breiel Blvd, turn right (N), continue on Breiel to 6th traffic light; this is entrance to University, second building is Thesken Hall. 13th Annual SW Ohio Digital Symposium. *TI:* 146.61, 224.96, 444.825. *Adm:* Free. Hank Greeb, N8XX, 6580 Dry Ridge Rd, Cincinnati, OH 45252, 513-385-8363, Fax 513-385-8888, 72277.706@compuserve.com; http://w3.one.net/~rkuns/swohdigi.html.

†**Ohio (Nelsonville)—Jan 17**; set up 6 AM; public 8 AM to 2 PM. *Spr:* Sunday Creek AR Federation. Hocking College, Hocking Parkway; from N take Rte 33E to Nelsonville, turn right at first light; from S take Rte 33W to Nelsonville, turn left at first light (Rte 691). Flea market, dealers, equipment, computers, VE sessions (noon), refreshments. *TI:* 147.15, 147.225, 146.46. *Adm:* $5. Tables: $8. Russ Ellis, N8MWK, 8051 Oregon Ridge, Glouster, OH 45732, 740-767-2226 or 740-797-4166; SCARF@hocking.edu.

†**Pennsylvania (Latrobe)—Feb 7**, 8 AM to 1 PM. *Spr:* Chestnut Ridge ARC. American Legion, 1811 Ligonier St, US Rte 30 to Rte 982 N, follow signs. Hamfest/Computer Show. *TI:* 145.15. *Adm:* $2. Tables: $10 (by reservation until Feb 1). William Demosky, K3AFS, 1740 Raymond Ave, Latrobe, PA 15650; 724-539-1552.

Pennsylvania (Philadelphia)—Jan 13. Russ Stafford, W3CH, 610-631-3401, Ext 902 (Auction).

†**South Carolina (North Charleston)—Feb 6**; set up Friday 5-9 PM, Saturday 6:30 AM; public 8:30 AM to 4 PM. *Spr:* Charleston ARS. Stall High School Gym, 7749 Pinehurst St; located near I-26 and Ashley Phosphate Rd. Hamfest/Computer Show, dealers, forums (ARRL, natural disasters, etc), VE sessions (noon, walk-ins only; bring original and copy of your license, any CSCEs, and two IDs, one with photo; Ed, KE2D, 843-871-4368; or Doc, W4MUR, 843-884-5614; efrank@charleston.net), refreshments. *TI:* 146.79, 145.25. *Adm:* $5, under 12 free. Tables: advance $8, door $10 (8-ft, includes 1 chair). Jenny Myers, WA4NGV, 2630 Dellwood Ave, N Charleston, SC 29405-6814, 843-747-2324; brycemyers@aol.com or wa4usn@amsat.org.

Tennessee (Gallatin)—Jan 23. Bill Ferrell, N4SSB, 615-451-5992.

†**Virginia (Richmond)—Jan 17**, 8:30 AM to 3:30 PM. *Spr:* Richmond Amateur Telecommunications Society (RATS). The Showplace, 3000 Mechanicsville Tpke, I-95, Exit 75 to I-64 E, then Exit 192 (Rte 360), go ½ mile on left. Hamfest/Computer Show, electronics flea market, dealers, vendors, forums (packet, MARS, computer), parking, handicapped accessible, refreshments. *TI:* 146.88. *Adm:* $6. Jim Clark, N3JJF, Box 14828, Richmond, VA 23221-0828, 804-739-2269 (ext 3378), frostfest@rats.net; http://frostfest.rats.net.

Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as free prizes, handouts, and other support.

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to giannone@arrl.org. QST

The "Considerate Operator's Frequency Guide"

The following frequencies are generally recognized for certain modes or activities (all frequencies are in MHz).

Nothing in the rules recognizes a net's, group's or any individual's special privilege to any specific frequency. Section 97.101(b) of the Rules states that "Each station licensee and each control operator must cooperate in selecting transmitting channels and in making the most effective use of the amateur service frequencies. No frequency will be assigned for the exclusive use of any station." No one "owns" a frequency.

It's good practice—and plain old common sense—for any operator, regardless of mode, to check to see if the frequency is in use prior to engaging operation. If you are there first, other operators should make an effort to protect you from interference to the extent possible, given that 100% interference-free operation is an unrealistic expectation in today's congested bands.

1.800-1.830	CW, data and other narrowband modes
1.810	QRP CW calling frequency
1.830-1.840	CW, data and other narrowband modes, intercontinental QSOs only
1.840-1.850	CW; SSB, SSTV and other wideband modes, intercontinental QSOs only
1.850-2.000	CW; phone, SSTV and other wideband modes
3.500-3.510	CW DX
3.590	RTTY DX
3.580-3.620	Data
3.620-3.635	Automatically controlled data stations
3.710	QRP Novice/Technician CW calling frequency
3.790-3.800	DX window
3.845	SSTV
3.885	AM calling frequency
3.985	QRP SSB calling frequency
7.040	RTTY DX
	QRP CW calling frequency
7.075-7.100	Phone in KH/KL/KP *only*
7.080-7.100	Data
7.100-7.105	Automatically controlled data stations
7.171	SSTV
7.285	QRP SSB calling frequency
7.290	AM calling frequency
10.106	QRP CW calling frequency
10.130-10.140	Data
10.140-10.150	Automatically controlled data stations
14.060	QRP CW calling frequency
14.070-14.095	Data
14.095-14.0995	Automatically controlled data stations
14.100	IBP/NCDXF beacons
14.1005-14.112	Automatically controlled data stations
14.230	SSTV
14.285	QRP SSB calling frequency
14.286	AM calling frequency
18.100-18.105	Data
18.105-18.110	Automatically controlled data stations
21.060	QRP CW calling frequency
21.070-21.100	Data
21.090-21.100	Automatically controlled data stations
21.340	SSTV
21.385	QRP SSB calling frequency
24.920-24.925	Data
24.925-24.930	Automatically controlled data stations
28.060	QRP CW calling frequency
28.070-28.120	Data
28.120-28.189	Automatically controlled data stations
28.190-28.225	Beacons
28.385	QRP SSB calling frequency
28.680	SSTV
29.000-29.200	AM
29.300-29.510	Satellite downlinks
29.520-29.580	Repeater inputs
29.600	FM simplex
29.620-29.680	Repeater outputs

Note

ARRL band plans for frequencies above 28.300 MHz are shown in *The ARRL Repeater Directory* and *The FCC Rule Book*. For detailed packet frequencies, see *QST*, September 1987, page 54, and March 1988, page 51.

IBP/NCDXF beacons operate on 14.100, 18.110, 21.150, 24.930 and 28.200 MHz.

By **Dan Henderson, N1ND**
Contest Manager

1998 ARRL June VHF QSO Party Results

For some, the 1998 June VHF QSO Party was like a fairy tale—the avid VHF contester falling in love with outstanding band conditions and living happily ever after. For others, it was a Stephen King nightmare where the fury of Mother Nature goes on a blind date with Mr. Murphy and cuts a swath of destruction across the bands. Whichever view you had, you had lots of people in agreement! But all seemed to agree that the 1998 version of VHF "paradise or purgatory on Earth" was a success.

As often happens in this contest, weather played a major role. From snow in the Rockies and tornadoes in the Midwest, to torrential downpours in New England and "the best weather in years" in the Southeast—Mother Nature took an active role in making certain the best laid plans of many a contester were challenged. Mountaintops may be advantageous places to be in great weather, but many a hearty contester cleared out when the fury of nature visited over the weekend. Hurricane force winds, snow, and thunderstorms wreaked havoc for home stations, rovers and portables alike. Throw in a few Midwestern twisters and some above-average rainstorms and you could run the gamut of conditions weather wise June 13–15.

There were some good happenings during the weekend and some shuffling in the Top Finishers, but the hard-core VHF/UHF "cream of the crop" generally repeated from 1997. W5ZN jumped from a third place finish to take the Single Op Category, pushing the 1997 champion WA8WZG down a notch to second place. W8TL/3 improved from second in 1997 to take the QRP Portable category with defending champion W1VT slipping behind W2TTT into a third place finish. W2SZ/1 repeated as the Multiop winner by beating back challenges from AA9D, K3MQH, W3CCX and K8GP. The Limited Multiop winner was W5KFT while AB4CR repeated as the Rover champion.

It isn't every year you have a new overall scoring record established, but W5ZN Joel Harrison's 626,220 scoring effort sets a new standard for Single Operator stations. This also is a new Delta Division record. Congratulations Joel on a masterful effort. Other new division scoring records were set in the Single Op category by N2BJ in the Central Division (280,575), WA8WZG in Great Lakes (592,668), K0GU in the Rocky Mountain Division (287,749), and N5HHS in West Gulf (406,308). W9GKA in the Central Division (22,515) and N8XA in Great Lakes (15,604) set division QRP records. AA9D in the Central Division (1,098,240) and K8GP in Roanoke (967,992) claimed Multi-op Division records. New Multi-Limited Division records were set by W7XU in the Dakota Division (473,135), AC5TN in the Delta Division (195,536) W1XE in the Rocky Mountain Division (369,672), and W5KFT in West Gulf (628,705). Finally, AB4CR, in the Great Lakes Division (255,635), N1MJD in New England (99,440), and WB7RBJ in the Northwestern Division (53,457) attained new Rover Division standards.

Time and again entries cited "outstanding" conditions on 6 meters. "Six is on the way back" proclaimed several logs. Reports of double skip, numerous new grid squares claimed, and QSOs for the taking were commonplace on this band. Cross-country and Cuban contacts on 6 meters were found in many logs. With the upturn in the sunspot cycle, 6 meters should continue to provide a great experience for the next few years.

Contesters were reminded, however, that openings on certain bands do have negative side effects. When you increase the activity on one band in this contest, you do tend to lose activity on others. Log after log bemoaned the reduction of activity on 2 meters and above. While there were some sporadic E reported and some stations did see increased activity, most VHFers on this weekend seemed to report that 2 meters suffered from the increased activity on 6 meters as well as relatively poor band conditions. Reports on the upper bands were varied as well. A dearth of activity on some bands in some regions was reported while one participant reported a pileup on 1296. The Soapbox section gives a good cross-section of the views of the participants in this year's June VHF extravaganza.

With three major VHF contests annually, it is an excellent opportunity for any ham to get involved in what is a fast-growing area of interest in the hobby. Remember the dates for each of the big three in 1999: the January VHF Sweepstakes January 23-25, the June VHF QSO Party June 12-14, and the September VHF QSO Party September 11-13. Start planning now to catch the VHF contest spirit. Maybe Mother Nature and Mr. Murphy will mellow and we all can catch some good propagation.

Region Box

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)			Southeast Region (Delta, Roanoke and Southeastern Divisions)			Central Region (Central and Great Lakes Divisions; Ontario Section)			Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)			West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)		
K1TEO	385,560	S	W5ZN	626,220	S	WA8WZG	592,668	S	N5HHS	406,308	S	W3SE	110,544	S
K1RZ	289,044	S	WA5RT	148,071	S	N2BJ	280,575	S	W8CM	396,210	S	N6HKF	97,197	S
WA2FGK (K2LNS,op)	219,198	S	WD4MGB	96,679	S	KE8FD	258,718	S	W5UWB	372,070	S	K6KLY	83,316	S
W8TL/3	69,112	Q	N6ZE/4	1,377	Q	W9GKA	22,515	Q	N0JK	6,762	Q	N6JO	21,375	Q
W2TTT	47,432	Q				N8XA	15,604	Q	N7MLD	1,702	Q	N7WLO	4,650	Q
W1VT	46,314	Q				KB9PCW	9,514	Q				W7PW	1,550	Q
W2SZ/1	1,141,084	M	K8GP	967,992	M	AA9D	1,098,240	M	K5IUA	488,865	M	W6TOI	104,247	M
K3MQH	988,875	M	W4IY	460,591	M	WW8M	298,368	M	KK5IH	153,672	M	W6WE	102,771	M
W3CCX	984,750	M	K4SZ	12,403	M	K8NNU	48,006	M	NN5DX/0	59,153	M	NI6G	94,650	M
KB2DMK	264,450	L	AA4ZZ	372,500	L	W0UC	291,312	L	W5KFT	628,705	L	WB2ODH/6	235,653	L
K1TR	242,688	L	AC5TM	195,536	L	N9LAG	162,632	L	W7XU	473,135	L	N7LQ	108,528	L
W3IP	210,897	L	K4RF	170,640	L	K8XX	103,208	L	W0ZQ	392,583	L	WA7JTM	90,954	L
W2FU	174,903	R	AB4CR	255,635	R	WB9SNR	57,152	R	W5DF	66,920	R	N6NB	90,552	R
W3EKT	147,610	R	ND3F	148,257	R	K9JK	51,920	R	AL7PO	65,835	R	K7XC	65,727	R
N1MJD	99,440	R	N4STK	91,350	R	N9GH	40,480	R	K5UHF	60,324	R	WB7RBJ	53,457	R

Key: L = Limited multioperator; M = Multioperator; Q = QRP portable; R = Rover; S = Single operator

QSO Leaders By Band

Single Operator

50 MHz

N5HHS	1212
W5UWB	1090
K0GU	1031
W8CM	1009
WD5K	953
N5WS	918
N5TSP	876

144 MHz

K1TEO	364
KD1DU	336
KB2ZVP	299
KB2IT	284
K1RZ	230
WA8WZG	226
W5ZN	218

222 MHz

WA8WZG	129
K1TEO	83
KD1DU	69
KE8FD	65
K1RZ	60
W3SE	53
KE6AXJ	52

432 MHz

WA8WZG	194
KE6GFF	159
K1TEO	125
KB2ZVP	103
W5ZN	98
KE8FD	92
K6KLY	91

902 MHz

WA8WZG	52
K1TEO	41
W5ZN	25
KE8FD	24
K1RZ	23
WA2FGK (K2LNS,op)	23
WA1MBA	21

1296 MHz

WA8WZG	72
WA4VHF	57
K1TEO	50
W5ZN	40
K1RZ	37
KE8FD	37

Multioperator

50 MHz

W5KFT -L	1358
W1XE -L	1066
K5IUA	992
AA9D	983
W7XU -L	944
W3CCX	850
W0ZQ -L	792

144 MHz

K3MQH	770
W2SZ/1	622
K3YTL	517
K8GP	476
W3CCX	426
AA9D	391
WB2ODH/6 -L	358

222 MHz

W2SZ/1	173
K3MQH	168
W3CCX	134
K8GP	123
K2TVI	100
AA9D	100
WB2ODH/6 -L	99

432 MHz

W2SZ/1	296
K3MQH	287
W3CCX	232
K8GP	217
AA9D	204
K3YTL	181
WB2ODH/6 -L	141

902 MHz

W2SZ/1	84
W3CCX	41
K3YTL	36
K8GP	33
N2PA	32
AA9D	32
WW8M	29

1296 MHz

W2SZ/1	103
W3CCX	61
AA9D	58
K8GP	51
WW8M	48
K3YTL	46
N2PA	37

-L denotes Limited Multioperator

Multiplier Leaders By Band

Single Operator

50 MHz

K0GU	234
N5HHS	233
W5UWB	221
N5TSP	216
WD5K	214
N0LL	213
W8CM	210

144 MHz

KK6IT	62
KE8FD	55
W5ZN	51
K8TQK	49
KE4YYD	47
K1TEO	47
WA8WZG	46
K2YAZ	46

222 MHz

W5ZN	37
KE8FD	35
WA8WZG	31
K8TQK	30
K1TEO	30
KD1DU	26
WA2FGK (K2LNS,op)	25

432 MHz

KE8FD	41
W5ZN	41
WA8WZG	38
K1TEO	36
K4QI	35
WA2FGK (K2LNS,op)	31
K8TQK	30

902 MHz

WA8WZG	22
W5ZN	22
K1TEO	19
KE8FD	18
K1RZ	14
K8TQK	13
WA2FGK (K2LNS,op)	13

1296 MHz

W5ZN	30
WA8WZG	23
WA4VHF	21
KE8FD	21
K1RZ	19
K1TEO	17
K8TQK	17

Multioperator

50 MHz

W7XU -L	258
W5KFT -L	245
W1XE -L	240
AA9D	229
W0ZQ -L	227
AC5TM -L	212
W0UC -L	211

144 MHz

K3MQH	68
W5KFT -L	66
K8GP	64
N2XTX	59
W7XU -L	58
K5IUA	57
K3YTL	56

222 MHz

K3MQH	50
K8GP	42
W3CCX	34
N2PA	32
AA9D	32
N2XTX	31
W2SZ/1	31

432 MHz

K8GP	52
K3MQH	50
W3CCX	43
AA9D	43
K3YTL	40
W2SZ/1	39
N2PA	38

902 MHz

W2SZ/1	21
K8GP	20
N2PA	18
AA9D	17
W3CCX	16
N2XTX	16
WW8M	16

1296 MHz

K8GP	28
WW8M	23
W2SZ/1	23
W3CCX	22
AA9D	21
N2XTX	21
K3YTL	19

-L denotes Limited Multioperator

Plaque Winners

Single Operator

1st	W5ZN	626,220	Mt Greylock Expeditionary Force, W2SZ/1
2nd	WA8WZG	592,668	Bald Knob VHF Contest Group, AA9D
3rd	N5HHS	406,308	Ed Parsons, K1TR
4th	W8CM	396,210	Wellesley ARS, Mt Equinox Contest Crew
5th	K1TEO	385,560	KB0HH, K0TLM, K0UO, KA0KUY, N0JK, WB0DRL, WQ0P,
6th	W5UWB	372,070	South Mountain Contest Team, K3MQH
7th	N5WS	365,078	John Butrovich, W5UWB, in Memory of John Chambers, W6NLZ
8th	K9MK	315,468	Woodbridge Wireless Inc.
9th	K1RZ	289,044	
10th	K0GU	287,749	

QRP Portable

1st	W8TL/3	69,112	K2RIW, Rick & K2OVS, Jay
2nd	W2TTT	47,432	West Coast VHFer
3rd	W1VT	46,314	Robin Gist, K4VU
4th	WR3I	31,600	
5th	W9GKA	22,515	

Rover

1st	AB4CR	255,635	W2SZ/1, In Memory of Dick Goodman, WB1HIH
2nd	W2FU	174,903	Wayne King, N2WK
3rd	ND3F	148,257	Northern Lights Radio Society & W0UC
4th	W3EKT	147,610	
5th	N1MJD	99,440	

Multioperator

1st	W2SZ/1	1,141,084	Randy Stegemeyer, W7HR
2nd	AA9D	1,098,240	N2LIV, N2GHR, N2BFJ Contest Team
3rd	K3MQH	988,875	Mt Airy VHF Club
4th	W3CCX	984,750	Rochester VHF Group
5th	K8GP	967,992	Flagpole Knob Contest Group, W4IY
6th	K3YTL	609,246	Schenectady ARA, K2AE
7th	N2XTX	506,115	In Memory of Sid Krauss, WA2VNK
8th	K5IUA	488,865	
9th	W4IY	460,591	
10th	N2PA	422,823	

Limited Multioperator

1st	W5KFT	628,705	W3EP/K9AKS/W9IP
2nd	W7XU	473,135	North East Weak Signal Group
3rd	W0ZQ	392,583	K1TEO, W2GKR, W2GKO, KA1FVG
4th	AA4ZZ	372,500	
5th	W1XE	369,672	

DX Single Operator

1st	XE2/N6XQ	23,074	Bill Tynan, W3XO

DX Multioperator

1st	CP0FRC	128,355	Robert J. Carpenter, W3OTC

Scores

Each line score lists call sign, score, stations worked, multipliers, hours, number of grids activated (if Rover) and bands (A= 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, G = 3456 MHz, H = 5760 MHz, I = 10 GHz, J = 24 GHz, K = 47 GHz, L = 75 GHz, M = 119 GHz, N = 142 GHz, O = 241 GHz, P = 300+ GHz). Call signs of division leaders and band indicators are listed in **boldface** type.

1

Connecticut

K1TEO	385,560	993	270	S	**ABCD9EFG**
KD1DU	186,032	746	176	S	ABCD9E**FI**
K1EM	31,929	317	87	S	ABCD
N1NQD	18,172	173	77	S	ABCD9E
K1WVX	5,400	99	45	S	ABCDE
N1SAX	5,375	125	43	S	AB
W9JJ	2,040	68	30	S	A
KE1CO	2,002	67	26	S	ABC
K1FO	1,400	50	14	S	D
W0MHK/1	1,150	46	25	S	A
N1JMM	1,020	47	20	S	ABD
N1BAH	588	49	12	S	AB
WA1GTP	450	24	18	S	ABC
N1QVQ	180	28	6	S	ABD
N1WCL	133	16	7	S	BD
WR3I	31,600	280	80	Q	ABCD9E
W1QK (+W1QJ,AA1MY,K1XS,N1TIV,N1TMG, KA1SYG,N1ABY)	139,986	810	154	L	ABCD
N1XTK (+KA1MM,KA1WGM)	1,386	68	18	L	BD

Eastern Massachusetts

N1BWT	53,144	360	104	S	**ABCD9EI**
WG1Z	26,767	280	71	S	ABCDE
W1PM	21,442	232	71	S	ABCDE
KX1C	14,300	183	50	S	ABCD9E
W1WV	13,481	197	61	S	ABD
KB1VC	7,568	145	43	S	ABD
K1UR	5,112	123	36	S	ABCD
K5MA	3,838	101	38	S	AB
AA1O	3,100	100	31	S	AB
WA1ENO	2,225	89	25	S	AB
N1VQR	1,840	73	23	S	ABD
K1HC	1,650	66	25	S	AB
KB2BZF	1,426	62	23	S	AB
WA1OFR	1,248	51	24	S	ABD
W1DYJ	833	49	17	S	A
AD1B	663	51	13	S	AB
KA1EKR (+N1IA)	9,366	148	42	L	BCDE

Maine

N1SVM	11,172	199	49	S	ABD
WA1JOF	6,426	102	63	S	**A**B
N1RWY	4,836	102	39	S	AB**CD**
W1XZ	4,656	97	48	S	AB
KQ1V	2,795	65	43	S	A**B**
W1REZ	1,656	69	24	S	B
K1WHS (+K1ART,W1MRQ,K1CA,K1DY,WB1FLD, N1LBI)	328,055	1057	245	M	ABCD9EFG
K1TOL (+WB6X)	61,180	437	140	L	A

New Hampshire

AF1T	87,216	439	138	S	**ABCD9EFI**
WA1OUB	46,010	430	107	S	**A**
WA1HOG	26,372	244	76	S	ABCD**E**
AC1J	16,740	223	62	S	ABCD
KU2A	16,348	183	61	S	ABCD9E
N1JHJ	3,729	98	33	S	ABD
WW1Z	3,400	84	34	S	ABCD
KD1P	390	26	15	S	A
K1TR (+K1EA,K3DNE,KM3T,AE1D,WB1DSW, WB1ADR)	242,688	1090	192	L	ABCD
N1NUM (+ops)	5,180	134	35	L	ABCD

Rhode Island

KM1X	48,899	405	107	S	**ABD**
N9LYE	30	9	3	S	ABD
K1MUJ (N1DGF,K1ZE,ops)	44,910	366	90	L	ABCD
W1VHF (K1AST,K1RWK,K1KT,WF1B,W1BSN, W1JJM,ops)	44,778	406	102	L	ABDE

Vermont

W1RNA	10,540	132	68	S	**A**BCDE
KE1JT	9,333	119	61	S	**AB**CD**E**
K1LPS	9,128	131	56	S	AB**CD**
KT1VT	6,136	112	52	S	**A**BD
W1VT	46,314	340	83	Q	ABCD9EFGHI
W1TKZ (AA1TH,KC1US,N1HXO,W1WEL, WO1G,ops)	36,980	379	86	L	ABCD

Western Massachusetts

N1MUW	70,104	455	127	S	**A**BCDE
WA1MBA	48,285	314	87	S	**BD9EFGHI**
N1DPM	37,278	249	114	S	AB**CD**
N1MIA	20,659	277	73	S	ABCD
N1MHH	7,750	135	50	S	ABCD
WA1UOL	1,980	56	30	S	ABCD
WA1NYV	1,564	92	17	S	B
N1RSY	1,045	95	11	S	B
WA1ZUH	352	32	11	S	B
W2SZ (K1DH,K1EP,K1IM,KA0D,K2TR,KA1DZV, KA1PRT,KB2DGA,KE2TP,KE4IBF,N1SXY,N2HPA, N2XRE,N2YCA,N2YZO,NC1J,W1SZ,W1VE, W2ARQ,WA1ZMS,WA2AAU,WA2SPL,WA8USA, WB2QCJ,WS2B,ops)	1,141,084	2108	332	M	ABCD9EFGHIJK

2

Eastern New York

W3HHN	50,960	378	104	S	AB**CD9**E
K2ZZ	44,191	370	107	S	**A**BDE
N2MSS	32,130	279	85	S	ABCD9**EFGI**
W2FCA	19,125	201	85	S	ABCDE
W2CCP	9,090	202	45	S	**B**
W2ENY	7,308	126	58	S	AB
WM2Y	5,610	143	30	S	ABCDE
W2LGB	4,200	103	35	S	ABCD
N2TMT	3,712	116	32	S	A
W2VDI	3,266	104	23	S	ABCD9
W2JHO	3,078	130	18	S	ABCD
N2SQW	2,700	84	30	S	ABD
KC2DMI	1,334	51	23	S	ABD
KG2H	1,140	57	20	S	A
KB2SLE	1,054	62	17	S	AB
WB2BEJ	924	47	11	S	ABCD9E
K2VNP	728	44	13	S	ABCD
WA2BAH	600	49	8	S	ABCD9E
KB2SMS	546	42	13	S	AB
W2WHO	430	36	10	S	BD
KA2MCU	371	34	7	S	ABCD9E
K2RI	357	32	7	S	BCD
AA2CW	120	19	5	S	BCD
N2SFB	30	10	3	S	B
KC2CCZ	28	6	4	S	BD
KC2DGM	232	20	8	Q	BD
K2TVI (N2DVQ,N2DHH,N2FMC,N2GDY,N2GKM, N2NWZ,WA2LVY,WB2NHC,WB2NVR,WB2VVS, N3EMF,ops)	330,372	1112	228	M	ABCD9EFGHI
W1SJ (+N2YHK)	163,845	859	165	L	ABCD
AB2I (+KC2AGL,KC2CRO,N2BZP,W2AWX, W2NY,WA2IID,WA2YSM,WC2J,KB2SSS)	114,210	704	141	L	ABDE

NYC-Long Island

WA2ZFH	19,215	206	63	S	**ABCDE**
KB2WVG	1,260	66	18	S	ABD
K2OVS	189	21	9	S	AB
WB2AMU	1,272	53	24	Q	AB

Northern New Jersey

WB2VVV	81,135	415	135	S	AB**CD9EFGI**
WA2VUN	30,121	306	91	S	**ABD**
K2KIB	24,700	210	95	S	ABCD
KB2IT	11,644	284	41	S	**B**
WB2TT	8,060	130	62	S	A
K4BNC	7,000	94	70	S	ABD
K2SIX	6,336	132	48	S	A
N2NHN	4,002	87	46	S	A
WA2BKN	3,686	97	38	S	AB
KE3PL	3,145	85	37	S	A
N2LMU	2,235	123	15	S	ABD
W2JEK	1,197	63	19	S	AB
K2JT	779	41	19	S	A

KB2TCQ 108 8 4 S 9I**JP**
WN2A 5 5 1 S B
W2TTT 47,432 375 88 Q ABCD9EP
WA2ASQ 918 54 17 Q A
N2WM (+K2BJG,K2BM,KB2LHH,N2HMM,N2TTT, WB2UFF,WD3R)
240,559 950 209 M ABCD9EF
K2BAR (NO2T,K2AMI,K2ZO,N2PBY,N2ST, KB2YGJ,KB2WKJ,WA2YLH,WU2C,W2MSK, KO2OK,ops)
82,600 573 118 L ABCD
NX2Q (+K2ZOQ)
7,437 201 37 L B

Northern New York

KB2ZVP 184,590 776 210 S **ABD**
WA2AEY 44,720 304 130 S ABD
N2UUX 16,800 200 84 S AB
KB0VPW 1,829 59 31 S AB
K3KYR (+WZ2T)
13,468 182 74 L AB
W2NNY (NT2W,N2MD,KC2BEZ,ops)
11,644 159 71 L ABD
WB2KLD (+KC2BFS,KC2APO,N2UID,KC2AVI, KB2ZJI,W2HQF)
8,094 136 57 L ABD

Southern New Jersey

KD2KS 19,980 239 74 S **ABC**D
K2WB 8,215 120 53 S ABC**D**
W2PAU 4,592 100 41 S ABD
KC2BMA 1,850 50 37 S AB
KB2WQM 1,617 47 33 S ABD
N2JVQ 918 54 17 S B
KF2YX 784 47 16 S ABD
KC2AZU 300 25 12 S AB
KC2AZT 80 10 8 S AB
KB2TIS 8 2 2 S D

Western New York

K8ZES 68,766 418 157 S **ABD**
AA2GF 33,948 213 123 S AB**CDE**
N2ULL 27,058 206 83 S ABCD**9EF**
NJ2L 3,535 62 35 S ABCD9EF
W2WGL 2,752 71 32 S BD
KB2VGH 2,600 75 26 S ABD9E**IP**
KB2YCL 1,518 69 22 S AB
KG2NI 1,500 98 12 S ABD
W2IC 1,488 75 16 S ABD
WA2ZNC 1,474 53 22 S ABCD
KB2NFS 770 56 10 S BCD
K2PAM 570 44 10 S ABD
N2XTX (+W2DRZ,N2ODU,NY2Z,K2EY,K2SR, W2UCZ,N2YCW,N3YVG)
506,115 1164 345 M ABCD9EFHI
N2PA (N2KG,N2YB,N2JQR,W3OAB,N2OPW, W7GJ,ops)
422,823 993 291 M ABCD9EFGIJP
KB2DMK (N2HLT,NS9E,N2JDQ,N2HQW, WA2IZL,KC2ATB,WA2BPE,KB2PVZ,ops)
264,450 853 246 L ABCD
N2JMH (N2WVK,AA2SP,ops)
77,480 414 149 L ABCD
N2VO (+WF2V)
1,914 54 33 L ABD

3

Delaware

W3OR 117,012 438 196 S AB**CD9EFG**
WA3WUL 3,456 72 48 S A
WA3BZT 3,294 122 27 S **B**
W3HZW (KE3UY,N3FZP,N3YVT,K0UWO, N3YFR,N3YMS,KA3IJO,N3RAE,K3LT,NS3E,ops)
16,235 168 85 L ABD

Eastern Pennsylvania

WA2FGK (K2LNS,op)
219,198 663 238 S **ABCD9EFG**
WA4GPM 72,144 347 167 S ABCDE
K3HZO 49,416 328 116 S ABCDE
K3GNC 27,692 219 92 S ABCD
W3SZ 8,342 138 43 S BDE
KA3ZAT 5,076 108 47 S AB
WT3P 4,800 100 48 S A
WA3CSP 4,368 91 48 S A
N3JNX 3,560 74 40 S ABD
KK3K 1,577 59 19 S BDE
N3TBB 1,449 63 23 S AB
N3YXX 1,170 41 26 S ABCD
N3TLJ 294 21 14 S AB
WA3KFT 40 8 4 S ABD
K3MQH (+AI3M,K3JFL,K3MM,K3RA,N3EYB, N3KTV,W3SST,WG3E)
988,875 2047 375 M ABCD9EIJ
W3CCX (AA3GN,K1DS,K2UT,K3ESJ,K3LIC,KF6AJ, KU3T,N2SCJ,N3DG,N3EVV,N3EXA,N3ITT,N3NGE, N3OZO,N3XEM,NE3I,NK8Q,W2SJ,W2SK, W3GAD,W3RJW,WA1YHO,WA3NUF,WA3RLT, WB3JYO,WF3W,WU3C,K3MFI,ops)
984,750 1822 375 M ABCD9EFGHIJ
K3YTL (K3MKZ,KB3QI,KA3EEO,KA3ZHT,KE3OA, N3FA,N3TKK,N3PBH,N3RN,W3DZH,WB3FAA, WB3FKQ,ops)
609,246 1454 306 M ABCD9EFGHIJ
N3ADC (+N3ZKK,N3ZXO,K1EX)
26,643 233 83 M ABCD9E
N3WDX (+N3TZW,N3XTG,N2RTX)
7,344 144 51 L AB

Maryland-DC

K1RZ 289,044 848 252 S **ABCD9**EF
K3ZO 115,700 650 178 S **AB**
N3HBX 76,653 455 153 S ABCD
N3ZTZ 14,720 183 80 S ABD
KA3TCC 10,780 143 70 S ABD
WA4VHF 8,505 75 35 S **EF**
K1NV 4,717 89 53 S AB
N3BWJ 4,512 84 48 S ABD
N3UMA 4,326 103 42 S AB
W3GN 1,113 53 21 S AB
WA4PRR 1,029 47 21 S ABD
N3SOK 650 45 13 S ABD
N3VOP 324 43 6 S BDE
K3UAL 300 30 10 S A
KB3CGD 60 5 4 S E
WB3KDB 16 8 2 S B
W8TL/3 69,112 322 163 Q ABCD9E
W3IP (+KF3FT,K3MLA,W3NLB,WA3TID,WG3R, N6OBP,K3HH)
210,897 809 219 L ABCD

Western Pennsylvania

NO3I 36,784 229 121 S AB**CD**E
N3FYD 34,086 221 114 S ABCDE
KA3SDP 17,334 171 81 S ABD
AA3GM 12,665 126 85 S ABCD**9**E
W3HH 5,130 87 54 S ABD
WA3TLT 4,590 87 51 S ABD
WA3LTB 3,848 104 37 S **B**
W3ZA 432 24 18 S AB
N3WAV 150 15 10 S A
KB3AFT 4,048 90 44 Q ABD
WB0IWG 56 8 7 Q AB
W8IJ 4 2 2 Q AB
W3YOZ (+KA3EJJ,K4VV,KC3EK,KC4ATS)
60,344 347 152 L ABCD
N3PUR (+N3NWN,K3MD)
9,548 154 62 L AB
N3IPS (+N3KTA,N3BXU,N3XSU)
924 39 21 L ABD

4

Alabama

KD4FMN 11,316 138 82 S **AB**
KM4ZL 4,960 80 62 S A
N4AHJ 4,503 79 57 S A
K4GSK 2,080 52 40 S A
K4IZN 1,672 44 38 S A
KD4ZO 837 31 27 S A
N4IDX (KD4MQA,K4EKW,KD4AMG,KF4UJM, N8MHC,ops)
41,445 307 135 L AB
KS4YT (+KV4T,KF4SAY,KF4ALD,KF4HIC)
40,180 267 140 L ABD
NN4C (+KV4T,KF4DGS)
140 14 10 L B

Georgia

W4KXY 72,027 429 159 S **ABD**
KD4K 50,901 334 141 S ABCD
KD4HLG 36,725 281 113 S **ABCD**
K4PI 15,345 165 93 S AB
K4BAI 11,583 143 81 S A
K4BI 5,200 100 52 S A
N4TYP 4,611 85 53 S ABD
WB4AYN 3,195 71 45 S A
NY4F 1,092 39 26 S ABD
N6ZE/4 1,377 51 27 Q AB
K4SZ (+KT4XE,AE4GQ)
12,403 146 79 M ABCDE
K4RF (+K4EA)
170,640 677 237 L ABCD

Kentucky

KE4JFS 37,206 306 117 S **A**BCD
WA4FVQ 27,648 202 108 S **ABCD9**E
AD4ZW 5,750 90 50 S ABCD**E**
KE4PZT 494 26 19 Q A

North Carolina

K4QI 29,072 218 92 S **BDE**
W4FSO 16,020 152 90 S AB**CD9**E
N4PPH 14,628 159 92 S **AB**
N4TL 8,556 124 69 S A
W4VHH 7,332 88 52 S BD**EF**
WA4IAM 6,976 109 64 S A
AA4S 4,048 88 46 S AB
W4PFM 3,520 80 44 S A
KD4OFG 920 40 23 S A
N4ZAK 693 33 21 S A
N4AYS 540 27 20 S A
KU4HM 375 25 15 S A
AA4ZZ (+KZ5D,K4MQG,W4MW,W4VHF, WA4UNZ,AA4SC)
372,500 1089 298 L ABCD
KV4I (WD4PVE,AF4HX,NC4SA,KC4QPR, KF4TDY,KF4TDZ,KD4LOA,ops)
119,748 555 204 L ABCD
NG4C (+N4ZWQ,KN4QE)
60,030 400 145 L ABCD
N4CM (+KE4WUT)
35,310 316 107 L ABD
W4ATC (N3NPQ,N3QYE,KF4ARS,KF4RDN, KF4RDR,KF4RED,KF4USQ,KF4YSN,N4ZSM, DL2JKK,ops)
24,024 224 104 L ABCD

Northern Florida

WB2QLP 78,684 455 166 S **ABD**
NU4Y 41,529 327 127 S A
W2BZY 39,336 246 132 S AB**CDE**
AC4TO 27,702 243 114 S A
W4UE 26,818 229 106 S ABCDE
KA4DON 21,582 217 99 S ABD
KE4YYD 10,143 133 63 S BD
W1LR 3,577 69 49 S ABDE
AK4P 1,900 50 38 S A

South Carolina

KR4QO 70,090 408 163 S **ABCD**
KF4JZH 20,055 191 105 S AB
N2FY 9,344 128 73 S A
N3WCM 6,300 92 63 S ABD
WB2WEO 810 30 27 S A
KD4ZMR (+KD4TCA,KD4TCB,W4APE,KE4JNY, KF4HIW,KF4VGY)
10,260 149 60 L ABD

Southern Florida

WD4MGB 96,679 501 187 S **ABD**
K2OY 52,029 367 141 S A**BD**
WB2WIH 32,208 239 122 S ABCD
K0VXM 22,680 177 108 S AB**CD9**E
K4NB 18,414 180 93 S ABD
W4UM 8,970 138 65 S A
W4AZR 6,695 100 65 S ABC**9**
K4SC 5,162 89 58 S A
N1RT 4,949 101 49 S AB
KF4FAJ 4,512 92 47 S ABD
WA4OFS 2,176 47 32 S BCD**E**
K4RS 2,052 57 36 S A
KF4KSN 1,900 50 38 S AB
W3DHN 775 31 25 S A
AJ4Y 672 32 21 S AB

Tennessee

N8UM 76,773 366 163 S A**BCD9E**
NS4W 56,127 306 159 S ABCD
N4JQQ 40,880 277 140 S **ABD**
KE4JLE 25,305 235 105 S ABD
WB4ZUG 13,013 158 77 S ABD
AD4F 9,516 145 61 S ABD
KF4VAU 1,386 42 33 S A
KC4VSN 945 35 27 S A
AC4LS 609 29 21 S A
ND4A (+KD4PIJ)
10,062 129 78 L AB
W4UOT (W4OWX,WB4NCW,WA4IRU,KF4MVH, KE4TVV,KF4LXL,KF4SJL,KE4UIL,AF4JJ, KF4VXW,ops)
3,645 81 45 L AB

Virginia

K4RTS 67,497 312 151 S AB**CD9E**
KN4SM 66,030 387 155 S A**BD**
N4HB 57,200 328 130 S ABCD9E
K4ZOO 52,934 321 133 S ABCDE
N4CH 43,824 332 132 S **A**
KH2CY 33,633 259 101 S ABCD
AD4DG 31,464 214 114 S ABCD9E
N4MM 20,504 216 88 S ABD
K4FTO 18,040 183 82 S ABCD
N4BG 14,532 171 84 S ABD
K4ENE 6,264 98 58 S ABD
KE4WFO 5,616 101 52 S ABD
W4LTU 5,459 103 53 S A
W2YE 4,641 91 51 S A
AD4TJ 3,116 82 38 S AB
KD4JXY 1,786 47 38 S A
K4ME 560 40 14 S B
KE4BVP 544 33 16 S ABD
WA4MA 80 10 8 S A
W4IY (W4AD,W4NF,W4RM,W4CE,W4DC, KA4CKI,WA0DYJ,N4DXS,W4DAV,K8MLM, W8ZET,ops)
460,591 1184 311 M ABCD9EFIJP
W4SPT (+KC4AUF,KS4RX)
9,672 146 62 L ABCD

5

Arkansas

W5ZN 626,220 999 420 S **ABCD9EFGHIJ**
KB5VRO 22,736 201 112 S ABD
KB5YUA 22,363 209 107 S A

Louisiana

WA5RT 148,071 611 231 S **ABD**
W5CTV 90,270 530 170 S ABD
WA5KBH 32,450 275 118 S A
K5CZD 30,940 207 140 S ABD
N5MYH 28,165 190 131 S ABD
KC5QAY 20,808 204 102 S AB
KB5VXZ 3,224 62 52 S A
AC5TM (+KB5ZOC,KB5KIX)
195,536 808 242 L AB

Mississippi

W5RCI 26,299 186 119 S A**BCD9EF**
KJ5RC 20,223 189 107 S **A**
KG5MZ 11,070 135 82 S AB
KB5ZEA 1,540 44 35 S A
N3AWS 256 16 16 S A

New Mexico

W0AH/5 204,057 850 237 S **ABD**
K5AM 167,580 720 228 S ABCD
N5JHV 139,314 651 214 S AB
KB5TZJ 45,537 350 129 S ABD
K5RHR 37,170 276 126 S AB**CD**
W5DO 7,276 105 68 S ABD
N9KUW 4,848 96 48 S ABD
N5XZM 4,400 83 40 S ABCD**E**
KB5ZSK 3,608 72 41 S ABCD
WB5YYX 520 34 13 S ABD

North Texas

W8CM 396,210 1254 281 S A**BCD9E**
K9MK 315,468 1040 276 S AB**CD**
WD5K 203,942 953 214 S A
N5NJ 164,418 818 201 S AB
W5RDX 113,778 602 189 S AB
KB5OAI 70,470 405 174 S A
WA5TKU 61,752 331 166 S ABDEH
N5KB 23,358 228 102 S ABD
W5RNF 20,884 227 92 S A
KK6IT 13,392 216 62 S **B**
W5KQJ 12,852 135 84 S ABDE
N5QGH 10,695 114 69 S ABCD9E**FH**
W5USJ 7,980 110 72 S A
WB5PJB 5,310 86 59 S ABCD
WA5VKS (KC5LBE,op)
30,058 239 113 M ABCDE
N5VGS (+KC5QHL)
176,736 762 224 L ABD
WA5BU (N5VHO,KK5KN,ops)
27,972 246 111 L ABD
AB5NX (KC5FWL,KC5MOA,ops)
8,932 116 77 L AB

Oklahoma

KC7ICM 35,625 265 125 S ABC**D**
KA5WRG 29,282 241 121 S **ABD**
K5SW 11,778 116 78 S AB**CDE**

South Texas

N5HHS 406,308 1348 294 S **ABD**
W5UWB 372,070 1225 290 S ABCDE
N5WS 365,078 1114 293 S AB**CD9E**
N5TSP 189,216 876 216 S A
W3XO/5 125,404 531 214 S ABCD9E
W2YX 96,048 551 174 S ABD
N5YK 90,150 601 150 S A
N5LZ 65,065 455 143 S AB
KM5RG 56,580 410 138 S AB
KM5PK 40,535 335 121 S AB
KC5UKB 34,048 214 133 S ABCD9E
KC5FP 31,753 275 113 S ABD
K5DU 27,540 270 102 S A
WA5IYX 27,000 250 108 S A
KK5IJ 16,318 199 82 S AB
AA5XE 16,102 166 97 S A
KC5VAK 12,325 145 85 S A
KK5OA 6,804 97 63 S ABD
KC5YOV 6,728 105 58 S ABDE
KA5PVB 5,760 96 60 S A
W5AJ 2,880 64 45 S A
KB5TEE 2,835 57 45 S ABD9
KD5AAU 1,426 46 31 S A
KA5GLX 1,376 43 32 S A
AJ4F 495 33 15 S B
KC5VOB 270 18 15 S A
KB5PGY 48 11 3 S ABD
K5IUA (+KC5BAL,W5BAK)
488,865 1299 327 M ABCD9EFG
W5KFT (+N5RZ,K5TR)
628,705 1668 355 L ABCD
K5NA 38,760 339 114 L ABD

West Texas

N5WDZ 1,053 39 27 S **AB**
KK5IH (+KK5KK)
153,672 645 228 M ABCDE
KB5KYJ (+KC5VKB,KC5OGT,KC5YPY,KC5QZM, KC5MVT)
71,610 461 154 L ABD
K5ED (+K9RU,K5VI)
18,308 199 92 L A
N5IS (+K5IS,KC5UNW)
11,004 131 84 L A

6

East Bay

KF6GYM 6,293 203 31 S **AB**
KQ6DI 5,704 124 31 S AB**CD**
W6OMF 3,200 75 32 S ABC**D**
K6VXY 280 35 8 S B
KE6WPP 60 12 5 S A
KA6NBC (+WA5YWC,KC6BWO,KA6VQV)
85,302 492 126 M ABCDE

Los Angeles

W3SE 110,544 574 147 S **ABCDE**
K9AKS 50,024 401 104 S ABCD
KE6FCT 31,360 281 98 S ABCD
W6AQ 28,665 313 65 S ABCDE
KQ6QW 23,504 337 52 S ABCD
AC6TA 11,500 209 46 S ABD
W6GGV 10,258 166 46 S ABCDE
W6IST 8,170 142 43 S ABCD
K6EHA 4,800 99 32 S ABCDE
KE6AXJ 4,556 158 17 S BCD
KO6CML 4,240 144 20 S ABCD
N6ED 3,360 154 21 S ABD
KQ6MU 3,097 163 19 S B
K6HLH 2,912 104 28 S B
W6SYA 2,650 74 25 S ABCDE
WA6BIL 560 35 16 S A
N5BF 495 34 11 S ABCDE
KF6EOJ 300 23 10 S ABD
KD6HXP 90 12 6 S BD
N6JO 21,375 204 75 Q ABCDE
N6KZ 528 40 12 Q BCD
K0BGL/6 (+K6NDV,W6TON)
46,322 350 106 M ABCD9E
W6TRW (K6OUE,N6ZAY,KE6YEX,ops)
8,772 190 34 M ABCDE
WB2ODH/6 (+N6RMJ,K6KWQ,KO6SY,WA6DJS)
235,653 981 193 L ABCD

Orange

N6HKF 97,197 445 179 S A**BCD**
KG6EG 44,365 334 95 S AB**CD**
K6TSK 33,852 313 84 S **ABD**
N6DN 18,815 217 71 S ABCD
K6IBY 14,224 172 56 S ABCD
KF6HAM 10,176 136 64 S ABD
KI6FF 9,520 198 40 S BD
KC6UIX 6,713 137 49 S AB
KE6GFF 4,452 159 14 S **D**
N6KZB 3,692 100 26 S ABCD
KE6GFI 2,414 125 17 S BD
WA6NOL 1,680 68 16 S BD**E**
KD6UIH 1,206 44 18 S ABCD
KF6XA 544 34 16 S A
KE6QCB 273 31 7 S BD
AC6XK 474 79 6 Q B
W6TOI (KB6WKT,N6TEB,KB6ATT,KC6OFS, KE6HPZ,ops)
104,247 559 143 M ABCDE

Santa Barbara

N6PI 46,280 350 104 S AB**CDE**
WB6AAG 31,500 220 105 S AB**CDE**
KE6RCI 2,466 110 18 S BD
W6WE (+W6FM,KD6NRU,AD6EA,KC6RPW, KE6TPP,KF6QJV)
102,771 498 171 M ABCDE

Santa Clara Valley

K6KLY 83,316 479 131 S **ABCDE**
W6GYD 16,801 222 53 S ABCD**E**
W6IT 10,850 154 50 S ABCD
AB6SO 4,680 132 24 S ABCDE
N6RZ 3,562 137 26 S **B**
N6JET 3,480 97 30 S ABD
WA6HRK 2,420 92 22 S ABD
KG6AO 697 40 17 S ABD
N6MNZ 156 22 6 S BD
N6NZ 60 12 5 S A
KA6SIQ 32 7 4 Q BD
K6PUD (+KQ6OB,KC6SBJ,AA6W,N6FFC,KB6LUC, NU6P) 35,706 401 66 M ABCDE

San Diego

KF6JBB 11,229 168 57 S **ABD**
AB6H 7,245 124 45 S AB**CD**
W6OYJ 2,266 79 22 S BCD**EI**
KE6SQG 1,584 60 24 S ABD
WA6HXD 1,460 73 20 S AB
K6IAH 768 45 16 S ABD
WB6AXW 338 21 13 S AC
WB6DTA (+K6DYD)
51,614 330 131 L ABCD
KB5MY/6 (+NF6L,WA6TBO,KF6FXM)
31,581 293 99 L ABD

San Francisco

WN6W 32,775 314 75 S **ABCDE**
K6UM 1,860 60 31 S A
N6KM 76 15 4 S BD
W6MMM (WB9NJS,WA6OEM,KB6OFY,N2GFF,ops)
56,727 446 99 L ABCD
WA6GG (AA1Z,K6QXY,WA6MXI,WB9LOZ,KK6XF, WB6QV,ops)
25,194 274 78 L ABDE

San Joaquin Valley

N7STU 44,016 280 112 S AB**CDE**
N6MI (at N6NB)
41,128 290 106 S ABCDE
K6YK 18,285 200 69 S **ABCD**
W6KOC 6,804 97 42 S BCDE
N2KK 6,549 111 59 S **A**
KF6CNV 294 42 7 S B
NI6G (+K6MI,AA6AH,KE6THG,WB6TIA)
94,650 467 150 M ABCDEI
K6ARP (KB6HRB,KF6JSO,KF6KDC,KD6MQG, KC6UCN,KD6UOK,ops)
26,880 248 84 L ABCD

Sacramento Valley

KJ6KO 52,822 425 98 S **ABCD**
N6KBX 50,740 330 118 S **ABCD**
KC6ZWT 19,584 257 51 S BCD
KD6VNQ 6,080 135 40 S ABC
K6FO 2,336 73 32 S A
KF6YL 1,254 63 19 S BD
KE6NTZ 192 26 6 Q BD
KC6TEU (+ops)
32,032 315 91 L ABDE

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Arizona

AA7A 80,152 413 172 S **ABDE**
W7GZ 13,467 164 67 S AB**CDE**
W7ZMD 4,400 100 44 S A

WB7OHF 3,612 77 43 S ABCD
KF7JS 3,285 65 45 S ABD
NE7X 1,764 63 28 S A
WA7JTM (+N7AMA)
90,954 466 186 L ABCD
KF7NP (+NU8I,KE7OT)
82,218 409 193 L ABCD
WA7VHF (+KE7FC,KC8CC,ops)
29,232 230 112 L ABD
K7RST (AB7HD,W7AI,KK7HV,KC7FNK, N2MMA,ops)
8,694 120 63 L ABDE

Eastern Washington

N7AU 18,236 154 94 S **ABCDE**
N3CEV 15,624 132 84 S **ABCD9EFGH**
KI7XD 3,690 65 45 S ABDE
W7PQE 3,440 80 43 S **AB**
N7JGO 1,682 40 29 S BCD
KF7CN 234 18 13 S B
W6LLP 220 19 10 S BD
W7FHI (+K7XW)
27,666 199 106 M ABCD9E
K7CW (+ops)
64,160 359 160 L ABCD

Idaho

WA0DYU 40,080 319 120 S **ABD**
KC7IJ 25,228 238 106 S AB
N7EIJ 16,461 164 93 S **ABD**
K7MAC 10,050 112 75 S **ABDE**
W7ID 9,017 105 71 S **ABDE**
KA7GUX 5,141 86 53 S ABD
KB1WW/7 1,938 57 34 S A
WX7G 108 12 9 Q A
K7TM (+N7LKA)
16,356 177 87 L ABD

Montana

WA7PDC 3,479 70 49 S **ABD**
K7BG 910 35 26 S **AB**
AB7VR 792 36 22 S A
N7LT (+KC7HCR)
33,512 280 118 L ABD

Nevada

K7ICW 46,282 279 146 S **ABCD**
NW7O 7,440 116 60 S ABCD
W7PW 1,550 62 25 Q B
N7LQ (+K7UI,KB7UIF,WO7I)
108,528 464 204 L ABDE

Oregon

W7EW 44,450 318 127 S **ABD**
N7DB 12,960 168 72 S ABCD
N7YAG 6,045 130 39 S **ABCDE**
KI7WB 4,900 98 50 S AB
K7HSJ 3,145 70 37 S ABCDE
N7CNH 1,044 51 18 S ABD
W7IY (+W5HVK,WB6FFC,N7NS,KB7RPM)
21,021 197 91 L ABDE
WA6KLK (+WD6HDY,KD6LTB,KB7QFE)
14,760 136 82 L ABDE

Utah

WA7PXD 19,516 191 82 S ABCD**9**E
NJ7A 16,038 177 66 S **ABCD9E**
KA9LNP 14,755 188 65 S ABCD9
WA0YPL 486 27 18 S AB
KI7ST 328 29 8 S BD
N7MLD 1,702 55 23 Q ABCD

Western Washington

KE7SW 29,750 240 85 S AB**CD9EFGH**
W7SZ 16,170 178 70 S ABCDE
WA1IED 7,680 157 48 S **ABD**
K7ND 3,808 119 32 S **B**
W7KQU 3,080 88 35 S A
KK7LK 2,916 104 27 S ABD
W3JPT/7 2,331 100 21 S ABD
KK7JP 1,428 68 21 S AB
N7WLQ 4,650 123 31 Q ABCD
N7NGO 119 13 7 Q BD
K7XD (+N0XX,K7ZL)
61,864 370 148 L ABDE

Wyoming

AB7UQ 57,084 426 134 S **A**

8

Michigan

K8MD 129,291 478 213 S ABCD9**E**
K2YAZ 121,520 414 217 S **ABCD9EF**
KU8Y 91,469 385 179 S **ABCD9E**
N8CGY 14,758 147 94 S ABCD
K8NFT 14,694 180 79 S ABD
W8SGR 12,382 149 82 S ABD
W8DOG 10,062 121 78 S ABD
WB8TGY 6,413 78 53 S ABD9EF
K8PNW 6,248 92 44 S BDE
WD8KUF 5,252 91 52 S ABD
WA8RLI 1,625 53 25 S ABD
K8GMW 1,504 47 32 S A
KC8DRK 245 33 7 S BD
WW8M (+KC8DAZ,NE8I,WA8VPD)
298,368 655 259 M ABCD9EFGHIJ
K8NNU (+N8PJP,N8IYD)
48,006 297 126 M ABCDE
K8XX (+K8GM)
103,208 523 194 L ABD
N8PVT (+KC8ALA)
8,880 118 74 L ABD

Ohio

WA8WZG 592,668 1160 326 S **ABCD9EFGHI**
KE8FD 258,718 655 277 S ABCD9E
K8TQK 124,821 397 207 S ABCD9E
N8ZJN 87,400 388 184 S ABCD9E
W8DJY 80,264 508 158 S **A**
WA8RJF 56,322 272 149 S ABCD9EF
KC8CSD 37,539 251 129 S ABCD
W8ANS 21,210 186 101 S ABDE
KB8YKR 11,322 141 74 S ABD
KB8UHY 9,576 136 63 S ABD
K8MR 7,260 95 60 S ABCD
KB8UUZ 6,431 109 59 S AB
AA8WJ 5,600 100 56 S AB
N8YSF 3,942 73 54 S AB
KB8JVH 2,738 74 37 S B
W1FEZ 2,553 56 37 S BD
W8SA 2,400 60 40 S AB
KB8YMN 1,674 51 31 S ABD
W8PLZ 1,421 45 29 S ABD
K5ZG 1,368 57 24 S B
KE8TQ 1,290 43 30 S AB
KC8CFI 416 24 13 S BD
W8ILH 280 20 14 S AB
KC8CZQ 204 17 12 S B
N8XA 15,604 157 83 Q ABCD9EI
N9AG (+N8NR)
93,104 529 176 L AB
KC8AAV (+N8MWK,KI8CA,KC8HKL,KA8LGK, N8UVM,KB8LPW,KC8HXQ,KC8IFE,KB8YPU, KB8UUD,ops)
24,948 207 108 L ABDE
KC8AKI (+KC8HFX)
9,211 147 61 L ABD

West Virginia

N8XUR 42,320 296 115 S AB**CDE**
W8DT 37,905 248 133 S **AB**CD
WB8TFV 12,136 146 74 S ABD
K8UC 11,935 122 77 S ABCDE
N3IWJ 5,096 98 52 S AB
WA3HQK 4,214 80 49 S ABC
WB8BEL 1,519 49 31 S A
W3TMZ/8 560 21 16 S BDE
K8GP (K1RA,W3ZZ,K3LFO,W3CMP,N4UK,W4XP, KM5FA,K6LEW,WD8ISK,ops)
967,992 1688 424 M ABCD9EFGHIJ
KC8ERC (+KG8WK)
8,073 117 69 L AB

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Illinois

N2BJ 280,575 863 261 S **ABCD9E**
K2DRH 114,460 590 194 S **AB**
WD9EXD 89,240 465 184 S ABCD
WB9UWA 61,600 331 160 S ABCD
W9IIX 53,793 344 129 S ABCD9**EF**
W9VA 28,638 254 111 S ABC
N9OBE 25,312 224 113 S A
N9WRO 24,300 177 90 S ABCD9E
K9EIF 19,500 188 100 S ABD
W9SE 7,497 119 63 S A
N9TZO 6,760 104 65 S AB
N9WKW 6,600 107 60 S ABD
WO9S 5,858 101 58 S AB
WD9ISG 4,270 95 35 S BD
WB9W 1,700 50 34 S AB
KB9MLA 848 53 16 S B
AA9UC 256 16 16 S A
N9VJO 135 20 5 S BD
W9GKA 22,515 226 95 Q ABCD
AA9D (+AA9IL,K9PW,N8KWX,N9KC,N9OGU, N9THC,W9QA,W9RM,WB9EEA,WD8KHE)
1,098,240 1845 429 M ABCD9EFGHIJP
N9LAG (+KB9QKL,KB9QQR,N9BJG,N9KJE,W9FX)
162,632 619 232 L ABCD
KB9KCJ (+KB9MCX,KO2R)
23,920 210 104 L ABD
N9XKH (+KB9MJG)
9,522 128 69 L ABCD

Indiana

KB9NKM 28,726 271 106 S **AB**
AA9LT 24,624 208 114 S **ABCD**
N8LUX 12,551 149 77 S ABD
N9RZY 10,857 141 77 S AB
WB9DRB 10,374 127 78 S ABC**D**
W9ESU 5,778 84 54 S ABD**E**
N9KZJ 5,104 88 58 S AB
KB9OBE 1,734 51 34 S AB
K9FOH 805 35 23 S A
KC9RG 12 4 3 Q B

Wisconsin

K9KL 125,132 476 218 S ABC**D9E**
WF9X 96,330 420 169 S ABC**D9E**
W9JN 83,106 461 171 S AB**C**
N9LLT 40,250 287 125 S ABCD
N9JR 27,615 214 105 S ABCDE
W9NFL 26,703 200 129 S ABCD
N9UBS 22,000 190 110 S ABD
K9FYZ 21,879 221 99 S A
ND9Z 15,743 161 91 S ABD
WA9LZM 12,035 145 83 S AB
WA9PWP 11,050 130 85 S AB
W9PHJ 9,408 138 64 S ABD
KB9PCU 8,760 120 73 S AB
AF9J 6,864 83 66 S ABCDE
W9YCV 3,666 77 47 S ABD
KB9IQR 2,961 63 47 S A
WA1UJJ/9 1,610 70 23 S B
N9NDP 1,196 46 26 S AB
N9TD 1,053 37 27 S ABD
K9OSH 884 33 26 S ABD
N9QZD 864 29 24 S ABDE
W9XT 620 31 20 S AB
KB0LGB 546 26 21 S AB
KB9PCW 9,514 132 67 Q ABD
W0UC (+K0GJX,N0AKC,N0UR)
291,312 917 289 L ABCD

0

Colorado

K0GU 287,749 1089 259 S **ABD**
W6OAL 142,202 708 194 S ABC**D9EI**
K7VNU/0 43,560 359 121 S ABC
W3DHJ 6,969 101 69 S AB
K0CS 4,720 80 59 S A
K0SU 2,150 50 43 S A
N3EUA 180 15 12 S A
NN5DX/0 (+K5LLL)
59,153 368 149 M ABCD9
W0KU (+KC0ASZ,N0WBW)
43,250 308 125 M ABCDE
W1XE (+WB0GAZ,K0CL,NA0US)
369,672 1208 292 L ABCD
W0ETT (+KC5VII)
73,080 411 174 L ABD
N0POH (+KB0YRX)
15,834 173 78 L ABCD
K0YB (KB0CY,KC0AMO,KA0DEH,ops)
4,368 87 48 L ABCD

Iowa

KA0Y 14,190 148 86 S AB**C**D
K0VSV 14,062 146 89 S AB**D**
WD0FOY 11,340 126 90 S **AB**
N0SPP 9,628 116 83 S AB
W0VAN 8,004 116 69 S A
K0ZKK 2,268 54 42 S A
K0MQS (+NN9K)
9,350 170 55 L B

Kansas

N0LL 202,386 723 267 S **ABCDE**
WQ0P 130,625 547 209 S AB**CD9EHI**
N0KQY 65,620 358 170 S AB**D**
W0EKZ 58,028 280 178 S ABCDE
KA0MR 51,359 281 161 S ABD**E**
N0UU 11,223 129 87 S AB
AB0DP 7,957 109 73 S A
W0RT 3,772 73 46 S ABD
N0TOU 700 28 25 S A
KA0EIC 468 26 18 S A
K0LLS 450 25 18 S A
N0JK 6,762 98 69 Q AB
KC0AHN (KB0YHU,N5CLU,KB0YHT,ops)
40,326 258 141 L ABDE

Minnesota

WA0BWE 143,668 598 196 S **ABCD9EFGH**
KB0VUK 56,364 316 154 S ABCD
K0MHC 45,360 301 144 S ABD
W0AUS 44,671 288 131 S ABCDE**IJ**
WA2HFI/0 40,770 247 135 S ABCD9E
WB0LJC 38,376 271 117 S ABCD9E
KB0TZA 27,621 224 99 S ABCD9E
KA0PQW 27,285 212 107 S ABCD
N0SRQ 25,620 196 122 S ABD
W0OHU 25,132 204 103 S **AB**D
W0KKN 20,070 203 90 S ABD
KB0ZEV 14,184 176 72 S ABCD
N0UK 11,343 147 57 S ABCD9E
KB0IXC 8,316 141 54 S ABD
W0LER 4,386 87 43 S ABD
N0NAS 3,390 100 30 S ABD
K0JO 1,984 53 32 S ABCD
KB0LYL 1,850 185 10 S B
W9FZ 594 50 9 S ABD9
KB0OBT 530 47 10 S BD
W0KRX 140 7 7 S BCDE**FGH**
W0ZQ (WB0GGM,WA2PHW,N0HJZ,ops)
392,583 1108 321 L ABCD

Missouri

KA2AYR 63,900 426 150 S **A**
K0TLM 37,760 316 118 S ABCD
W0FY 29,184 228 128 S AB
K0WR 27,724 223 116 S **ABD**
W0JRP 14,758 148 94 S AB**C**D
KG0TQ 10,804 146 74 S A
WA0CNS 6,930 105 66 S A
KC0AUY 2,482 67 34 S ABCD
KB0STN 2,028 52 39 S AB

North Dakota

NT0V 9,702 114 77 S **ABCDE**

Nebraska

ON9CMR/W0
38,308 314 122 S **A**
KA0ABA 22,184 183 118 S AB**D**
W0HII 12,835 151 85 S A
AE0G 7,918 107 74 S **AB**
N0SFC 2,832 59 48 S AB
KB0WHY 368 23 16 S A

South Dakota

WB0ULX 12,927 136 93 S **AB**D
WB0HHM 7,973 99 67 S **ABCD**
W7XU (+W0SD,WD0T,W0DB,N0JPE,N0QJM)
473,135 1164 377 L ABCD
K0ND (WV0H,WB0OAJ,ops)
35,872 304 118 L AB

Maritime-Newfoundland

VE1GA 1,325 53 25 S **A**

Nova Scotia

VE1ZJ 23,322 335 69 S **ABDE**

Quebec

VE2SHW 315 63 5 S **AB**
VB2PIJ (VE2PIJ,op)
3,744 83 36 Q ABCD

Ontario

VE3SAR 42,456 304 122 S **AB**D**E**
VE3FGU 36,140 231 139 S **AB**D
VE3AJY 21,276 172 108 S ABD
VA3AEC 16,432 195 76 S ABD
VE3FHU 11,242 130 73 S AB**C**D
VE3SXE 7,020 117 60 S AB
VE3OJN 6,678 107 53 S ABDE
VE3OCY 3,588 78 46 S AB
VE3WCB 2,380 43 35 S ABD**E**
VA3KA 1,034 44 22 S BD
VE3VHB 874 38 23 S B
VE3BFM 462 22 21 S AB
VE3TMG (+VE3DEB)
42,780 307 124 L ABD
VA3FIN (+VE3SRE)
37,320 276 120 L ABCD
W1AIM/VE3 (W1AIM,W3EP,ops)
22,977 199 111 L ABD

Manitoba

VE4MBQ 6,435 99 65 S **A**
VE4KGB 100 10 10 S A**B**

Saskatchewan

VE5UF 28,197 241 117 S **AB**

Alberta

VE6TA 18,109 180 91 S **ABCDE**
VE6NTT 12,089 157 77 S **AB**
VE6EKP 9,525 127 75 S AB
VE6JW (+VE6DGG,VE6MAA,VE6LDX,VE6JY, WA2TMC)
33,550 269 110 L ABD

British Columbia

VE7XF 16,206 193 73 S **ABDE**
VE7VDX 6,180 101 60 S ABD
VE7AGG 6,032 94 58 S ABD
VE7XO 570 28 19 S ABD
VE7NUT (+VE7EKY)
10,434 131 74 L ABD
VE7SKA (+K0KAN)
6,525 136 45 L ABD

France

F/K6KMN/P 24 8 3 Q B

Cuba

CO0FRC (CO2KG,CO2JA,CO2OJ,CO2WW,CO2YY, CM2II,CM2KC,ops)
128,355 620 199 L ABCD

Alaska

WB4PCS/KL7 4 2 2 S **A**

Puerto Rico

WP4LNY 42 21 2 S **B**
WP4KOE 26 13 2 S B

Turks & Caicos Islands

VP5KE 11,781 187 63 S A

Mexico

XE2/N6XQ 23,074 260 83 S ABC
XE2HWB 731 43 17 S A
XE2/KC5FMT (+KC5FMU)
62,208 370 162 L ABD

Hawaii

NH6YK 230 36 5 S **ABD**
KH6/WB6FZH 18 9 2 S B

Indonesia

YC2OK 13,794 174 66 S **ABD**

Marine Mobile

K1KIP/MM (+W6GOS)
7,353 146 43 L ABDE

Rovers

Atlantic

W2FU 174,903 574 173 R 6 ABCD9EFGHI
W3EKT (+K3IXD)
147,610 729 145 R 4 ABCD9E
KA2CKI (+KV2X)
59,052 366 111 R 6 ABCD9EFG
K3QII (+W3IKE)
6,594 96 42 R 4 ABCD9E
N2VJV (+KB2SGX)
2,546 65 38 R 4 ABD
K8MR 414 23 18 R 6 B
N3ZYL 407 18 11 R 6 BDE

Central

WB9SNR 57,152 299 94 R 8 ABCD9EFGHI
K9JK (+AA5UK)
51,920 273 118 R 8 ABCD9EFGH
N9GH 40,480 292 88 R 6 ABCDE
N9KS 13,500 180 75 R 8 AB
N9RLA (+N9RMJ)
6,200 111 50 R 2 ABD

Dakota

N0BEL (+KB0NES)
3,848 84 37 R 4 ABCDE

Delta

NT4L (KQ4TV,KB4IDC,ops)
22,480 223 80 R 7 ABCDE
KD4NOQ 16,093 183 77 R 7 ABD

Great Lakes

AB4CR (+KF4TUK)
255,635 582 215 R12 ABCD9EFGHIJ
N4STK 91,350 224 145 R13 ABCD9EFGHIJ
KF9US 68,808 341 122 R 8 ABCD9EI
K8WW (+KB8ZW)
65,010 420 110 R 8 ABCDE
AA4R 15,521 184 83 R 4 ABD

Hudson

N2OPJ (+KB2YZA)
1,768 90 17 R 4 ABCD
KF2XY 506 29 11 R 2 ABD9
WA2SDO 440 33 11 R 4 BD

Midwest

AL7PO 65,835 385 171 R17 AB
N0KE (+KB0LRR)
37,848 283 114 R 9 ABCDE
KB0YFN (KB0WPY)
33,810 291 115 R 6 ABD
N3KKM 10,792 126 71 R 4 ABCDE
KB0QGT 7,638 114 67 R 8 AB
K0DAS (+N0LNO)
5,152 91 46 R 4 ABD9

New England

N1MJD (+N1JEZ)
99,440 673 110 R11 ABCD9E
N1QVE (+N1QDQ)
35,136 349 64 R 5 ABCD9EI
N1ISB 13,332 237 44 R 6 ABCD9EFHI
KJ1K (+WB2VVQ)
10,665 140 45 R 6 ABCD9EFGH

Northwestern

WB7RBJ 53,457 425 103 R23 ABCD9
AA7VT 19,688 283 46 R 6 ABCD9EGH
K7UV 8,052 122 66 R 4 AB
KC7WGS 3,638 95 34 R 9 ABD
N7CFO 3,542 68 46 R 6 ABD
W7HOF 1,551 47 33 R 3 AB

Pacific

N6NB (+N6MU)
90,552 537 132 R 8 ABCDE
K7XC 65,727 470 109 R18 ABCD
KB7PQW 30,485 259 91 R26 ABCD
N6IFW 28,400 321 71 R12 ABD
N7TUA 14,280 150 70 R18 ABD
N6DHN 13,034 212 49 R 3 ABCDE
W7KK 10,080 164 48 R 9 ABCD
KB6OLL (+KC6UDS)
2,266 61 22 R 6 BCD
KA6AMD 1,890 54 35 R 9 B

Roanoke

ND3F 148,257 479 153 R12 ABCD9EFGHIP
N4OFA 16,425 183 75 R 6 ABCD
KC4ZRH (+KD4GAR)
15,150 169 75 R 5 ABCD
WB3AKD 8,865 197 45 R 4 AB
KS4S 4,450 89 50 R 4 A
KC4YHI 2,380 68 35 R 5 AB

Rocky Mountain

KC5YXB 5,488 105 49 R 2 ABD

Southeastern

K4GSX 588 28 21 R 2 A

Southwestern

KC6WLC (+KD6WZR)
16,182 171 58 R 9 ABCDE
N6VHF 12,690 233 47 R 3 ABD
N7QJP 6,231 160 31 R 6 ABD
AD6AF 2,240 98 16 R 4 ABD
KQ6BS 1,089 121 9 R 2 B
KF6JXM 60 9 6 R 2 ABD

West Gulf

W5DF (+AB5SS)
66,920 326 140 R11 ABCD9EHP
K5UHF (+KD4JDT)
60,324 394 132 R 8 ABCD9E
N5VBK (+KB5VPR)
52,245 338 135 R11 ABCD
WB5VYE (+K5OT)
52,197 302 137 R10 ABCD9E
WD5AGO 17,372 185 86 R 6 ABD

Canada

VE3OIK (+VE3SMA)
38,592 229 96 R 5 ABCD9EFGI
VE3NPB (+VE3OIL)
37,152 294 96 R 9 ABCDEG
VE7DXG (+VE7DDR)
27,816 312 76 R 3 ABD
VE6AQE (+VE6MK)
7,038 123 51 R 5 ABD
VE6TC 2,208 71 24 R 4 ABDE

Checklogs

AB0HF, N5JM, W1FIG.

By **Dan Henderson, N1ND**
Contest Manager

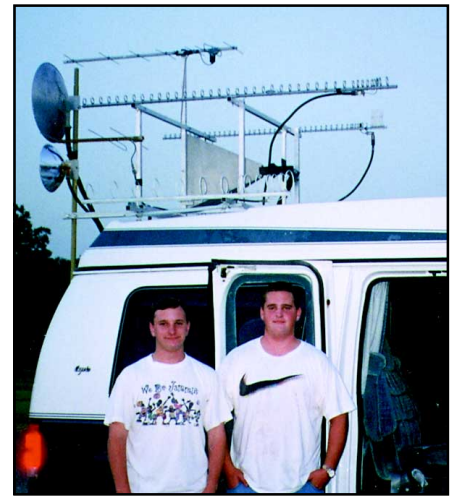
1998 ARRL UHF Contest Results

Judging from the 162 logs received the 1998 UHF Contest was great for those hams who enjoy a real challenge. Conditions were not reported to be as favorable as in the past several contests. Few band openings of any duration were noted. Congratulations to WW8M, K2DH and VE3SMA for coming out on top of their categories. A dozen new division scoring records were established. An Atlantic multiop record was set by the K2DH operation in WNY while the Dakota Rover record is now held by W9FZ. KF9US holds the Great Lakes Rover score with 6426 and N1MJD raised the New England Rover bar to 31,584.

The Northwestern Division saw new records set in all three categories: KE7SW Single-Op with 13,407, KD7TS multiop with 32,922 and AA7VT Rover with 12,060. N6KBX now holds the Pacific Single-Op mark with 7209 and K6DN is on top in the Southwestern Rover category with 6318. The West Gulf Single-Op record is now possessed by W5LUA with 86,268, while West Gulf Rover N5QGH's 22,968 is the new target. The new Canadian Rover score is 66,312 turned in by VE3SMA. Congratulations to all new record holders. The 1999 UHF Contest is scheduled for August 1-2. Let's see lots of new scoring marks and participants in 1999.

Top Five

Single Operator		Multioperator		Rover	
WW8M	137,196	K2DH	649,740	VE3SMA	66,312
W5LUA	86,268	W2SZ/1	469,542	WB9SNR	44,073
WA2FGK (K2LNS,op)	72,210	N3LJK	37,386	VE3OIL	37,125
N2BJ	26,364	KD7TS	32,922	N1MJD	31,584
K1RZ	20,592	AA4ZZ	18,576	N5QGH	22,968



The road warriors: N5QGH (left) and Bryan Wood (right) on the way to a West Gulf Division Rover record setting operation.

Scores

Each line score lists call sign, score, stations worked, multipliers, entry category (S = single operator, M = multioperator, R = rover), ARRL/RAC section, and bands (C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, G = 3456 MHz, H = 5760 MHz, I = 10 GHz. J = 24 GHz, K = 47 GHz, L = 75 GHz, M = 119 GHz, N = 142 GHz, O = 241 GHz, P = 300+ GHz). Call signs of division leaders and band indicators are listed in boldface type.

Atlantic

WA2FGK (K2LNS,op) 72,210 188 83 S EPA **CD9EFG**
K1RZ 20,592 100 48 S MDC CD9EF
W2SJ 11,025 63 35 S SNJ CD9EF
N2HLT 10,578 70 43 S WNY CDE
NO3I 5,439 42 37 S WPA CDE
AA3GN 3,672 52 17 S EPA CD9E
NS9E 2,442 30 22 S WNY CD9E
W3SZ 2,067 28 13 S EPA DEF
N2JMH 1,920 32 20 S WNY CD
W3KM 1,440 18 16 S EPA CD9EF
N1MU 1,218 18 14 S WNY CD9EF
WS3C 360 15 8 S EPA D
AA3GM 360 12 10 S WPA CD
N3BWJ 336 16 7 S MDC D
WA2AEY 270 15 6 S NNY D
WA3BZT 132 11 4 S DE D
N3XJX 96 8 4 S EPA C
K2DH (AA2WV,K2DB,WA2TMC,KD2KQ,N2KG, W3OAB,W2FU,N2YB,NJ2L,KA2CKI,KB3PW, KC2DQR,N2AKD,WO2P,N2KXS, ops) 649,740 564 182 M WNY CD9EFGHIJP
N3LJK (+K3YWY,WA3UGP) 37,386 140 62 M EPA CD9EFGHIJ
K3QII (WA0QII,W3IKE,ops) 990 20 15 M MDC CD9E
K2IWR (K2DN,KB2AED,KC2CXP,N2MRE, WA2TOL,ops) 120 7 5 M WNY CDE

Central

N2BJ 26,364 138 52 S IL **CD9E**
W9IIX 6,528 55 32 S IL CD9E
N9LAG 882 20 14 S IL CDE
N9KJE 480 19 8 S IL CDE
WV9T 459 17 9 S WI D
AF9J 273 12 7 S WI CDE
KB9JIF 72 6 4 S WI D
WB9DRB 45 5 3 S IN D
WB9SNR 44,073 157 59 R CEN CD9EFGHIP
K9JK 2,322 37 18 R CEN CDE
N8KWX 891 15 11 R CEN CDP

Dakota

WA0BWE 12,810 72 35 S MN CD**9EFGH**
WA2VOI 4,608 50 24 S MN C**D9IJ**
N0UK 4,284 52 21 S MN CD9E
KB0TZA 3,456 51 18 S MN CD9E
W0AUS 2,700 40 15 S MN CDE**IJP**
KA0PQW 2,520 40 21 S MN **CD**
W0OHU 1,344 28 16 S MN D
W9FZ 12,900 134 25 R DAK CD9EF
WB0LJC 5,292 40 21 R DAK CD9EFGIJP
WB5EMX 420 5 7 R DAK FGP

Delta

KA4CHT 720 16 10 S TN D**E**
K4FHG 144 8 6 S TN **D**
AD4F 90 6 5 S TN D
WU4W 36 6 2 S TN **C**D

Great Lakes

WW8M 137,196 233 103 S MI **CD9EFGHIJ**
K2YAZ 12,771 73 43 S MI CD9E
K8MD 9,840 63 40 S MI CD9E
WA8RJF 7,215 46 37 S OH CD9EFH
K8MR 1,056 22 16 S OH CD
KC8CSD 990 22 15 S OH CD
K8PNW 360 13 8 S MI DE
N8PVT (+KC8ALA) 252 12 7 M MI D
KF9US 6,426 48 34 R GL CD9E
NE8I 2,925 29 13 R GL CDEFGHIJ
WB8TGY 144 6 6 R GL D9

Hudson

WB2VVV 15,621 77 41 S NNJ **CD9EFGI**
WA2ZFH 7,194 88 22 S NLI CD**E**
KB2T 3,150 75 14 S NLI C**D**
WB2WHD 2,691 58 13 S ENY CDE
N3EMF 2,166 31 19 S ENY CD9E
K2ZD 1,014 20 13 S NNJ DE
K2AMI 450 15 10 S NNJ CD
K2RI 336 14 8 S ENY CD
WB2BEJ 96 8 4 S ENY CD
N2MSS 72 6 4 S ENY CD

Midwest

WQ0P 7,440 51 40 S KS **CD9EHI**
K0DAS 1,326 20 17 S IA C**9**
N0KQY 1,224 24 17 S KS D
W0VAN 126 7 6 S IA D
N0LL 75 5 5 S KS CD

New England

K1TR 16,128 95 42 S NH **CD9EF**
KX1C 4,896 58 24 S EMA CD9E
W1PM 4,176 51 24 S EMA CDE
KA1EKR 4,158 54 22 S EMA CDE
N1DGF 3,816 53 24 S ME CD
K1ZE 2,898 46 21 S RI CD
K1TEO 1,188 36 11 S EMA D
AC1J 1,170 30 13 S NH CD
W1VT 540 11 9 S VT DI
W2SZ/1 (K2AD,KB0WJO,KC2DVW,KE4IBF, KR2L,N1SXY,N1XHS,N2BNY,N2LBT,N2XRE, N2YCA,N2YZO,W1IX,W2ARQ,WA1ZMS,WA2AAU, WA8USA,WS2B,ops) 469,542 545 139 M WMA
CD9EFGHIJK
W1QK (+W1QJ,K2ZZ,AA1MY) 8,064 74 32 M CT CDE
N1MJD (+N1JEZ) 31,584 153 56 R NEW CD9E
KJ1K 8,961 63 29 R NEW CD9EFGH
N1ISB (+N1XSY) 4,218 43 19 R NEW CD9EFGHI
N1QVE 3,795 44 23 R NEW CD9E

Northwestern

KE7SW 13,407 74 41 S WWA **CD9EG**
K7ND 6,570 56 30 S WWA CD9E**F**
W7DSA 1,296 24 12 S OR CD9EFG
W7SZ 1,260 28 14 S WWA CDE
N7DB 288 12 8 S OR CD
K7HSJ 252 10 6 S OR CD9E
KK7AT 102 17 2 S ID D
N3ZTR 72 12 2 S ID D
KC7ZTW 72 12 2 S ID D
KD7TS (+NU7Z,W7YOZ) 32,922 104 59 M WWA CD9EFGHI
AA7VT 12,060 125 20 R NW CD9EGH
W7VHF (W7BA,op) 96 8 4 R NW C

Pacific

N6KBX 7,209 75 27 S SV **CDE**
KC6ZWT 3,024 63 16 S SV **CD**
W6OMF 2,550 50 17 S EB CD
KQ6DI 2,400 46 16 S EB CDE
WN6W 2,016 48 12 S SF CDE
K6YK 1,836 36 17 S SJV CD
W6KOC 1,512 28 14 S SJV CDE
K8BUW 1,470 28 14 S SJV CDE
K6RFM 744 26 8 S SCV CD**9**
AB6SO 729 21 9 S SCV CDE
N6IFW 294 14 7 S SJV D
N6DHN 255 17 5 S SV CD
KF6MXK 72 8 3 S SCV D

Roanoke

K4QI 8,778 59 38 S NC **DE**
K4ZOO 5,184 45 32 S VA C**DE**
W4VHH 3,510 31 26 S NC DE
W4TNV 528 12 11 S NC CDE
W4FSO 324 9 9 S NC CDE
AA4ZZ (+W4MW) 18,576 108 48 M NC CD9EI

Rocky Mountain

W6OAL 1,890 30 15 S CO **CD9EI**
N0KE 1,080 24 12 S CO **D**EI
KB5ZSK 117 12 3 S NM CDE

Southeastern

WD4MBK 2,205 27 21 S GA **CDE**
K4SZ 828 20 12 S GA CDE
WB0QGH 828 19 12 R SE CDE

Southwestern

N6HKF 5,757 101 19 S ORG **CD**
KE6GFF 2,739 83 11 S ORG **D**
K6TSK 2,520 60 14 S ORG D
KQ6QW 1,443 37 13 S LAX CD
KQ6EE 1,332 37 12 S LAX CD
KD6RMS 1,020 32 10 S LAX CD**E**
KF6JBB 960 32 10 S SDG CD
KD6UIH 936 24 13 S ORG CD
KD6OLH 828 23 12 S LAX CD
K6OUE 420 28 5 S ORG D
KQ6TI 399 19 7 S LAX CD
KE6GFI 192 16 4 S ORG D
W9EC 165 9 5 S SB CD**E**
KK9MM 150 8 5 S SB CD**E**
KE6SQG 144 12 4 S SDG D
KE6RCI 120 10 4 S SB D
KE6NRO 108 9 4 S SDG D
K6IAH 108 9 4 S SDG D
KN6WL 81 9 3 S ORG D
KF6OIF 63 5 3 S SB **DE**
KG6EG 45 5 3 S ORG CD
K6WLC (+K0BGL) 9,963 108 27 M SB CDE
KD6EFQ (+KO6ET) 1,200 40 10 M SDG CD
N6DN 6,318 76 26 R SW CDE
N0IO 1,134 27 14 R SW CD
AD6AF 432 18 8 R SW D

West Gulf

W5LUA 86,268 141 91 S NTX **CD9EFGHI**
AA5C 17,535 79 35 S NTX CD9EFGHI
WA5TKU 15,372 68 42 S NTX CDEFGHI
K5SW 1,224 22 17 S OK CDE
WA5VKS 972 30 9 S NTX CDE
N5QGH 22,968 136 24 R WG CD9EFGHI

Canada

VA3ST 11,748 89 44 S ON **CD**
VE3WCB 960 20 10 S ON D**EF**
VE2JWH 663 17 13 S QC CD
VB2PIJ 75 5 5 S QC CD
VE3SMA (+VE3OIK) 66,312 166 72 R ON CD9EFGHIJ
VE3OIL 37,125 123 55 R CAN CDEFGIJ

By Lew Malchick, N2RQ

It's Time to Gear Up for the 13th Annual School Club Roundup!

Would you like to be able to brag like Tim Ruzin, KI0IJ, does? Tim, from Palisade, Colorado, writes: "We signed up 17 youths for our kid-contest team for the 1998 School Club Roundup. Students with little interest in school argued over whose turn it was to operate the radio, and raced each other to my world map to circle the QTHs. These 13- and 14-year olds think the Internet chat rooms are ho hum, but lit up with delight over a call from Hawaii, Mexico or Puerto Rico."

You can boast of similar great success, even if you've never worked with a school group. Start making plans for the 1999 School Club Roundup (SCR)! Contact an innovative teacher you've heard about, or your local school PTA or principal, and offer them a one-day (or more) hands-on lesson in geography and technology. The ARRL can give you a booklet about Amateur Radio in school, if you'd like some ammunition to hand out while you're suggesting a radio station set up in the school library, lunchroom, lobby or parking lot. We've seen these temporary operations lead to permanent programs. Or, if you're a teacher who doesn't have a radio in your classroom, you can follow the lead of Robert Jones, WB1P, who enlisted help for his elementary school from the local ham club. (Contact the ARRL Educational Activities Department by e-mail at ead@arrl.org to find a club in your area.)

The Eric Hamber High School SCR Team, VE7HSS, in Vancouver, British Columbia, worked stations in 41 states and four DX locations with advisor Ross Gebert, VE7HRR.

Last year's participants reported that the SCR was a great way to get young operators on the air, and improve their communications skills while they had a good time. Many reported that the SCR was what caused students to get their licenses.

The SCR with its low-pressure format is intended to eradicate the fear new operators have with not knowing what to say to the stranger on the other radio. Having a set contest exchange helps newcomers with that fear. Experienced SCR operators are encouraged to be patient and take time to chat beyond the contest exchange. In response to requests, the SCR rules were limited to 6 hours in any 24-hour period. Separate award certificates will be issued for elementary, middle school, high school and college/university levels for US and DX entries.

School Club Roundup (SCR) is sponsored by the Council for the Advancement of Amateur Radio in the New York City Schools (CAAR/NYCS), the ARRL and its Hudson Division Education Task Force to foster contacts with and among school radio clubs.

School Club Roundup Rules

1. **Object**: All stations to exchange QSO information as below with as many other stations as possible especially school clubs.

2. **Contest Period: 1300 UTC on Monday, February 8, to 0100 UTC on Saturday, February 13.** Operate no more than 24 of the 108 hours, with a maximum of 6 hours in any 24-hour period. Logs must clearly show on and off dates and times; off periods must be at least 30 minutes. All amateur bands except 30, 17 and 12 meters are permitted. Do not use VHF or UHF repeaters, or the national calling frequency of 146.52 MHz. Only recognized simplex frequencies such as 144.90-145.00; 146.49, .55, 58; and 147.42, .45, .48, .51, .54 and .57 MHz may be used.

3. **Classes:** Single transmitter only:

(I) *Individual* or *Single Operator* (nonclub)

(C) *Club* or *Multioperator Group* (nonschool) Multioperator Group stations must use *only one* call sign during the whole contest.

(S) *School Club* or *Group* (grades K-12, college or university). This includes any station operated at school for the contest, and those formed for the sole purpose of operating the SCR.

4. **Exchange**: Your call sign, RS(T), class (I, C or S), US state or DX country. For example, W2CXN answers N2RQ's call by sending **N2RQ DE W2CXN 57(9) S NY.**

5. **Scoring**: Stations may be contacted once each on phone and CW (digital modes count as CW). No repeater contacts except satellite and "real time" packet. Score 1 point for each phone QSO and 2 points for each CW QSO. *Multipliers*: [Number of states plus number of DXCC countries] + [2 × number of class-C QSOs] + [5 × class-S QSOs]. QSOs with school stations are given a multiplier of 5, which makes them the most desirable stations to work. QSOs with Marty, KA2NRR, will count as a 5 × multiplier. (KA2NRR was the founding chairman of the CAAR/NYCS and creator of the contest that became the SCR). *Final Score*: Multiply QSO points by multiplier. Please use the SCR summary form to avoid errors, especially for your first time in the SCR (see item 6 below).

6. **Reporting**: Obtain sample log and entry forms by sending a large self-addressed stamped envelope (SASE) or a label and postage to Lew Malchick, N2RQ, Brooklyn Technical HS, 29 Fort Greene Pl, Brooklyn, NY 11217. *SCR-LOG* V4.x written by AD8B for IBM and compatible PCs is included as an attached file with e-mail requests to caarnycs@aol.com. Also check on the Web at http://www.arrlhudson.org and http://www.arrl.org/contests. Logs must include exchange information, bands, and signature of all operators and authorized club official or trustee. Indicate the number of hours and operator/loggers, and type of school and entry class. Dupe check sheets are required for entries over 100 QSOs. Computer entries on disk are appreciated (use *SCR-LOG* or follow the ARRL standard file format). Include a printed summary sheet and instructions as to the disk file names and formats. If you are not sure if we can handle your files, call or write and ask us. Entries must be postmarked to Lew, N2RQ, (see address above) by March 15, 1999.

8. **Awards**: Certificates for the top three entries in each class. The school club class will be divided into elementary, middle, high school and college/university. DX will be listed separately at the end of US entries in each category. A special certificate is awarded to any station contacting 10 or more school clubs. Send a large (9 × 12 inch) SASE or a mailing label and sufficient postage (or IRCs) to Lew Malchick, N2RQ, (see address above) for complete results and information about CAAR/NYCS. Certificates have always been sent for each entry, but because of increased participation and associated workload, those entrants who don't send appropriate postage, envelope and mailing label may not receive a certificate. QST

Section News

*Edited by **Steve Ewald, WV1X** • Assistant Field Services Manager*

The ARRL Field Organization Forum

Field Organization Abbreviations

ACC	Affiliated Club Coordinator
ARES	Amateur Radio Emergency Service
ASM	Assistant Section Manager
BM	Bulletin Manager
BPL	Brass Pounders League
DEC	District Emergency Coordinator
DXFR	DX Field Representative
EC	Emergency Coordinator
LGL	Local Government Liaison
NCS	Net Control Station
NM	Net Manager
NTS	National Traffic System
OBS	Official Bulletin Station
OES	Official Emergency Station
ORS	Official Relay Station
OO	Official Observer
OOC	Official Observer Coordinator
PBBS	Packet Bulletin Board Station
PIC	Public Information Coordinator
PIO	Public Information Officer
PSHR	Public Service Honor Roll
SGL	State Government Liaison
SEC	Section Emergency Coordinator
SM	Section Manager
STM	Section Traffic Manager
TCC	Transcontinental Corps
TA	Technical Advisor
TC	Technical Coordinator
TS	Technical Specialist
VC	Volunteer Counsel
VCE	Volunteer Consulting Engineer
VE	Volunteer Examiner

ATLANTIC DIVISION

DELAWARE: SM, Randall K, Carlson, WBØJJX, e-mail: wb0jjx@arrl.org—Delaware government entities are paying a lot of attention to emergency planning and operations these days. There is a general upgrading of facilities at the county and state level currently underway. Sussex County is in the process of completing a renovation of their current EOC. A new Kent County EOC has just opened for business, and the amateur station is in the process being moved to the new location. The state is building a new EOC in Smryna, and it should be completed sometime in 1999. The amateur station from the current EOC will be moved to the new EOC when it becomes operational. Throughout this process, Amateur Radio (ARES/RACES) is still getting a lot of support from the government agencies. The planners are aware that what we bring to the table is flexibility and survivability. While we tend to think of them as fun, all the public service events we are doing each year are the key to training in this area. They allow us a chance to practice the art of evaluating needs and the deployment existing resources. Please have a safe and happy holiday season! 73 Randall.

EASTERN PENNSYLVANIA: SM: Allen R. Breiner, W3TI—SEC: WB3FPL. STM: W3KOD. SGL: KI6NJ. OOC: W3DZI. TC: N3HTZ. ASMs: N3KYZ, K3TX, WY3K, WB3FQY. W3DAB has been appointed Emergency Coordinator for Cumberland County. Temple University Amateur Radio Club under the leadership of K3HQ sponsored a Boy Scout Merit Badge Workshop with five Boy Scouts from troop 607, Morrisville participating. New club officers for 1999 for the Penn-Mar Amateur Club are; N3TGF president, WN3N vice pres, N3JKY secretary, and W3BCS treasurer. Tamaqua Wireless Association 1999 officers are; W3ZRQ president, KB3FCV, vice pres, W3TI secretary/treasurer, KB3ACB activity manager and NI3H trustee. Delaware-Lehigh Amateur Radio Club officers for 1999; W3JD president, KA3JWE vice pres, secretary W3ZF and KA3MOU treasurer. WA3PZO was interviewed live on WHYY-TV News regarding the use of Amateur Radio communications when Hurricane Bonnie came up the coast. The Phil-Mont Mobile Radio Club is looking for volunteers to help staff the amateur station, W3AA, at the Franklin Institute. The Chester County ARES/RACES team battled the elements, wind and rain, during the Marshallton Triathalon, assisting with communications were: N3EML, N3LRA, WACQT, N3IKL, WB3ITC, N4SEN, WA3DMV, K3IV, N3MXB, W3STA, AA3EO, H3HLJ, KD3OK, W3MYP and KC3XL. Member participation from the Southern Pennsylvania Amateur Radio Club provided communications for the Mount Hope Winery Run and the Columbia Area Jaycees Annual Halloween parade were; KB3FQY, N3LOM, AA3C, K3KSA, N3CXY, N3ABC, WA3UOE, N3XPB, N3XPA, W3PWH, N3ZKV, and N3ZKW. The Tamaqua Wireless Assn. Provided radio communications for the 32nd consecutive year with the Tamaqua Halloween parade sponsored by the Chamber of Commerce and Tamaqua Lions Club, members assisting; WY3K, KB3ABY, KB3ACB, KB3CFV, KA3WGG, KA3WGF, N3HHH, N3LBM, W3ZHW, W3ZRQ, and W3TI. The monthly newsletter for the Mobile Sixers Radio Club is *The Hetrodyne*. They meet at 7:30 on the fourth Monday of the month, at the Pennsylvania Institute of Technology in Media. Congratulations to our recent license class upgrades; Novice KB3DDI. Technician KB3DDG, KB3DDH, KB3DDJ. General KB3CAY. Advanced KB3CFU and N3YGF. Does your club VE team or emergency group assist or sponsor similar activities, if so, send us the information and call letters of those who participated and we'll be glad to enter the information here. Our State Government Liaison, KI6NJ, sent a letter of information to over 60 clubs explaining the sections Local Government Liaison program. Not one club bothered to respond. If there is zero interest in this program it will be discussed at the next meeting of the Section cabinet and in all probably be discontinued. There are still a few radio clubs who have not filed their 1998 League affiliation renewal forms. Within a few weeks the new renewal forms for 1999 will be mailed out. The data listed on these forms are the only means by which headquarters and this office have in order to keep your club officers and mailing address current. These forms must be filed annually in order to retain a Special Service status. The SSC renewal is every two years and that form does not supply the necessary information. Tfc: W3KOD 513, N3DRM 407, W3IVS 169, N3EFW 106, N3YSI 73, W3HK 67, N3AT 40, WA3EHD 38, N3HR 36, W3JKX 35, AD3X 27, K3TX 26, WB3JOE 26, NR9K 24, W3ZQN 22, N3IRN 16, N3KYZ 12, KA3LVR 10, N3AS 9, W3TI 9, N3DCG 8, W3DP 6, WA3CKA 5, W3TWV 5, W3SD 4, N3AO 3 WB3GCK 1. Net reports: EPA 223, PFN 136, EPAEP&T 96, PTTN 87, MARCTIN 15, D6ARES 14, SEPTN 6, LCARES 6, D8ARES 4. Total traffic reported for October: 2187.

MARYLAND/DC: SM, Bill Howard, WB3V (wb3v@erols.com)—ACC: Tony Young, WA3YLO 301-262-1917. ASM: Jerry Gavin, NU3D 410-761-1423 (k2ilq@aol.com). ASM/RACES Coord: Al Nollmeyer W3YVQ (alyvq@juno.com). BM: Al Brown, KZ3AB 301-490-3188 (Al_Brown@ix.netcom.com). SEC: Mike Carr, WA1QAA (bamcc@erols.com) 410-799-0403. STM: Bruce Fleming 301-863-6582 (MEGASWOOP@aol.com). TC: Bob Bruninga, WB4APR 410-553-6021 (bruninga@greatlakes.nadn.navy.mil). MDC Section Web home page www.erols.com/wb3v/mdc. Please visit the MDC home page for all the latest links, information and more nets! ANAR EC N3QXW reports 4 net sessions on 147.805 with liaison to EPA, NCAC, MEPN, BTN, MDD, and WVA. One training session and 1 drill was held. 12 members provided communications for the Team Snow Valley Bike Tour. OES reports from: N3QXW NU3D W3CA KO4A. GARR EC N3KAT reports 4 net sessions on 147.105 and 1 drill. GARR ARES participated in a search and rescue exercise with Dept of Natural Resources, MD Defense Force, County Sheriff, Gorman Fire Dept and Gorman Ambulance Service. PRGE EC KA3PVS, reports two members participated in the SET. PG county is talking about reviving the 4-wheel drive program, and will be in touch regarding progress in that area. members participated in the Marine Corps Marathon. MONT EC K3XO, reports that RACES/ARES volunteers supported the 1998 Rockville Runfest. Thanks to Eric, N3NFS, Erin, N3HSA, Ken, N3JEY, Wendy, N3YIC, Dave, W3DRD, Fred K3CSX, Laura, N3VOL, Dick, WB3AAO and Stan, N3PPJ. Rip, K3XO, was net control and the operation was organized and coordinated by Bob Lyons, NK3I. Several Montgomery County RACES/ARES volunteers supported the Marine Corps Marathon, which again was a successful operation. Thanks, Kathy, N3PRU; Laura, N3VOL; and Eric, N3NFS; from Montgomery County, who participated, and to Jim, N3CLL, who ably assisted K3XO at the net control operation. Congratulations to KA3PNI, first MD Tech YL to win the Tech category in the 1998 MDC QSO Party! Also congrats to KB3BLK, first club to win the club category, three times and to WA3DCG for successfully defending his general single op championship. In the Field Day results congratulations to all who participated in MDC and especially PVRC for their second highest score in the nation. A dinner was held to honor Hugh, W3ABC, for his many contributions to Amateur Radio. Please help me welcome the new year with a resolution to help make this world a better place to live and to strike a balance between family, work and fun. Happy New Year! 73 – Bill. With the nets: Net/Net Mgr/QND/QTC/QNI: MSN/KC3Y/32/78/404, MEPN/KE3OX/31/74/696, MDD/WJ3K/67/233/370, MDD Top Brass: KJ3E 258/K3JL/136/AA3GV/147, BTN/AA3LN/no report/, SMN/KE3OX/2/1/10. Tfc: KK3F 1632, KJ3E 128, N3XPK 105, AA3GV 79, N3WKE 69, W3YVQ 68, KC3Y 65, N3ZKP 58, N3WK 56, K3USO 48, KE3OX 45, N3DE 42, WJ3K 31, KO4A 29, N3EGF 23, KB3AMO 18, KE3FL 16, WA1QAA 10, WA3GYW 6, PSHR: N3XPK 162, W3YVQ 159, N3WKE 144, N3WK 134, KJ3E 128, WJ3K 114, KO4A 112, KC3Y 110, AA3GV 104, WA1QAA 100, KE3OX 98, N3ZKP 86, KE3FL 86, KK3F 81, KB3AMO 72.

NORTHERN NEW YORK: SM, Les Schmarder, WA2AEA—ASMs: KD2AJ, WB2KLD, N2ZMS, WA2RLW. ACC: WZ2T. BM: KA2JXI. OOC: N2MX. PICs: N2SZK,WA2RXO. SEC: KF2GC. STM: N2ZGN. TC: N2JKG. Lots of club activity throughout the section. Popular meeting topics include traffic handling, code practice nets on 2m rptrs, modulated CW kits. Regular breakfast ham gatherings in NNY @ Potsdam & Fowler. Local paper articles on Schoharie ARA led to class participants and new ARRL members. Nine NNY FD entries this year, plus I know of one more that did not submit log. 1998 NNY FD Trophy goes to NFARS. Hams involved in County budget processes this year for RACES equipment in Clinton, Essex, and St Lawrence. CVARC dinner moved to November to get away from January road condx. October Reports, BBS, B/P/T: KA2JXI 1525/433/32, KD2AJ 1482/598/63. Nets, QNI/QTC/QND: BFSN 270/30/30, Bill's Geritol 272/1/22, Carrier 639/45/27, CVARCCPN 50/0/8, CVARCSN 42/0/4, CVARES 48/3/4, Kids R Us 19/0/3, MVARC 32/0/5, NDN 250/9/31, NNYARES 231/3/31, Q NET 420/2/31, SIRR 870/42/31, W2UXC Swap 42/0/4. 73, Les, WA2AEA.

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA) e-mail: ka2ykn@arrl.org—ASM: W2BE, K2WB, W2OB, N2OO, KB2TME. SEC: KB2TME. STM: WB2UVB. ACC: KB2ADL. TC: W2EKB. SGL: KB2WKY. OOC: K2PSC. PIC: N2YAJ. TS: W2PAU,W2BE, AB2Y, K2JF, WB2MNF, KD4HZW, WA2NBL, N2XFM. A new year, a fresh start. Let's think Annual Reports. It's easier than ever with the form on the ARRL Web Site. Just click, type and send. Benefits? A club newsletter, discount on pubs for the club, referrals, insurance, club stationery, discounts on new and renewals for ARRL membership and more. The FCC is now cracking the whip. If you hear interference, call the Amateur Enforcement Line at 202-418-1184. Help keep our bands fit for our youth. In view of the recent disasters in Texas and Honduras, we are reminded that it can happen to us. Are we prepared to help ourselves? Are we willing to help others? If you have cards for WAS or DXCC, let me know. I will put you in touch with a checker and you can get your certificate. As an ARRL member, you may be eligible for a 25-yr pin and certificate. Awards are given for 40, 50, 60 and 70 years. It was a pleasure to present Jim Hepburn, W2IIC, with his 25 year pin and certificate at the November monthly meeting of Old Barney. I will be presenting more. SJVN Traffic net nightly 10:30 PM on 147.345. Tfc: WB2UVB 216, K2UL-4 123, K2UL 110, AA2SV 88, N2VQA 45, KB2RTZ 36, KA2CQX 28, W2AZ 25, N2ZMI 3, KB2CDB KB2HJJ N2FHJ N2SOE N2FHK KB2VSR KB2YBM KB2RHI 1 each.

WESTERN NEW YORK: SM, William Thompson, W2MTA—WNY Web. **http://www.dreamscape.com/phaedrus/WNY** CLUB NEWS: Walton Radio Association honored W2TFL, Mr. Ham Radio of Delaware County, in recent newsletter. TCARC's W2FXU just let another one go: A Ham Lexicon that won't quit, including self-portrait of faking knowledge of Gadgetrinos. (Gadgetrinos are technical items and terms to obfuscate operation of radios usually in possession of affluent hams.) Hamophile: overly fond of radios, sleeps with receiver speaker under pillow. Hamagra: pill to renew the vigor of hams who've gone soft on the hobby. Hamoroid: magnetic sphincter attachment, very annoying when pounding brass. Hamatic: Unfortunate hams who are radio frequency challenged, often called "radio clubs." Hamophobic: Fear of Hams, often affects whole families, as in "My gawd, not another radio!" Hamarama: A full sweep of "Q" signals that refuse to die with CW. CLUB OFFICERS: GRAM KA2OQZ N2LVW KB2ZCE WB2CGF; KLARA KB2WXV KG2HA KV2W N2VEB; RAPS N2OYG KB2WPT WB2BWQ; RAWNY WA2FKV KM2L KA2ORB KG2DR. CONGRATULATIONS: W2FS awarded FB cover plaque for his October *QST* article on PIC Microcontrollers in Amateur Radio. In latest CW SS, K2NNY made clean sweep in 20 hours! K2RSK crowned as King of the Grill by WNYDXA prexy WB2RAJ. THANKS to all the clubs and ARES for their support to the Thruway Pumpkin Patrol from Chautauqua to Herkimer! Recently reported Silent Keys will be missed: W2FB and KA2IXW.

Net	QNI	QSP	QND
Early Bird-FM	465	000	022
NYS RACES-SSB	048	006	003
NYS RACES-CW	017	004	004
#NYS/M-CW	226	083	031
CHN-SSB 3925	187	048	031
#WDN/M-FM	403	078	031
#NY PHONE-SSB	211	425	031
#NYPON-SSB	362	262	031
ESS-CW 3590	353	109	031
NYSPT&EN-SB	361	037	031
#OCTEN/E-FM	1391	285	031
VHF THIN	009	000	001

Net	QNI	QSP	QND
#STAR-FM	436	027	030
#WDN.E-FM	433	115	031
#NYS/E-CW	352	138	031
OMEN-FM	048	003	004
OARCN-FM	034	005	004
TIGARDS-FM	027	004	004
BRVSN-FM	192	002	031
STTHN-FM	no Oct report		
#CNYTN-FM	422	070	031
#OCTEN/L	676	240	031
#WDN/L-FM	411	050	031
#NYS/L-CW	271	204	031

#Signifies NTS Net. *Denotes Public Service Honor Roll. Tfc (Oct.): N2LTC*1848, KA2ZNZ*586, W2MTA*472,

Continued on page 104.

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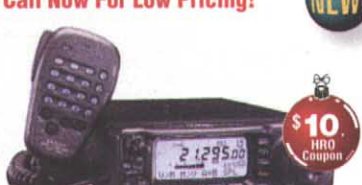

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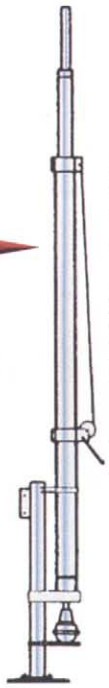

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(DJ-S41T shown)

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The perfect antenna for high profile vehicles. The heavy-duty whip bends to enter garages, drive-thrus, etc.

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Compatible w/all FM VHF/UHF • Transceivers + HF SSB Send/Rec Digital Images • (32 seconds) for download Store pictures in memory • 1.8" Color TFT LCD Display • Built-in speaker + mic • Download to PC • (with special software)

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AO 6.5 automatically optimizes antenna designs for best gain, pattern, impedance, SWR, and resonance. *AO* features 3-D pattern and geometry displays, 2-D polar and rectangular plots with overlays, automatic wire segmentation, automatic frequency sweep, skin-effect modeling, symbolic dimensions and expressions, current sources, and polarization and near-field analysis. *NEC/Wires 2.0* models true earth losses, surface waves, and huge arrays with the Numerical Electromagnetics Code. Best for elevated radials, Beverages, wire beams, giant quads, delta loops, and LPDAs. *TA 1.0* plots elevation patterns for HF antennas over irregular terrain. *TA* accounts for hills, valleys, slopes, focusing, shadowing, reflection, diffraction, and ground constants. Use *TA* to optimize antenna height and siting for your particular QTH. *YO 6.5* automatically optimizes monoband Yagi designs for maximum forward gain, best pattern, minimum SWR, and impedance. *YO* models stacked Yagis, dual driven elements, tapered elements, mounting brackets, matching networks, skin effect, ground reflection, and construction tolerances. *YO* runs hundreds of times faster than NEC or MININEC. *NEC/Yagis 2.5* provides reference-accuracy modeling of individual Yagis and large arrays. Best for EME arrays. One antenna program, $70; three, $120; five, $200. 386+387 and VGA required.

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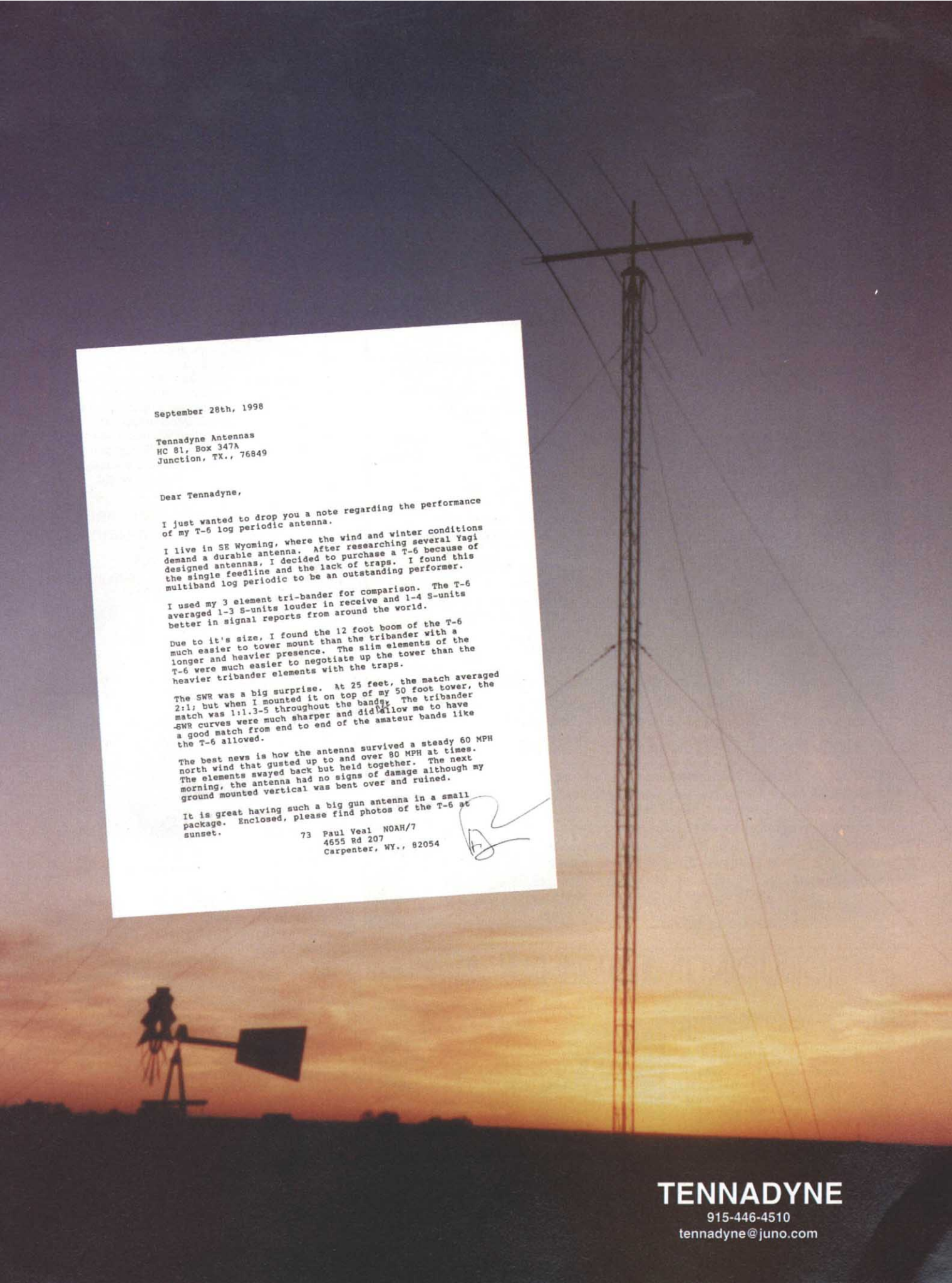

September 28th, 1998

Tennadyne Antennas
HC 81, Box 347A
Junction, TX., 76849

Dear Tennadyne,

I just wanted to drop you a note regarding the performance of my T-6 log periodic antenna.

I live in SE Wyoming, where the wind and winter conditions demand a durable antenna. After researching several Yagi designed antennas, I decided to purchase a T-6 because of the single feedline and the lack of traps. I found this multiband log periodic to be an outstanding performer.

I used my 3 element tri-bander for comparison. The T-6 averaged 1-3 S-units louder in receive and 1-4 S-units better in signal reports from around the world.

Due to it's size, I found the 12 foot boom of the T-6 much easier to tower mount than the tribander with a longer and heavier presence. The slim elements of the T-6 were much easier to negotiate up the tower than the heavier tribander elements with the traps.

The SWR was a big surprise. At 25 feet, the match averaged 2:1; but when I mounted it on top of my 50 foot tower, the match was 1:1.3-5 throughout the bands. The tribander SWR curves were much sharper and did allow me to have a good match from end to end of the amateur bands like the T-6 allowed.

The best news is how the antenna survived a steady 60 MPH north wind that gusted up to and over 80 MPH at times. The elements swayed back but held together. The next morning, the antenna had no signs of damage although my ground mounted vertical was bent over and ruined.

It is great having such a big gun antenna in a small package. Enclosed, please find photos of the T-6 at sunset.

73 Paul Veal NOAH/7
4655 Rd 207
Carpenter, WY., 82054

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Innovative Products Eliminate QRN for the Clearest QSOs!

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ClearSpeech™ Products

ClearSpeech DSP-based noise filtering products incorporate NCT's proprietary ClearSpeech algorithm to clean QRN from received speech transmissions. This breakthrough technology removes up to 95% of stationary or constant noise from signal containing noise and speech. The algorithm is adaptive—as background noise changes, it continues to cancel the noise for consistent performance. The products deliver excellent performance for CW, SSB and FM, and eliminate heterodynes from AM stations.—Plus, they greatly improve receiver performance of older radios.

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$109

This easy-to-use DSP speaker activates automatically and filters background noise, static and other interference.
Reg. $149

ClearSpeech™-Line

$99

This DSP filter delivers the same level of performance as the ClearSpeech-Speaker. Simply connect in front of your existing amplified speaker.
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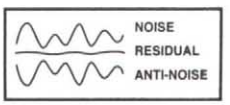
Active Noise Reduction (ANR) Headsets

NCT is the leading supplier of high-performance ANR headsets for consumer, commercial and industrial use. ANR is the electronic coupling of a noise wave with its exact mirror image to cancel the noise. A microphone in each earpiece of the headset senses background noise at the user's ear. That information is sent to an electronic controller where an "anti-noise" wave is generated and coupled with the offensive noise to cancel it. NCT headsets cancel up to 80% of low frequency background noise.



ANR technology is particularly effective against low frequency noise generated by heating and cooling systems, computers and fans which is a scientifically-proven masker of speech and other sounds. This "upward spread of masking" phenomenon makes it difficult to decipher the meaning of speech because the soft consonant sounds that carry the meaning of speech are buried in the noise. NCT's ANR headsets connect easily to your radio for clear, intelligible QSOs.

NoiseBuster® Headset

This comfortable, lightweight headset, available in monaural (NB-TM) and binaural (NB-TB) styles, is the most affordable ANR headset on the market today. It features ANR and a high-quality noise canceling boom microphone. Runs for 100 hours on two AAA batteries.

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NB-TB $79 **Reg. $109**

NB-EX $49 **Reg. $69** ***(listen only)***

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This commercial-grade open-back headset is comfortable and durable. It features ANR and a noise canceling boom microphone. Comes complete with Ni-Cd battery module and charger.
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KA2GJV*452, KF1L*394, WB2IJH 214, K2BCL*202, NN2H*147, WI2G*138, N2IKR*126, WB2QIX*125, N2CCN*115, AF2K*113, KB2WII*110, W2PII*104, NY2V*83, KB2VVD*76, AA2ED*61, N2WDS*61, KG2D*60, N2JRS*49, KB2ETO*46, KB2UQZ*40, W4BNY*36, KB2TIY 28, K2DN*16, KB2QIK 16, WA2GUP*8. Clifford Parker, KA2DBD, again qualified for Public Service Honor Roll, but suffered a stroke in late October and was unable to report. Datalink Reports (Oct) RX/TX: K2DN 2/1, KA2GJV 57/22, N2LTC 609/164. BPL (Oct): KA2ZNZ, N2LTC. Happy 1999, enjoy a great club party over the Holidays, es 73!

WESTERN PENNSYLVANIA: SM, Bill Edgar, N3LLR—ASM: N3MSE. ACC: N3SJR. ASM-ARES: WB3KGT. SEC: N3SRJ. ASM-Packet: KE3ED. ASM-Youth & Education: KE3EE. PIC: W3CG. STM: N3WAV. TC/OOC: WR4W. DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: N3NIA. DEC-S1: KA3HUK. DEC-S2: N3PHF. I'm very happy to announce that Bob Livrone, N3WAV, has been named the Section Traffic Manager for the WPA Section. Bob has been a regular on the section nets and has been very good at encouraging new people to get involved with NTS. Bob replaces Don Brennan, WB8KPE, who recently resigned. While Don was the Section Traffic Manager, WPA Section saw some good growth in the NTS program. Kudos to Mary Housholder, N3QCR, for an excellent job on her District N-1 ARES Newsletter. Fine job! After you get this edition of the *QST*, it will be time to work on that New Year's Resolution. I'd like to ask you to make a small addition to your resolution: Please make an effort to introduce this hobby to at least one new person each month. Excellent opportunities for introducing the hobby are invitations to Field Day exercises, contesting, public service events, Santa Claus nets, licensing classes, and ham club meetings. Plans are being developed for the 1999 Club President's Conference and the Emergency Coordinator's Conference. We will be holding an Official Observer's Conference in 1999 and are very excited about this new conference. Oct tfc reports:

	MGR	*Msgs*	*Sess*
WPA Phone	N3KB	98	31
WPA CW	N3COR	93	31
NWPA2MTN	WA3ZSC	44	30
WPA2MTN	KA3BGC	30	30
Mailbag	N3PBD	17	22

Tfc: N3COR 147, W3OKN 92, WA3UNX 80, N3ON 74, W3NGO 71, WB8KPE 52, W3GJ 43, N3KB 40, N3WAV 37, WA3QNT 28, KC3NY 26, N3PBD 22, K3JHT 9. Traffic handler of the month: N3KB. PSHR: W3OKN 138, N3WAV 119. 73, Bill Edgar, N3LLR.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. SGL: WA9AQN. ACC: N9KP. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. Moultrie Co EC KA9Z reports that a number of amateurs helped Logan Co authorities on a search operation several weeks ago. His report states in part, "The search was for a 3-year old girl who had wandered away from home in Lincoln. At the time, she was sick, with a temperature of 103. After signing in and receiving last minute instructions, we entered [a nearby] corn field about 10:20 PM. Unpicked corn, with a lot of stalks laying down made it very difficult to walk, especially at night. Probably 150 people in all the search parties. At about 11:25 PM the little girl was located in the cornfield, not far from the group I was in. She was in some mud, and very cold, but otherwise unharmed. She was rushed to the hospital as a precaution. All the search parties returned to the house, where we were debriefed and signed off. There was a public address system in front of the house where we assembled, and IEMA and ESDA officials expressed their sincere thanks to all that participated in the search. Rather emotional, with cheering and applause. Red Cross was there with coffee and doughnuts. The Macon County group met at Steak and Shake' after returning to Decatur, for a critique of the entire episode. I did not get home until 2:00 AM. Finding the little girl was a very rewarding experience, and I'm glad I joined in." This report from KA9Z is a good example of how amateurs can serve the community (and their neighbors), even when the use of a radio is not required. Well done to all the amateurs who helped. The new officers of the Six Meter Club of Chicago are pres W9CEJ, VP WA9FIH, sec WA9RIJ, trea AK9Y. In October, the Kishwaukee ARC provided assistance with the Crop Walk and the Sycamore Pumpkin Parade. Co EC WA9APQ reports 8 amateurs participated in the Simulated Emergency Test. The test lasted 3 hours and involved government agencies and area hospitals. All traffic for the test was handled by Amateur Radio. Members of the Lamoine Emergency ARC assisted with the Heritage Days celebration in Macomb. During the same weekend, other LEARC members operated the Salvation Army canteen in support of a train derailment in Niota. The Sangamon Valley RC has voted to donate $250 to the ARRL Foundation scholarship fund. The Starved Rock RC reports an 8 week license class will begin Feb 4 in Ottawa. The class is free but space is limited. To register call 815-433-0707. WB9JGG was appointed a director of STARS to fill the remainder of a vacant term. STARS president WW9WW was interviewed by the *Chicago Tribune* for a piece on Amateur Radio. If your radio club is ARRL affiliated, remind your members to renew their League membership through the local club. Affiliated Clubs get to keep a portion of the ARRL dues by providing the collection service. The cost to the League member is the same, and it's a simple way for your group to raise a few extra dollars.

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ISN	3.905	1800 Daily
ILN	3.665	1830 Daily
ITN	3.680	1900 Daily
CTN	147.090+	2100 Daily
IL ARES	3.905	1630 1st & 3rd Sunday
Macon Co	442.250+	2100 Wednesday
Madison Co	145.130	1900 Monday
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NCPN	3.912	0700 M-Sa; 7.270 at 1215 M-Sa

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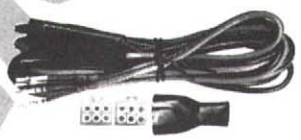

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Sept traffic: WA9SLT 59. Oct traffic: W9HLX 187, WB9TVD 33, NC9T 18, W9FIF 6, WA9RUM 6. D9RN Cycle 1&2 de K9PQ, IL checkins-34 % of IL representation-10%, sess-53, average tfc-3.8, rate-0.28. W9VEY Memorial Net via K9AXS 6 with 198 check-ins. ISN Report de WB9TVD-QNI 235, QTC 67, Sessions 30. ISB via WB9TVD QTC 67 in 30 sessions. ILN via K9CNP QTC 10 in 29 sessions. ITN via KF9ME No Report. NCPN via W9OUF QTC 43 in 27 sess. IPN via KA9CYJ QTC 8 in 25 sess. IEN via K9HEZ QTC 6 in 4 sess.

INDIANA: SM, Peggy Coulter, W9JUJ—SEC: K9ZBM. ASEC: WA9ZCE. STM: AA9HN. OOC: KA9RNY. SGL: WA9VQO. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys. Sept 25, Ralph M. Applegate, N9JIC, South Bend; Oct 16 Ellen E. Johnston, K9QXU, Anderson; Oct 22, Alfred Z. Storey, N9ACE, Indianapolis; Oct 27, Donald E. DuKate, Ka9GTQ, Indianapolis; Oct 27, Ray L. Roberts, WA9LRG, Versailles; Nov 2, James H. Morris, WB9QMG, Terre Haute. They will be missed. The Tri State ARS helped at the Haunted Hayride at Wesselman Park in Evansville. Those assisting were N9RAH, N9MZH, WD9FHA, KB9PAE, KD5AT, KB9NVI, KB9RBO and N9GWS. They also furnished communications for the Great Pumpkin Metric Bike Ride. Those helping were AA9MM, KB9NVI, N9WYG, KB9GNI, KB9PAD and KD5AT. Kokomo ARC assisted the Kokomo High School south campus with the Annual Band Day furnishing communication throughout the grounds and several members shadowing a couple of key people at their request after they discovered communication was difficult without the help of good radios and a coordinated team. Congratulations to WA1MKE, Muncie, for first place single op, phone only, low power, 1997 ARRL 10-meter International Contest. Thirteen South Bend amateurs provided communications for the six-mile Memory Walk. There were no emergencies while more than 600 walkers followed paths along the St. Joseph River and on streets in the area. A dozen operators furnished communications for the Diabetes Walk where everything was routine and no emergencies developed. N9QIL was net control for both events. What is your club planning for 1999. How about letting me know. I hope everyone had a Very Merry Christmas and that the New Year will bring Health and Happiness to all. NMs ITN/W9ZY, QIN/N9PF, ICN/AA9HN, WN/AB9AA, VHF/AA9HN.

Net	*Freq*	*Time/Daily/UTC*	*QNI*	*QTC*	*QTR*	*Sess*
ITN	3910	1330/2130/2300	2829	600	1883	93
QIN	3656	1430/0000	172	89	650	45
ICN	3705	2315	27	4	110	15
IWN	3910	1310	2102	–	310	31
IWN VHF Bloomington			487	–	465	31
IWN VHF Kokomo			739	–	155	31
IWN VHF Northeast			1012	–	620	31
Hoosier VHF nets (9 nets)			882	101	1271	89

9RN Total QTC 246 in 61 sessions IN represented 95% by KJ9J, KO9D, WB9UYU, N9PF, WA9QCF, AA9HN, and W9FC. Tfc: W9FC 226, K9GBR 129, K9PUI 126, N9ZZD 125, W9ZY 125, WB9QPA 122, W9UEM 45, W9JUJ 41, K9RPZ 30, W9BRW 20, W9EHY 18, K9DIY 17, KB9NPU 14, W9RTH 10, W9KT 10, AB9A 7, K8LEN 5, W9CSJ 4, WB9NCE 2, K9OUP 1, N9JAI 1.

WISCONSIN: SM, Roy A. Pedersen, K9FHI—SEC: WB9SMM. STM: KA9KLZ. ACC: KF9ZU. SGL: W9RYA. OOC: W9RCW. PIC: K9ZZ. TC: K9GDF. ASM: W9CBE, K9UTQ. BM: WB9NRK. WB9TQG is now N9CH, congratulations John. I regret to report the following Silent Keys W9JY KA9MPP. 9RNC4 well represented by N9KHD, N9CK, K9LGU, W9UW, W9CBE and W9YCV, thanks fellows. Betty and Ken, W9NUE, celebrated their 50th wedding anniversary, also Phil, N9FEW, and Bea Noftz who will celebrate their 50th. Those stations who earned BPL this month are W9RCW, WB9JSW, W9CBE, K9RTB, WB9YPY, W9IHW, K9GU, W9YCV, K9PQ, N9CK and K9JPS, very good job. As usual all the nets in Wisconsin need more checkins and traffic, come on fellas and gals let's do it, all those who have their new license, please support the nets in Wisconsin. Do you have a winter car kit? Winter is coming—be prepared. Cindy and Skip KA9PZG, KA9DDN, are the very first Ozares members to earn all seven icons (Ozares Emergency Management Operations, ECC and EOC Operations, Boat OPS, Packet Traffic, Hazmet and WX). Congratulations to both of you. *Ozares Newsletter.* I hope you fellows and gals are looking for a replacement for me. I will not seek reelection, and I won't endorse anyone. It's time for someone else to do the job. Sorry to hear WB9JSW had a stroke. Our prayers are with you, Carl. W9RCW, Rick, is recovering at home from a stay at the hospital. I understand Rick is on the air at times. Yours truly will be going to the hospital November 9 for right knee replacement. I will be off the air for a few days, will be on local repeater and possibly on the nets when I can manage the steps to the shack. Thought for the day: What this country needs is more open minds and fewer open mouths. I hope everyone has safe and HAPPY HOLIDAYS. Tfc: K9JPS 905, W9IHW 729, K9RTB 578, W9CBE 562, K9GU 430, WB9YPY 425, W9RCW 375, N9KHD 153, W9YCV 106, AG9G 95, N9CK 92, W9UW 75, K9PQ 66, K9FHI 63, N9BDL 62, KE9VU 56, KA9KLZ 56, KA9BHL 47, N9HDF 34, KA9FVX 28, K9LGU 27, W9ODV 23, WB9ICH 21, WD9FLJ 12, N9JIY 10, K9UTQ 7, W9PVD 5.

DAKOTA DIVISION

MINNESOTA: SM, Randy "Max" Wendel, N0FKU—As I wrap up each year with this news column, I look back on the year and always realize just how fast the time (year) has gone by. I must thank all those dedicated folks in our field organization activities who continue to give and give in making ham radio a viable service for our fellow hams and the general public. I can't help but think about my hometown of St Peter which was turned upside down on March 29. My parents still have a home standing though there were 8 houses on their block alone that were demolished. Our STM Bob Meyer, W0LAW, has parents in Comfrey whose house had significant damage but was still able to repair and stay put. Mike Langer, WQ0A, in St Peter had significant damage but still has his house after months of repair. The list can go on, but the point I want to make is

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THANK YOU to every single ARES and ham radio operator who jumped in to help during the tornado relief events. Unless you've lived through the destruction and suffered losses, you can't begin to appreciate the help given by the many volunteers who gave and gave during tough times. You should all take pride and be proud of yourselves for the help you gave representing ham radio. When you really stop and think about it, we all have a lot to be thankful for. I'd like to thank all the ARRL Section Net managers and net controls for keeping the HF nets going. My thanks to Bob Meyer WØLAW our STM for his continued efforts as well as Gary Peterson, NØZOD, for his work in ARES. I'd like to thank ALL ARES ECs who continue to help keep our mission alive. I'd like to thank all the clubs who regularly send me their newsletters. Thanks to all those who sponsor hamfests and create a place for us to meet and enjoy our hobby/service. In another year we will be faced with a new millennium/Year 2000. Hopefully my computer will still type this message and my radios will still turn on. Most of all, I hope you're all still here sharing and enjoying something we all have in common...Amateur Radio...and...friendships. May you be blessed in the year to come. 73 from Randy Wendel, NØFKU, in Bloomington. Net QNI/QTC/Sess: MSPN/E 770/73/3. MSPN/N 477/123/31. MSN/1 255/103/31. MSN/2 90/35/31. PAW 2434/93/87. Tfc: WBØWNJ, WOØA, WØLAW, KAØAII, WAØTFC, WØHPD, KØPIZ, WØGRW, KN9U, KBØAIJ, KØWPK, WØWVO, KAØIZA, KØOGI, KBØOHI, WDØGUF, NØJP.

NORTH DAKOTA: SM, Bill Kurtti, WCØM—NØRDJ has been busy helping with the Central America flood disaster in the 20 net as a Net Control. Also, Dick has agreed to take a Official Emergency Station appointment. I'm sorry to report that WØCTS from Bismarck & KFØTB from Fargo are Silent Keys. The Bismarck Club was called out 15 times by the Weather Service for SKYWARN. Also they set up a booth at the Weather Service Open House last month. The 1999 International Hamfest setup meeting was held with Williston & Bismarck Clubs hosting the Event July 9-11. Dickinson has replaced the 82 repeater with a new machine. We wish KBØNVQ, KØUB & KØDK speedy recoveries after their surgeries. Grand Forks hams were called out 3 times for SKYWARN this summer along with providing communications for several events including the Alzheimer Walk & UND Potato Bowl. Their hamfest was held last month with a real great flea market. Congratulations to WØZQJ on the nice article in the Forum. Also to KGØFR on his choice of farm tractor colors. Tfc: NØRDJ 1. Net sess/QNI/QTC: Goose River 4/58/0; DATA 28/543/6. WX Nets 30/779/22.

SOUTH DAKOTA: SM, R. L. Cory, WØYMB—Contact any of the following people if you would like to become a part of our field organization. R. L. Cory, WØYMB, SM; Ole Johnson and Bob Olson, Asst. SM; Jerry Gaithright, WNØY, SEC; Loyd Timperly, WBØYYX, CC; Roger Kehm, NØROG, Public Information Officer; Arnie Sjomling, TC; and Glen Edland, W6IVV, STM. QCWA Dakota Chapter 102 will have the second annual special event station in Feb. Details on this next month. For info. on membership in the Quarter Century Wireless Assn. contact NUØF, Frank, or Dave, KØERM. W6IVV Glen and XYL celebrated their 50th wedding anniversary. A number of SD hams enjoyed attending the St Paul Ham Expo at the new Rivercenter. The flea market produced a lot of good bargains. The nice weather in Sept apparently was the cause of a lower turn out for many of the SD nets. The SD Novice Net held a large decline in checkins. The checkins to the SKYWARN net was also down. The North East SD 2-meter Net was also down. The Walworth County Emergency CW Net also way down and really needs help. On Sun 12:45 PM on 3700 kHz. Net control will resend at your checkin speed. Please send items for the column to WØYMB. Total tfc for the month of October was 813.

DELTA DIVISION

ARKANSAS: SM, Roger Gray, N5QS, e-mail n5qs@arrl.org — Merry Christmas and Happy New Year to all. I hope the New Year finds you well and enjoying Amateur Radio's renewed band propagation. Last week I visited with a school at Foothills Vocational Technical Institute in Searcy and talked to an electronics class. We had a lot of interest and one out of the class has already tested for his license. One of the highlights of the talk was my visit with K3FBI, the special-event station at the FBI Academy in Quanico, VA. Thanks to the operator there for talking to my class for a few minutes, it sure helped the demonstration. I want to thank Eldon Bryant for collecting traffic reports for me during the illness of Joe Johnson, W5QFU, and to express my appreciation for the years of dedication Joe has put into the position. Joe, we hope you have a speedy recovery. I must also apologize to those who sent traffic in for a while that did not get published, I was unaware of the problem. If anyone has traffic reports for April, May, June, July, August, or September send them to Eldon with the month they are from and I will print them soon. Oct traffic: AB5SG 43, K5BOC 33, AB5AU 22, K7ZQR 16, KO5E 11, N5SAN 9, W5HDN 8, AB5ZU 5, KC5UEW 2, KA5RRK 1.

LOUISIANA: SM, Lionel A "Al" Oubre, K5DPG, e-mail k5dpg@arrl.org. Web Page www.aisp.net/k5dpg—ASM: KB5CX. K5MC. ACC: KA5IJU. BM: K5ARH. TC: KE5FZ. SEC: N5MYH. OOC: WB5CXJ. PRC: KB5QVI. STM: KG5GE. NM: LTN WB5ZED. NM LCW: W4DLZ. As I wrote last month, hopefully we had seen the last of hurricane season for 1998. Then along comes Mitch, and caused the most devastating storm recorded. We must be ever on alert to the threat of disasters. As we begin this new year, we need to look back at 1998 for lessons learned. The most important is to be constantly alert for pending disasters. The second is that through cooperation and coordination good things happen. The coming together of the LA, MS and STX Sections to provide a working group to assist each other during disasters has worked very well. The frequencies 3873/7285 for official traffic and 3935/7290 for health and welfare traffic has made a major impact on the effectiveness of Amateur Radio during disasters. Upcoming hamfests are: Hammond Jan 16, Lafayette March 13-14. Go out and support our area hamfest events. Louisiana Section Nets: LTN 6:30 PM, 3910 kHz, nightly, WB5ZED mgr. LCW 6:45 PM, 3673 kHz, nightly W4DLZ mgr;Reports for September 1998: LTN QNI 370 QTC 113 in 30 sessions, LCW QNI 167 QTC 38 IN 29 sessions, LSN QNI 22 QTC 20

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in 26 sessions. PSHR: KG5GE 92, K5WOD 141, K5DPG 156, K5IQZ 168, WB5ZED 178, K5MC 228. Tfc: K5WOD 16, KG5GE 28, K5DPG 43, K5IQZ 64, WB5ZED 216, K5MC 330 BPL.

MISSISSIPPI: SM, Malcolm Keown, W5XX—DEC: K5IMT, N5XGI. EC: KK5BY, W5DJW, KC5TYL, N5XGI, N5XXX, KB5ZEA. Chairman N5PS reports that all had a great time at the Greenville Hamfest. Paul notes that WB5AKZ, KC5ECI, KC5TGX, N5LRL, N5WK, KB5VNH, KB5SOE, and KB5LJR really put their shoulders to the wheel to make it all happen. Kudos are also in order for Chairman K5NRK and his VARC/JARC crew, who drew rave international reviews for hosting the 16th Annual Space Symposium and AMSAT-NA Meeting in Vicksburg. Check out the new Magnolia DX Association Web site at www.datasync.com/~w5ue/mdxa. Real Cool! Welcome to KM5GT as EC for Tippah County and KB5WJJ for Warren County. Net Reports: sessions/QNI/QTC. MSPN: 31/2433/57, MTN: 30/166/88, MSN: 31/1080/8, PBRA: 31/817/0, Jackson Co ARES/RACES: 30/487/32, MSSN: 22/119/4, MLEN: 4/78/0, MBHN: 4/23/0, Stone Co ARES 4/51/0, MCARAN 4/42/0. PSHR: KB5W 143, N5XGI 143, K5DMC 97. Traffic: KB5W 430, K5DMC 57, N5XGI 52, K5VV 32, W5XX 15.

TENNESSEE: SM, O. D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU. OOC: AD4LO. TC: KB4LJV. BSFARC is getting ready to make 1999 the best year ever for the club, small in numbers but big in spirit and activities. This year the first one day hamfest for CARC, which turned out very good. All Chattanooga area hams join the CARC's weekly net on 146.79 at 2100 hrs eastern time and keep up with the club's meetings and other activities. Those involved in the MS 150 were; K4ZQX, WG4G, K4IOQ, N4MKG, KC4ZAG, WA4ZUD, KD4EHC, KE4DGW, KB4QBO, KR4SL, KB4AJW, AD4F, KE4CTQ, KE4QOF, KE4AIK, N4NWD, KA8EBL, KF4KFZ, KJ4RC & K4CMY. Thanks to the members of BARC, BMRC, KARC & JCARA and the Gray Hamfest committee for putting on a very successful hamfest. SRARC reported that the club's communications at the air show went well, except a small accident to WB4OFM, which was a broken hand expected to heal completely. Thanks to KD4LDL, KE4JQA, KC4UZO, KF4ROV, KE4OHN, ND4F, KE4HSM, KF4RLJ, KF4VMJ, KF4HID, KB4FZK, & WB3JKQ, RACK members who assisted in the "Wear's Valley 15K Race," and the "Susan G. Komen Race." The participants in the races included Knoxville Mayor Victor Ashe, Lady Vols head coach Pat Head Summitt, and Congressman Jimmy Duncan. As always, the MARA and Delta Amateur Radio clubs in the Memphis area put on a very good hamfest. The location was convenient, parking was sufficient and the weather was great, there were lots of good prizes and lots of the best fellowship. Many thanks to the MARC News to include a listing of the club's membership in the Oct issue. Tfc: NZ4O 404, WB4GIJ 171, N4PU 112, KA5KDB 67, WA4HKU 65, W4SQE 38, WB4DYJ 35, WA4GLS 23, WD4JJ 22, KI4V 10, N4ZXM 5, W4PSN 4, W4HZD 4, W4IKK 2.

GREAT LAKES DIVISION

KENTUCKY: SM, Bill Uschan, KC4MIS— ASM: Tom Lykins, K4LID. SEC: Craig Still, KD4PWK. STM: John Farler, K4AVX. ACC: John Embry, K4AT. PIC: Steve McCallum, W2ZBY. SGL: Bill Burger, KF4WMU. TC: Scotty Thompson, KI4AT. BM: Ernie Pridemore, KC4IVG. A special meeting of the ARRL Board of Directors was held on October 24, 1998. This meeting was to reaffirm the proposals made to the FCC earlier in the year. The Ft Know Amateur Radio Club will receive a plaque from the ARRL as recognition for being an ARRL Affiliated Club for 50 years. Congratulations! Make a note that the date for the Cave City Hamfest is March 13, 1999. This was changed due to a conflict. The Cincinnati Hamfest will be held the last weekend in February 1999. In the next Section News, I will list all the dates as I have them. Word was received that the home of KR4SR, Jim Carrico, was lost due to a fire. A relief fund has been set up and contributions can be sent to Johnny Harrison, PO Box 26, Elk Horn, Kentucky 42733. For more information, contact Tom Lykins at k4lid@rinx.com or k4vzc@kih.net. I also received word that AE4VT, Garland Jordan, was not doing well at all. Our prayers are with him. Also, it is with deep regret that Blaine Ford, WB4IBO, became a SK. Mr Ford resided in Barbourville, KY. The Fort Knox Amateur Radio Club should be congratulated for 50 years as an ARRL Affiliated Amateur Radio Club. A salute to its officers and membership. Net QNI/QTC/Sess: KRN 947/22/22; MKPN 1275/45/31; KTN 1435/39/31; KSN 221/64/31; KEN 215 39/5; CARN 234/33/30; TSTMN 476 36/31; 4ARES 442 34/31. Tfc: K4AVX 51, W4ET 20, KO4OL 60, KD4PWK 39, KF4RBK 16, KU4UO 34, K4YKI 7. KC4SSO 3. WB4ZDU 7.

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@centuryinter.net). ASM: John LaRock, K8XD (k8xd@voyager.net). SEC: Deborah Kirkbride, KA8YKK (ka8ykk@concentric .net). STM: VACANT. ACC: Sandra Mondro, KG8HM (smondro@mich.com). OOC: Donald Sefcik, N8NJE (fdsmith@tir.com). PIC: James (Erv) Bates, W8ERV (kb8tnq@voyager.net). SGL: Ed Hude, WA8QJE (edhude@juno.com). TC: Dave Smith, W8YZ (dsmith@smithassoc.com). VHF/UHF Net Manager: Ray Knuth, KB8ZYY. Section Newsletter Editor: Dave Colangelo, KB8RJI (dcolangelo@ameritech.net). QRV Bulletin Editor: Mike Pearsall, N8MP (n8mp@concentric.net). HAPPY NEW YEAR 1999! Another new year is upon us, and it's once again time for those New Year's resolutions. When we turn over the last page of our old calendar and open the new, it might be a good time to reflect on some of the mistakes we made last year and attempt to do things a little differently. We are all communicators, and often we forget to communicate with each other and let others know of our needs. One good means of communicating to others is through our club newsletters. We have many fine newsletters in our section and each one is unique. It reflects the goals of our clubs. Some clubs are fortunate to have editors that have the time and patience to put out multi-paged issues, and others that are not so fortunate must do the best they can do with their limited resources. No matter what class your club is in, it's still important to communicate with your members. Some can do it very effectively with just a single page. If your club does not have a newsletter editor, why not try to enlist one, if only to put out a single page. Postage a

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problem? Why not publish your newsletter as an Internet document or just a simple text file and e-mail it to those members that have that capability? It really doesn't matter how you do it, as long as you communicate. I really look forward to receiving club newsletters, and I read each and every one. It is my way of keeping current with your club activities. To those of you that send me a newsletter, I thank you for the opportunity. For those of you that have not yet done so, please do, and for those that do not currently publish a newsletter, give it a try. I would like to thank the Catalpa Amateur Radio Society for inviting me to their November club meeting. I had a great time chatting with all of you and with the honor of presenting the club with their certificate for 50 years as an ARRL Affiliated Club. Congratulations to all of you for the fine job of keeping your club active for a half century! I am also looking forward to attending the December meeting of the Adrian Amateur Radio Club to present them with their 50 year certificate as an ARRL Affiliated Club. Congratulations to you on your half-century of activity and service to your members! Traffic reports for October 1998: AA8PI 200, N8FPN 205, KB8ZYY 165, WX8Y 154, W8RTN 100, K8GA 74, K8GXV 64, KC8GMT 64, N8TDE 53, W8RNQ 52, WA8DHB 49, WI8K 49, K8AI 33, N8OSC 29, WR8F 27, K8UPE 30, W8YIQ 24, K8ZJU 19, AA8SN 19, K3UWO 8, K8XD 8, KA8LAR 7, W8YZ 4, KC8GRP 3, N8EXS 2, NJ8R 2. (REPORTS BY 5th of the month please). Please support the following Section Traffic Nets: October NTS Net Reports.

Net	*QNI*	*QTC*	*Sess*	*NM*	*Freq*	*Time*	*Day*
QMN	817	305	65	WB8SIW	3.663	6:30&10 PM	Daily
MACS	327	81	31	W8RNQ	3.953	11 AM	Daily (1 PM Sun.)
MITN	495	156	33	KA9EIZ	3.952	7 PM	Daily
UPN	1415	79	36	WA8DHB	3.921	5 PM	Daily (Noon Sun.)
GLETN	733	19	31	VE3SCY	3.932	9 PM	Daily
SEMTN	321	78	34	WI8K	145.330	10:15 PM	Daily
WSSBN	702	35	31	K8JRE	3.935	7 PM	Daily
ARAHH	42	03	04	KC8DAJ	145.130	8 PM	Wed
NCN	86	11	15	WD7G	146.940	7:30 PM	M-F
TATN	252	13	23	KC8FXF	147.300	9:30 PM	Daily

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12)—ASM-NE Ohio: Bob Winston, W2THU, Cleveland, w2thu@nacs.net. ASM-NW Ohio: Ron Griffin, N8AEH, Findlay, griffin@ohio.tds.net. ASM-Central Ohio: Mary Carpenter, N8AOM, Columbus, n8oam@iwaynet .net—ASM-SW Ohio: John Haungs, W8STX, Cincinnati, w8stx@aol.com. ASM-SE Ohio: Bill Creighton, K8TUT, Athens, wcreighto1@Ohio.edu. SEC: Larry Solak, WD8MPV, Mantua 330-274-8240. STM: Jack Wagoner, WB8FSV, Hilliard, fsv@netwalk.com—ACC: Joanne Solak, KJ3O, Mantua, 330-274-8240. TC: Mike Brown, W8DJY, Middletown, mhbrown@miavx3.mid.muohio.edu. PIC: Beverly Priest, N8VZV, Dayton, mapriest@erinet.com. OOC: Carl Morgan, K8CM, Middletown, morgancl@muohio .edu. SGL: (Appointment Pending). For 1999, let's spotlight each month one of the lesser known station appointments available to Ohio ARRL members. For example, Technical Specialist who reports to the Technical Coordinator, Mike Brown, W8DJY. Know how to solve interference problems? Like to be a Sherlock Holmes of electronic puzzles, discovering why a proper ham radio signal continues to be received in a neighbor's electric organ? Want to continue Ham Radio's fine tradition of assisting others? Get in touch with Mike (See above listing) and offer your technical expertise to your area of Ohio. Speaking of appointments, those holding any Fields Appointments in Ohio, please make sure the proper cabinet member has current address and telephone information for you. All OOs (to the OOC), OES and ECs(to the SEC), PIOs (to the PIC), TS (to the TC), NMs (to the STM), Club Liaisons (to the ACC). ORS stations and LGLs please check with me for the time being. Great time to remind Ohio hams to check out the Web Page of the division and also Ohio Section. Available at http://facops.albion.edu /arrl/ on the Internet through the constant care of Great Lakes Vice Director, George Race, WB8BGY. Applause to the FCC for apparent return to effective enforcement of Amateur Radio frequency interference laws. I have been critical of the FCC for other matters recently. Cincinnati hams, contact OH-KY-IN ARS Eric Neiheisel, N8YCL, to discover how to qualify for the John Hugentober, N8FU (SK), CW Proficiency Award. Different awards for different license classifications but entries due the end of this month. Congrats to Fred Osterman, N8EKU, of Columbus, for his editing of the Third Edition of *Shortwave Receivers 1942-1997*. And congrats to Ohio's own Keith Baker, KB1SF, of Xenia, who is the new national president of AMSAT, the Radio Amateur Satellite Corp. I hope the Mahoning Valley ARA (Youngstown) Kit Building and Home Brewing classes went well. It's past time to get us hams back to the days when a soldering gun is as important as a push-to-talk button. Ask MVARA editor Andy Brincko, WA8ZLK. Saturday, January 16 at Thesken Hall of Miami University of Middletown, Ohio, will host the 13th Annual SW Ohio Digital Symposium. Interested in CW, RTTY, Packet, AMTOR or other digital modes? Plan to attend. Sessions for the beginners as well as advanced sessions are scheduled beginning at 9 AM. General ham radio topics as well. For all newsletter editors or club database managers, please make sure your addresses for the SM, your area ASM, PIC, ACC are all up to date and correct. Many are new after last October. All of us should be receiving your newsletters and club activities. It is to your advantage to spread the news around. Now for our October traffic reports. Tfc: K8DHD 291, WD8KFN 283, W8PBX 217, WB8FSV 191, NS8C 177, KD8HB 173, WA8SSI 161, KF8DO 152, W8STX 150, KB8TIA WA8EYQ 119, W8RG 114, N8FWA 93, KA8FCC 92, N8DD 86, KB8ESU 75, KC8VWM 74, N8YWX 67, WA8HED 66, KB8VYB 63, N8VES 60, K8OUA 59, K8JA 56, K8WOQ 54, N8PAI 48, KB9GGA 47, K8IG 43, N8CW 42, KD9K 41, NY8V 40, KI8O 34, KC8HTP 33, KC8FWU 32, WB8UEY 32, N8DFB 28, N8ZBW 27, WD8MIO 26, WB8HHZ 26, KB8ROA 25, W8BO 25, W8LDQ 25, WB8KWD 19, KF8FE 17, N8YXL 17, W8JLW 16, KB8SIA 16, AA8XS 15, KE8FK 13, N8GOB 13, KB8SVK 12, W2INO 10, W8GAC 10, K8WC 8, W8GDQ 6, KC8HFV 6, WB8IOW 4.

HUDSON DIVISION

EASTERN NEW YORK: SM, Rob Leiden, KR2L (@WA2UMX or bleiden1@nycap.rr.com)—STM: Pete

MFJ *Switching* Power Supplies

Power your HF transceiver, 2 Meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!

No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

NEW!

MFJ-4225MV 25 Amp **$149.95** Add s/h

MFJ-4245MV 45 Amp **$199.95** Add s/h

MFJ's new adjustable voltage switching power supplies do it all! You can power your HF transceiver or 2-Meter/440 MHz mobile or base and accessories.

MFJ's *MightyLites*™ are so lightweight and small you can carry them in the palm of your hand! Take them with you anywhere.

No more picking up and hauling around heavy, bulky power supplies that can give you a painful backache, pulled muscle or hernia.

MFJ's 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp version is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

No RF hash!

These babies are clean . . .

Your buddies won't hear *any* RF hash on your signal! *You* won't hear any in your receiver either!

Some competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

These super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

Low ripple . . . Highly Regulated

Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

Fully Protected

You won't burn up these power supplies! They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Easily replaceable fuse.

MightyLites™ . . . Mighty Features

MFJ *MightyLites*™ feature a front-panel voltage control. It lets you vary the output voltage from 9 to 15 Volts DC and gives you a highly regulated voltage output.

You get an easy access front-panel with five-way binding posts for heavy duty use and a cigarette lighter socket for mobile accessories. The MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Large 3 inch dual meters are brightly illuminated to make it easy to monitor load voltage and current.

A *whisper quiet* internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D inches.

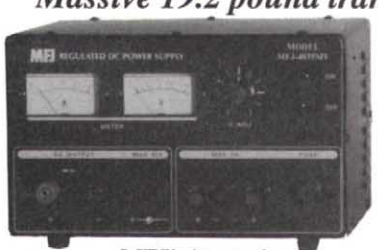
MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D inches.

MFJ No Matter What™ Warranty

MightyLites™ are covered by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your power supply for one full year.

MFJ 35/30 Amp *Adjustable* Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .



NEW!

MFJ-4035MV **$149.95** Add s/h

MFJ's heavy duty conventional power supply is excellent for powering your HF or 2 Meter/440 MHz transceiver and accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for shack accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾ inches.

Your MFJ-4035MV is protected by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your power supply for one full year.

MFJ *High Current* Multiple DC Power Outlets

Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

MFJ-1118 **$69.95** Add s/h

MFJ-1116 **$44.95** Add s/h

MFJ-1112 **$29.95** Add s/h

MFJ-1118, $69.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. It lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC power supply.

Two pairs of *super* heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total. "ON" LED.

Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with an "ON" LED indicator.

Built-in 0-25 VDC voltmeter. You get 6 feet of super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs.

Heavy duty aluminum construction. 12½x2¾x2½ inches.

MFJ-1116, $44.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $29.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

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http://www.mfjenterprises.com **FAX: (601) 323-6551**

• 1 year *No Matter What*™ warranty • 30 day money back guarantee (less s&h) on orders from MFJ • **Add s/h**

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Cecere, N2YJZ. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. SGL: Phil Bradway, KB2HQ. PIC: Jim McKnight, WA2UMH. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Elmer Sharp, WA2YSM. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. Net Reports (October 1998) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 43/6 CDN 358/120 ESS 353/218 HVN 580/319 NYPHONE 211/850 NYPON 362/540 NYS/E 352/295 NYS/M 226/178 NYS/L 271/411 SDN 339/211 ENY Emergency Services Net - 145.25 at 8 PM, the 1st Tuesday of the month. Section News: Congratulations to Jim, K2CSS, formally KC2BGJ, on his new call sign. 1999 is an ENY convention year. We'd like to hear what you'd like to see. Please pass along any ideas to kr2l@arrl.org or shirleyd@computer.net. The NYC Marathon was a blast! If you're interested in helping out next year, let me know. Is your emergency gear ready for Winter (including your vehicle)? Remember the ice and snow storms of past years! 73 de Rob KR2L. PSHR:N2YJZ 209, N2JBA 174, K2CSS 162, W2AKT 161, WB2ZCM 141, K2BPT 135, W2JHO 127, WB2IIV 108, KB2YUR 103. Tfc: N2YJZ 568, WB2IIV 121, N2JBA 88, K2CSS 63, K2BTP 58, WB2ZCM 46, W2JHO 46, W2AKT 31, W2CJO 25, N2YGK 15, N2AWI 11, KB2YUR 10, N2FTR 8.

NEW YORK CITY/LONG ISLAND: SM, George Tranos, N2GA—ASM: KA2D, N2JIX, K2YEW, KB2SCS, KD2YA. SGL: W2UFO. SEC: KA2D. ACC: K2EJ. PIC: N2RBU. TC: K2LJH. BM: KG2M. OOC: N2JIX. STM: WA2YOW. Mike Christopher, KG2M, is the new section Bulletin Manager as of October 15,1998. Mike replaces Rick Lapp, KC2FD, who has been the BM for many years. Thank you to Rick for his years of service and to Mike for coming forward to serve. Mike has been busy and has appointed N2OX, N2ZN, KC2ACL and N2OEQ as Official Bulletin Stations. Congratulations to GSBARC, RCARC and LIMARC for renewing as Special Service Clubs. Upcoming hamfests: LIMARC on 2/21 in Freeport, RCARC on 2/28 in Melville. Please send me a list of your new club officers for 1999 for inclusion here. On behalf of the ARRL NYC/LI Section, I would like to wish one and all a Happy and Healthy New Year. NYC/LI VE exam list follows: Islip ARES, 1st Sat 9 AM, Slip Town Hall West 401 Main St. Slip, Addison Levi, KD2YA, 516-234-0589. Bears VE: ABC Bldg Cafeteria, 125 West End Ave at 66th St. Call Hotline 212-456-5224 for exact dates & times, Jerry Cudmore, K2JRC. Grumman ARC, W5YI, 2nd Tues 5 PM. Northrop-Grumman Plant 5 S Oyster Bay Rd via, Hazel St Bethpage, NY. Bob Wexelbaum, W2ILP, 516-499-2214, LIMARC, 2nd Sat 9 AM NY Inst of Tech, 400 Bldg Rm 409, Northern Blvd. Old Westbury, Al Bender, W2QZ, 516-623-6449. East Village ARC, 2nd Friday 7 PM, Laguardia HS, Amsterdam Ave and West 65 Street, Manhattan. Robina Asti, KD2IZ, 212-838-5995. Great South Bay ARC, 4th Sun 12 PM, Babylon Town Hall, ARES/RACES Rm 200 E Sunrise Hwy N Lindenhurst, Michael Grant, N2OX, 516-736-9126. Hellenic ARA: 4th Tues 6:30 PM; Pontion Society, 31-25 23rd Ave, Astoria, NY, George Anastasiadis, KF2PG, 516-937-0775. Larkfield ARC: 3rd Sat 9 AM, Huntington Town Hall, 100 Main St, Huntington, NY, Joe Coffield, W2DDZ, 516-266-3192, Columbia U VE Team: 3rd Mon 6:30 PM, Watson Lab 6th floor 612 W 115th St NY, Alan Crosswell, N2YGK, 212-854-3754 PARC: exams held every three months at Southold School Oaklawn Ave, Southold, NY, on next to last Friday of the month. 6:30 PM all classes of licenses. For info contact Ralph Williams/ N3BT 516-323-3646. Mid-Island ARC, Last Tue. 7 PM, Brookhaven Rec Ctr, 20 Wireless Rd, Centereach, NY. Mike Christopher, KG2M, 516-736-9126. Tfc: WB2GTG 314, N2AKZ 227, W2RJL 133, KB2KLH 118, KC2ACL 59, N2XOJ 33, WA2YOW 24, W2LJM 23, KB2GEK 22, NB2D 20, AA2NX 16, N2OQI 5, KC2CGX 2.

NORTHERN NEW JERSEY: SM, Roy H. Edwards, Sr., AB2RE, (AB2RE@AB2RE-4), e-mail: AB2RE@arrl.org—ASM: KB2CMF OOC: KB2JSG@MAGJSG@juno.com. ASM: N2WZB NNJ Webmaster. ACC: N3RB. Volunteer Counsel/N2IOB. BM: N2LXM. STM: WB2FTX. PIC: WX2DEB. Congratulations to both David B. Popkin, W2CC, repeat winner and William J. Fitzsimmons, N2LMU, for earning top honors in their respective division's in the New Jersey QSO Party Contest. The awards were presented at the NTS Traffic Handlers' Confab held at the College of New Jersey on December 5. More on the Confab and the NTS Award winners in a future column as the information is made available. Stephan M. Anderman, K2SMA, has asked that I include the following information. "The Vernon RACES repeater, K2BOG/R, 146.925 MHz (-600 kHz, PL 151.4 Hz) now carries the weekly Amateur Radio bulletin service "This Week in Amateur Radio" each Saturday night at 9:00 PM (local). The repeater has great coverage throughout much of NNJ, ENY and EPA. Martin Goldfarb, KB2JSG, the Section OO Coordinator is still looking for additional volunteers to participate in the Field Services as OOs. Congratulations are also due to Steve, W2ML, and thanks to all the NNJ and other volunteers for another successful NY Marathon. Tfc: N2QAE 156, N2XJ 128, W2MTO 95, N2GJ 74, KC2AHS 60, N2OPJ 54, N2RPI 39, N3RB 37, K2PB 35, KB2VVB 22, W2CC 21, N2TTT 15, K2VX 14.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL@KE0BX—ASM: N0LDD. SEC: NA0R. ACC: N0IJP@KE0BX. BM: K0IIR@W0CXX. SGL: K0KD. TC: W0DIA. Christmas dinners are over. Hope you had a good set of holidays. The Fort Madison Club went to the Palms Supper Club for theirs. I have heard the food is great. Wish I could have been there. FMARC is having their holiday dinner in January. Sorry to note that W0LU and WA0MXH are Silent Keys. TSARC-N is still making money for their projects. I hear that a chicken fry is planned for January. TSARC -N would like to hear from TSARC-S, and I can't find a contact. Did you hear anything of the hurricane work for Central America? There is a discussion of whether or not a club needs insurance. Ask your attorney what "jointly and severally liable" means. I read that the OARC has a real CW Training Officer. DSM Co ARES worked with Red Cross for a hazmat drill. Keep it up. The NIRAA letter includes an inventory of all club owned equipment. What does your club own? Where is it? Does it work? What is it worth? Most clubs I have been a member of had no answer for any of their questions. SARA reports the loss in their area of WB0S, N0GSS, W0DUN, K0GDS, and

MFJ *tunable* super DSP filter

Only MFJ gives you tunable and programmable "brick wall" DSP filters

U.S. Patent D374,010

MFJ-784B

$249.95

NEW!

MFJ's *tunable* super DSP filter automatically eliminates heterodynes, reduces noise and interference *simultaneously* on SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX, weak signal VHF, EME, satellite.

You get MFJ's *tunable* FIR linear phase filters that minimize ringing, prevent data errors and have "brick wall" filter response with up to 57dB attenuation 75 Hz away.

***Only* MFJ gives you 5 *tunable* DSP filters. You can *tune* each lowpass, highpass, notch, and bandpass filter including optimized SSB and CW filters. You can *vary* the bandwidth to pinpoint and eliminate interference.**

***Only* MFJ gives you 5 *factory* pre-set filters and 10 *programmable* pre-set filters that you can customize. Instantly remove QRM with a turn of a switch!**

MFJ's *automatic notch* filter searches for and eliminates *multiple* heterodynes.

You also get MFJ's advanced *adaptive noise reduction*. It silences background noise and QRN so much that SSB signals sound like FM.

The *automatic* notch and *adaptive* noise reduction can be used with *all* relevant tunable pre-set filters.

***Automatic gain control* (AGC) keeps audio level constant during signal fade.**

Tunable bandpass filters

Narrow band signals like CW and RTTY jump out of QRM when you switch in MFJ's exclusive *tunable* FIR bandpass filters.

You can tune the center frequency from 300 to 3400 Hz, and vary the bandwidth from 30 Hz to 2100 Hz -- from super-tight CW filters to wide razor-sharp Data filters.

You can use two tunable filters together. For example, tune one to mark, one to space and set bandwidth tight for a super sharp RTTY filter.

Tunable highpass/lowpass filters

You can tune the lower cutoff frequency 200 to 2200 Hz and the upper cutoff frequency 1400 to 3400 Hz. This lets you create *custom* filters for Voice, Data and other modes.

Signals just 75 Hz away literally disappear -- they are reduced 57 dB!

Automatic notch filter

MFJ's automatic notch filter searches for and eliminates multiple heterodynes in milli-seconds. It's so fast, that even *interfering* CW and RTTY signals can also be eliminated.

You can *selectively* remove unwanted tones using the two *manually tunable* notch filters --an MFJ exclusive. Knock out unwanted CW stations while you're on CW.

Adaptive Noise Reduction

Noise reduction works in all filter modes and on all random noise -- white noise, static, impulse, ignition noise, power line noise, hiss.

The LMS algorithm gives you up to 20 dB of noise reduction. Noise reduction is adjustable to prevent signal distortion.

15 *pre-set* filters -- factory set or you custom program

You can select from 15 *pre-set* filters. Use for SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any mode.

If you don't like our pre-set filters, you can program your own -- *an MFJ exclusive!* Save center frequency/bandwidth, lowpass/highpass cutoffs, auto/manual notch, noise reduction -- all filter settings -- in 10 *programmable* filters.

Plus more . . .

A push-button bypasses your filter -- lets you hear the *entire* unfiltered signal.

2½ watt amplifier, volume control, input level control, speaker jack, PTT sense line, line level output. 9½x2½x6 inches.

Plugs between your transceiver or receiver and external speaker or headphones. Use 12 VDC or 110 VAC with MFJ-1315, $14.95. Cable Pack, MFJ-5184, $7.95, includes receiver cable, DC cable, 2 open-end TNC cables.

New Features

MFJ's exclusive tunable *Spotting Tone*™ -- accurately tunes even the narrowest CW filter.

MFJ's exclusive *Adaptive Tuning*™ -- tuning rate automatically becomes finer as you narrow bandwidth -- makes narrow filters easy-to-use.

MFJ's exclusive *FilterTalk*™ -- sends precise filter settings in Morse code.

Has automatic notch with *variable* aggressiveness, new quieter 2½ watt audio amplifier, new speaker switch keeps phones always active.

Manual and automatic notch can be used together. Noise reduction, automatic notch and tunable manual notch can be used when a custom filter you saved in memory is selected.

You get an accurate easy-to-use input level indicator, improved manual notch in the CW mode, adjustable line level output, more Mark-Space frequencies and baud rates for data filters and auto- matic bypass during transmit for monitoring CW sidetone, voice or data by sensing the PTT line.

Firmware Upgrade

For MFJ-784, order **MFJ-55, $29.95.** Gives you most features of the MFJ-784B.

NEW! 60 dB Null *wipes out* noise and interference

MFJ-1026

$169.95

Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise-- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker because interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequencies from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network*. You can combine two antennas to give you various directional patterns. You can null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312B, $12.95. 6½x1½x6¼ inches.

MFJ-1025, $149.95. Like MFJ-1026 less built-in active antenna, use external antenna.

Add DSP to *any* Multimode

MFJ-781

$129.95

Add "brick wall" DSP filtering to *any* TNC or multi-mode data controller.

Copy signals buried in noise and QRM.

Under severe QRM, DSP greatly improves copy of Packet, AMTOR, PACTOR, GTOR, Clover, RTTY, SSTV, WeFAX, FAX, CW -- nearly any digital mode. Automatic gain control, ON/OFF/Bypass switch. Plugs between transceiver and multi-mode. Uses 10-16 VDC or 110 VAC with MFJ-1312B, $12.95. 4½x2½x5in.

DSP for your MFJ-1278/B

MFJ-780

$99.95

Plug a MFJ-780 "brick wall" DSP filter into your MFJ-1278/B multi-mode and you won't believe your eyes when you see solid copy from signals completely buried in QRM! MFJ-1278/B *automatically* selects the correct DSP filter for Packet, AMTOR, Pactor, RTTY, ASCII, FAX, Color SSTV, Navtex or CW.

Plug in a MFJ-780 and copy signals that other multi-modes can't. Some soldering needed.

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Nearest Dealer . . . 800-647-1800

• 1 year *unconditional* warranty • 30 day Money Back guarantee (less s/h) on orders from MFJ • Add s/h

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KDØYW. Polk Co ARES has been involved in parades, bike rides, and runs. What is your group doing? TLCN was 100% rep to TEN CY4 for Oct. Six guys were involved in that effort. Nice presentation on FM in the SEITS newsletter. It runs from Armstrong to Mitrec. That's it for this month. Keep those cards and letters coming in boys and girls! 73. Newsletters were received from FMARC, OARC, MPARC, IIARC, NEIRAA, TSARC-N, SARA, DMRAA, CAARC, NIARC, SEITS. Traffic: KAØADF 90, NRØE 36, NØJL 31, KAØADF (Sep) 69.

KANSAS: SM Orlan Q. Cook WØOYH—ASM/ACC/OCC: Robert Summers, KØBXF. SEC: Joseph Plankinton, WDØDMV. SGL: Marshall Reese, AAØGL. Hi gang, winter is upon us again and the bands are stretching out. Be kind if you think someone has moved in on top of you. He may have been there all the time, the band just changed. Tnx to ECs June, KBØWEQ, and Rick, KF4LM, for two terrific reports this month. June created some HF activity when the Salvation Army lost cellphone communications with two of their canteens working two different flooded cities Some good news. I have no Silent Keys to announce this month. Please send me any newsworthy happening in Kansas. Send it to orlan@swbell.net. Keep me up on what is going on in your neighborhood in ham radio. Congratulations Mike, KØPY, on your new job as a CW TCC op to PAN in the evenings. As of today, I have survived 67 years on this planet and look forward to a few more. A special thanks to our NMs: Louie WBØYWZ of the two WX nets. Bill, NØKFS, of the KSBN and KPN. Jay, AB5PA, of the CSTN. Tom, WBØZNY, of our two QKS CW nets and Ron, KBØDTI, of QKS-SS slow speed net for giving KS 7 fine nets. Thanks to all active KS ARES and NTS members KS reports. Kansas Nets: sessions/QNI/QTC,KSBN 30/1045/92, KPN 21/226/12,KMWN 30/561/446,KWN 30/861/531,CSTN 26/1785/104 QKS 58/296/75 QKS-SS 2/3/0. Clubs: Coffeyville 4/70/0, Ind. 4/68/0, SEC 8/297/34 QTC/2 with KBØAMY KBØWEQ WDØDDG KF4LM WDØDMV. TEN report 232 msgs 60 sessions KS stns 72% with AAØFO KXØI KØPY NBØZ WBØZNY. BBS reports: W1AW bulletins/personal/NTS, AAØHJ 62/459/8 NØOBM 47/541/8 NXØR 31/366/5. KS stns tfc NØKJ 542, WBØZNY 93, KØPY 46, WØOYH 44, KØRY 31, KXØI 15, NBØZ 10, KBØDTI 8, WØWWR 5.

MISSOURI: SM, Roger Volk, KØGOB—ACC: Keith, WEØG. ASM: Karen, NØTDW. ASM: Tom, KIØJO. OOC: Mike, NØQBF. PIC: Dennis, AAØA. SGL: Ern, KDØUD. BM: Open. SEC: Fred, WAØUS. STM: Tom, KIØJO. TC: Mac, K4CHS. Hamfests on both sides of the state this month. I'm sorry that I was not able to attend the Warrensburg Hamfest, but I was in Rolla celebrating my 30th year of graduation from UMR. The Halloween Hamfest is back, and this year it was actually on Halloween day. Not many commercial vendors, but the flea market tables were full. As word spreads, I'm sure vendors will return to this unique event. Joining a contesting club and a middle school youth club. The net manager for the MO Traffic Net, WB4RDV, is hospitalized following a heart attack. His long-term prognosis is unknown at this time. My thanks to the Hannibal Club for the hospitality shown to my wife and me during our visit and discussion on grounding for lightning protection. I attended the QCWA National Convention in Palm Desert, CA, where ARRL Pres Rod, W6ROD, chaired the well-attended ARRL Forum. Yours truly is the chairman of the 1999 convention in St. Louis. You do not have to be a QCWA member to attend the convention. Amateurs participated in the St. Charles county simulated emergency training exercise. A hidden transmitter hunt for a simulated ELT was the highlight of the event. Hams also participated in a simulated plane crash in Taney County. College students from The College of the Ozarks were simulated victims. Ten were transported in ambulances, 5 in the COO van and 4 by private car. The latter wound up at McDonalds rather than the hospital. Nets: MOTRAN 31/653/157 WB4RDV; STLRPTR 4/103/25 WAØIVY; PAULREVERE 4/387/0 NØIWA; HAMBUTCHERS 17/675/80 WL7YM; MON1&2 60/151/93 WØWFF; WAARCI 4/96/0 KB8DQB; WJACKCOARES 6/43/0 KØUAA; 1880GOB 31/277/32 WL7YM; CARL 3/36/0 KCØMV; AUDRAINARC 5/40/1 WBØSEN; HARC 5/236/0 NØYLF; QCWA35 5/124/0 KØYML; ROLLABB 31/305/4 NAØV; SWMOWARN 5/95/2 NØUAM. Tfc: KIØJO 1467, KEØK 122, KGØIV 49.

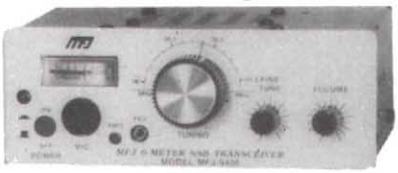
NEBRASKA: SM, Bill McCollum, KEØXQ—ASMs: WØKVM, NØMT, WBØULH, WYØF & WBØYWO. It is with deep regret to inform you of the passing of Joe Foster, WØWRE and Linda Keller, NØJLK. Joe was a Board Member of the Nebraska chapter of the QCWA and a member of the AK-SAR-BEN ARC. NØJLK was the wife of KAØYWP. It gives me great pleasure to announce that the Heartland DX Association has been given approval for affiliation with the ARRL. Don't forget the Kearney Hamfest on Jan. 9. It will be held at the Buffalo County Fairgrounds in Kearney. Be sure to mark your calendar for the Nebraska State Convention March 5-7 in Norfolk. The Ashland ARC has a new call – KØASH. Members of the Elkhorn Valley ARC participated in a communications exercise on November 23. The purpose of the exercise was to assess interagency communication needs, strengths and weaknesses especially in an emergency situation. Net reports: WNE Net; QNI 1847, OTC 183 and 27 sess. NE Storm Net; QNI 758, QTC 19 & 31 sess. NE CW Net; QNI 161, QTC 9 & 22 sess. NE 40M Net; QNI 116, QTC 4 & 13 sess. WØIRZ Memorial Net; QNI 39, QTC 1 & 4 sess. Mid NE ARES Net; QNI 293, QTC 9 & 29 sess. NMPN; QNI 1353, QTC 1 & 31 sess. Lincoln/Logan ARES; QNI 233, QTC 2 & 18 sess. Tfc: KØPTK 98, WØAP 31, KEØXQ 30, KØRRL 2, KAØDOC 2, WAØZCN 2, KØSW 2, WØEXK 2, AAØKQ 2, WYØF 2.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—We in CT mourn the loss of our true friend and colleague in this hobby, Clark Magness, NI1U, who recently became a Silent Key from cancer. He was only 47 years old. Yet, in his short life, he was a fine example and gift to all of us. Clark served brilliantly as our Section Emergency Coordinator since 1991 when I became Section Manager. I was truly awed by the detail with which he prepared for an emergency situation. The search for the missing Ansonia Police Officer that took place in New Britain immediately comes to mind. He was respected by state officials and other agency heads with whom he worked as SEC. Among other things, he led us in the creation of the search and report program, worked

MFJ 6 Meter SSB Adventure Radio™

Incredibly low $259.95 . . . for No-code Techs and Veterans alike . . . Explore the world . . . Ragchew with locals . . . 10 Watts Out . . . Super Hot Receiver . . .



MFJ-9406
$259.95
MFJ-9406X
$269.95 with mic

Work exciting 6 Meter DX from all over the world on ham radio's *"magic band"*!

It's an adventure every time you turn on your MFJ-9406 six meter SSB transceiver.

Distant stations come rolling in loud and clear with crystal clear armchair copy. You'll have fun exploring exotic 50 MHz band openings -- Tropo, Sporadic E, F2, TE, Aurora, Meteor Scatter, and more.

Ragchew with locals, hunt down new grid squares from far-away places from home, car or mountain top.

***Special Offer!* MFJ-9406X, $259.95!**
Includes MFJ-9406 & MFJ-290 microphone.

Here's what you get . . .

Full SSB/CW coverage: 50.0-50.3 MHz covers SSB, CW, propagation beacons.

Potent signal: 10 Watts PEP output. MFJ's exclusive *Constant-Current*™ syllabic speech processing gives you up to 6 dB more punch to cut thru noise, fading, QRM.

Hot receiver: Crystal-mixed single-conversion superhet with low-noise preamp digs deep into the noise to capture weak signals. If a station is there, you'll hear it!

Easy to operate: No microprocessor mumbo-jumbo . . . just turn on and tune in.

Low power drain: Mountain-top all day on lightweight NiCads or operate from home on 110 VAC with MFJ-4110, $39.95.

Excellent selectivity: Sharp *HF proven* SSB crystal ladder filter reduces QRM and passband noise.

TVI protection: Seven element low-pass filter knocks out TVI -- lets you operate when *you* want to!

Real S-meter: Give meaningful signal reports, accurately steer your beam, monitor speech processing.

Smooth tuning: Vernier reduction drive makes tuning precise and easy.

External amplifier: Jack provides a key-line for activating 6 Meter SSB amps.

Built to last: Premium PC board, quality components, brushed-aluminum panel and tough vinyl-clad case gives years of service.

Compact: At only 2½x6½x6 inches, the MFJ-9406 fits in just about anywhere.

Fully guaranteed: MFJ's exclusive one-year *No Matter What*™ warranty. We will repair or replace (at our option) your MFJ-9406, no matter what happens, for 1 full year.

MFJ-9406 Accessories

Handheld dynamic SSB microphone: Specially matched to compliment the *Constant Current*™ speech processor used in the MFJ-9406. **MFJ-290, $29.95.**

CW Module: Install this and operate CW -- a must for DXers. Provides semi-QSK break-in and sidetone. **MFJ-416, $39.95.**

Power Supply: Heavy duty wall transformer and voltage regulator delivers 13.8 VDC for MFJ-9406. Powerful, yet small. Fits in your coat pocket! **MFJ-4110, $49.95.**

Portable Battery/AC Power Pack: Use Ni-Cad, Alkaline, regular D cells or 110 VAC. Charges Ni-Cads. Fastens to MFJ-9406. Batteries not included. **MFJ-4112, $69.95.**

MFJ 6 Meter *FM Communicator*™ Transceiver

MFJ-9606
$159.95
MFJ-9606X
$169.95 with Mic

The MFJ-9606 *FM Communicator*™ is the most inexpensive way to get on 6 Meter FM Voice or Packet! 10 Watt transmitter, *CrystalClearVoice*™ puts the fun and fidelity back into ham radio with true-to-life speech quality and ultra-clean AFSK data signals. *Super fast* PIN diode switching, no compromise dual-convers- ion FM receiver with quiet LNA, factory installed 52.525 MHz calling frequency crystals. Addl plug-in crystals, $24.95 per freq.

MFJ 6 Meter Antenna Tuners

MFJ-906, $79.95. Lighted 2 Range Cross-Needle SWR/Wattmeter, bypass switch. 100 watts FM, 200 Watts SSB PEP. 8x2½x3 inches.

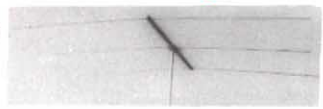
MFJ-903, $49.95. Like MFJ-906, no meter, bypass switch. 5x2½ x3".

MFJ-945E, $109.95. Compact *mobile* tuner covers 6 Meters thru160 Meters. Lighted Cross-Needle SWR/Wattmeter. Antenna bypass switch. 300 Watts PEP SSB. 8x2x6". Mobile mount, **MFJ-20, $4.95.**

MFJ-969, $189.95. MFJ-969 has MFJ's superb *AirCore*™ Roller inductor, *continuous* 6 Meter - 160 Meters coverage and *QRM-Free PreTune*™! Wide matching range, lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, 4:1 balun., 300 Watts PEP SSB. 3½x10½x9½".

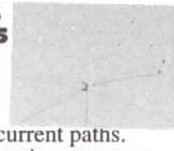
6 Meter Antennas

MFJ 3 element 6 Meter Yagi



MFJ's three element 6 Meter Yagi quadruples your MFJ-1762 **$69.95** effective radiated power over a half-wave dipole. 6 foot boom. 2 pounds. Can use TV rotator and mast. Handles 300 Watts PEP SSB. Mounts vertically or horizontally. Current balun decouples feedline. Excellent front-to-back ratio.

MFJ 6 Meter low-angle DX Vertical



MFJ's omni-directional low-angle vertical radiator lets you work plenty of DX in all directions even with low power. A *GroundIsolated*™ radial system eliminates common mode current paths. Reduces undesirable feedline/supporting structure radiation. 55" *high-strength* aluminum radiator. MFJ-1756 **$69.95**

MFJ 6 Meter J-pole Travel Antenna

Hang up this 6 Meter J-pole in the clear and enjoy some exciting DX QSOs. Omni-directional full size halfwave antenna with low angle radiation that outperforms 1/4 waves. MFJ-1736 **$24.95**

MFJ 6 Meter folded dipole

MFJ's efficient low SWR folded dipole is light-weight, easy-to-carry, easy-to-put up. Perfect for MFJ-9406 and other 6 Meter rigs. MFJ-1776 **$34.95**

MFJ full halfwave 6 Meter Antenna

MFJ's *full halfwave* 6 Meter centerfed antenna has excellent bandwidth and low angle radiation for super DXing! Mounts vertically for FM/Packet or horizontally for SSB. Strong light weight aluminum. Two 47" radiators, 23" boom. 1½ pounds. MFJ-1764 **$44.95**

MFJ Dual Band 6/2 Meter Mobile

On 6 Meters, it's a high performance *full quarter wave* mobile magnet mount antenna. On 2 Meters, it's a *maximum gain* 5/8 wave antenna. Low SWR, handles 300 Watts. MFJ-1728B **$24.95**

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Work exotic 6 Meter DX with 150 Watts of brute power! The A-1015-G is the *world's most popular* all mode FM/SSB/CW 6 Meter amplifier. Ideal for 1 to 15 Watt mobile, home or handheld rigs. 150 Watts out with just 10 Watts in. Extra heavy duty heatsink spans length of cabinet. Draws 18-22 amps at 13.8 VDC. 12x3x5½ in.

Power Curve -- typical A-1015-G output power for your HT input									
Watts Out	6	22	42	63	84	98	122	142	150
Watts In	.25	1	2	3	4	5	7	9	10

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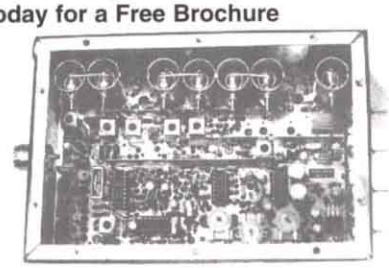


closely with the NWS to make Amateur Radio in CT an active part of the SKY WARN Program and made sure that the details relating to ARES were properly updated in the State Emergency Plan. Clark was an incredibly patient Elmer and one who was interested in several facets of our hobby. He was a man who truly made a difference! Our deepest sympathy goes out to his wife Kathy, N1KGO, and her family. The New Year is coming and we must greet it with joy and hope. It will be a time of resettling, especially in the ARES Program but we will together continue the work that Clark encouraged us to do—We're a team—we can do it! Have a Happy and Healthy Holiday Season. Net sess/ QNI/QTC/NM: RTN E/L 30; 31/152; 304/21; 60 WA4QXT. WESCON 31/332/145/KA1GWE. NVTN 31/240/113/ K1STM. CPN 22/306/103/N1DIO; CN 22/88/27/N1AEH. BEARS of Manchester 39/491/456/NM1K. Tfc: NM1K 2002, KA1VEC 522, KA1GWE 240, WA4QXT 153, N1VXP 133, K1STM 125, KE1AI 58.

EASTERN MASSACHUSETTS: SM, Larry Ober, W1MW—SM W1MW regrets that there will be no Section News this month as he is in the midst of moving his QTH. The column will resume next month. The STM's report follows:

Net	*Sess*	*QTC*	*QNI*	*Minutes*	*NM*
EMRI	62	259	226	610	K1SEC
EMRIPN	30	146	172	460	WA1FNM
EM2MN	30	176	322	462	N1LKJ
HHTN	31	56	263	463	N1IST
CITN	31	92	306	566	N1SGL
WARPSN	4	10	71	NA	K1BZD
NEEPN	3	6	17	NA	WA1FNM
CHN	31	48	187	443	W2EAG
OSTN	24	21	47	122	KA1JXH

Tfc: WA1TBY 409, NZ1D 238, K1UGM 218, WA1FNM 191, W2EAG 157, N1LKJ 106, K1SEC 68, KA1WCD 66, WA1LPM 62, N1LAH 51, K8SH 50, NG1A 49, N1SGL 46, N1AJJ 43, KA1VAX 39, N1TDF 30, N1IST 26, KB1EB 17, N1TPU 10, N1XQC 8

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: NX1A. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: KA1WRC. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: W1KX, KA1TKS, K1NIT. Web Site: N1WFO. Winter's harsh grip will be softened by Winterfest, Feb 13, at Crystal Falls in Chelsea. Also look for the call, W1F, to help get the festivities under way. The Maine State Convention will be Mar 19 & 20 in Lewiston at the Ramada Conference Ctr, and a room rate of $49.95, single or double, should entice everyone to attend. When making reservations, be sure to mention the convention. To ensure your concerns and interests are met at the convention, contact N1OXA at ilazure@gwi.net, or N1WFO at rjames@dlois .com. Looking for some radio activity to keep you warm? Check out 146.70 Tues. 7:30 PM for code practice from AA1KF and crew. The Northeast Weak Signals Group meets Thurs 8:30 PM local at 144.250, USB or CW. Maine chapter QCWA gets together on Sun 2:30 PM at 3.942. Help pass some traffic into those hard to reach towns by checking into the Seagull Net 5 PM M-Sat at 3.940. The new help would really be appreciated. Tfc: NX1A 227, W1KX 75, AF1L 52, W1JX 46, W1LIC 44, W1JTH 41, KA2ZKM 36, K1UNQ 35, W1QU 20, KA1RFD 12, WA1YNZ 10. 73, Bill, N1KAT.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK—ASMs: W1NH, N3CLZ, N1FIL, N1KIM. TC: WA1HOG. STM: WA1JVV. ACC: NA1E. PIC: KA1GOZ. OOC: W1GTA. SGL: K1KM. BM: KH6GR. SEC: Open. (www.nh.arrl.org) I hope that you and your family enjoy the holiday season. The long-awaited results in the Sixth Annual 1998 NH Section Manager's Field Day Award are in. The winner is Twin State Radio Club with 9896 total points (4A), giving them a score of 2474, bettering their last year's score by 37.4%. Second NARC with 23.6 % and third CVARC with 13.7 %. Full contest results can be found on the NH Web site (www.nh .arrl.org). Are you planning to participate in the NH QSO Party on February 6 and 7. The operating rules, contest software download and Bonus Station listing will be available off the Web page or you can mail me at PO Box 119 Goffstown, NH 03045. A bit late, but congrats to Jason Greene, N1IIC, on his appointment as NH DEC Liaison to the National Weather Service at Grey, Maine, and Taunton, MA. Jason continues to keep NH amateurs updated with weather conditions affecting New England. Jason, keep up the good work. A special thanks to NH ARES and RACES for their dedication as we move through this winter season. Net Mgr/Sess/QNI/QTC/Time: GSFM N1RCQ 31/249/56/ 480; GSPN K1ZO 32/145/71/307; TSEN N1VFM 4/59/5; VTNH WA1JVV/31/179/148/524. Tfc: W1PEX 849, K1TQY 770, WA1JVV 145, N1CPX 85, WB1GXM 55, N1NH 51, W1ALE 51, AE1T 47, KA1OTN 34, K1ZO 22, AA1QD 17, KH6GR 12.

RHODE ISLAND: SM, Rick Fairweather, K1KYI, e-mail k1kyi@juno.com—ASM: N1JFY. ACC: AA1CE. STM: KA1JXH. SEC: N1JMA. OOC: W1AOM. TC: KA1EGY. BM: KA1BNO. SGL: NN1K. Sad to report the passing of W1PCQ in Riverside...he'll be missed on the bands. Newport County Radio Club's participation in the annual Harvest Fair in Newport was a great success again. Organized by AA9AL, many members pitched in to erect antennas the day before the event and provide operators for the special event station. With excellent propagation and weather, they generated over 200 QSOs all over the world and most of the US impressing all who stopped by the booth. About 20 people expressed interest in a basic electronics course leading to an entry- level amateur ticket. KA1RCI's BBS on 145.050 has some new hardware and some new features including access to the WWW's converse server on the Internet...check it out if you haven't been there in a while. Hope you all enjoyed the holiday season and I wish you all the best in the New Year! Tfc: KA1JXH, K1KYI. PSHR: KA1JXH.

VERMONT: SM, Bob DeVarney—Well, we've gotten through another foliage season. The weather has definitely taken a turn for the cooler. It's a great time to finish off that fall antenna project. We had an ARES training session this month (October) in Burlington at the Red Cross. Stay tuned for more sessions to follow, at a club near you. I want to

10 Bands -- 1 MFJ Antenna!

Full size performance . . . No ground or radials

Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna
Separate full size radiators . . . End loading . . . Elevated top feed . . . Low Radiation Angle . . . Very wide bandwidth . . . Highest performance no ground vertical ever . . .

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters -- with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

Full size performance gives you high efficiency for more power radiated. The result? Stronger signals and more Q-5 QSOs.

Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

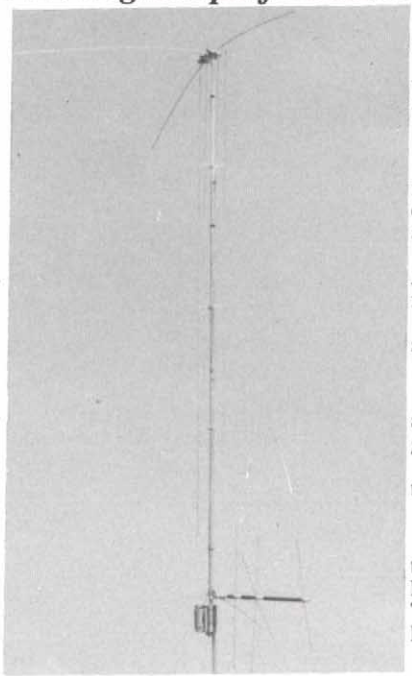
Full size performance is achieved by using separate full size radiators for 2 through 20 Meters and highly efficient end loading for 30, 40 and 75 /80 Meters.

Get very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, and low SWR. Handles 1500 watts PEP SSB.

MFJ's unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

It's easy to tune because adjusting one band has minimum effect on the resonant frequency of other bands.

Self-supporting and just 20 feet tall, the MFJ-1798 mounts easily from ground level to tower top -- on small lots, backyards, apartments, condos, roof tops, tower mounts.



MFJ-1798
$269.95

Separate *Full Size* Radiators

***Separate** full size* quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

The active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows in all parallel radiators.

This forms a very large equivalent radiator and gives you incredible bandwidths.

These radiator stubs provide automatic bandswitching -- there is absolutely *no loss* due to loading coils or traps.

End Loading

On 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

MFJ's unique *Frequency Adaptive L-Network*™ provides automatic impedance matching for lowest SWR on these low bands.

Tuning to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

No Ground or Radials Needed

You don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

You can mount it from ground level to roof top and get awesome performance.

No Feedline Radiation to Waste Power

The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with Teflon® coax and *can't* saturate, no matter how high your power.

Built to Last

Incredibly strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is used in the main structure.

Efficient high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant Teflon® covered wire.

Teflon® is registered trademark of Dupont

MFJ *Super Hi-Q Loop*™

MFJ-1786
$319.95

MFJ's *tiny* 36 inch diameter *high efficiency* loop antenna lets you operate 10 to 30 MHz *continuously* -- including the WARC bands!

It's ideal where space is limited -- apartments, small lots, mobile homes, attics, motor homes.

Enjoy both DX and local contacts when you mount it vertically. You get *both* low angle radiation for excellent DX *and* high angle radiation for local close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ-1786 *Super* Remote Control has *Auto Band Selection*™. It auto-tunes to your desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune push buttons and built-in two range *Cross-Needle* SWR/Wattmeter lets you quickly tune to your exact frequency.

All *welded* construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter *round* radiator -- not a lossy thin flat-strip -- gives you highest possible efficiency.

Each plate in MFJ's *superb* tuning capacitor is welded for low loss and *polished* to prevent high voltage arcing. It's welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches and a continuous *no-step* DC motor for *smooth precision* tuning.

A heavy duty 1/8 inch thick ABS plastic housing with ultraviolet inhibitors protects it.

MFJ-1782 $289.95. Same as MFJ-1786 but remote control has only fast/slow tune buttons.

NEW! **MFJ-1788**, $379.95. Same as MFJ-1786 but covers ***40 Meter through 15 Meter*** continuous. Includes super remote control.

Super 80/40M Vertical

MFJ-1792
$159.95

Designed as a *high performance* antenna for 80 and 40 Meters, the MFJ-1792 features a *full size* quarter wave radiator for 40 Meters - - that's a full 33 feet of ruthless radiating power.

End loading -- the most efficient form of loading -- is used for 80 Meters. It's accomplished by a virtually lossless 4½ foot capacitance hat and a high-Q coil wound with Teflon® wire on a *low-loss* fiberglass form.

The *entire length* radiates power.

High strength 6061-T6 aluminum tubing, super strong solid fiberglass insulator, *Frequency Adaptive L-Network*™, heavy duty *swing* mount. Handles 1500 watts PEP. Requires guying and radials, counterpoises or ground screen.

MFJ-1793, $179.95. Same as MFJ-1792 but includes *full size* 20 Meter quarter wave radiator.

MFJ *halfwave* Vertical

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed!

MFJ-1796
$199.95

Operate 6 bands -- 40, 20, 15, 10, 6 and 2 Meters -- with this MFJ-1796 *ground independent halfwave* vertical antenna! No radials or ground ever needed!

It's only 12 feet high and has a *tiny* 24 inch footprint! Mount it anywhere from ground level to tower top -- on apartments, condos, small lots, even motor homes. Perfect for vacations, field day, DX-pedition, camping.

Efficient *end loading*, no lossy traps. *Entire length* is always radiating. *Full size* halfwave on 2 and 6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting one band has minimum effect on other bands.

Automatic bandswitching, low radiation angle, omni-directional, handles 1500 watts PEP. Goes together in an afternoon.

Box Fan Portable Loop

MFJ-1780
$229.95

No, it's not a fan -- it's a high efficiency portable loop antenna that's about the same size and shape as a 2x2 foot box fan, complete with carrying handle.

Carry it like a suitcase, tuck it in a corner of your car or check it as baggage on a plane.

When you get there, set it on a table or desk and enjoy ragchewing or DXing.

All welded construction, covers 14-30 MHz *continuously* including WARC bands, handles 150 watts. Remote control has fast/slow tune buttons. Separate control cable not needed.

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wish everyone a Happy Hanukkah, or Merry Christmas as the case may be. Hopefully Santa will bring that new beam or transceiver you've been dreaming about! Happy Holidays de WE1U & N1WCJ. Sessions/Checkins/Traffic: Vermont/New Hampshire Net (VTNH) 31/179/148. Vermont Phone Emergency Net (VPEN) 5/40/9. Green Mountain Net 26/ 832/22. Tri-State FM Emergency Net (Keene) 4/59/5. Rutland County ARES Net 4/33/0. Windham County ARES Net 1/6/0. PSHR Stations: KT1Q 164, N1DHT 126. Tfc: KT1Q 392. N1DHT 185. KA1YLN 6. Vermont had the 95% representation on 1RN Cycle 2. Bob DeVarney, WE1U ARRL Vermont Section Manager 43 West Milton Rd, Milton VT 05468. 802-482-4280 e-mail: we1u@arrl.org. http://www.vt.arrl.org.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, **w1ud@juno.com** –ASM: N1LZC. ASM (digital) KD1SM. STM: W1SJV. SEC K1VSG:. OOC WT1W. HCRA is 50 years old and Tom Frenaye and I presented its president Irv (W6IS) with a plaque. It was their annual auction night. Irv and his crew have certainly turned that organization around. Thanks for a great evening! Our SET was held, and I want to thank Dennis, K1VSG, for organizing an emergency test that was a tremendous success. This was the first year that we used 75 meters and both East and Western Mass combined. Repeaters handled the local traffic. All Red Cross chapters participated. It was outstanding. Thank you all for a job well done. I donned my hat as SM and enlightened MARA to what was happening in the section and the licensing proposals by the League. I was the guest speaker at their meeting. Considering it has been my club for the past 50 years and nobody fell asleep, I think I did well. Tfc: W1XPB 108, KD1SM 12, W1SJV 22, W1UD 131.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB—OOC: KL7IKX. SEC: NL7DL. DEC: KL7JBV. DEC: WL7GK. TC: AL7CE. TS: KL7CC-TS. ASM: WL7BJ, KL5T, KL7RS. Snipet Net 3.920 daily 1900 AST; Bush Net 7.087 Daily 2000 AST; Motley Group 3.933 Daily 2100 AST; and Alaska Pacific Net 14.292 M-F 0830 AST. It's time to volunteer for public service such as the Yukon Quest Dog Shed Race, the Iditarod Dog Shed Race, Fur Rondy Dog Shed Races and The Rondy Car Races. Schools are starting their next semester so get involved and teach a class ham radio. The KL7G code practice schedule is 0700, 1000, 1600, 1900, and 2200 at 3575 and 145.35. The QCWA should have the new amplifiers installed at the new site for code practice. Finally, the Spanish DX this fall on 6 m, 2 m, and 440 had diminished when HRO sent the English manual to replace the IC T8's Spanish manual they provided at the flea market. Correction to the November column: John Bierman, KL7GNP, received his Gold Pan at the South Central Radio Club meeting on Nov 13, 1998. PSHR KL5T 159. OOC: KL7IKX found 3 violations.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—SEC: WA5ZAY. STM: W7GB. OOC: KB7HDX. SGL: WB7UEU. TC: N7TOF. Happy New Year! Y2K is one year away. Are you going to be ready? Whadaya mean? What's Y2K? Well, Y2K is "Year 2 Thousand," a very significant event. It's the beginning of the next millennium, and also when computer clocks are supposed to turn over to 2000 and not jump back 100 years to 1900. Various agencies, companies, and corporations are working on this now to be sure their computers are in compliance. It's anticipated there could be some computer-related problems with communications, utilities, and whatever. The ham radio operators have been put on alert to be a back-up resource in case of any problems. Thanks to those of you who sent in comments to the FCC regarding re-structuring. Net Activity (for Oct.): WSN: QNI 809, tfc 301; Noontime Net: QNI 8229, tfc 422; WARTS: QNI 3310, tfc 157. Tfc: W7GB 201, K7GXZ 185, K7BFL 106, KA7EKL 82, KK7T 47, W7UVP 2. PSHR: W7GB 138, K7.XZ 131, W7UVP 70.

IDAHO: SM, Michael P. Elliott, KF7ZQ — OOC: N7HGV, SEC: AA7VR, STM: W7GHT. As we begin this new year in Amateur Radio, one of the biggest issues facing our hobby is the FCC NRPM on restructure of the Amateur Service. Regardless of your opinion on the number of licensing classes, requirements for CW, etc, please make your opinions known. *QST* and the ARRL Web site will provide you with a summary of the issues. Comments may be filed with the FCC by e-mail or by letter. This is your opportunity to express your opinion and help chart the course of Amateur Radio for the years to come. In October, the Idaho section participated in a SET exercise. As a reminder, if you received the SET message be sure to pass that message on to your County EC who in turn will pass the message to the Idaho Bureau of Disaster Services (IBDS). 73 — Mike, KF7ZQ. Tfc: W7GHT 420, KB7GZU 122, N7MPS 64, and WB7VYH 51. PSHR: W7GHT 132, WB7VYH 81, and N7MPS 62. Net (SESS/QNI/QTC/ Mgr.): FARM - 31/2154/ 62/ N7OGR; NWTN - 31/1662/61/ KC7RNT; IDACD 22/586/ 37/ K7UBC; IMN 31/376/428/ N7MPS.

MONTANA: SM, Darrell Thomas, N7KOR—The Capital City Amateur Radio Club provided community service for two more events during October. Bob Solomon, KC7KKM president of the organization estimates that his group has donated approximately 1100 man hours of community service in the first 10 months of 1998. This service has not gone without recognition. At their October club meeting on October 5, they were surprised by a visit from a local RV dealer who presented the group with the title to a 24 foot travel trailer to be used as an emergency communication center. The unit will also be used as a command post for all of their community support activities and Field Day participation. The dates for the annual Race to the Sky Sled Dog Race have been announced. The weeklong activity will be February 11-18, 1999. The race will start on February 14. The Amateur Radio folks have again been asked to provide the communications between checkpoints for this event. Plan now to become involved. If you have not assisted in the past and wish to volunteer contact Darrell Thomas, N7KOR, for a checkpoint assignment. Net QNI/QTC/NM MSN 117/1 W7OW; MTN 1750/93 N7AIK; IMN 368/428 WB7VYH.

OREGON: SM, Bill Sawders, K7ZM—ASM: KF7KE. ASM: KG7OK. ASM: N7QQU. STM: WA7EES. SEC: WB7NML. PIO: KC7YN. SGL: KA7KSK. STC: N7HMV. OOC: NB7J. The October Swap-Toberfest was successful as usual with

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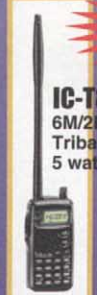
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an attendance of about 800. Sponsored by the Mid-valley ARES group, the swap tables were full of goodies, and lots of meetings and interesting seminars were held. It gave me the opportunity to meet many of my section appointees for the first time! But, the real "biggie" is next month! February's Rickreall Swapfest is the second largest ham radio operator get-together in the state, with the annual Northwest ARRL Convention in Seaside being the largest. Naturally, many tables and rooms of new and used ham gear will be featured, in addition to the regularly scheduled ARES, ORRC, and other meetings. A highlight this year will be a special seminar, hosted by Oregon Section Traffic Manager, David Bogner, WA7EES. Dave will provide NTS traffic handling information and training procedures. All ARES and NTS members and officers should plan on attending this informative meeting. With Y2K around the corner, the smallest of incidents could cause havoc. ARES will be on alert, and traffic will have to be passed...and we have got to work together as a "team" to answer this new challenge. Another NTS note. KC7ZZB, Harold Haines, is now active in the Portland area 2 meter NTS net, and is setting an example for new hams in our section who are becoming active in public service communications. Way to go Harold! The Oregon Region Relay Council (ORRC) reports that three new Director at Large positions have been filled. The winners are: Carl DiPaolo, W7EXH, Steve Humphrey, KA7A, and Joel Determan, WB7TGZ. They will join current position holder, Evan Burroughs, N7IFJ. Remember to check out www.y2k.com on the Internet. It could be the most important thing you do this year! Keep in touch. Bill, K7ZM. NTS traffic totals for October: WA7EES 342, K6AGD 167, KK1A 148, N7DRP 139, K7NLM 132, W7VSE 105, KA7AID 40, KC7ZZB 32, W7ODG 29.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—A recent simulated earthquake drill held in Washington State very dramatically demonstrated the change in Amateur Radio communications, its improvement and its shortcomings. With the ever- increasing trend toward VHF communications, lack of incentive to upgrade, and decline in HF communication ability amongst many ARES volunteers the HF liaison to NTS cross-state communication was drastically impaired while localized communication was somewhat improved. It is apparent that ARES and ACS operations must not overlook the function of the National Traffic System and provide HF liaison for each local area. Those members of NTS who participated are to be congratulated for their FB effort. Kudos to W7TVA who provided the HF NCS function. Traffic training is obviously needed and one who will assist in Kitsap County ARES training is Section Traffic Manager Pati, W7ZIW. Leading the pack in traffic handling again is George, K7BDU, with a total of 1082 for October. Other traffic totals: N7AJ 51, K7CLL 62, W7LG 146, KD7ME 114, K7MQF 91, W7NWP 98, KA7TTY 9, N7YSS 91, W7ZIW 253. We seldom mention those that deservedly make the monthly Public Service Honor Roll, but for October we recognize K7BDU 300, W7LG 128, KD7ME 131, W7NWP 147, KA7TTY 125, W7TVA 213, N7YSS 137 and W7ZIW with 147 total points. Under emergency preparedness the city of Seattle and King County are heavily involved in developing a counter-terrorism program according to DEC for Medical Services Marina, N7LSL. In March Marina will present a paper on "Developing an Effective Amateur Radio Team" at the WWEN Emergency Management Conference. Her team is preparing now to do a tabletop exercise on net control communications and to review message traffic originated during the recent simulated earthquake exercise. Some messages provided various degrees of confusion. In addition King County ARES is being reorganized under the guidance of SEC N7NVP.

PACIFIC DIVISION

EAST BAY: SM, Bob Vallio, W6RGG—ASMs: W6ZF, KF6RCO. SEC: N4OGL. DECs: WA6TGF/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6USW/Solano County, N6UOW/Training, KE6HCI/Administration, KE6NVU/Finance, W6CPO/Technical Services. STM: K6APW. OOC: W6NKF. TS: KF6NY. The Alameda County Emgy Svcs (ACES) Net is held Tuesdays at 8 PM on 147.240, 444.200 (107.2), 147.120, 224.740, 441.125 (100.0) & 145.43 (100.0). Check out the EB WWW Page at http://www.pdarrl.org/ebsec/. Webmaster is KB6MP. SARS membership has grown to more than 50. The Alameda County Sheriff's Communications Team (RACES) manned the County EOC in Dublin, for SET. Oakland RACES Officer, K6JAT, met with Henry Renteria and Renee Domingo, from Oakland OES, to plan future antenna installations in the city. EBARC heard the latest restructuring news from W6CF, and W6RGG. The club welcomes new member W6THB, and congratulates KE6WZN on his upgrade to Amateur Extra. LARK welcomes new members Casey Smith, Ginger Smith, and KF6AWD. MDARC's EC, KF6FGH, wrote a feature article for the "MDARC Carrier" covering safety and action items for all household utilities; water, gas, and electricity. October tfc: W6DOB/1037, WB6UZX/23. 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, Bob Davis, K7IY—ASM: Jan Welsh, NK7N. SEC: N7JEH. TC: NW7O. ACC: N7FFP. STM/SGL: N7CPP. PIC: WW7E. OOC: N7ELV. Happy New Year to the Nevada Section. Here we are at the beginning of a New Year...Again! Time seems to be passing in leaps and bounds. By now, most of the clubs and organizations in the Section have their new officers and board of directors firmly in place and are formulating the plans and activities for the year ahead. Many clubs will be organizing membership drives to recruit new members. I would ask you to consider including ARRL membership in your efforts, thereby bolstering Amateur Radio both locally and nationally. If you are a member of one of the several newly organized clubs in the section, please contact Jo Ann, N7FFP, or myself for information on becoming an ARRL Affiliated Club. Newsletter editors, please note my new mailing address in the front of this issue. The HF bands continue to improve—what an incentive to upgrade. VEC programs and test sessions are scheduled continually throughout the section. Now would be a good time to see some of you "Seasoned Veterans" in our ranks, reactivate yourselves and become an "Elmer" to

MIRAGE ...160 Watts on 2 Meters!

Turn your mobile, base or handheld into 160 Watt powerhouses and talk further, longer, clearer . . . All modes: FM, SSB, CW . . . Superb GaAsFET preamp . . . Overdrive, high SWR, Over-temperature protection . . . Remote controllable . . .

B-5016-G
$299
Suggested Retail

MIRAGE RUGGED!

Power Curve -- typical B-5016-G output power								
Watts Out	*130*	*135*	*140*	*145*	*150*	*155*	*160*	*165*
Watts In	*20*	*25*	*30*	*35*	*40*	*45*	*50*	*55*

The MIRAGE B-5016-G gives you 160 watts of brute power for 50 watts input on all modes -- FM, SSB or CW!

Ideal for 20 to 60 watt 2 Meter mobile or base. *Power Curve* chart shows typical output power.

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. *We know of one that has been in constant use since 1979!*

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's *Therm-O-Guard*™.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive switching with remote external keying.

RC-1B, $45, Remote Control. On/Off, preamp On/Off, selects SSB/FM. With 18-ft cable.

Draws 17-22 amps at 13.8 VDC. 12x3x5½ in.

More 160 Watt, 2 Meter Amplifiers . . .

B-2516-G, $299. For 10 to 35 watt mobile or base stations. 160 watts out for 25 watts in.

B-1016-G, $379. MIRAGE's most popular *dual purpose* HT *or* mobile/base amplifier. 160 watts out/10 W in. For 0.2-15 watt transceivers.

B-1016-G Great for ICOM IC-706!

B-215-G, $379. MIRAGE's most popular *handheld* amp. 150 watts out/2 watts in; 160 watts out/3½ W in. For 0.25 to 5 watt handhelds.

100 Watts for 2 Meter HTs

B-310-G
$199
Suggested Retail

Power Curve -- typical B-310-G output power							
Watts Out	*25*	*50*	*75*	*95*	*100*	*100+*	*100+*
Watts In	*¼*	*½*	*1*	*2*	*4*	*6*	*8*

- ***100 Watts out with all handhelds up to 8 watts***
- ***All modes: FM, SSB, CW***
- ***Great for ICOM IC-706***
- ***15 dB low noise GaAsFET preamp***
- ***Reverse polarity protection/SWR Protection***
- ***FREE mobile bracket*** • ***Auto T/R switch***
- ***FREE handheld BNC to B-310-G cable***
- ***Ultra-compact 4¾x1¾x7¾ inches, 2½ pounds***
- ***One year MIRAGE warranty***

***Boost** your 2 Meter handheld to 100 Watts!*
Ultra-compact all mode B-310-G amp is perfect for *all* handhelds up to 8 watts and multimode SSB/CW /FM 2 Meter rigs. *Great for ICOM IC-706!*

35 Watts for 2 Meter HTs

B-34-G
$89.95
Suggested Retail

Power Curve -- typical B-34-G output power								
Watts Out	*18*	*30*	*33*	*35+*	*35+*	*35+*	*35+*	*35+*
Watts In	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*

- ***35 Watts Output on 2 Meters***
- ***All modes: FM, SSB, CW***
- ***18 dB GaAsFET preamp***
- ***Reverse polarity protection***
- ***Includes mobile bracket***
- ***Auto RF sense T/R switch***
- ***Custom heatsink, runs cool***
- ***Works with handhelds up to 8 watts***
- ***One year MIRAGE warranty***

MIRAGE RUGGED!

35 watts, FM only . . . $69.95

B-34, $69.95. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3⅛x1¾x4¼ inches.

MIRAGE Dual Band 144/440 MHz Amp

BD-35
$159.95
Suggested Retail

MIRAGE RUGGED!

Power Curve -- typical BD-35 output power							
Watts Out (2Meters)	*30*	*40*	*45*	*45+*	*45+*	*45+*	*45+*
Watts Out (440 MHz)	*16*	*26*	*32*	*35+*	*35+*	*35+*	*35+*
Watts In	*1*	*2*	*3*	*4*	*5*	*6*	*7*

- ***45 Watts on 2 Meters/35W on 440 MHz***
- ***Auto Band Selection*** • ***Auto T/R switch***
- ***Full Duplex Operation*** • ***5x1¾x5 inches***
- ***FREE mobile bracket*** • ***"On Air" LEDs***
- ***Single Connector for dual band radios and antennas***
- ***Reverse polarity protection***
- ***Works with all FM handhelds to 7 watts***
- ***One year MIRAGE warranty***

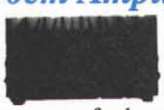
Add this Mirage *dual band* amp and boost your handheld to a *powerful* mobile or base -- 45 watts on 2 Meters or 35 watts on 440 MHz! **Mirage's** exclusive *FullDuplexAmp*™ lets you talk on one band and listen on the other band at the same time -- *just like a telephone conversation.* (Requires compatible HT).

6 Meter Amplifier

FCC Type Accepted

The A-1015-G, $389, is the *world's most popular* all mode FM/SSB/CW 6 Meter amplifier. 150 watts out for 10 in. For 1 to 15 watt transceivers.

70cm Amplifiers (420-450 MHz)



D-3010-N, $365, -- 100 W out/30 in. For 5 to 45 watt *mobile/base*. **D-1010-N, $395,** 100 W out/10 in. *Dual purpose* -- for handhelds or mobile/base. **D-26-N, $269,** 60 W out/2 in, for *handhelds*.

Amateur TV Amps

Industry standard ATV amps -- **D-1010-ATVN, $414,** 82 watts PEP out / 10 in. **D-100-ATVN, $414,** 82 watts PEP out/2 in. (without sync compression).

Remote Control Head for Amps

RC-1, $45, remote controls most MIRAGE amps. Power On/Off, preamp On/Off, switch for SSB/FM. 18 foot cable (longer available). 1¾x3¾x2½ inches.

Repeater Amps

11 models -- continuous duty all modeFM/SSB/CW repeater amps for 6, 2, 1 1/4 Meters, 70cm, 450 MHz ATV.

Low noise GaAsFET preamps

KP-1

KP-2

High gain *ultra low noise* GaAsFET preamps for receiving weak signals. Selectable gain prevents receiver intermod. 15 to 22 dB gain. Less than 0.8 dB noise figure. Automatic RF switching up to 160 Watts. **Choose** In-*Shack* model or *Mast-Mount* (includes remote control) model to reduce loss. Rugged die-cast enclosure.

Frequency (MHz)	*In Shack $139*	*Mast Mount $195*
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some of our aspiring new operators, and help them move up through the ranks. Thanks and 73, Bob, K7IY.

PACIFIC: SM, Ron Phillips, AH6HN—SEC: Dennis Carvalho, KH7H. ASM: Harry Nishiyama, KH6FKG. ASM: Lee Wical, KH6BZF. ASM: Jim Reid, KH7M. ASM: George Heloca, Sr, KH6ANA. ASM: Mel Fukunaga, KH6H. TC: Chuck Cartwright, AH7Y. PIC: Russ Roberts, KH6JRM. ACC: Bob Schneider, AH6J. Dennis Carvalho reports the SET on Oct 12, 1998, was the best simulated exercise of all. More participants than ever, more new locations! Congratulations to all participants. Hawaii had an excellent response and turn out for our first-ever QCWA Chapter meeting on Oahu held on Saturday, Oct 17. Saturday morning, 23 eventually arrived at the Columbia Inn for breakfast, eyeball QSOs and a fine chapter meeting. John Peters, K1ER, reports that the US Navy League has donated 2 complete ham stations for the USS *Missouri* to be placed in the "public area" of the ship. A separate USS Missouri Radio Club of some sort will be organized to oversee/monitor/maintain and be responsible for these projects. Ken Hoppe, KH7R, invited QCWA members to visit his Pacific super station on Waimea Bay. Thanks, Ken, for your hospitality. Please continue to let me know how your *QST* delivery is going. So far, all reports are not very good compared to the mainland. Mahalo, 73 and Aloha.

SACRAMENTO VALLEY: SM, Jettie Hill, W6RFF—I want to wish everyone a very Merry Christmas and a Happy New Year. Hope Santa brought you some goodies for your shack! The last two years have been hectic with the raids on the ham frequencies and the ARRL/FCC license proposals. Let's hope that 1999 will be calmer and the propagation continues to improve on the HF bands. Your club is looking for your help as a committee chairman/member. Do YOUR part. Sacramento ARC putting up new antennas at the Sacramento Blood Bank. K6KM operated from Lord Howe Isle and KI6T from St. Lucia. New members MLDXCC: W6QYO and AB1U. New hams in Nevada County are: KF6TIH, KF6TII, KF6TIG, KF6TIF, KF6TID, and KF6TIE. Congratulations! Also new members of Nevada Cty. ARC: W6GJA and AA2RB. Clubs, please note new club officers should look for affiliation renewal forms near the end of Jan. Please fill out and send in as soon as possible to HQ. New club phone for River City ARCS is 916-492-6115. VE exam Jan 16. RCARCS looking for newsletter editor. They helped with the Clarksburg Country Fun Run. Yuba-Sutter ARC meetings at Jerry's Restaurant in Yuba City until after the holidays. Their VE exams are Jan. 12 and Mar 9. Call (530) 674-3648 for more info. GEARS members, KA6GND and WA6WJZ spoke and demonstrated Amateur Radio to the Forest Ranch Lions. KD6EVP & KC6DKO provided contacts on HF and VHF. KE6YLH hosted several Webelos in his shack as they worked on their Communication Badges. WA6WJZ also spoke to 35 kids at the Chico Creek school. He demonstrated Braille and other methods the blind use, as well as contacts on VHF. Shasta Cascade ARS had a program on the Shasta County Emergency dispatch system. Think propagation for 1999. 73.

SAN FRANCISCO: SM, John Wallack, W6TLK—ASMs: N6KM, KE6EAQ. OOC: KD6VWD. PIC: N6BWS. SEC: WB6TMS. TC: N1AL. I regret to report that W6PM and KA6QNL are now Silent Keys. AA6VS, EC, reports that the ACS and ARES Coastal Emergency Net for the entire Sonoma and southern Mendocino County Coast has changed to Tuesday at 1900 on the same frequency of 147.825. He reports that the net has been meeting weekly since Feb 1993. This is a unique ACS and ARES group since they serve local authorities for 2 counties along a rugged and sometimes isolated disaster prone area. They are a respected and appreciated comm resource by both emergency officials and the general public. News from the Redwood Empire DX Assoc. is that the club has approved an Elmer Program to help both new and old hams with DXing, contesting and license upgrades. Nine REDXA members immediately volunteered to be Elmers. This is a worthwhile project for all clubs. WA6KLK, WD6HDY, KD6LTB and WB9NJS from the Willits ARS scored close to 49,000 points in the Sept VHF Contest. A reminder to all clubs to keep your club info updated on the ARRL Web site www.arrl.org/field/club/ and use the Annual ARRL Club Report Form. Also, please keep your club info updated on the Pacific Division web site www.pdarrl.org/ Traffic: W6JCG, ORS, 28. Tfc: W6JCG 28.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN—The Kern County Central Valley ARC gathers volunteers each year at Thanksgiving time set up a road and weather net as a service to amateurs traveling through the area. The Road & WX net is a great idea for all clubs to set up. This year, Neal, N6YGG, and Dennis, KA6TZP, are organizing the Road & WX net. Great idea! At the beginning of each new solar cycle, a ham's fancy turns to DX. This solar cycle is no exception. If you would like to join a great DX club, I would recommend our own Central California DX Club. Information about joining this fine fraternity of DXers can be had by calling Charles McConnell, W6DPD (club president), at 209-431-2038. The DX net meets every Wednesday night on 147.09 MHz. at 8:00 PM local. The club address is: 1658 West Mesa Ave. Fresno, CA 93711. It is fall as I write this column, and memories of last year's flood should remind us that volunteer service with an ARES or RACES group in your local community is a great idea. Check with your local radio club for info on how to join an ARES or RACES organization. There are some Amateur Radio operators whose accomplishments and dedicated service to their local radio clubs deserve special mention and to that end I would like to thank Pat Fennacy, W6YEP, and John Pritchett, WA6JWK, for being the valuable resources that they have been to the section and the Fresno ARC. Both Pat and John have been past presidents of FARC, did a great job, and continue to support the club. Time also to make note that Henry (Hank) Lane, KC1TF, site engineer for the channel 51 transmitter site on Mt Bullion, made the site host to the Mountain Amateur Radio Club this past June for Field Day.

ROANOKE DIVISION

NORTH CAROLINA: SM, W. Reed Whitten, AB4W—ASMs: AB4S, KE4ML, KC4ACE. SEC: K4MPJ. ASECs: WA4MOK, N4UCO, KD4RYE. STM: K4IWW. ASTM: W4EAT. TC: K4ITL. SGL: KI4AN. OOC: W4ZRA. PIC:

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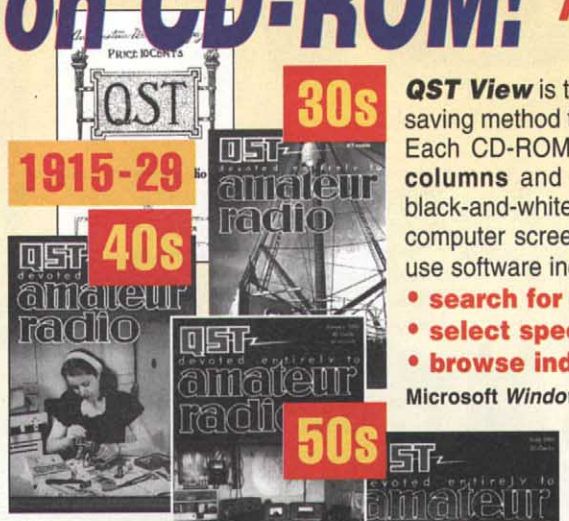

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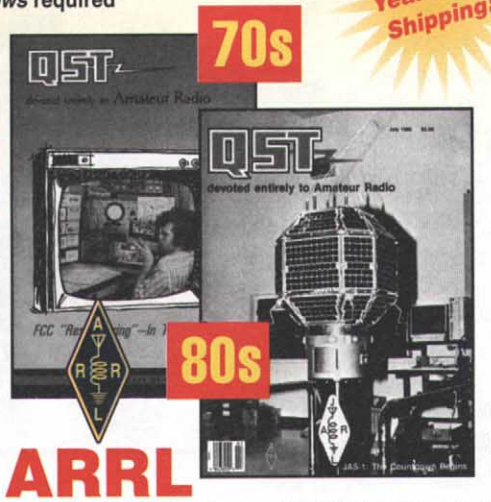

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KN4AQ. ACC: W4CC. BM: KD4YTU. Section Web site http://www.ncarrl.org. Thanks to Don Negus, N0SU, new Net Manager of the North Carolina Evening Net. NCEN, an NTS section net, meets on 3923 kHz 6:30 p.m.—check in, enjoy the fellowship, and help with the traffic load. Don recently moved to Bryson City from Charlotte and is also serving as an Asst. EC. Don's involvement with both ARES and NTS is not unusual in our section. Your ARRL Field Organization encourages working together for the benefit of the Amateur Radio Service. ARES and NTS are two aspects of preparation for emergencies, not two isolated activities. Field Day results gave us something to be proud of: Two North Carolina clubs finished first in their class and were in the top ten scorers in the nation: Raleigh ARS (13,802), 8th overall and 1st in 8A; and Cary ARC (13,424), 9th overall and 1st in 3A. Both of these clubs have finished first in their class in previous Field Days. No other section had two in the top ten! (Not obvious in *QST* though, since the "Top 10" list did not include sections.) The next high NC scores, all in 2A except as noted, were Bladen ARC, Cape Fear ARS, Orange Co RA (5A Bat), Smoky Mt AR Team, Blue Ridge ARC, and Tar River ARC. Congratulations to ALL of the 49 groups and 15 individuals from our section who submitted Field Day logs. Participation, without emphasis on the contest aspect of FD, is very worthwhile. Thanks also to those who send messages to the SM and SEC. A final reminder to turn in SET paperwork. We want to try to repeat our FIRST in the nation finish last year. Are you part of this? You can be. Join you local Amateur Radio club, contact you EC, check into the NTS and ARES nets, volunteer for public service communications. YOU can make an important contribution. My thanks to all who hold ARRL Field Organization appointments for helping make all these good things happen for Amateur Radio in our section. Oct Traffic: W4EAT 1181 (BPL), AB4E 238, K4IWW 165, K4AIF 118, K4CWZ 118, KI4YV 90, KE4JHJ 84, W2CS 84, W3HL 62, W4CC 62, KE4AHC 40, AC4DV 37, AB4W 37, W4IRE 36, WA4SRD 30, WD4MRD 23, KF4OZF 20, WA2EDN 18, KB4FWL 17, KF4VDW 13, W4DYW 10, KT4CD 6, N2JLE 6, N4YXU 3, NT4K 2.

SOUTH CAROLINA: SM, Les Shattuck, K4NK—In this month's column, I need to address my concern with filling my leadership spots now vacant. I have to ask several now for help. At this time I need someone to come forward and be the section Public Information Coordinator. I also need a new Technical Coordinator. If you're not sure what is involved, I will be happy to send you a data sheet with the information. A volunteer in the field service program does not take up a lot of your time. Please consider what Amateur Radio means to you and could you put a little back into Amateur Radio? Please contact me. I would like to congratulate Audry McCroskey, KF4DLS, for his work with the city of Clinton to help stave off a possible tower regulation. Have you heard of a possible tower or antenna problem in your city? Yes...you can make a difference. We enjoyed meeting you all at the Sumter, Myrtle Beach and Union hamfest. A special thanks to those clubs who invited us to dinners and Christmas parties. Looking forward to a great 1999. Tfc: AE4UB 169, KT4SJ 132, KA4LRM 83, W4DRF 79, KA4UIV 42, WA4UGD 36, WD4BUH 28, W4CQB 26, W4FBE 26, KQ4SY 6, WT4F 4. Five stations for PHSR this month are: KA4UIV 130, W4FBE 129, AE4UB 118, KT4SJ 108, KA4LRM 106.

VIRGINIA: SM, Lynn Gahagan, AF4CD—ASM, W4TLM. SEC: K4EC. SGL: KK4IY. TC: W3ERD. OOC: KR4UQ. PIC: W2MG. It is with great sadness that I report the following Silent Keys, John Harvey, WB4KIT and William "Bill" Morhard, KA4DEO. John Elmered numerous hams over the years and was active in the NTS and many other organizations. Bill was District Emergency Coordinator Rappahannock District 5. Jim Morhard is studying for his license to follow in his father's footsteps. Both will be sorely missed, and our condolences to their families. Great to see a new QCWA chapter formed in our section, Old Dominion Chapter #202. Officers are pres W4YE, vp-WA4BKW, sec/treas K4UK. The city of Colonial Heights has recognized the valuable part ARES plays in providing emergency communications. The city relied 100% on ARES to provide all communication for their first ever SET, on October 23. Participating were all units of city government, the sheriff's office, Virginia State Police, Chesterfield County Emergency Services, and the FBI. The SET was designed to test ARES capabilities, and city officials were totally impressed. KE4CIO, EC Dinwiddie/Petersburg; KD4YCS, AEC Prince George/Hopewell; KR4UQ, ASEC "A" and KD4YEL participated. The SET was designed around a local dam being blown up by a terrorist group hence, the FBI involvement. The Virginia Department of Emergency Services has recently beefed up both phone and digital resources at the VA EOC. A new set of antennas for all bands, an additional HF rig, linear, and a new Pentium computer for W4ZA. Many extra accessories have added to ZA and the JNOS software upgraded. ZA is now compatible with MYSYS. If you're into packet, you'll find W4ZA a pleasure to use with many new friendly features. Luke, AD4MG is the SysOp, with the help of KO4XB and K4ZIV. All have worked very hard to make ZA a great site. WA4DAI, A.C. Frame, has done a fantastic job of restructuring the VA EOC as interim EC of the EOC. K4EC advises effective January 1 1999, the call for the VA EOC Phone and CW will be WC4VA, formerly W4ZA. Tactical calls for ARES/RACES Area A will be WC4VAA; Area B, WC4VAB; and Area C, WC4VAC. Area tactical calls are for ASEC designated use only. Earl Evans, KE4NBX, has taken over as DEC 7. Peter Stolbunov, KM4ZS, is EC for Henry & Patrick Counties. Fred Merica, N4IF, is EC for Alllegheny and Bath Counties. Congratulations' to Earl, Peter, and Fred on your new appointments! I am pleased to announce that the VA. Digital Emergency Net ARC has achieved ARRL 100% Club for 1998. Congratulations to all of the members, keep up the fine work the club is doing for the Section! 73 de AF4CD. Tfc: K4DOR 422, KE4AZL 225, KR4MU 213, K4MTX 181, N4ABM 176, WA4DOX 120, W3BBQ 112, WB4ZNB 84, W4CAC 81, WD4MIS 80, KE4PAP 75, W4JLS 70, K4YVX 68, K0IBS 41, KF4FXT 37, AF4CD 32, W4YE 30, KF4HJW 21, K4IX 21, WA4JFW 16, KC8GUK 14, KB4CAU 13, W4GP 12, K4ISM 12, W4HDW 11, W4TCZ 10, WB4UHC 10, N4BTO 7, WB2KQG 6, W4HU 6, WA8AHV 4, K4JM 3, W4IN 2, N4FNT 2, KE4NYY 2.

WEST VIRGINIA: SM, O.N. (Olie) Rinehart, WD8V—STM: W8IMX. SEC: K8QEW. ASEC: KA8ZOO. SGL: K8BS. TC: K8LG. OOC-N8OYY. ACC: WD8MKS. Digital-KA8MHR, APRS -W8XF. Hey did you know there were two categories in WV QSO Party this year? I even mentioned it in my article but was told very strongly at an off record (or was it?) portion of WVSARC meeting that I failed to mention that the Multiop entry winner was K8WT, Rick and crew! My congrats to you for a job well done and the beginning of a new era for the WV Section. Looks like more honors for WV Section as KC8FS, Hal, was winner of the WV Section of the 1998 ARRL International DX Phone Contest and placed 4th in the Southeast Region! A great showing Hal. We have a recently formed group (ARRL affiliated) in the state which is dedicated to specializing in turning Techs into HF-oriented hams! They are the Central West Virginia Contesters. All amateurs are welcome, for further info contact K8WT 304-592-1987 or k8wt@eatrf.com or CBA. Please note that W8IMX, Bob, is shown in header as Section Traffic Manager, Dave, WD8LDY, is busy with that part of life other than ham radio! HI HI. The next change in the header will not take effect until 00:01, 01, 01,99 but will affect us all now! I have after a great deal of discussion (pleading) and consideration (begging) accepted the resignation of K8QEW, George, as Section Emergency Coordinator, as of Dec 31, 1998. He will have served officially for a full twenty (20) years. George, bless you for your dedicated service, and believe me the accolades and honors you have earned will not stop here! Would fill a book! The purpose of the early announcement is to facilitate the transition from George to the person assuming the appointed position—W8XF, Morris (Mac) McMillian, 2537 Larwood Drive, Charleston,WV 25302, 304-346-6006, w8xf@juno.com. Please, all DECs, ECs and ARES/RACES personnel, cooperate and coordinate this transition. Hug a friend today ! 73, Olie.

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. With 1998's public service season winding down, I want to extend my thanks for the thousands of hours donated by hams throughout Colorado. Congrats to Walt Stinson, W0CP on his election as our new division director. Results of the race for vice director haven't been published as I write this but should be known by the time it's printed. Many ARES districts were pressed into service last winter responding to emergencies. There are several winter weather preparedness lists available. Please make sure you and your vehicle are equipped for winter operations BEFORE you have to answer an emergency call. Congrats to Ben, KB0UBZ, and Dist 22 ARES for their support of the City of Englewood holiday parade. Parade organizers were so impressed, they are turning all communications over to the hams for future parades. Pat, W0IPL, is the new Net Manager for the Section VHF ARES Net. Pat is also training coordinator for Colorado ARES and you can find ARES training info on the Web at **www.iex.net/ares/ares.htm**. Thanks to Jerry, N0MYY for his stewardship of the VHF net over the past couple of years. Several Colorado hams have been working toward establishing link to a New Mexico repeater system. Watch this space for developments. Hope everyone has a happy and prosperous 1999. 73, de N0WPA. NTS traffic totals: W5JCV 351, W0QOB 134, K0TER 117, N0UOD 51, N2TOY 17. CAWN: W0WPD 830, N0DKK 732, K0YFK 536, AA0ZR 393, W0LVI 372, N0JUS 289, N0FCR 289, WB0VET 273, W0GGP 269, K0HBZ 218, KI0ND 169.

NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5BIS & N5ART. SEC: K6YEJ. STM: N7IOM. NMs WA5UNO & WA5UWY. TC: W8GY. ACC: N5ART. New Mexico Roadrunner Net meets daily on 3939 @ 0100 UTC and handled 138 msgs with 1153 checkins. New Mexico Breakfast Club meets daily, 3939 @ 6:30 AM and handled 257 msgs with 1092 checkins. Yucca 2-mtr Net 78/18 handled 43 msgs with 743 checkins. Caravan Club 2-mtr Net, 66/06 handled 7 msgs with 70 checkins. SCAT Net, 66/06 handled 15 msgs with 685 checkins. Four Corners Net handled 30 msgs with 377 checkins. GARS Net, handled 6 msgs with 31 checkins. QCWA Net with 17 checkins. Rusty's Net with 65 msgs and 727 checkins. Valencia County Net with 2 msgs and 29 checkins. Congratulations to K5TRW and his crew for an extra nice Hamfiesta. Keep up the good work Clay & Mary. Was nice to have KJ5AE, West Gulf Vice Dir, and WB5T, W. TX SM there. Also had a wonderful visit with the Deming ARC and with the (GARS) Gila Amateur Radio Society in Silver City. Tnx to all who made those visits such a success! Also enjoyed a nice visit with W5LAJ & his wife Ethel, and nice visit with N5IMW who showed us their new DX location & her beautiful gem collection & WA5Y's fantastic key collection. Sorry to report the passing of K5LMB, W5GGO, & N5AEW. They will certainly be missed. Tfc: K5OWK 14. Vy best 73—W5PDY.

UTAH: SM, Jim Rudnicki, NZ7T—Greetings. Happy New Year! Only one more year until that stressful moment when your home computer changes to the next century! HI! Last month, I reported the passing of a restrictive antenna ordinance in Roy City. This month I bring reports of a victory or two. After several months of letters, phone calls, and most of all, patience, Payson City has relented and will allow FCC Part 97 to regulate the placement of amateur antennas. My thanks to Matt Moody, N4ZGL, for bird-dogging the issue. In Kaysville City, Tim Seeley, KK7EF, reports that the local building department has requested our assistance in developing an ordinance that specifically authorizes amateur towers within the parameters of FCC Part 97. By the time you read this I will have met with the folks in Kaysville City (11/19). Stay tuned! As you can see, most of my time and effort spent as your SM has been (and will continue to be, I fear) the protection of amateurs from restrictive antenna ordinances. My thanks to those hams who took the time to check things out in their communities and also for getting me in the loop so I can be of some assistance. That's what I am here for! That's about it in the antenna department. I regret to report that Gordon Howes; KE7QV of Ogden ARC became a Silent Key on 10/30. Drop me a line, and let me know about your club's 1999 officers. I will publish them here. That's all the news for now. 73 de NZ7T.

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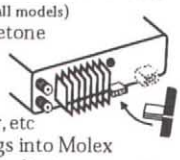

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WYOMING: SM, Bob Williams, N7LKH—This summer we received a record number of requests for Amateur Radio communications support to public service events. The two biggest were the March of Dimes, involving support to 14 cities over a 3-week period, and the Tour de Wyoming, covering 380 miles over 6 days. It was possible to provide this support only because of the Emergency Coordinators. In each case, when the request for communications support was received, a series of messages was sent to the emergency coordinators in the areas or along the routes, and they put together groups to provide the communications support. Because they were trained and had experience in such activities, they knew how to put together a team and what to do with it. In general, the people called in to help were members of the local clubs so they knew each other and the area in which they would be working. They knew what repeaters would be useful, when to use VHF simplex and where to use HF. To have a well-established emergency coordinator organization in the section is a must to properly support that kind of public service communications request, especially given our low population densities and large areas.

SOUTHEASTERN DIVISION

ALABAMA: SM, Scott Johnston, N4YYQ—ASMs: W4XI, N4ZNO, KL7P, KB4KOY, KT4XA, KT4JW, KC4RNF, KR4TZ, KX4I, KA4PKB. STM: WB4GM. SEC: AE4WP. OOC: KL7Q. TC: KC4RNF. ACC: K4LI. BM: KA4ZXL. SGL: KE4RPX. Hello to everyone, and to you a most Happy New Year! 1998 now takes its place in the history books. It certainly had more than its share of severe weather, and during it all our amateurs pulled together to be there when and where needed. Be it as net controls, relays, damage assessment or spotters. No matter how large or small a part one assisted, we all interlocked our skills as Amateur Radio operators and provided essential vital communications. Though we may not realize it, but even during our routine day-to-day communications with our friends, participating in the nets, handling traffic, serving as NCSs, relaying, and liaisons etc, we are practicing and fine-tuning our Amateur Radio operator skills. Amateur Radio is a service. One in which we can be proud to be a part of to be there when the need arises. I want to take this moment to recognize our ham of the month for November 1998. Congratulations to Tim Edmondson, KE4RWG, of Roanoke, AL. Congratulations, Tim! You're doing a fantastic job. Keep it up! As we head into 1999, there will be an abundance of fun activities for us to do. There's the hamfests we can all look forward to and search for that perfect bargain or 2 (or 3, hi hi). And by June, we'll all be fired up, raring and ready to participate in Field Day. All I can say folks is enjoy! Till next month, 73—Scott, N4YYQ. Tfc: WB4GM 342, W4PIM 191, W4CKS 143, W4ZJY 130, N4ZNO 126, KU4IJ 86, WA4GQS 82, KL7Q 56, AE4WP 47, N4YYQ 45, AC4CS 32, W4ZBA 28, KC4RNF 18, W4DGH 16, KD4PDQ 15, AE4EI 14, AF4HE 14, W4XI 10, WB4TVY 6.

GEORGIA: SM: Sandy Donahue, W4RU—ASM/SO Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. SEC: Tom Rogers, KR4OL. STM: Dick Baxter, K5TF. SGL: Charles Griffin, WB4UVW. TC: Eddie Kosobucki, K4JNL.OOC: Monroe Gaines, KF4NXD. PIC: Chuck Calmbacher, AD4JU. Happy New Year. Are you glad 1998 is going away? It was the meanest year weatherwise in memory. We had tornadoes in Gainesville and Atlanta in the spring and floods in Albany (again). During the summer and fall several hurricanes that struck elsewhere had us concerned for a while before moving on. Georgia hams responded to the FLA Keys, Puerto Rico and Central America to help with cleanup of hurricane damage. On a more positive note, we had an ARES conference in June that was very successful with good attendance and the chance to network with served agencies. We look forward to 1999. Alford ARC has new officers: pres W4EPI, vp KF4KJO, sec KS4JR, tres KA4IAO. Their November hamfest was very successful. GA Tech ARC has a net on Weds nights at 8 PM 145.15 repeater. KA4UZB is NCS. Gainesville Hamfest moves from Sept to July 10 at the GA Mountain Ctr. You will have to wait until February to go to a hamfest in GA. The Dalton Fest usually kicks off the new hamfest year on Feb 27. Mark your calendar and plan to attend the ARES annual meeting on Jan 16. KR4OL has the details. In October the Coweta County ARES was called up to help search for a little girl in Newnan. 73 Sandy. Tfc Aug. WB4GGS 168, WU4C 160*, K4BEH 150*, W4AET 111*, KE4NAY 80*, K1FP 68*, KA4HHE 64*, AD4KA 30*, KF4UZB 19, K5TF 16, K4JNL 6, K4BAI 1 *=PSHR.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—ASM-APRS: WY8O. ASM-Youth: KO4TT. ACC: WA4B. OOC: WB4GHU. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. Hope each of you had a good Holiday. Each of you and your clubs should establish an agenda for this New Year 1999 that will include a progressive step forward for the enhancement of Amateur Radio. The only thing keeping us from reaching new goals will be the lack of our efforts to make a contribution. FCC is changing for the better on the enforcement front. All enforcement investigation, evaluation, and processing have been transferred to the Compliance and Information Bureau. This change will facilitate the pursuit of compliance especially in the area of resolving interference complaints. Governor Chiles threw a party at the Daytona International Speedway for fire volunteers. About 750 attended including amateur operators. The state presented checks to the American Red Cross, Salvation Army, to the tune of $100,000 for their relief efforts. Hurricane Georges hit the W Panhandle of Florida in September, and much of the clean up had to be done in October. The Escambia and Santa Rosa Counties were activated primarily for the purpose of ascertaining road conditions due to flooding. Beaches were evaluated and some shelters opened to house the people. The Five Flags Amateur Radio Association became a Special Service Club, and the members set up a booth at the Pensacola Fair. This was a first and might add a very successful event. They also had a special event radio station, prepared radiograms for those desiring to make contact with friends and relatives in another state. About 30 signed up to take classes in preparation for taking the exams. The amateurs were involved in assisting in searching for lost mothers and children. Tfc: NR2F 313, KE4OAV 175, KE4PRB 99, AD4BL 96, AD4DO 83, KF4NFP

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82, AF4GF 52, W5MEN 47, W4KIX 44, N4JAQ 43, KF4TQX 42, KU4LY 29, AB4PG 26, KC4FL 24, N0ZO 20, KB4DCR 19, KJ4HS 16, KM4WC 15, WB2IMO 13, KF4TM 10, N4GMU 10, WB9GIU 8, WA4EYU 7, W8IM 6, WX4J 4, KF4GUA 3, WD4IIO 2.

SOUTHERN FLORIDA: SM, Kevin "KB" Bunin, K4PG, 561-496-5257. ASM/STM: KA4FZI 941-574-3467. ASM for Youth Activities: WB9SHT 561-336-5608. SEC: W4SS. 561-967-1477. Asst SECs: WB2WPA 941-775-2397, KD4GR 954-778-0775. TC: KI4T 954-791-4275. BM: KE4WU 941-465-8176. PIC: WA4ATF 813-733-9441. OOC: WB4GHU 941-665-6708. ACC: W3BLW 813-541-2895. SGL: KC4N 904-385-5924. Pkt Mgr: KB4VOL@ N4EXO. Welcome to our newest Official Bulletin Station (OBS), N3BUL, Fred Hendershot, Riverview, FL. The Tampa Hamfest and Southern Florida Section Convention was held on November 21 and 22. SEC, Manny Papandreas, W4SS, spearheaded the Public Service forum held in Tampa on Saturday, November 21, from 1 to 5 PM. Hope I met you there! Miami Tropical Hamboree! Feb 6 and 7. Highlands County ARC Hamfest will be March 13, 1999 (KD4CQG). Okeechobee ARC Hamfest is December 5 (AD4RZ). South Palm Beach ARES/RACES gave its Hurricane Georges active stations two beautiful certificates of appreciation suitable for framing (KE4IDW, W2DO). Fun for me as I attended the Vero Beach ARC Club meeting on November 12 at the request of Russ McConnell, N2GBI. Received newsletters this month from Highlands County ARC, Thunder Bay ARA, Broward ARC (KD4JMV), Lakeland ARC, Manatee ARC (K4GG), Vero Beach ARC, Tampa ARC (W4DUG). Received e-mail news from N4HHP, N2GBI. SeaPort Manatee Day was Saturday, Nov. 7. Club members operated from 8 AM to the end of the day. 50,000 people were expected! (WA2IVN). KC4YTP, PIO, Will Holcomb, sent me a press release about the successful Open House held by ARES in Pinellas County. Clearwater ARS hosted a Year 2000 Computer Problem Discussion" on November 12 at the Red Cross building downtown Clearwater (KC4YTP). Congratulations to the Florida Contest Group and Florida Contest Club (K4FCC); they have been putting in winning scores the past six months worldwide! K4SCL is back from vacation and on the traffic nets again. AB4XK is away on vacation. Wendy, KB1AF, is back in Florida. K4CDR is back in Florida from Lima, Peru. Hope you all voted in your club election of officers. Send me the results, please. I will be attending a Section Manager's Workshop (School) for new SMs on December 5 in Newington, CT. Great time of year for a Florida boy to go north! Sad news received that Ted Wallace, W4LJB, became a Silent Key (W7AMM). Remember all EC reports go to David Smith, KE4UEI, via WB9SHT or KE4UEI@gate .net. All ECs please report and let me know what your activity has been and your monthly membership statistics. Thanks. South Florida ARES Net (SFAN), Saturday mornings 8 AM or right after the ARRL Information Net (AIN) 3.940 MHz, 7:30 AM. Send a station activity report (SAR) each month, no matter how small you think it may be! 73 de K4PG. BPL: W7AMM 609, WA9VND 554, KF4VEX (Club) Origs 132. Tfc: W7AMM 609, WA9VND 554, KB4WBY 330, KF4VEX (Club) 304, KC4ZHF 292, KA4FZI 262, AB4XK 255, K4SCL 189, KD4HGU 185, KD4GR 163, WB4PAM 131, K4FQU 122, KD4JMV 113, K4RBR 97, AA4BN 90, KJ4N 85, K4PG 73, W4DL 71, W4DWN 64, WA4EIC 59, AA4HT 46, K2GNZ 45, KT4XK 42, KE4WBI 31, KE4UOF 29, WA4CSQ 26, WD4JNM 15, W4WYR 12, K3KT 5, W4WYR 12, K3KT 5, AA4WJ 5, K9EHP 4, W4AUN 2, K4ENA 2, (Sept) KE4WBI 21.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St Croix—ASM: Drew, NP2E, St Thomas. ASM: Mal, NP2L, St John. SEC: Vic, WP2P. St Croix. PIC: Lou, KV4JC, St Croix. ACC: Debbie, NP2DJ. St Thomas. NM, Bob, VP2VI/W0DX Tortola. The St. John weather net, which normally operates 1040 UTC daily, remained in extended session during Hurricane Georges and operated on each hour during its passing through the Virgin Islands. KP2G, net control, provided windspeed and direction as well as barometer readings and descriptions from satellite photos. This information was relayed by marine mobile, NP2IW, Terry, to approximately 20 other vessels in Hurricane Hole on St John on VHF channel 72. NP2L provided reports from the west end of St John while KP2CN and N3RDL provided reports from Red Hook on St Thomas. NP2FO provided reports from Coral Bay plus relayed messages from NP2IW to St John's Myra Keating Clinic. Maximum wind speed recorded by KP2G was a 150 mi/hr gust with over 10 minutes of 130-135 mi/hr sustained winds. SM thanks George, KP2G, (not to be confused with Georges) for that report. Matt, NP2FK, reports that although both St. Croix repeaters were down, that Charles, NP2EN; Al, KP2CF; and Jerry, WB6RCN; were heard on local VHF. 147.25 machine came back up when power was restored. Jerry, N3BDW, manager of the Hurricane Watch Net on 14.325 has advised SM NP2B not to make comments on how calm the Hurrricane season is in early September. SM concurs! On a lighter side, Drew, NP2E, reports that Debbie, NP2DJ, was heard operating the CQWWDX contest from her boat. KP2N is becoming more radio active and plans to make his 100 Qs for SS CW. NP2E's station is still down but may have it operating by the weekend. Team VI RITTY was preparing for CQ RTTY, but their efforts were interrupted by Georges. Much disappointment, but will be ready next year. NP2E reported that they had a new secret weapon to unleash on the ether. Julio, WD4JNS, and Bruce, W4OV, joined SM NP2B for the CQWWDX Contest. In spite of a few small glitches, we managed to make 5365 QSOs. Bruce kept saying we needed something better on 160, I told him what we had would work fine. It didn't. Bruce was right. So that's what's happening in the VI. Come vacation with us this winter, and bring your H-Ts. 73, John, NP2B.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—With the start of the new year, I want to task all of us veterans of Amateur Radio to take a few moments and help the new-comer's learn how to operate and use the equipment correctly. Several weeks ago I was shopping in the Tucson Mall (wearing my Amateur Radio sweatshirt) when a person stopped and asked if I would help him program his new H-T. We sat down on the bench and I showed him how to program the local repeaters using standard offsets. It seems that the local

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manufacture that sold him this H-T did not provide instructions on how to use the unit, but only said to follow the written instructions. He was having trouble following the instructions. This person also said that he had gone to a local club meeting and no one would take the time to help him. This does not make us look good. We want to add people to our clubs, but to do this we must be willing to spend a few moments and help people. Please try and remember back when you first started and needed help. By now Charles Ellis, W6PNM, has started his retirement and is filling the extra time with Amateur Radio activities. Ralph Barr, W0DNO, is trying to get the Thunderbird ARC rejuvenated and could use some help from other people interested in this club. Also he is still interested in getting help to man the science museum Amateur Radio station. My club listing needs its update so please send me the latest information on address and a point-of-contact person with telephone number. We have over 55 clubs here in Arizona. The 1999 DX Convention will be held at the Fresno City (California) Holiday Inn during the time of April 9-11, 1999. This is a good event with lots of classes on the latest equipment, past DX activity, how to operate correctly. It is not too late to make hotel reservations. The Southwest Division Convention for 1999 will be held in October on the first weekend (01-03) in Long Beach, California, on the *Queen Mary*. Don't forget to also make advance reservations. The rooms will fill up fast for this event. Lance Halle, KW7H, has been very active in the Phoenix area helping control amateur radio interference. If it is time to renew your ARRL membership, please renew through your club. Then your club will get to keep a small amount of your dues. This month is the Westfest Swapmeet at the Glendale Community College on January 9, 1999. Hope to see you all there. Not much else to report this time.15 meters has been very active in the late afternoon and I have make a few new contacts after work. Hope to hear from you on the bands. 73s Clifford Hauser; KD6XH. ATEN 898 QNI; 181 tfc; 31 sess. Tfc: K7VVC 838, AB7NK 402, W7EP 108, W7UQQ 70.

LOS ANGELES: SM, Phineas J. Icenbice, Jr, W6BF— The LAACARC meeting was held at the Red X headquarters building on Wilshire Blvd, in downtown LA, Tuesday November 3. About 30 local area clubs were represented. Everyone was happy to see Rosemary Willis, KF6EKP, back from a serious illness. Archie, W6LPJ, is in need of DX card sorters for cards starting with the "Suffix L." You could be the lucky one if you call Archie immediately. 818-767 5131. Another major topic discussed was a very unpopular Palo Verde City Antenna Ordinance under consideration. The proposed ordinance is so restrictive that it was almost unbelievable. It even included mobile antennas. A City Council meeting were scheduled for September 4, where a packed house of local amateurs was anticipated. - Traffic reports for the month were reported by AD0A, Jerry, 68 and W6SX, Hank, 39. It has been reported that: the subject of "Repeater interference Complaints" was answered by the FCC. The question was: when a coordinated repeater is not active on their assigned frequency pair, is it interference when any other station or repeater (not coordinated) uses the frequency? The answer was why should it be interference if the channel was clear and unused. (Coordination is not total ownership of any frequency.) Our ASM, Al Hart, W6UBM, is having great fun on the high end of 10 meters with AM. He reports great reports running only 10 watts most of the time. He says that it is like old times. I think that he means back when we had real propagation. Like when "Ten Watts" would get you a solid S7 in Africa or down under almost any time the band was open. Vy 73 es DX de W6BF, Phineas.

ORANGE: SM, Joe H. Brown, W6UBQ—ASMs: Riv Co-Joe, KO6XB 909-685-7441; Org Co-Art, W6XD 714-556-4396; SB Co-James, KE6LWU, 909-824-2454; Sec News/PIC-Gwyn, KE6JOF, 909-685-7441. SEC: Ted, N6RPG, 909-947-1769. For this month's Words of Wisdom, we chose what the editor of GTARC's *Triangulator* cited from "The Amateur's Code": An amateur is "considerate [and] never knowingly operates in such a way as to lessen the pleasure of others." GTARC also reports that Tom Tortomasi, KQ6GV, and Michael Maierhoffer both passed their Amateur Extra last Sept. Fine business, both! Congrats to WARA's Chris Prewitt, WA6OQC, their Ambassador of the Month for October, who serves on the club's Tech Comm and also is a WARA rep for the 1999 ham convention on the *Queen Mary*. Hats off to the following clubs for their public service events: Fullerton RC's Rosie, N3IVO, reports in *Smoke Signals* that CARES and MARC supported approx 850 bicyclists in the National Multiple Sclerosis Society's "Bay to Bay Bike Tour" on Oct 3 and 4. RCARA's Ted Hudson, N6FJX, Ron Braley, KE6RYX, Tony Blackwood, KE6RUT, Vivian Blackwood, KF6GZK, Rich Harwick, AB4AW, Mike Riff, KA6VPW, John Hughey, KO6RZ, Michelle Hudson, KF6KFB, Steve Evans, KF6BNP, Bob Henry, N6HOJ, and Bill Allen, KD6VAE. Excellent work, one and all! Lee DeForest ARC reports that the city of Hemet awarded the Hemet RACES group Community Development Block Grant funds in the amount of $5605 to purchase new Amateur Radio equipment as per their application for funding. Great work, guys and gals! LDFARC's newsletter also reports that on Monday, 10-5, Riverside Co RACES was activated to provide communications for Red Cross shelters opened to support evacuations relating to the Mt Edna fire. STM, N6GIW , reports for October '98: Traffic totals: KO6RZ 376, KC6SKK 155, KF6RDI 117, W6QZ 80, N6GIW 48, KF6RNO 37, KD6EYI 21, N3IVO 5, KA6TND 4. Digital traffic: W6QZ NTS BBS 658. N6GIW mailbox 82. PSHR: KO6RZ 134, W6QZ 127, KC6SKK 113, KF6RDI 82. Net Mgr, KO6RZ, reported SCN/V 29 Sess, QNI 277, QTC 178. Glenn also says, "Congratulations to Dan, W6QZ. His NTS BBS made BPL this month. Vy 73, KE6JOF for W6UBQ.

SAN DIEGO:SM, Tuck Miller, K6ZEC, 619-475-7333—ASM: Patrick Bunsold, WA6MHZ. ASM/Elmers: Pat Ryan, KC6VVT. ASM/MARS: Harry Hodges, WA6YOO. Youth Coord/SGL: Bob Spann, KE6BJL. ASM/Red Cross: Al Rich, W6WYN. SEC: Dave Doan, KC6YSO. ACC: Evelyn Miller, N6EVE, Bul Mgr: Steve Adams, K6PD. PIC: Roy Stark, KF6NQG. OOC/TC: Del Radant, N6JZE. STM: Warren Dilley, KT6A. DECs: North: Dennis, K7DCG, South: Vacant, Imperial: Martin N6QU; East: Rich N6NKJ, Central:

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RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz	.15/FT	.13/FT	.12/FT
RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS@ 30MHz	.15/FT	.13/FT	.11/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.17/FT	.15/FT	.13/FT
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150	1.30	1.81	0.845	2.75	0.458	6.04
450	2.30	1.02	1.51	1.53	0.834	3.32
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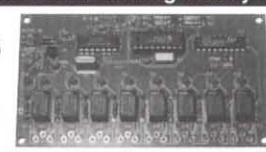

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Wade, KE6BZI. Each year at this time, we make promises or resolutions that we may or may not keep. What will yours be this year? Snagging that rare DX country, building your own rig? Setting up a packet station perhaps. I bet you want to upgrade to a higher license class. Hey, that's great, however, I have an idea that will really make you feel good during the new year!! Public service. That's right. When you hear the call go out for volunteers to do special service events, why not be among the first to raise your voice. Ken, WA6BCC, is always looking for help, and sometimes doesn't get enough hams till right up to the last minute. Let's relieve his blood pressure just a bit, and give him a hand. Making plans for the International DX Convention in Fresno, California, this year. If you have not made your reservations, now would be a great time to do it. Looking forward to seeing the outcome of the license restructuring proposals. Are you a representative of an area club?. Keep in contact with me, and let me know what is happening with your group. One great way to do that is to make sure I am on your club's newsletter mailing list. I read all of the newsletters I receive from cover to cover. A special thanks to the following hams who helped provide communications for this years Pacific Crest Trail Run: KB6NMK,KF6SFO, K6PD, KG6LH, K1CT, KC6VVT, KA6PSG, N6JZE, WA6WYC, KO6BU, KE6BZI, and WA6ODQ. The race was an endurance run of 50 miles, 25 up to the 6000 foot level, and then 25 miles back down the hill. The wind was howling and the rain was pouring, but the hams were there! Traffic totals: WA6ODQ 1096, KT6A 647, KD6YJB 495, W6FFF 199, K7DCG 143, KD6IVF 16, BPL: WA6ODQ 1096, KT6A 647 PSHR: WA6ODQ 160 (3 Public Service events) KT6A 144, KD6YJB 91. Please make it a great new year!! Remember, Helping Others.....Always Worthwhile!! 73, Tuck, K6ZEC.

SANTA BARBARA: SM & STM, Rob Griffin, K6YR, 805-543-3346 & k6yr@arrl.org—SEC: Jennifer Roe, AA6MX. ACC: Michael Atmore, KE6DKU. BM: (vacant position). OOC: Tom Perkins, KD6BXM. PIC: Jeff Reinhardt, AA6JR. TC: Warren Glenn, KM6RZ. ASMs: Doc Gmelin,W6ZRJ & Don Milbury,W6YN; DECs: SB - Rick Laird, KB5OO. SLO – Jack Hunter, KD6HHG, & Ven - Dave Gilmore, AA6VH. The Section has lost one of the truly generous and talented communicators: Buck Romine, N6SSA, now a Silent Key. Buck devoted hours to the San Luis Obispo Co. ARES/RACES emergency communications system and he will be missed. I visited the Simi Settlers in early November and enjoyed a vigorous exchange of views and information on the licensing restructuring proposals. Look for the FCC to decide some of these issues in the Spring. It will affect each of us in the long run, so STAY TUNED! Are you interested in receiving the SLO CO Emerg Comm Council's Newsletter electronically? e-mail: W6TTX@fix.net and he will add you to the distribution list, I am sure. Congratulations to the Poinsettia ARC for renewing as an ARRL Special Services Club (SSC). SSCs are the active clubs, and receive several benefits from the League. Contact me or the ACC for more information on applying for SSC status. The Satellite ARC is planning its 1999 hamfest for June 20 in Orcutt. Check out the Santa Barbara Section Web Site: qsl.net/arrlsb. SCN/SB: 9 P on 147.00+(131.8), 224.90-(131.8) & 448.875-(100). K6YR 203/186, W6ZRJ 54/-, KE6MIW 27/108 & KE6GFV 6/107.

WEST GULF DIVISION

NORTH TEXAS: SM, Don Thomas, KA1CWM—SEC: K5UPN. STM: KC5OZT. TC: W5CWO. BM: KB5YAM. SGL: N5GAR. OOC: WB5UDA. ASMs: K5RE, W5IWE, K5LP, KG5VX, W5FB, KX5K, KK5QA, KK5NA. I hope everyone had a good holiday season and looking forward to 1999. As stated before one of the sections major goals for 1999 is to provide support to all clubs and all amateurs within the section. We will assist clubs with their programs in an effort to increase membership in their clubs and also increase ARRL Membership. Another one of our goals is to assist clubs and all amateurs in their efforts to make the general public more aware of the public service activity contributions that Amateur Radio operators make in each local community throughout the year. Items such as providing communications for siren tests, storm spotting, marathons, fun runs, disasters preparedness drills, Field Day, etc. This can be accomplished through a continuing program by the Public Information Officer appointee, through media contacts and news releases. Appointments and other Amateur Radio contacts and information should also be given to the local news media. Let's blow our horn about all of the good things we do. We also have under development a traffic training program where traffic message training can be given to those that are interested by attending a periodic traffic-handling training class. In addition a special section traffic brochure is being prepared that can be handed out at hamfest and other amateur gatherings that will bring attention to that facet of the hobby. We are working with the clubs and amateurs in developing a section speaker's bureau that will include top speakers on specialized topics. Another item is the section newsletter that was originally developed to be sent to the affiliated clubs will be expanded to include all amateurs in the section that have e-mail addresses. Amateurs can get on the distribution list by sending their name, call sign and e-mail address to ntxnews@juno.com. Information on section appointments, bulletins and other related information can be obtained by accessing the section Web page at http://www.lsic.net/net/ntexas.html. We recommend that you visit it often. Additional emphasis will be placed on the ARES organization, appointments, training and our ability to perform when called on to do so at a local and section level. I encourage everyone that has information that should be included in the section's *QST* article to let the section manager know two months before the article would appear. This would also apply if you wanted a special-event station or other activity to appear in *QST*. The Affiliated Clubs should also promptly send in their annual affiliation reports as well as any updates or changes of officers throughout the year. The information received from the clubs forms our basic database and should always contain accurate updated information. Thank you for your patience and support. Let's keep the communications going both ways and your suggestions are all greatly appreciated. Tfc: KC5VLW 201, K5AO 197, KC5QGI 139, KC5OZT 114, KB5TCH 104, K5MXQ 93, KC5QZZ 90, KC5EIV 84, N5JZ 74, KB5WEE

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70, WA5I 55, KC5PNM 16, KB5YAM 9, KD5AHW 4, N8QVT 1. Nets—Net/QNI/QTC/QTR (min.)/ SESSIONS—TTN/ 819/144/31. TEX/238/126/595/60; TSN/135/82//31; DFW early/313/80/542/31; DFW late/205/88/362/31.

OKLAHOMA: SM, Coy Day, N5OK—ASMs: N6CL, K5CPZ, K5TTT. SEC: W5ZTN. STM: AB5RV. ACC: KB5BOB. PIC: WA9AFM. OOC: K5WG. SGL: W5NZS. TC: KB5RV. (http://www.telepath.com/n5ok/) A hearty welcome to Larry, W0PAN, former ARRL Director, now living in OKC. Mr James Roberts, Shawnee Emergency Management Director, informed Pottawatomie County amateurs that the mayor and city council were well pleased with their actions during a recent power outage. Amateurs and repeaters were operating with backup power passing vital traffic to and from the Norman Severe Storm Warning Center allowing tornado warning sirens to be sounded in time. Howard, WB5FAJ, reports: Charles Dibrell, W5BLW, of Ardmore became a Silent Key Oct 28 at the age of 86. "We will miss our longtime friend and Elmer." The path from CHN (WA5BQX-5) to ENID05 (N5UGA-5) is now supporting the forwarding load to the KC5TKF packet BBS in Enid. K2GKK-4 packet BBS in OKC keeps chugging along. Welcome aboard to new ECs: Jon, N5AVV; Wayne, AA5JJ; and John, KA7GLA. Also to new OBS, James, KF5A. Pat, WB5NKD, and Arley helped with the Texas Emergency Tactical Net. Pat, K5QOP, reports: The Green Country Hamfest Committee selected Miss Angela Skolaut, N0UAI, as the 1998 Bill Moore, KF5DL, Scholarship winner. "I was quite surprised to learn that I was selected as the Oklahoma DX Association's "Ham of the Year." Thanks gang! Tfc: N5IKN 721, WB5NKC 538, K5GBN 319, KF5A 213, KE5JE 123, WA5OUV 86, WB5NKD 81, KC5VOG 47, AB5RV 46, W5REC 34, KI5LQ 30, W5VBD 30.

SOUTH TEXAS: SM, E. Ray Taylor, N5NAV—ASMs: AE5ED, N5WSW, WD5GKH, K5DG, N5LYG, WA5UZB, KK5CA, WA5TUM, KB5AWM, WA5JYK, K5PFE, and K5SBU. STM: WD5GKH. SEC: K5DG. ACC: N5WSW. PIC: KA5WSS. TC: KJ5YN. BM: W5KLV. OOC: W5JAM, SGL: KM5HY. The month of October, 1998, will not be forgotten due to the flooding of South Texas. I was first awaken at 5 AM by the NWS in New Braunfels, Saturday, October 17, with the statement that we might be in trouble. While I was working on a plan for the localized area, WA5FSR, EC of Bexar County, called to see if I was aware of the heavy rain moving into San Antonio. I had him activate SKYWARN while I activated SKYWARN on 2 of the wide coverage repeaters, and notifying other ECs of pending danger. By 7 AM, things were beginning to get very serious. Leo, N0ERI, and Sue, NF0T, started checking the rivers in the area. When they checked a trailer park near the water's edge, it was almost too late. When their fifth-wheel truck, they began pulling out trailers until the water got too deep. The rest went down the river. The police had not given any warning. By 10 AM the Red Cross began setting up shelters and headquarters, and asked for communications to be set up between San Antonio, Austin, and New Brainless. I put out a call on 2 meters for people to man the New Brainless Red Cross and shelters. KM5BY, KK5KT, and AC5QP answered the call and manned these locations with the help of N0ERI and NF0T throughout the duration of the disaster. Even though N5IJR, EC of Comma Co, had damage to his house, he set up the Prime Co Comm van with 2 repeaters to link San Antonio, New Brainless, San Marcus, Austin, Sequin, and Gonzales, For Red Cross, and the Baptist Men Kitchens. N5YWA manned the New Brainless weather station for 18 hours. While this was being done I contacted the FCC to put 7290, 7285, 3873, and 3935 on emergency status. I called DPS Austin for their assistance and contacted 7290 net to go on emergency operation, along with 7285. We maintained 24-hour operations until October 27. We thank the Corpus Christi weather station for their help when ours went out.Thanks to N5ECP for the mobile command post that moved around to several areas. More than 450 hams assisted in this devastating experience. The term amateur should be changed to Professional Radio Operators. There was nothing but praise for the ham operators. Once again, it proves that nothing will replace ham radio in a disaster. There was much property destroyed and damaged from San Antonio to the Gulf via Houston. Many thanks to all that helped. If you would like to become involved in disaster work in ham radio, listen to one in progress and help where you can. Study the ARRL radiogram and the National Traffic System for starters. Learn the system before disaster strikes. The 7290 Traffic Net and the Texas Traffic Net on 3873, put a lot of emphasis on training new operators. Since WWII 7290 has been used for traffic and someone to this day is always monitoring if needed. Congratulations to the Orange Amateur Radio Club, Inc., for 50 years of affiliation with ARRL. I hope everyone has a Safe, Happy, and Prosperous New Year in 1999. God Bless all. Tfc: W5YQZ 708, W5SEG 350, N5NAV 249, KA5KLU 208, AE5ED 159, W5KLV 114, W5ZX 105, KD5GM 51, W5GKH 47, K5UCQ 45, WA5FXQ 42, W5CTZ 41, W4RRX 35, W5ZIN 28, N5OUJ 27, KD5CRX 21, WD5AAH 16, N5LF 8, N5HK 7, KG5CX 6, WA5AA 6, N5JUU 3.

WEST TEXAS: SM, Charlie Royall, WB5T, 915-944-0469, cnroyall@wcc.net. New YLs: Amy, KD5FMW, Cassandra, KD5FMV. El Paso Hamfiesta dealers rptd a 400% increase in sales; tnx to Joe Knight, W5PDY, SM-NM, for his help & Barney Boone, KJ5AE, Asst W Gulf Dir, for ARRL Forum. 9 hams provided comm for TX Panhandle Arabian Horse Club endurance races of 25 & 50 mi ea at Lake Meredith: Larry, KC5QVU; Michael, KC5ZFU; John, KD5AZD; GH, AC5MP; Cliff, WA5SGF; OL Jr, WB5TIH; Tom, NG5U; Ray, KD5EUR. Midland ARC provided comm for CAF AirSho 98: Joe, KK5ZG; Doug, K5MTX; Ted, W5WTX; Tom, KC5ETW; Sterling, WB5G; Bill, N5QB; Larry, N5OKO; Jon, KC5LZP; Jim, K5KUX; John, N5SMX; Ken, K5JOG. Pecos Co ARC rpts Big Bend Open Rd Race will be 4-17-99; FMI contact Richard, N5DLX. New 6 mtr rptr between Pecos and Ft Stockton, 53.050/52.050, no tone. Alpine ARES/RACES conducted surprise SET, 183 points, Bob Ward, WA5ROE-EC. Participants: Bill, W5ATO; Dave, N5DO; James,K5FO; Al, KD5ESB; Jim, N5JOE; Bill, N5ZXW; Barbara, KB5ZGN; Jim, N5VS; Steve, KB5SJU; Randy, KD5BXC. Club's Web site is: brooksdata.net/personal/ bbarc. Rcvd the sad news on the passing of Tommy Martin, KC5DAD (SK). Our thoughts and prayers are with his family and father, Tom Martin, K5TOM. Best wishes for a prosperous New Year! de

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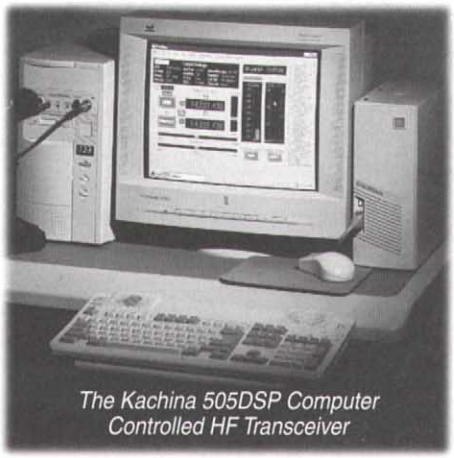

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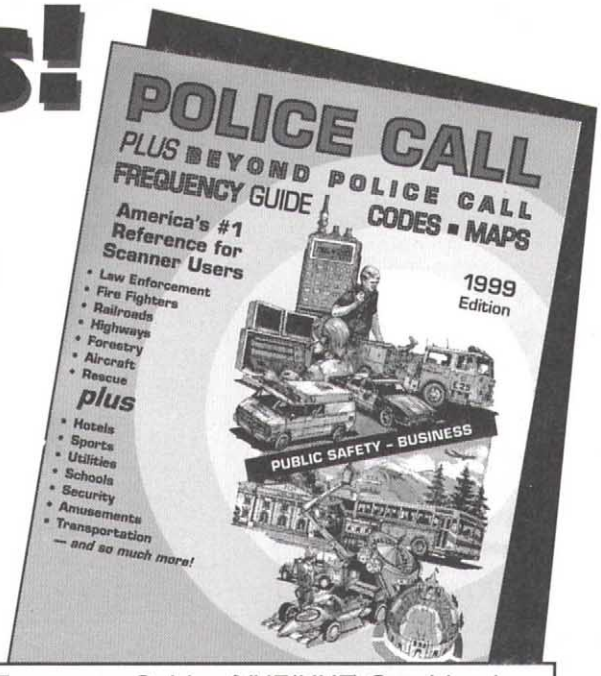

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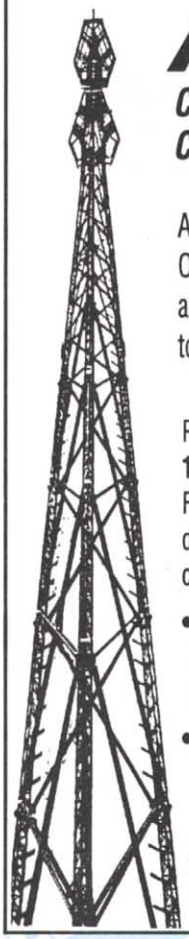

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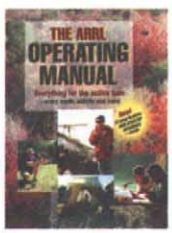

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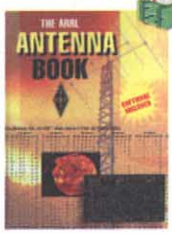

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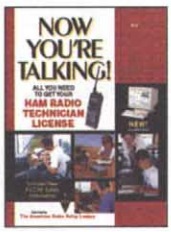

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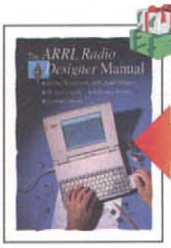

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- **Dual receive for voice & image transmissions (VHF only)**

FEATURES

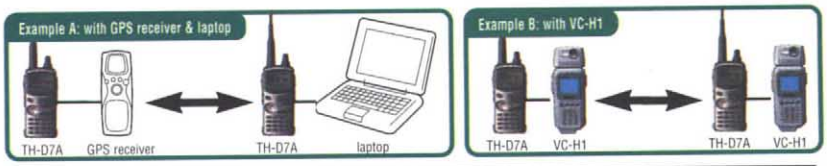
■ Built-in 1200/9600bps TNC (1 packet, 1 frame, 256 bytes) compliant with AX.25 protocol ■ Dual receive on same band (VHF only) for both voice and data (two frequencies simultaneously) ■ Large (12 digits X 3 lines) dot-matrix LCD, multi-scroll key, menu mode & other user-friendly features ■ 200 memory channels with 8-character memory name input ■ 16 backlit keys ■ Built-in CTCSS (38 EIA-standard subtone frequencies) ■ 16-digit, 10-channel DTMF memory ■ MIL-STD 810C/D/E water resistance ■ High-gain dual band antenna ■ High-speed (9600bps) PC-based packet communications for chat, BBS, etc. ■ Kenwood Skycommand System (KSS) II for remote control of fixed HF transceiver– TS-570S/D(G) or TS-870S (requires optional PG-4R) ■ Monitoring DX cluster, TM-742A/TM-V7A remote control (DTMF remote), etc.

ISO 9001
JQA-1205

Communications Equipment Division
Kenwood Corporation
ISO9001 certification

NOTICE:

The TH-D7A has not been approved by the F.C.C. This device is not, and may not be, offered for sale or lease, or sold or leased until the approval of the F.C.C. has been obtained. Pending approval in December, 1998.



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Amateur Radio Products Group
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KENWOOD COMMUNICATIONS CORPORATION
AMATEUR RADIO PRODUCTS GROUP
P.O. Box 22745, 2201 E. Dominguez St., Long Beach, CA 90801-5745, U.S.A.
Customer Support/Brochures (310) 639-5300
KENWOOD ELECTRONICS CANADA INC.
6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

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