



QST

devoted entirely to

AMATEUR RADIO

Official Journal of
The American Radio
Relay League

March 1999

QST *reviews:*

**Ten Tec RX-320
PC-controlled receiver**

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collectors**

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receiver"**

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HANDHELDS

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IC-T22A

2 Meter Single Bander • Fun, Shirt Pocket Small and Easy to Use • Alphanumeric Display • Wide Receive Coverage, Including Air Band • 5 W @ 13.5 V (3 W Out of Box) • 80 Memory Channels (40 w/Alpha Display) • MIL SPEC 810 C/D/E for Shock/Vibration • 2.3"(W), 4.3"(H), 1.1"(D), 10.9 oz

NEW with MORE POWER IC-T7H

2 Meter/440MHz Dual Bander • **Now 6W on Both 2M and 440MHz** Out of the Box • 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 • CTCSS Encode/Decode • MIL SPEC 810 C/D/E for Shock/Vibration • Built-in Guide Function • 2.5"(W), 4.8"(H), 1.1"(D), 11.3 oz



IC-Q7A

2M/440MHz Ultra Compact Dual Bander • Extended Rx 30-1300 MHz (cellular blocked), Airband Receive Broadcast FM and AM Receive (most TV stations, too) • 350 mW on 2M, 300 mW on 440MHz • 200 Memories • Includes "AA" Ni-Cd Batteries and Recharger, or Use Alkalines • MIL SPEC 810 C/D/E for Shock/Vibration • Tone Squelch • Easy to Use • Splash Resistant • Multiple Tuning Steps • Full Scanning Capability • Power Save Feature • 2.3"(W), 3.4"(H), 0.98"(D), 6 oz

IC-W32A

2M/440MHz Dual Bander • 5 W Out of the Box • No Function Key • PC Programmable • 200 Memories with Alphanumeric Display, Messaging & Paging • Built in Guide Function • 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 • MIL SPEC 810 C/D/E for Shock/Vibration • PC Programmable* • 2.2"(W), 4.9"(H), 1.2"(D), 12.0 oz



SAVE \$20
On the Spot
See dealer for details

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IC-T8A

6M/2M/440MHz Tri Bander Handheld • 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 • Ni-MH Powered • One-Touch Band Switching • RX (MHz): 50-54, 118 - 174, 400 - 470 • Receive FM, WFM, AM, TV Stations, Air Band, Public Safety • 123 Memory Channels with 10 Scan Edges and 1 Call for Each Band • MIL SPEC 810 C/D/E for Shock/Vibration • 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 • PC Programmable* • 2.3"(W), 4.3"(H), 1.2"(D), 9.9 oz



EASY TO USE

MOBILES

Optional Infrared Wireless Mic

The optional HM-90 infrared optional wireless microphone works with the IC-2100H, the 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 Programmable* • 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 • 50W (2M)/ 35W (440MHz) • Detachable Control Panel* • Fast Scanning • 220 Memory Channels • PC Programmable • CTCSS Encode (decode optional) • RF Attenuator • 8 DTMF Memory Channels • V/V, U/U, V/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 • 45W (2M), 35W (440MHz) • 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 • 5.5"(W), 1.6"(H), 8.1"(D), 2.6 lb

SAVE \$30
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BASE STATIONS



IC-821H

2M/440MHz 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 Size: 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, N4US1, AO-27 Control Operator

*Optional and/or third party equipment required.

*Reception guaranteed only on 2 meter ham band.

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Windows™ software, RS-746,
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DSP Audio Peak Filter (320/160/80 Hz). The '746's DSP Auto Notch eliminates multiple heterodyne signals.

ONE LOOK AT THE LARGE LCD DISPLAY SAYS IT ALL.

A glance "above the line" instantly lets you know all operating conditions and settings. Look "below the line" for menu selection, 5 soft key functions (which vary with the menu), passband width, and a band scope to search for signals.

PULL OUT MORE SIGNALS. DX'ing? Even faint signals buried in noise can't hide from the '746's adjustable IF-DSP noise reduction.

ELIMINATE ADJACENT CHANNEL INTERFERENCE with Twin Passband Tuning, 3 optional filter slots (front panel selectable), and a selectable

**SAVE
\$200
ON THE
SPOT**

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for details

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QST bottom line:

"An impressive transceiver for HF, 50 MHz and 144 MHz work. With loads of those features desirable to the serious HF operator and all modes at 100 W on both 6 and 2 meters, the IC-746 is a fine choice in a mid-priced rig."
— QST, September, 1998

SPECIFICATIONS

Transmit: HF/6 Meter/2 Meter,
100% Duty Cycle
Receive: 30 kHz-60 MHz, 108-174 MHz
Quadruple conversion superheterodyne
Mode: AM, FM, FM-N, SSB, CW, RTTY
Power: 5-100 Watts (2-40W, AM)
Power Supply Requirement: ... 13.8 V DC
Memory Channels: 102 total,
99 regular, 2 scan edges, and 1 call
Size: 11.3(W) x 4.7(H) x 12.5(D) in.
287(W) x 120(H) x 316.5(D) mm.
Weight (approx.): 19 lb, 10 oz / 8.9 kg

FEATURES

- **IF-DSP (15.625 kHz)**
 - Noise Reduction
 - Automatic Notch Filter
 - Selectable Audio Peak Filter
- **Twin Pass Band Tuning (PBT)**
- **Multi-Function LCD Display**
 - Band Scope, Memory Names, Key Assignments, PBT Settings, Split Frequency, Memory Keyer Contents
- **3 Optional Filter Slots**
 - 2 for 9 MHz, 1 for 455 kHz
 - All Front Panel Selectable
- **Digital, Multi-Function Metering**
 - Signal Strength, RF Output, SWR, and ALC levels
- **Auto Antenna Tuner**
- **RF Speech Compressor (not AF)**
- **Tone Squelch and Tone Scan**
- **Auto Repeater Duplex Setting for 2 Meters**
- **Quick Split Function**
- **Complete CW Functions**
 - 4 Ch. Memory Keyer
 - Electronic Keyer
 - CW Pitch Control
 - Full Break In (QSK)
- **VOX**
- **Voice Synthesizer (opt)**
- **Triple Band Stacking Register**
 - Remembers tuner selection, preamp, antenna, mode and frequency for last 3 frequency selections



CALL BUTTON
One touch recall of user programmed frequency and mode

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Programmable RF gain, squelch, or both

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UPGRADE 1998
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ICOM options required for PC operation:
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OPC-478 Connection Cable



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ICOM T8A



MH-BP-200
680mAh 9.6V for Icom IC-
T8A.

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2841-B Saturn St.
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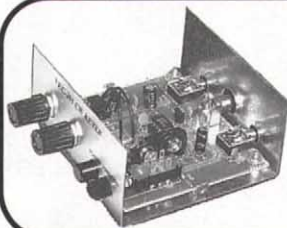
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CW Memory Keyer Kit stores 512 characters in four 128 character non-volatile EEPROM message memories. Carry on entire QSOs by just pressing memory message buttons. True sinewave sidetone with soft rise and fall time eliminates harsh keyclicks. Has all features of VEC-201K CW Keyer Kit. 1 1/2 x 6 1/2 x 5 1/4 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. 1 1/2 x 4 1/2 x 5 1/4 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. 1 1/2 x 4 x 3 1/2 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. 1 1/2 x 4 1/2 x 5 1/4 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. 1 1/2 x 4 x 3 1/2 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. 1 1/2 x 4 x 3 1/2 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. 1 1/2 x 4 x 3 1/2 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. 1x1 1/2 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 1 1/2 x 3 x 1 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 sub-band and runs off your 9 volt battery. Plug in speaker or headphones for loud clear reception. 1 1/2 x 4 x 3 1/2 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. 19 1/4 in. telescopic whip. 9V battery. 2x4 1/2 x 4 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. 1 1/2 x 4 1/2 x 5 1/4 in. *Difficult skill level.* Order **VEC-1202K, \$99.95.**



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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. 1 1/2 x 4 x 3 1/2 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. 1 1/2 x 4 x 3 1/2 in. *Intermediate skill level.* Order **VEC-131K, \$29.95.**



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The GIANT Book of Electronic Projects, Volume I.

The GIANT Book of Electronic Projects,



Volume I

Project book

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See page 10 for detailed contact information.
Telephone: 860-594-0200
Fax: 860-594-0259

David Sumner, K1ZZ
Publisher

Mark J. Wilson, K1RO
Editor

Steve Ford, WB8IMY
Managing Editor

Joel P. Kleinman, N1BKE
Associate Technical Editor

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Production Supervisor

Jodi Morin, KA1JPA
Asst Production Supervisor/Layout

Sue Fagan
Graphic Design Supervisor

David Pingree, N1NAS
Senior Technical Illustrator

Michael Daniels
Technical Illustrator

Joe Shea, Paul Lappen
Production Assistants

Steffie Nelson, KA1IFB
Proofreader

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Our Cover

Jim Andera, K0NK, and Tobie the faithful pack dog, take Amateur Radio to a new low—on the Fahrenheit scale! They are part of a team of hardy hams who hike deep into the winter wilderness to savor the challenge of snowbound operating. Read “Hamming from an Igloo” in this issue.

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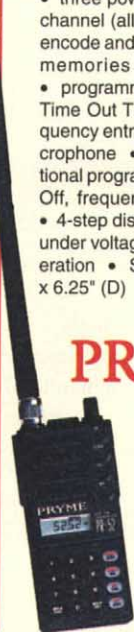
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"It Seems to Us..."

The Radio Amateur is Friendly

That's what Paul Segal wrote in 1927 when he composed The Amateur's Code. Radio amateurs are friendly. At least, that's what we like to think.

Are we? Or in fact are we driving away newcomers without even realizing it?

It's a harsh, unpleasant question. But think about it. At a time when fewer people are finding their way into our avocation, we can't afford to lose any due to our own negligence.

Imagine you're a freshly minted amateur, attending a meeting of your club for the very first time. Would you have a positive experience and want to come back for more? Put yourself in the shoes of someone with a brand new license listening to your repeater, net, or roundtable. Would you feel welcome to join in?

All too often, the answer to these questions is no. Deliberately or not, many of us who have been around for a while are sending signals that newcomers interpret as meaning that we wish they'd just go away. All too often, they do. We're not imagining this; it's been the theme of several recent letters from former members who wrote to explain why they were no longer interested in Amateur Radio and had not renewed their memberships. The fact that they cared enough to write says that the loss is ours as much as theirs; they'd have made good hams, but we lost them.

Consider what you do when you go to a club meeting. You talk to people you already know, right? Most of us do. It's only natural; wanting to see friends is what motivates us to go to the meeting in the first place. What if you didn't know anyone? What if, as a beginner in Amateur Radio, you felt unsure of yourself? If a new face showed up at your club, would anyone go over and introduce themselves? Would you? Is someone assigned to be the "welcoming committee" or is it left to chance? If it's left to chance, how many opportunities for needed, fresh blood is your club passing up?

Is the meeting itself a positive experience? Will a visitor get the impression that your club is interested in getting things done, or will they feel as if they have stumbled into a dysfunctional family's living room? Will they want to join, or to flee at the first coffee break? Anyone who goes to the trouble of getting themselves to your meeting is what salesmen call a qualified prospect. They've done their part; it's up to your club to make the sale.

Listen to your favorite repeater sometime. Are newcomers *ever* invited to join in, sim-

ply on the off chance that one might happen to be listening? Is there time set aside when younger hams are invited to talk to one another without being made to feel they're intruding into adult airspace? If so, give your group a gold star; our experience is that people seldom think to make these simple gestures. Even worse is what travelers and newcomers often report: they will put out a general call on a repeater and be greeted by stony silence, but when a "regular" makes a similar call two minutes later, he or she gets an immediate reply. It's understandable that they would feel they've been given the cold shoulder, even if this wasn't intended.

Nets are a bit better in inviting participation—a reason, perhaps, why they remain popular. Unless the net has a special purpose that dictates its function on an "invitation only" basis, there is likely to be an opportunity to join in. On the other hand, some net controls can drive people away by being less than tactful in correcting minor errors of procedure, or by dragging the net out for so long that busy people don't have the time to participate. Net managers should do a self-assessment from time to time, just to make sure a message of welcome is getting across.

We build walls between newcomers and ourselves in other ways.

No matter how many years ago it happened, we all remember our first on-the-air contact. Unless we were too young to know any better, it was pretty intimidating—but we got through it, probably because someone on the other end gave us an encouraging word at the right time. When was the last time you made someone's early on-the-air experience equally memorable? Chances are, it's been too long. Too many of us fall into the comfortable rut of talking only to people we already know or of only chasing hello-goodbye DX contacts.

Radio amateurs have divergent interests, ranging from restoring antique equipment to exploring the microwaves. We're enthusiastic about the specialties that have captured our interest. When was the last time we shared our enthusiasm with a new or prospective amateur, in language they could understand?

And speaking of language, think of how much jargon we use! Language does help to define a group's identity and everyone who gets involved in a new activity expects to have to learn some new terms, but is it possible that we overdo it just a wee bit?

By and large, we radio amateurs are friendly. But our welcoming could use some work.—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
(651-222-7253); k0qb@arrl.org

Delta Division

RICK RODERICK, K5UR
PO Box 1463, Little Rock, AR 72203
(501-988-2527); k5ur@arrl.org

Vice Director: Henry R. Leggette, WD4Q, 7335 Ginger Snap Cove, Memphis, TN 38125-4732
(901-757-0444); wd4q@arrl.org

Great Lakes Division

DAVE COONS, WT8W
932 Hedwick St, New Carlisle, OH
45344 (937-849-0604);
wt8w@arrl.org

Vice Director: George Race, WB8BGY
3865 Gibbs Rd, Albion, MI 49224
(517-531-4758);
wb8bgy@arrl.org

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);
w2xx@arrl.org

Midwest Division

LEW GORDON, K4VX
PO Box 105, Hannibal, MO 63401
(573-221-7730); k4vx@arrl.org

Vice Director: Bruce Frahm, K0BJ,
PO Box DX, Colby, KS 67701
(785-462-7388); k0bj@arrl.org

New England Division

TOM FRENAYE, K1KI
PO Box 386, West Suffield, CT 06093
(860-668-5444); k1ki@arrl.org

Vice Director: Mike Raisbeck, K1TWF,
85 High St, Chelmsford, MA 01824
(978-250-1235); k1twf@arrl.org

Northwestern Division

MARY LOU BROWN, NM7N*
7040 Channel View Dr, Anacortes, WA 98221 (360-293-9295);
nm7n@arrl.org

Vice Director: Greg Milnes, W7AGQ,
740 SE 24th Ave, Hillsboro, OR
97123-7286 (503-648-6990);
w7agq@arrl.org

Pacific Division

BRAD WYATT, K6WR
18400 Overlook Rd, No 5, Los Gatos, CA 95030 (408-395-2501);
k6wr@arrl.org

Vice Director: Jim Maxwell, W6CF,
PO Box 473, Redwood Estates, CA
95044 (408-353-3911);
w6cf@arrl.org

Roanoke Division

JOHN C. KANODE, N4MM
RFD 1, Box 73A, Boyce, VA 22620
(540-837-1340); n4mm@arrl.org

Vice Director: Dennis Bodson,
W4PWF, 233 N Columbus St,
Arlington, VA 22203 (703-243-3743);
w4pwf@arrl.org

Rocky Mountain Division

WALT STINSON, W0CP,
999 S Logan St, Denver, CO 80209
(303-770-3926); w0cp@arrl.org

Vice Director: Marshall Quait, AG0X
PO Box 200878, Denver, CO
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ag0x@arrl.org

Southeastern Division

FRANK M. BUTLER JR, W4RH*
323 Elliott Rd SE, Ft Walton Beach, FL 32548 (850-244-5425);
w4rh@arrl.org

Vice Director: Evelyn Gauzens,
W4WYR, 2780 NW 3rd St, Miami, FL
33125 (305-642-4139);
w4wyr@arrl.org

Southwestern Division

FRIED HEYN, WA6WZO*
962 Cheyenne St, Costa Mesa, CA
92626 (714-549-8516);
wa6wzo@arrl.org

Vice Director: Art Goddard, W6XD,
2901 Palau Pl, Costa Mesa, CA
92626 (714-556-4396);
w6xd@arrl.org

West Gulf Division

JIM HAYNIE, W5JBP
3226 Newcastle Dr, Dallas, TX
75220-1640 (214-352-6180);
W. (214-351-2385)

Vice Director: Coy C. Day, N5OK,
RR1, Box 254, Union City, OK
73039-9726; 405-483-5632;
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Atlantic Division

Delaware
Randall K. Carlson, WB0JXX, 121 Scarborough Park Dr, No 10, Wilmington, DE 19804 (302-655-6179); wb0jxx@arrl.org

Eastern Pennsylvania
Allen R. Breiner Sr, W3TI, 212 Race St, Tamaqua, PA 18252 (717-668-3098)

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

Western Pennsylvania
Bill Edgar, N3LLR, 22 Jackson Ave, Bradford, PA 16701 (814-362-1250); n3llr@arrl.org

Central Division

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

Dakota Division

Minnesota
Randy "Max" Wendel, N0FKU, 8539 Bryant Ave S, Bloomington, MN 55420-2147 (612-888-5953); n0fku@arrl.org

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)

Delta Division

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

Great Lakes Division

Kentucky
Bill Uschan, KC4MIS, 800 Leewood 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); w8ftq@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 Tylar 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

Sacramento Valley
Jettie Hill, W6RFF, 306 St Charles Ct, Roseville, CA 95661 (916-783-0383); w6rff@arrl.org

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

Roanoke Division

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

Virginia
Lynn Gahagan, AF4CD, 208 Velva Dr, Chesapeake, VA 23325 (757-545-1290); af4cd@arrl.org

West Virginia
O. N. (Olie) Rinehart, WD8V, 1256 Ridge Dr, South Charleston, WV 25309-2434 (304-768-9534); wd8v@arrl.org

Rocky Mountain Division

Colorado
Tim Armagost, WB0TUB, 6337 S Lafayette Pl, Littleton, CO 80121 (303-795-9683); wb0tub@arrl.org

New Mexico
Joe Knight, W5PDY, 10408 Snow Heights Blvd NE, Albuquerque, NM 87112 (505-299-4581); w5pdy@arrl.org

Utah
Jim Rudnicki, NZ7T, 306 North 1500 East, Layton, UT 84040 (801-547-9218); nz7t@arrl.org

Wyoming
Robert Williams, N7LKH, PO Box 130, Wapiti, WY 82450 (307-527-7758); n7lkh@arrl.org

Southeastern Division

Alabama
Scott Johnston, N4YYQ, 1810 Macedonia Loop, Vincent, AL 35178 (205-960-6516); n4yyq@arrl.org

Georgia
Sandy Donahue, W4RU, 960 Ralph McGill Blvd, Atlanta, GA 30306 (404-875-9450); w4ru@arrl.org

Northern Florida
Rudy Hubbard, WA4PUP, PO Box 843, Milton, FL 32572-0843 (850-626-0620); wa4pup@arrl.org

Southern Florida
Kevin Bunin, K4PG, 3307 Lakeview Dr, Delray Beach, FL 33445 (561-496-5257); k4pg@arrl.org

Puerto Rico
Raul Escobar, KP4ZZ, PO Box 366051, San Juan, PR 00936 (787-760-9070); kp4zz@arrl.org

Virgin Islands
John Ellis, NP2B, PO Box 24492, Christiansted, St Croix, VI 00824 (340-773-9643); np2b@arrl.org

Southwestern Division

Arizona
Clifford Hauser, KD6XH, 8741 N Hollywood Ave, Tucson, AZ 85742 (520-744-9095); kd6xh@arrl.org

Los Angeles
Phineas J. Icenbice Jr, W6BF, 19323 Halsted St, Northridge, CA 91324 (818-349-3186); w6bf@arrl.org

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

San Diego
Tuck Miller, K6ZEC, 3122 E 2nd St, National City, CA 91950 (619-475-7333); k6zec@arrl.org

Santa Barbara
Robert Griffin, K6YR, 1436 Johnson Ave, San Luis Obispo, CA 93401-3734 (805-543-3346); k6yr@arrl.org

West Gulf Division

North Texas
Donald Thomas, KA1CWM, PO Box 112, Coppell, TX 75019 (972-462-1333); ka1cwm@arrl.org

Oklahoma
Coy C. Day, N5OK, RR1 Box 254, Union City, OK 73090-9726 (405-483-5632); n5ok@arrl.org

South Texas
E. Ray Taylor, N5NAV, 688 Comal Ave, New Braunfels, TX 78130 (830-625-1683); n5nav@arrl.org

West Texas
Charles C. Royall, WB5T, 2063 Putter Dr, San Angelo, TX 76904 (915-944-0469); wb5t@arrl.org

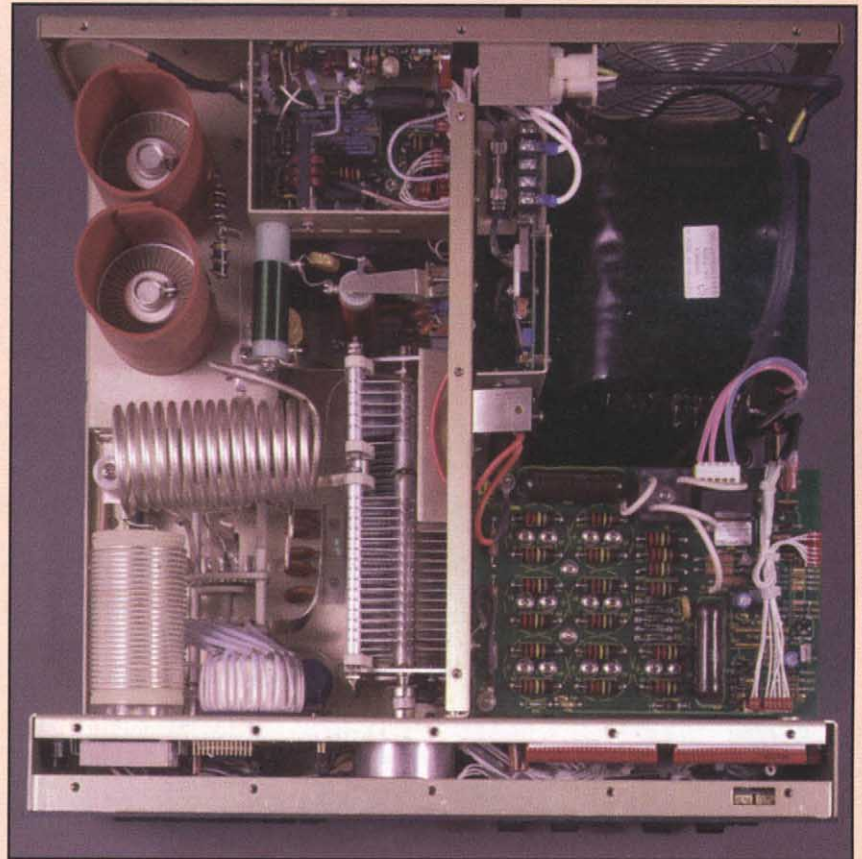
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Ameritron ALS-500M Mobile no tune Solid State Amp has 500W out, covers 1.5-22 MHz



ALS-500M Ideal Mobile amplifier
\$799 Suggested Retail -- uses 13.8 Vdc mobile electrical system, very compact 3 1/2 x 9 x 15 in., extremely quiet, 500W output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, no tubes, SWR protected.

Ameritron ALS-600 no tune Solid State base amp includes heavy duty power supply, 600 Watts out



ALS-600 No tuning, no fuss, no worries -- just turn it on and operate. Includes AC power supply, 600 W output, continuous 1.5-22 MHz coverage, instant bandswitching, fully SWR protected, extremely quiet, very compact. Amp is 6x9 1/2 x 12 inches.

AL-82
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Suggested Retail

This linear gives you full legal output using a pair of 3-500s. Most competing linears using 3-500s can't give you 1500 watts because their lightweight power supplies can't use these tubes to their full potential.

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ADL-1500 Dummy Load with oil... \$59.95

Oil cooled 50 ohm dummy load handles 1500 W for 5 minutes. SWR under 1.2 up to 30 MHz. Low SWR to 400 MHz.

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Stops power-up inrush current and absorbs momentary high voltage spikes to your amplifier. ICP-120 for 110-120V, ICP-240 for 220-240 V.

ATR-15 Legal Limit Antenna Tuner... \$399

Designed for legal limit amplifiers! Covers 1.8-30 MHz, peak reading SWR/Wattmeter, 6 pos. antenna switch, 1:1 or 4:1 balun.

ARB-700/702 amp-to-radio interface... \$39.95

Protects your costly transceiver from damage by keying line transients, steady state current and excessive voltages.

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ADL-2500 2500 Watt fan cooled dry dummy load... \$199.95

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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.

Chairman Kennard Says FCC Agenda Fosters Competition, Deregulation

Federal Communications Commission Chairman William Kennard has reaffirmed the FCC's commitment to fostering "competition" and "deregulation" during the coming year. In a statement posted on the FCC's Web site (<http://www.fcc.gov>) the Chairman hailed 1999 as a "new beginning," citing the Commission's move to the new Portals office building in southwest Washington, DC (a move resisted for several years by many in the Commission).

Kennard noted the growing role of "electronic commerce" in sustaining our booming economy. The Chairman singled out the growth of the Internet and the explosion in the number of cellular phones (currently at 61 million and growing) as driving forces. He said that the US is in a time of transition and that "the ground rules we set now will structure competition in the telecommunications industry for years to come." Part of that process will be for the FCC to "streamline its operations, eliminate unnecessary regulatory burdens, and make it easier for the public to interact with the agency."

Much of the Commission's current agenda seems to be focused on regulation of the nation's telephone network. Kennard said that, to achieve its goal of promoting competition, the FCC plans to work to ensure that communications markets remain open, to reform access charges and rate setting, to make sure that telecommunications

mergers are pro-competitive and benefit consumers, and to promote alternatives to wire line technology in the local telephone market. To foster further deregulation, the Commission will continue to eliminate unnecessary regulations and reduce reporting and accounting requirements, as well as to streamline its internal operations. To ensure that consumers aren't hurt by all this, the Commission plans measures to make consumer bills truthful, clear and understandable, and Kennard says the FCC will "show zero tolerance for perpetrators of consumer fraud such as slamming and cramming."

Kennard said that the FCC plans to promote the development and deployment of high-speed Internet connections to all Americans. They also intend to promote compatibility of digital video technologies with existing equipment and services, and to search for competitive alternatives to cable and broadcast TV.

The FCC's wireless goals include preserving free, over-the-air broadcast services and satellite coverage in under-served areas. In addition, they plan to open certain low-power radio frequencies for local use.

The ARRL will, of course, be monitoring these initiatives for their impact on Amateur Radio as they move beyond glittering generalities and become tangible proposals in the FCC agenda for 1999.

Giving Credit Where Credit is Due

♦ Careful readers of *The ARRL Letter* and *QST* will note a refreshing turnabout in the FCC's attitude toward enforcement and compliance on the amateur bands in response to repeated instances of jamming and other inappropriate behavior by a few identifiable individuals. The FCC's efforts include a recent series of well-publicized warning letters or Notices of Violation to amateurs in Indiana, New York, New Jersey and Pennsylvania. The Commission's Compliance and Information Bureau indicates that it is now prepared to follow up its admonishments with fines and equipment confiscation where warranted. While ARRL lobbied the FCC for several years to get tougher on jammers and other violators, it is clear that much of the credit for the turnabout goes to the FCC's Riley Hollingsworth, K4ZDH, who shouldered the burden when the FCC shifted Amateur Radio enforcement functions from the Wireless Telecommunications Bureau to the Compliance and Information Bureau last September. In addition to bringing more vigor to the Commission, Hollingsworth has "appeared" on the HF bands to reinforce the Commission's seriousness of purpose in compliance and enforcement. If you wish to thank Mr. Hollingsworth for his efforts, a *brief* note of thanks can be sent to him by mail to FCC Compliance and Information Bureau, 1270 Fairfield Rd, Gettysburg, PA 17325, or by e-mail to rholling@fcc.gov.

Media Hits

- A full page article in the *Denham Springs Livingston Parish News* (Louisiana) featured hams Joey Himel, KC5NCS, Keith Wheat, KL7JJU, and other members of the Livingston Amateur Radio Society (LARS). The article talked about ham radio and described LARS volunteer community service.
- Has the Internet diminished ham radio? According to an article in the *Daily Hampshire Gazette*, Northampton, Massachusetts, "the airwaves are still buzzing with the activities of local hams." The article features interviews with Tom Williams, WA1MBA, Richard Strycharz, KD1XP, and Paul (N1FI) and Cindy (K1ISS) Loiero and extols the continuing virtues of the Amateur Radio service.
- Charles Ector, W4SYZ, Charles Guffey, KJ4LY, Randy Hix KD4OAK and Ed Lee WB4ZMI, offered the services of the Military Affiliate Radio System (MARS) to Gainesville, Georgia residents so they could communicate with loved ones in the military services overseas during the holidays, according to an article in the *Gainesville Times*. The article notes that Ector served in the famous 99th Fighter Group, also known as the Tuskegee Airmen, during World War II.
- The Lancaster (Pennsylvania) *Sunday News (Intelligencer/New Era)* reported on the activities of James "Yogi" Bear, WB3FQY, E. Kenneth Manning N3ABC, James Ibaugh AA3C, Sharon Ibaugh N3CXY and others in the Southern Pennsylvania Amateur Radio Club shaking out their new emergency support vehicle during the PECO Atomic Power Station emergency preparedness drill.

ARRL Legislative Package Adopted

• Meeting in Houston in January, the ARRL Board of Directors adopted a slate of ARRL legislative positions to guide ARRL's legislative relations effort during the 106th Congress that just convened (see "Board Welcomes Return of FCC Enforcement; Embraces Technology for the Future" on page 59 in this issue). The Board's positions include support for legislation that would preserve and protect amateur access to existing Amateur Radio and Amateur Satellite Service frequencies "as a natural resource for the enjoyment of all properly licensed individuals." The Board also supported federal preemption of telecommunications regulation, "including strengthening and improving the ability of the FCC to promulgate and enforce reasonable regulation of transmitter and antenna issues." The Board said that spectrum auctions should not be used as a means to offset specific budget items, and that the ham bands should be exempt from auction or reallocation to commercial services. The Board also supported resolutions in support of legislation that would:

- permit the FCC or its Administrative Law Judges to issue summary suspension of Amateur Radio licenses in cases of repeated and willful misconduct. The Board also expressed support for "higher levels of funding to the FCC and other legislation as necessary to support broader enforcement activities."
- exempt hams from annual fees, "unless such fee provides for services or benefits to the Amateur Radio Service."
- require the FCC to develop and implement effective mandatory standards for radio frequency susceptibility of consumer electronic devices.
- Maintain traditional values and regulatory measures that promote Amateur Radio operation, licensing or spectrum allocation.
- raise the current ceiling on reimbursement for out-of-pocket costs for individuals or organizations that provide or coordinate volunteer license examinations to \$10, to be adjusted annually.
- exempt reasonable Amateur Radio antenna and support structures from local ordinance and covenant restrictions.
- support funding and other measures to maintain "a healthy and robust Military Affiliate Radio System."

The Board also passed a resolution opposing the expansion of prohibitions on radio monitoring beyond those that now exist to protect the privacy of cellular and PCS services that interface with wireline communication. They also passed a resolution opposing legislation restricting the siting of commercial telecommunications facilities unless such legislation reflects the legitimate needs of all telecommunications interests. The full package, along with rationale, may be found on the ARRL's Web site at <http://www.arrl.org/govrelations/>.

Telecommunications Agenda Shaping Up on the Hill



Despite belated protestations of congressional peace, fallout from the impeachment flap does not augur well for legislative progress during the next two years. Indeed, the underlying political polarization that has occurred since 1994 has caused Congress to resemble an exaggerated version of the "Pushmepullyou." You may recall that Dr. Doolittle's mythical beast had a head at each end and, as a result, was unable to get anywhere at all. Many on The Hill hope that the completion of the impeachment trial will act as a "reset" button, restoring some measure of forward motion and civility. But today's political calculus is sufficiently complex to compel most observers to resist the urge to make any such prediction. Given the developments over the last year, that's probably the only sane posture.

We do, however, have sufficient documentation to venture some predictions on the telecommunications agenda. On the House side, Commerce Committee Chairman Bliley recently issued a news release asserting that the major telecommunications items the House will consider include: multi channel video competition through the Satellite Home Viewers' Act, legislation restructuring the way satellite services do business, legislation creating a national 911 emergency number for wireless and wireline calls, and enhanced privacy for wireless phones. (Note to those who got heartburn from last year's HR.2369: Bliley said, "I am putting committee members on notice that we must pass a new bill.")

The Chairman also put "Internet reform," including a national standard for electronic authentication, high on the agenda, as well as easing restrictions on encryption products, developing on-line privacy protections, and creating new legislation against spamming. For those who yet retain a sense of optimism in all this, a cautionary note: Bliley had indicated that public utility reform is his highest priority, so telecommunications may appear to be making a lot of progress and then be superseded by utility issues when it comes time for the full committee to begin marking up legislation. Whatever the Committee plans to do, its prospects will be significantly enhanced by the fact that the new Speaker of the House, Dennis Hastert, is a Committee alumnus and personal friends with several committee members. The Speaker of the House sets the agenda for action on the floor.

On the Senate side, Senator John McCain, Chairman of the Senate Commerce Committee, has been a bit more circumspect on actual legislation, but he has stated that his telecommunications priorities will include hearings on:

- the development of the Internet and high speed digital technology
- the relationship between the satellite industry and its subscribers
- export controls on satellite technology
- the emerging "electronic media market"
- Internet filtering, and
- the FCC's implementation of the Telecommunications Act of 1996.

This last hearing may well evolve into multiple hearings to develop a comprehensive and long overdue FCC reauthorization bill.

Of the approximately 300 bills introduced by the end of January in the House, only a small handful addressed telecommunications issues. Of those, the only one of possible interest to some in the Amateur Radio community is probably HR.89, which concerns copyright restrictions on the content of satellite TV carriers. There were even fewer telecom bills in the Senate. Watch these pages in future issues of *QST* as the Congressional telecommunications agenda begins to shape up.

Government Spectrum Manager Reveals New Public Safety Radio Plan

♦ The US Commerce Department has announced a plan to enhance emergency radio communications among Federal, state and local emergency officials. The plan comes in the wake of Congress' \$1.95 million appropriation for the initiative as part of the Omnibus Consolidated and Emergency Supplemental Appropriations Act of Fiscal Year 1999. The plan will be administered by the Department's National Telecommunications and Information Administration (NTIA).

"Recent disastrous events in our nation, both natural and man-made, have shown that emergency workers at all levels of government need access to fast, reliable communications in order to perform their jobs effectively and successfully," said Larry Irving, Assistant Secretary of Commerce and head of the NTIA. "This new initiative will enable us to develop a national strategy to ensure that sufficient radio spectrum is available when and where an emergency or public safety need may arise."

A news release from NTIA says the agency "will provide technical, policy and spectrum management expertise in support of a national strategy for improved radio communications among Federal, state and local public safety programs." The initiative will be headed by William Speights, public safety program manager, NTIA's Office of Spectrum Management.

The plan is an outgrowth of Vice President Gore's National Performance Review and the Public Safety Wireless Network Program (PSWN), created in 1996 to promote an integrated wireless and wireline network that meets the needs of the public safety community. The initiative also will address the recommendations of the Public Safety Wireless Advisory Committee's (PSWAC) Final Report, which includes improving the capability of public safety entities to communicate.

Information about NTIA's Public Safety Program can be found on NTIA's home page at <http://www.ntia.doc.gov>.

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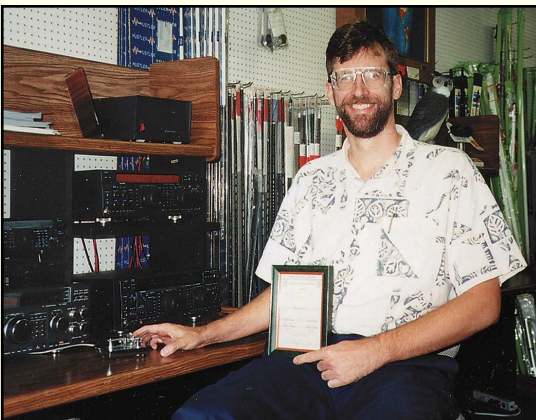
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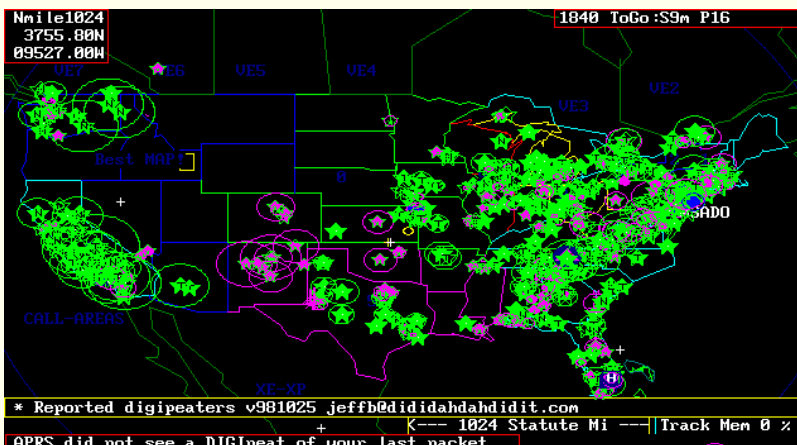
Final approach to Penryhn. The blue lagoon of Penryhn Atoll as seen from the Air Raratonga flight that brought members of the Dateline DX Association to this Pacific paradise. Read [their story](#) in this month's QST!



How fast can you become a ham? Bill Sipperly, AD6EL, went from zero to Amateur Extra in just a few hours last August at the ARRL Southwestern Division Convention in San Diego.



Yes, they do moonbounce in Alaska—even in the dead of winter. Look closely and you'll see Chris Hazlitt, KL7FB, standing on the tower that supports his impressive moonbounce antenna array near Palmer, Alaska.



APRS is growing. This image shows the 500 or so APRS (Automatic Position Reporting System) digipeaters on 144.39 MHz that provide data coverage to over 90% of the packet-active ham population in the US. The notable holes in the East will be filled as more digipeaters come on line. On the West Coast, APRS operators are using satellite options to cover the gaps. If you want to learn more about APRS and possibly join the action, see <http://www.aprs.org> on the Web. (You can also see a "live" APRS data stream at <http://www.aprs.net>.)



This used to be a 4-element, 40-meter quad antenna. It was the pride and joy of Krzysztof Sobon, SP7GIQ, in Lask, Poland until a storm brought winds exceeding 110 miles per hour.



The cozy glow isn't RF. When you're operating under the snow, flashlights provide the only illumination. See "Hamming From an Igloo" in this issue.



Signs, signs, everywhere a sign. Hugo Oliver, W2HQF (right), and Judy Cary, director of the Schoharie County Office of Emergency Management (left), present the members of the Schoharie County Amateur Radio Association with a sign that will mark their meeting place at the County Emergency Management offices. You know the local authorities are on your side when they allow your club to add its moniker to their headquarters!



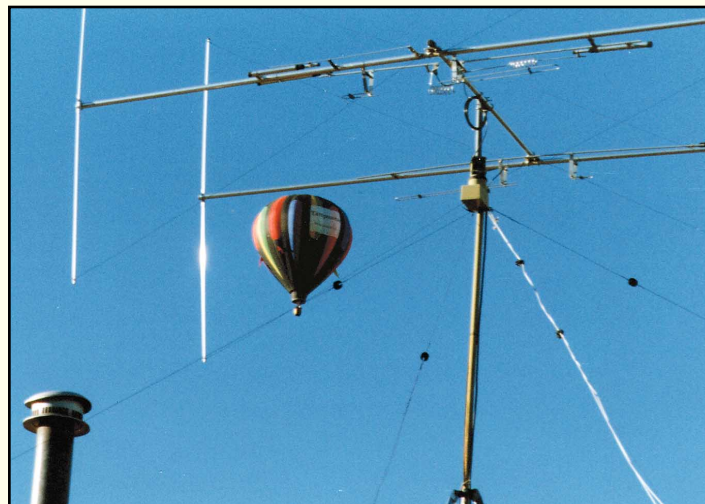
Happy 50th Birthday, Israel! Israel Amateur Radio Club certificates, like the one shown here, honor amateurs who made a substantial number of contacts with Israel during 1998, Israel's 50th Jubilee year. Top US recipients include: Platinum: AA2KD—302 points; Gold: K1DWQ—230 points; Platinum: N4MM—275 points; Copper: WA1SMI—97 points; Basic: W1RZH—76 points; Basic: N6ZS—47 points.



Oops! Lee Walter's license plate was *supposed* to read: WD0HEO. They must not have hams working in the Iowa Department of Motor Vehicles.



Who says public service can't be fun? Ask this crew of cheerful hams who regularly assist the Braintree (Massachusetts) Emergency Management Agency. From left to right, Rick Reuss, KA1LKB; Frank Kelly, N1KQT; Ed Anders, W1FGD; Jim Smith, K1OOI; Rick Cantin, AA1TI; Cindy Cantin, N1XPQ; Tom Holmes, WA1ZIF; Ernie MacLauchlan, K1ELA and Bob Salvaggio, WB1GON.



Balloon ahoy. Rick, KB5HRS, captured this shot of the *Driftwood* as it drifted high over his Butternut Butterfly beam antenna. The *Driftwood* was just one of more than 850 hot-air balloons that participated in the 1998 Albuquerque International Balloon Fiesta.

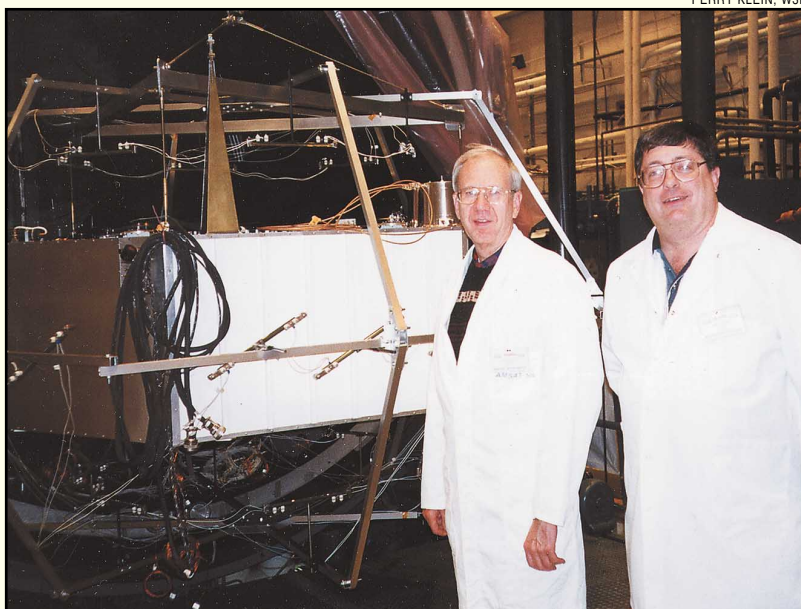
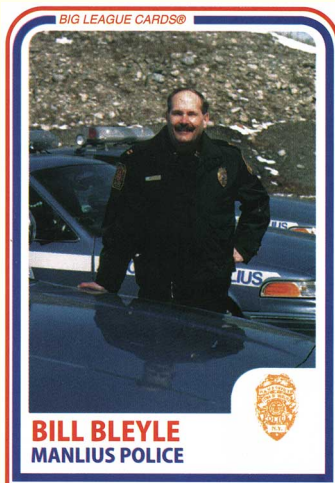


“QTH here is a very old windmill.” Kiki, SV1BRL/8, and Fivos, SV8AQY, frequently work DX pileups from their summer home on the Greek Island of Kefalonia. Their shack is nestled in a converted 300-year-old windmill perched on a hill at the southern end of the island.



We’re hams. We’re cool. Phil, N3YQI (left), and Mike Rhoads, N3YQH (right), are students at Wyomissing (Pennsylvania) Area High School. They used Amateur Radio to demonstrate technology available at the school during “Foundation Evening” last September. Phil and Mike are both members of the Wyomissing Area High School Ham Radio Club.

You’ve heard of baseball cards, but how about “cop cards?” The police department in the town of Manlius, New York distributes cop cards to foster better relations between the department and local youth. On the back of each card is a personal biography of the officer that includes hobbies and interests. Captain Bill Bleyle, N2QWH, makes a point of mentioning his Amateur Radio involvement and his call sign. “It’s a great way to spread the word about our hobby and stimulate conversation.”

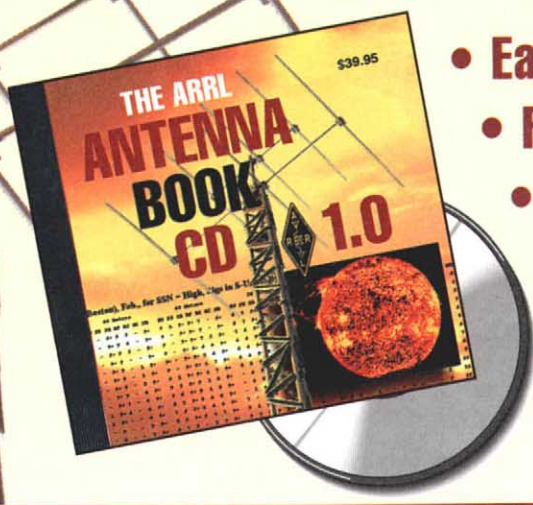


Testing Phase 3D. Last October the AMSAT Phase 3D satellite underwent thermal-vacuum testing at Orbital Sciences Corporation in Germantown, Maryland. On hand for the testing was Chuck Green, N0ADI (left), with the Phase 3D RUDAK project and Harold Price, NK6K (right), who is involved with Phase 3D software development. Phase 3D passed the tests—now all we need is a rocket to take it to orbit.



Bernie Fuller, N3EFN, Atlantic Division Vice Director (right), was presented with a citation from the Pennsylvania House of Representatives citing his “...more than 10 years of service as a volunteer in the Amateur Radio structure in the Commonwealth.” The citation singled out his leadership in providing expert communication assistance during natural and man-made disasters. It concluded by saying, “...the House of Representatives of the Commonwealth of Pennsylvania pays tribute to Bernard E. Fuller upon his richly deserved recognition; notes with pride his exemplary record of service and volunteerism, in keeping with the highest traditions and ideals of the Commonwealth.” Fuller’s citation was sponsored by the Honorable Teresa Forcier (left).

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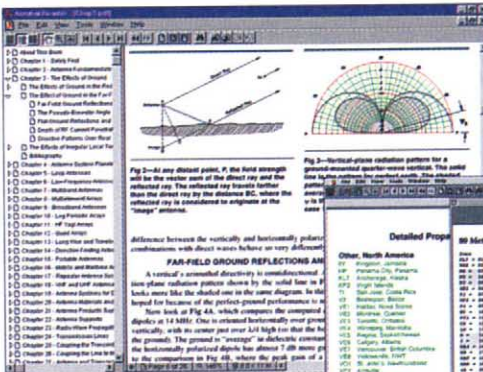
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Anchorage, AK	61.0	-149.0	100	AKST
Atlanta, GA	33.0	-84.0	1000	EST
Baltimore, MD	39.0	-76.0	100	EST
Boston, MA	42.0	-71.0	100	EST
Chicago, IL	41.0	-87.0	100	EST
Dallas, TX	32.0	-96.0	100	CST
Denver, CO	39.0	-104.0	5000	MST
Detroit, MI	42.0	-83.0	100	EST
Houston, TX	29.0	-95.0	100	CST
Los Angeles, CA	34.0	-118.0	100	PST
London, UK	51.0	0.0	100	GMT
Madrid, Spain	40.0	-4.0	100	GMT
Moscow, Russia	55.0	37.0	100	GMT
New York, NY	40.0	-74.0	100	EST
San Francisco, CA	37.0	-122.0	100	PST
Seattle, WA	47.0	-122.0	100	PST
Washington, DC	38.0	-77.0	100	EST
Yokohama, Japan	35.0	139.0	100	GMT

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MORIBUND MARS?

◆ This comment is in reply to the letter by Bill Mayers, KG2DI, which appeared in the November 1998 "Correspondence." In his letter Bill mentioned that fact that the Veterans of Foreign Wars were issuing prepaid telephone calling cards to overseas troops rather than encouraging them to use MARS—the Military Affiliate Radio System—to communicate with their loved ones in the States. This is true—and for good reason!

As a former MARS operator at McMurdo Station, Antarctica, I thought I would be able to assist MARS when I arrived here in Germany. My location is in Landstuhl, in the southwestern part of the country, close to the Kaiserslautern military community, the largest conglomeration of Americans outside the United States. It took a while to wade through the German "Burokratie," but I successfully obtained a German license. Then I tried to contact the local Military Radio Club, as listed by ARRL, to offer my services for public service events and MARS. I found to my surprise that due to the drawdown of troops, the local club had disbanded and the MARS station had shut down. The 2-meter and 70-cm repeaters, and the remaining members of the club who spoke fluent German, merged with the local German club. I was invited to join, but since I speak little German, I declined.

To my dismay I soon discovered that there were no other MARS stations *anywhere* nearby. All health and welfare messages were being handled on the Internet. There appears to be only one MARS station left in all of Germany, near Heidelberg. I think.

The use of calling cards, telephone callback services and the Internet (if you have civilian access) is the "modern" way of communicating from Germany. MARS is just about dead here. I can't fault the VFW's efforts to raise money for calling cards.—*Art Smith, KB1TX/DJ6PC, Landstuhl, Germany*

MEDICAL WAIVER SUGGESTIONS

◆ I have noticed a lot of complaints about medical waivers for CW tests on these pages, but very little in the way of constructive solutions. I would like to put forth a couple.

One of the things that I have noticed is that many VEs have a poor understanding of the subject. This is certainly not their fault. The ARRL VEC, maybe in conjunction with an organization such as Handi-

Hams, should provide assistance in the form of a consultant. This consultant should be readily available, and should be able to both assist in defining the gray areas that will still exist, and in locating the tools and services necessary for a handicapped individual to take the test.

The waiver form must be redesigned. The current form describes, for example, how important code is to the hobby. This information is of virtually no use to the doctor. He is not being asked to decide if the individual should be interested in taking the CW exam. He (or she) is being asked to determine if the individual *can* take the exam. Unfortunately, the form fails to tell the physician about the nature of the test itself and what level of bodily function is necessary to participate. The revised form should state exactly what physical skills are required to take the test normally. The form should also require the doctor to specify the limitation that prevents the patient from taking the test in the normal way. It should also require the doctor to suggest testing changes to accommodate the patient. The VEC consultant should be available to the doctor if he/she has any questions.

As long as we take no positive steps to solve the problem we are part of the problem. Let's be part of the solution.—*Ray Todd Stevens, KB9LGS, Bedford, Indiana*

LEAKY CUSTOMERS

◆ I read with interest the December 1998 "Washington Mailbox" column concerning CATV leakage and amateur responsibility. I work for a local cable company here in Naples, Florida, as a Lead High-Speed Data Technician for our cable modem service.

Ninety-five to 99% of all leakage occurs on the customer side of the cable plant. A cable company provides cable to the outside of the structure via a closed and, by law, a tight system with minimal leakage. The cable company does not control the inside of each structure; the customer owns the internal wiring. Therefore, all the changes and damages caused by the customer can add leaks to the system.

The FCC does fly-overs to verify the cable plant is within specs. The cable operator also visits each mile of the system to ensure that there are no leaks. On the customer side, however, it's "anything goes." With this in mind, if you're having a problem with cable leakage, it's most likely in your house or the homes of your immediate neighbors.—*William Stearns, KE4RGH, Naples, Florida*

PIONEERS

◆ In the December 1998 "It Seems to Us," Dave Sumner, K1ZZ, told the story of the first two-way transatlantic radio transmission between Fred Schell, 1MO, in the US and Leon Deloy, 8AB, in Nice, France on November 27, 1923. Their exchange took place on 110 meters (about 2.7 MHz). This wasn't a "hello-goodbye" contact; the stations remained in contact for nearly two hours. They were joined later by John Reinartz, 1XAM, from Manchester, Connecticut. High noise levels, according to Dave, thwarted further attempts on subsequent nights.

Well, now the true story can be told!

What actually happened on the following nights was the formation of a huge pileup as word reached the amateur community that a French station was on 2.7 MHz. The frequency was jammed with stations transmitting: UP UP ... He is listening UP ... You idiot. He is listening UP ... What is the DX? ... Working split ... What is the DX call? ... Don't tune on the DX frequency! ... and so on, and so on.

It took several days before communication could resume between 1MO and 8AB. Good thing we don't have to put up with that type of behavior today!—*Bob "Whitey" Doherty, K1VV, Lawrenceville, Massachusetts*

AN UNINTENDED CONSEQUENCE?

◆ The ARRL's request to the FCC to give Technician operators HF CW privileges without passing a code test deserves some comment. The results of implementing this change pose some interesting possibilities. The apparent intent of this proposal is to get more Technicians learning CW and using the HF bands. Of course, these aspiring HF operators could circumvent the learning of CW simply by sending and receiving computer-generated code to each other. As long as the computer does the sending and deciphering the Technicians can communicate as much as they want without ever learning Morse code.

I am not sure that this scenario is altogether bad, but I doubt it is what the League had in mind when it proposed the idea. Some segments of the HF bands could eventually become overwhelmed by "no code" operators sending machine-generated code. Restriction of this type of communication would be impossible. Perhaps the best solution would be to set aside small band segments for this purpose rather than trying to restrict computer-generated CW alto-

gether. The only other alternative is to not allow Technicians to use HF at all.

The ARRL directors are to be commended for their efforts to keep Amateur Radio vigorous and contemporary. Towing the line between past traditions and future possibilities is a difficult and thankless task. I think they are doing an excellent job.—*Bruce W. Kizerian, KK7QP, Centerville, Utah*

DUST OFF THAT TNC

◆ For the past several months my friend Scott, KC8GXR, and I have been running 1200-baud packet on what is apparently a private frequency. In the four months we have been using this frequency (running beacons every five minutes, using automated mail pickup and enjoying long chats), not a single person has intervened.

This may not seem so strange if we lived in the middle of nowhere, but the area surrounding Cincinnati, Ohio has more hams than you could count! Maybe it's because of the exotic frequency? That might be true if we were in the gigahertz range, but we're not. In fact, the band we're using opens occasionally for long-haul DX. So where are the rest of you folks?

Several popular HF multiband rigs sold today include this band and many of you already have packet TNCs, although you may not use them much anymore. It's getting pretty lonely here. I'd love to check my TNC mailbox and see a message from someone who connected directly from 1000 miles away!

Oh yeah, I almost forgot. The band is 6 meters and the frequency is 50.620 MHz. The mode is good old FM 1200-baud packet and everyone is welcomed. Please dust off that old TNC, connect it to your 6-meter rig and fire it up. We're looking forward to hearing from you!—*Jim Whitaker, N8XYN, Blanchester, Ohio*

BACK NEXT YEAR, BUT FASTER

◆ Thank you—all the wonderful, patient hams who worked me in the ARRL 160-Meter Contest last December! I was the guy with the straight key at 5 WPM. Nobody slowed down for me but, little by little I got the format down and began to recognize calls.

The contest was great! This was my first time on CW in over 40 years. I never had the courage to call a station that was ripping away at 30 WPM before, but on that weekend I called many CW speed demons—and you all came back to me. I am sorry for jamming 1833 kHz, but PSE QSY at 30 WPM goes straight through my head and out the other side. Finally, I heard the VK and realized my mistake. Next year I hope to join you all in the hunt for low-band DX—but at a respectable code speed.—*Mark Moynahan, K3EE, Arlington, Virginia*

KUDOS FOR CRUMMY

◆ I enjoyed Rob Henderson's article "Low

Power, Crummy Antenna" in the December *QST*. He's right! It doesn't take a big station to have a blast. My station is a 17-year-old Kenwood TS-130S transceiver connected to an inverted V antenna up 27 feet. No serious DXer will give Rob a hard time about his position on CW. It gets through when nothing else does, and no problem with language accents. I've confirmed 206 countries on CW, but only 121 on SSB. I admit that running a big station might be fun, especially for serious DXing. Of course, in an emergency big is helpful, too. But for day-to-day fun, very little is needed. I worked 73 sections in last November's phone Sweepstakes and have over 2,000 DX QSLs—all by using the "crummy" stuff.—*Ray Good, AA9F, Oak Park, Illinois*

OUR GREAT LOSS

◆ My morning e-mail brought news of the worst sort: the ARRL Northwestern Division Director, Mary Lou Brown, NM7N, died of a heart attack at the Los Angeles International Airport as she was returning from a DXpedition to Lord Howe Island off the coast of Australia.

Of all the fond memories I have of Mary Lou as she carried out her ARRL duties with such enthusiasm and good will, the one that stands out the most is the day I first met her.

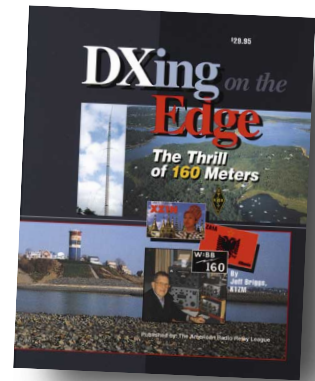
It was a breezy September in 1991 and our local K-Mart had graciously allowed us to use their building entryway to set up a radio display for our national Amateur Awareness Day. I was on the roof doing my best not to get blown away by the gusty winds as I struggled to erect a vertical antenna. Just as the antenna threatened to fly out of my grasp, a small arm reached over my shoulder and helped me steady the pole. Within minutes the antenna was secured.

When I caught my breath I turned to get a better look at this person who had appeared out of nowhere to show such an interest in our project. She was a rather small, graying woman probably in her late fifties, and she was all twinkles and smiles.

Even though I was new to the area I thought I knew everyone in our club, but here was a face I hadn't seen before. "Thanks for the help," I said. "Are you a new member?" More smiles, more twinkles. She held out a delicate hand with a firm grasp. "Not really," she replied. "I'm Mary Lou Brown, vice-director of the ARRL Northwestern Division. I'm just passing through. I heard about your project and wanted to have a look."

Just passing through, indeed. She worked with me on that windswept roof for nearly an hour, then climbed down to join the others in setting up the tables, the radios, stacking the publicity brochures, etc. This charming woman, later to become Director, not only made a friend for life, but left an positive impression wherever she went.—*Marshall King, N7PIP, Coupeville, Washington* **QST**

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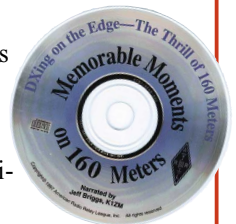
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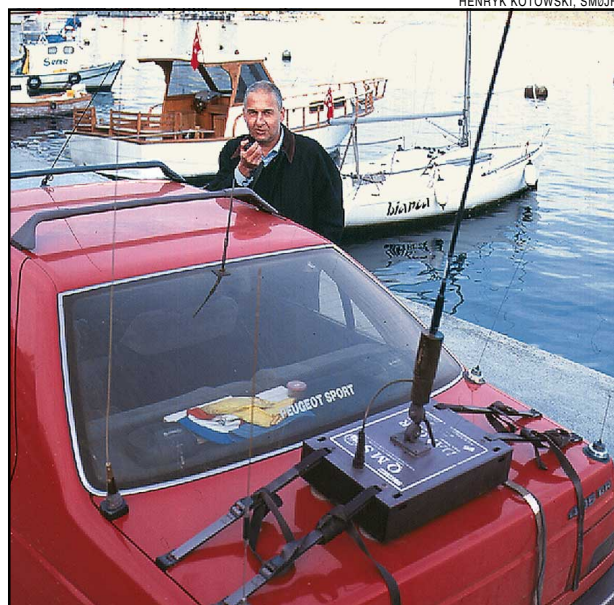
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This Month in Amateur Radio

The HF bands are in great shape, and they'll only get better over the next year or two. If you're chasing DX during these exciting times, March is *your* month. Check out the **ARRL International DX Contest**, March 6 and 7, and the **CQ WW WPX Contest**, March 27 and 28. Hams new to the DX game may be astonished to discover that they can easily earn their DXCCs just by participating in these HF slugfests!

With the hint of warmer weather to come, hamfests and conventions are popping up like early spring flowers. In Charlotte, North Carolina they're gathering for the **Roanoke Division Convention** on March 13. On the following weekend you'll find both the **Oklahoma and Maine State Conventions** in Tulsa and Lewiston respectively. The month ends with the popular **Maryland State Convention** in Timonium (suburban Baltimore) on March 27. "Coming Conventions" in this issue has all the details on these events and many more.



HENRYK KOTOWSKI, SMOJHF

Aziz, TA1E, does his DXing from his car while traveling in the vicinity of Istanbul, Turkey. Listen for Aziz this month during the ARRL International DX contest.

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You can learn more about the Roanoke Division convention on the Web at <http://www.w4hfb.org/hamfest.html>.

Erin go Bragh! (Or, for those who have not mastered Gaelic, "Ireland forever!") March 17 is **St Patrick's Day**, but in Savannah, Georgia they celebrate **St Patrick's Week**. The Coastal Amateur Radio Society joins the festivities by putting W4S on the air from March 13 to March 20. See "Special Events" in this issue.

No less than *five* state QSO parties take place in March. The **Wisconsin** and **Missouri** QSO Parties are first on the weekend of March 13 and 14. On the weekend of March 20 and 21 you're treated to the **Virginia, Alaska** and **Ohio** QSO Parties. (If you need Alaska for your Worked All States award, this is the time to get it!) "**Contest Corral**" has the scoop.



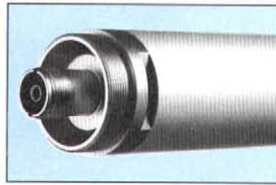
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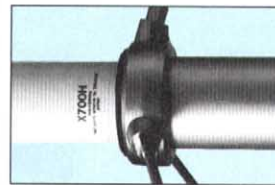
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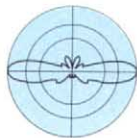
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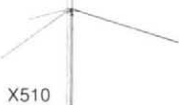


147MHz

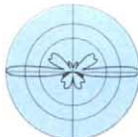


445MHz

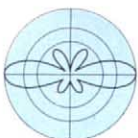
Radiation patterns for
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X510



U-300A 440MHz



F-22



U-300A 1200MHz

U5000

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F22A	144		200	UHF	10.5	112
F23A	144		200	UHF	15.0	90
F142A	222		200	UHF	6.0	110
F718A ²	440		250	N	15.0	110
F1230A	1240		100	N	10.5	90

DIAMOND Dual-Band Base/Repeater Antennas

MODEL	BAND (MHz)	GAIN (dBd.)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No Ice)
X50A	144/440		200	UHF	5.6	135
X200A	144/440		200	UHF	8.3	112
X300A	144/440		200	UHF	10.2	112
X510NA ³	144/440		200	N	17.2	90
X510MA	144/440		200	UHF	17.0	90
X500HNA	144/440		200	N	17.8	90+
X700HA	144/440		200	UHF	24.0	90
X2200A	144/222		150	UHF	11.5	112
U200A	440/1240		100	N	5.9	135
U300A	440/1240		100	N	8.3	110

DIAMOND Tri-Band Base/Repeater Antennas

MODEL	BAND (MHz)	GAIN (dBd.)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No Ice)
U5000A	144/440/1240		100	N	5.9	135
V2000A ^{1,4}	50/144/440		150	UHF	8.3	110
X3200A ⁵	144/222/440		100/200	UHF	10.5	112
X6000A	144/440/1240		100/100/60	N	10.5	112

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

Most requirement: 1.4"-2.4".

¹ 50 MHz antennas are adjustable

² F-718A: 440-450MHz, F-718J: 430-440MHz, F-718L: 420-430MHz.

³ X510NJ: 144-147/430-440MHz.

⁴ 1/4λ, rated in dBi.

⁵ 2m: 146-148

Hamming From an Igloo

Freezing temperatures and drifting snow aren't reasons to miss out on the fun of getting on the air from the great outdoors. After this introduction to the trials and tribulations of operating "polar bear portable," you'll want to winterize your radio and take to the frozen wilderness!



Mealtime at the igloo station. From left to right, Bill Sample, NO1ET; Maggie; Kip Sullivan, KC0ACW; and Tobie.

Every winter, static levels drop and HF propagation improves. At the same time each year, freshly fallen snow transforms the Rocky Mountains into a winter-wonderland of unsurpassed beauty. Why not combine these gifts of Mother Nature in the form of a winter backpacking-hamming expedition?

Imagine the thrill of stuffing ham gear into your backpack, strapping snowshoes to your feet and heading into the snow-covered wilderness. The forest is as pristine as that

which Lewis and Clark experienced nearly 200 years ago as they trekked through the uncharted wilderness of the American West. Today, however, maps are your guides and radio is your constant companion. This is exactly what our team experiences each winter as we head into the wilds of Colorado.

Leaving our vehicle, we trek into the wilderness, gaining altitude and leaving almost every trace of civilization behind. Snowshoes allow us to float over the snow-covered forest floor. Our tracks become our only connection

with civilization. When it's windy, those tracks can be erased moments after we make them.

Our party consists of two or three men and two pack dogs. We haul QRP HF gear and VHF radios into the backcountry to elevations of more than 10,000 feet, searching for an exceptionally beautiful area to host our base camp. Taking our hobby seriously, we are always careful to find a spot that offers a convenient tree to serve as an antenna support. Once we select our base



Kip, KC0ACW, enters through the tunnel of the partially completed igloo. Wearing a rain suit, Bill, NO1ET, trims the wall with a snow saw.



The paddle I use was originally configured to support HF CW operation while flying a single-engine airplane on a trip to Alaska. It has since become standard equipment on backpacking trips. The paddle is a Ham-Key model HK-2 (no longer manufactured) mounted on a plastic base. A nylon strap comes off the back and an elastic strap comes out the front to hold it securely to my leg. Today, a handy backpacking paddle that includes a leg strap is available from Paddlette Company, PO Box 6036, Edmonds, WA 98026. Also, Winterook Products carries small paddles and keys.



With fresh snow adding extra insulation to the igloo, Bill, NO1ET, listens to his 2-meter H-T while standing in the tunnel entrance.

camp site, we drop our 50-pound packs and start building an igloo. This snow shelter will become our home and our ham shack for several days—and nights.

Two-meter and 222-MHz H-Ts provide communication within our party. Our modest 4-W HF station, a Heathkit HW-9 (modified for improved cold-temperature performance), and an inverted-V antenna allow us to chat with friends back in eastern Kansas or meet new friends worldwide. (See April '94 *QST*, page 20, for backpack-hamming information and June '94 *QST*, page 68, for antenna details.) With a simple click of the HW-9's power switch we're in touch with the world; with another click we're blissfully sequestered in the pristine wilderness.

In the winter we have most wilderness areas largely to ourselves. Places that may be quite popular in the summer are often desolate in the winter. In the backcountry, the deep snow covers nearly every trace of the trail. Signposts that would normally point the way are buried under snow deeper than we can measure with our ski poles.

With solitude and isolation come challenges. Winter navigation is difficult. Good maps and GPS receivers can't always pinpoint our location. Traveling with snowshoes can be slow and strenuous. Hazards lurk in the form of avalanches, hypothermia, frostbite, dehydration, exhaustion and blizzards. If we have an emergency, help could be hopelessly slow in arriving. Preparedness and caution are important ingredients of every winter trip, and if we get into trouble, our radios and the Amateur Radio community would become our wilderness version of a 911 network.

You don't have to be a die-hard back-



Blending Amateur Radio and the wilderness—it's the perfect marriage. The rig is a Heathkit HW-9 sitting on traditional wood-and-leather snowshoes.

packer, or even a winter camper, to blend the fun of ham radio with the beauty and excitement of the snow-covered outdoors. H-Ts can accompany you on afternoon cross-county ski trips or snowshoeing jaunts in a local park. Ice fishing, snowmobile trips or walking your dog can be a good excuse to take your radios into the crisp winter air. You may even want to set up a simple HF station just to see how well your hands form dits and dahs at temperatures well below freezing.

When Your Radio Gear Says "Brrr"

Using radio gear in the cold can be enjoyable, if you—and your radio—are properly prepared. Many radios are rated for operation to only -10°C ($+14^{\circ}\text{F}$). Mobile radios may be rated to -20°C (-4°F). This is probably okay if you're willing to accept compromised performance. Below their rated temperatures, performance may fall significantly out of specification. Receiver sensitivity and selectivity may be affected. Transmitter power may change. And modulation or receiver audio may be weak or distorted.

The most probable change is frequency drift. And, as the radio operates, it will tend to warm itself up, so expect additional frequency change as a result. VHF and UHF FM radios may drift off established channel frequencies by several kHz. Try tuning your radio 5 kHz higher or lower to counteract the drift.

Another winter concern is condensation. This becomes a serious problem when the radio's temperature changes dramatically, especially when it moves above and below the freezing point. Frost can collect on the inside of the unit when it's cold, and when the internal temperature rises above freezing, the frost will turn to water. This water can cause high-voltage circuits to arc or cause logic circuits to function improperly. Worse yet, the radios may even turn themselves on, depleting the battery even when you're certain you've turned them off!

Keeping the radio gear as dry as possible and at a constant temperature tends to reduce condensation. This means leaving your H-T on the outside of your jacket, rather than trying to keep it warm inside your jacket, which would encourage condensation. Don't

be surprised if older, nonmicroprocessor-controlled radios outperform newer radios in wintry environments.

Reduced battery capacity is a fact of life in the winter. Primary lithium cells (non-rechargeable) perform best, and lithium batteries are the best cold-weather rechargeables. Standard alkaline batteries are okay for winter operation. Sealed lead-acid (gel-cell), NiCds and NiMH batteries are usable, but offer significantly reduced performance in winter weather.

Warming batteries inside your jacket is a common trick used to squeeze out more energy. But remember that inserting a warm battery into a cold radio may cause condensation.

Before taking an unproven radio into the winter elements it's wise to test the radio and related gear at cold temperatures—that's what freezers are for. Most deep freezers operate at about 0°F , which is a good approximation of what to expect in winter situations.

Winterizing Your Radio

If your rig uses a frequency synthesizer, it may be possible to improve its cold-temperature performance by obtaining a more stable reference oscillator, often called a TCXO (temperature-compensated crystal oscillator). TCXOs extend the temperature range over which a radio will remain stable. If you use your gear in extremely hot or cold weather, TCXOs are probably worth the additional cost. Check with your dealer or the radio manufacturer for TCXO availability.

Radios that use mechanical capacitors or inductors for VFO tuning (popular in QRP radios) will probably experience even greater frequency drift problems, as will QRP radios that use potentiometers to drive varactor tuning diodes. With some effort this drift can usually be reduced.

The effectiveness of aluminum electrolytic capacitors degrades considerably below about 0°F . If necessary, replacing them with tantalum parts of the same value and voltage rating will help ensure operation to well below -40°F .

Keeping Yourself Comfortable

The key to staying comfortable in cold weather is dressing properly. Almost every



Pack dogs are valuable members of the team. Tobie carries his own food plus much of our food and other gear, including the 2.2 Ah gel-cell battery and a multiband inverted-V antenna for the HF station. What does Tobie think of this? He'd rather pack than eat—to him it's one big adventure.

book on outdoor winter activities points out that layering your clothes is the best way to stay comfortable during activities that range from aerobic to nearly motionless. Staying cool can be as much of a problem as staying warm.

If you're overdressed as you make your way up a mountain, pushing hard through the snow with a pack on your back, you can approach heat-stroke conditions. Peeling layers off before you start feeling warm is the solution. If you're underdressed you're guaranteed to be cold.

Several layers of light- to medium-weight clothing keep us comfortable in temperatures well below 0°F. Well-insulated boots are important, too. Yet, even with good boots, we sometimes find that our toes are cold for the first hour or so each morning.

Fingers, too, can be hard to keep warm. Using gloves that range from lightly to heavily insulated is the best solution. Rubber gloves with insulating liners are important for preparing meals, doing dishes or building igloos. Headgear, ranging from lightweight caps to a hooded parka, are also important. And bring along at least one item that covers your face (a scarf, ski mask, etc).

Don't ignore the importance of a proper diet. Foods that are high in calories, fats and carbohydrates help keep the body warm.

Building Igloos

How long does it take to build an igloo?

The answer is anywhere from three hours to three days. The time and effort required is dependent on snow conditions and temperature. For successful igloos, the snow must pack well. We start by tromping down the snow (with snowshoes) in the area that will become our igloo floor (and also in a large nearby area we'll use as our snow quarry). After we let the snow sit for an hour or two to compress (sometimes overnight), we cut blocks that are about 15 inches long, 12 inches high and about 8 inches thick.

Each block is trimmed and carefully placed into the wall. With one person steadying a newly installed block, another person will chink the seams with snow, helping to secure the block in place. The walls go up in an endless spiral that we carefully slope toward the inside to make the igloo's dome.

The entrance tunnel is simply dug under the wall. A finishing touch is the addition of a 2-inch diameter vent hole near the top. This handy coax feed-through also vents potentially deadly carbon monoxide! Our finished igloos are about 10 feet in diameter—large enough to accommodate three men and two dogs, with extra room around the edges for gear and radios. We cover the entire floor with a sheet of plastic to help keep everything dry.^{1,2}

Igloo Living

Life in an igloo is fun and occasionally frustrating. We must enter on our hands and knees, yet once inside, it's warm (about 34°F) and extremely quiet. Sunlight (or moonlight), peeks through the mortar between blocks. We can't generate too much heat, though, or the ceiling will melt and start to drip. We use only candle lanterns and flashlights for lighting. The limited lighting can make it difficult to read radio panels or read our CW copy at night. Finding a comfortable operating position is difficult, too, especially with an iambic paddle strapped to one leg!

Despite these minor difficulties, hamming from an igloo is a blast. The warm interior allows for glove-free operation. During daylight hours, hamming from the front porch (the tunnel) is equally enjoyable as long as the wind isn't blowing too hard.

From our campsites we have been able to enjoy views so beautiful they cannot be adequately captured with a camera or properly described with words. As we tune across the band, the sounds of the dits and dahs blend with the sounds of the breeze through the trees and the crunching of snow under our feet. To say the least, it is an invigorating and exciting experience.

A Word of Caution

There are unique problems and dangers associated with backcountry travel and snow camping. Before heading out, make sure you understand the dangers of avalanches, snow-shelter collapse, winter storms and the risk of becoming disoriented. Read up on the symptoms and treat-

Snow Country Technology

Like radio technology, snowshoes and cross-country skis have undergone a lot of improvements over the past 50 years. While the original wood-frame snowshoes with leather webbing are still available, higher-technology designs are the trend. Aluminum frames and synthetic decking are popular on modern shoes, along with cleats to provide traction on icy patches. Bindings are available in a variety of styles. Choose bindings that make it easy to put the snowshoes on and off. Unless you're a real lightweight, select the larger sizes, usually 10 inches wide by 36 inches long, if you are planning on backpacking.

Cross-country skis, too, have come a long way since the days of the wooden ski with skins or wax for traction. Fiberglass waxless skis are popular and practical. They come in a mind-boggling variety of widths, lengths and stiffnesses, as do the bindings and special ski boots. Wider and slightly shorter skis are usually recommended for backcountry travel.

Under the right terrain conditions, ski travel will be much faster than snowshoes. Skis also require a much higher level of skill to use, especially when wearing a heavy backpack. Snowshoes have the advantage of being able to better deal with steeper uphill slopes and brushy conditions. Also, snowshoes can be used with regular winter boots and require almost no training to be used effectively. Ski poles are important accessories for both modes of travel. With either approach, you will be guaranteed good exercise!

ment of frostbite, hypothermia and dehydration. Make your first winter expedition a simple one. On an unusually cold weekend, go to a local park, or maybe just your own backyard, and set up your tent and your ham station. This way you'll have a safe bailout plan if at 1 AM you discover that your sleeping bag is totally inadequate!

After you have proven that you and your equipment can handle the cold, stuff your ham gear into your backpack, strap snowshoes or cross-country skis to your feet and discover the thrill of hamming in a winter-wonderland. When you return, you will likely wonder, as I do, why Field Day is held in June rather than January....

References and Notes

¹Panther, Gene, *Snowshoeing*, Seattle: The Mountaineers, 1980.

²McManners, Hugh, *The Complete Wilderness Training Book*, New York: Dorling Kindersley, 1994.

You can contact the author at 506 S Center St, Gardner, KS 66030; jeandera@wellsville.com.

QST

The Collins Collectors Association

What could possibly inspire such dedicated devotion to a single radio manufacturer?

Interest in the restoration of vintage radios is certainly not new and, in fact, has been on the rise over the last decade. Throughout the period from the 1930s, and well into the 1960s, most hams had favorite manufacturers that they aligned themselves with—and many are finding themselves realigned with their old favorites once again. As the baby boomers grow gray, and the move towards radio nostalgia increases, names like Collins, Hallicrafters, National, Johnson, Hammarlund, Heathkit, RME, Drake and others are being kept alive today by people that have an interest in collecting and restoring these vintage radios to their former glory.

For Collins enthusiasts October 15, 1998 was the start of something that is sure to bring even more attention to nostalgia. On that date, a new tradition was ushered into the annals of Amateur Radio history when the first national Collins Collectors Association convention got under way in Dallas, Texas. For the next three days, CCA members were treated to lectures, workshops and good-spirited fun. The event was a success, thanks to the help of former Collins Radio Company employees, present day Rockwell-Collins employees, and an array of noted Collins collectors—all with interesting stories to tell and unique equipment to display. See the sidebar, "Dallas 1998."

The Mystique

In this age of solid-state microprocessor-controlled amateur equipment, just about



J.B. JENKINS, W5EU

W5EU's hand-made replicas of an Arthur Collins transmitter and receiver.

everyone has heard the name "Collins." The veteran hams among us recall the prestige of owning a piece of Collins equipment. Newcomers to are driven to find out what this Collins talk is all about.

Looking back to those days when radios glowed in the dark, it is safe to say that the Collins name held a special place as the standard of quality. Fifty years later, this still has a ring of truth. Who among us in the

1950s did not lust after a 32V3, 75A-4, or one of their predecessors? During the 60s it was the KWM-2 and the S-line that earned our affection. Although not as popular as the S-Line, the KWM-380 created a brief Collins renaissance when it was released in the late 70s, and remains a very popular prize among collectors.

Why do these radios continue to stir interest? The answer is simple: Because Arthur



GENE DUPREY, K1GD

A beautifully restored Collins demonstration van owned by Jim Stitzinger, WA3CEX.



A 1954 Collins 30L1 prototype. The 30L1 was to become the KWS-1 and the 30L1 designation was reborn later as a linear amplifier.



Gene Duprey, K1GD, at the mike of W5ROK, the Rockwell-Collins factory club station in Richardson, Texas.

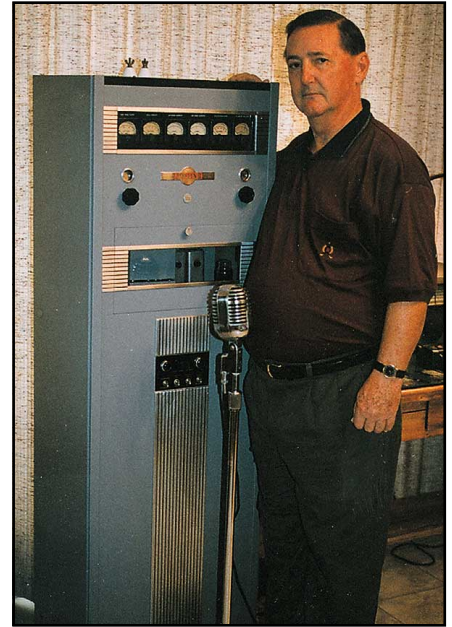
Collins was a perfectionist. He was a brilliant engineer; very demanding and sometimes difficult. Collins was driven to perfection in the pursuit to build better radio communications equipment. He had an eye for innovation and a keen sense of what his customers wanted. The Collins quest for excellence showed in all of his product developments.

When I was a Novice in 1958, Collins gear was the stuff of dreams. For some, Collins ownership remained a dream, while for others, the dreams came true. Once a ham acquired that coveted first piece of Cedar Rapids hardware, he knew that he could do no better; this was the best. There was a feeling of accomplishment that went along with owning Collins equipment. Not surprisingly, many amateurs have remained faithful to Collins over the years, and a few still operate their original equipment. Others may have left the fold for a time, but have found their way back. Still others are recent converts. The Collins Collectors Association was born with ideal fulfilling and preserving those life-long dreams.

The Group

About 10 years ago, Bill Wheeler, K0DEW, had an idea. Bill had been collecting, restoring, and operating Collins equipment for 25 years. He truly enjoyed preserving these radios, and he knew that there had to be others like him. Bill decided he would try his hand at starting a Collins net on 20 meters. The idea was to compare notes on company history, technical issues, repair problems, parts resources, and what ever else came up that was related to Collins. To get the word out, Bill placed an ad in the *QST* classifieds, announcing his intentions. In February 1989, 17 people checked in to the first Collins net on 14.263 MHz, starting a weekly tradition that continues today.

After two years of meeting on the air, they decided to get together in person and chose the 1991 Dayton Hamvention for their gathering site. Word went out that there would be a Collins Collectors Association forum and a room was set aside at the headquarters hotel. When the appointed hour arrived, "We were shocked by the turnout," said Wheeler. "It was



J.B. Jenkins, W5EU, and his fully restored 1937 Collins 30J transmitter.

a standing-room-only crowd, which spread out into the hall," he added. The Collins Collectors Association had come of age.

The folks at Rockwell-Collins in Cedar Rapids, Iowa, soon noticed all of this activity. In August 1991, an article appeared in *Rockwell News, Collins Avionics and Communications Division*, their employee news bulletin, explaining that they had "a fan club" in the Collins Collectors Association. Over the next few years, the folks at Rockwell-Collins in Cedar Rapids hosted several CCA meetings, complete with tours of the facility and the Collins museum. In the words of Jay Miller, KK5IM, "They rolled the red carpet out for us."

In 1992, the CCA loosely formed around a board of directors, whose mission was to help keep all of activities organized and focused. For almost three years the net was the only place to get the news, but another communications vehicle was soon born. Jay Roman, KB0ATQ, who worked closely with Bill Wheeler in maintaining the regular net, also began publishing the *Collins Collectors Magazine* on a monthly basis. Jay did a splendid job of collecting and publishing tidbits of information about the company, the people, and the equipment "The combination of the weekly nets and the *Collins Collectors Magazine* really launched the CCA," Bill Wheeler commented in a recent interview. Jay continued the publication for about four years, but eventually had to stop due to other pressing obligations.

In late 1995 Jay Miller, KK5IM, was asked by Bill Wheeler to create a new look and publication, hence the creation of the *Signal*, the first publication actually under the control of the CCA. The *Signal* focused on news and technical information, and became a vehicle to share ideas among members in the pursuit of finding and restoring Collins equipment. At Dayton 1996, the organization was formalized. Today, the Collins Collectors Association is over 1000 members strong



Wayne Spring, W6IRD, teaches the care and feeding of a KWM-2.

Dallas 1998

The Collins Collectors Association gathering last year in Dallas began Thursday evening. There was a casual reception with lots of introductions. The swap table goodies were seen for the first time, and tales of the "one that got away" were much the subjects of discussion. Most had a chance to rub elbows and exchange thoughts with people like Warren Bruene, W5OLY, who led the development of the 30K-1, 30L-1, 30S-1, and the famous Collins power meter. Bill Perkins, another Collins engineer, and Fred Johnson, who developed the ingenious S-line dial mechanism as well as many other intricate mechanical devices (including gear drives for the T-195) were present.

The convention swung into high gear on Friday morning. Attendees were treated to historical seminars as well as talks on various aspects of operating and restoring Collins equipment. Some of the presentations on Friday included:

Polyphase Broadcasting by Warren Bruene, W5OLY
Restoring 30L-1 Power Supplies by Steve Pautard, WN4I
Collins Literature Collecting by Jim Stitzinger, WA3CEX
Pre-War Collins Equipment by Gary Halverson, WA9MZU
Cleaning & Painting Techniques by Butch Schartau, K0BS
PTO & Dial Alignment by John Bess, WA5VVT
Rejuvenating 516F-2 power Supplies by Bud Whitney, K7RMT
Shack Wiring by Mac McCullough, W5HPM

Saturday was "hands on" day, with everyone rotating through demonstrations of S-Line, KWM-2, and 75A-4 alignment and operation. Attendees also learned the details involved in overhauling a 516F-2 power supply and re-aligning an S-Line dial mechanism. This last demonstration, by WA5VVT, was much more difficult than it sounds. Fred Johnson, the Collins engineer who designed the dial was there to support John, and answer any questions that came up.

The balance of the day was occupied by bus tours of some really impressive sites. Thanks to Gene Duprey, K1GD, and others, we were all treated to a tour of the Rockwell-Collins Government Systems development and test facility in Richardson, where we saw the latest in computer-controlled frequency agile SSB and data communications equipment. Then we were off to see local antique collections owned by Jay Miller, KK5IM, J.B. Jenkins, W5EU, and Jenks Garrett, K5YNZ (who hosted a bodacious Texas-style barbecue to cap the evening).

While all of this was going on, and despite bouts with rainy weather and wind, two special-event stations were set up at the CCA convention site. The first station was operated from the beautifully restored Collins Communications van, now owned by Jim Stitzinger, WA3CEX. Thanks to the participation of CCA members from the Rockwell-Collins Amateur Radio club of Cedar Rapids, Iowa, the van used the call W0CXX. Collins Radio originally built the van in 1963 as means of marketing the S-Line and KWM-2. It spent several years touring the United States, stopping at Collins dealerships to show off the equipment. Jim has painstakingly brought the van back to life, outfitting it with a complete array of Collins equipment from that time period. For those not familiar with the call sign

W0CXX, it belonged to Arthur Collins until his death in 1987, when the club members applied for it in his memory.

The Dallas Amateur Radio Club donated their Mobile Communications Center for the other special event station, which used a KWM-380 operated under the call sign W5R0K. This call sign belongs to the Rockwell-Collins radio club in Richardson, Texas.

Passing the Baton

On Sunday morning, the group got around to the business aspects of the convention. The first order of business was a talk by Jay Miller, KK5IM, the editor of the CCA *Signal*, and the publisher of the *Pocket Guide to Collins Amateur Radio Equipment, 1946 to 1980*. (Jay has been finding life a little too busy these days, and must pass the responsibility for the magazine to someone else. Jay was largely responsible for the new look and feel of the CCA, vis-à-vis his work in getting the *Signal* published. He will be sorely missed in this area, but remains active with the group.) Jay then introduced outgoing president Butch Shartau, K0BS, who announced the results of the recent CCA elections and the installation of newly elected officers, including:

Sandy Meltzer, KW6KW - President and board member
John Bess, WA5VVT - Vice President and board member
Floyd Soo, W8RO - Vice President and board member
Jim Stitzinger, WA3CEX - Vice President and board member
Butch Shartau, K0BS - Vice President and board member

According to Sandy, KW6KW, "Our new organization is being streamlined to promote better communication among the board and CCA members, and to promote involvement at all levels of the group." Later, Rod Blocksome, K0DAS, of Rockwell-Collins in Cedar Rapids, gave an interesting historical overview of Collins commercial and military radios, beginning with the KWT-6, and ending with HF-380 series.

After the meeting broke up, a number of local hams opened their shacks to any of the CCA group that wished to visit. During the tour, I had the occasion to meet with Mac, W5HPM, whom I've come to know through numerous phone calls and e-mails. The trip was well worth it! There, in Mac's radio shack, sat a Collins KW-1. Seeing a KW-1 is a real treat, but this one had special significance. Not only was it immaculate, it had once belonged to the legendary Faust Gonset!

Kudos

An event is only as good as its planners, and this one had the best. The members of the Dallas Posse put on the CCA convention. The Posse included Bob Peters, K1JNN; Mark McCurley, KE4LPD; Doug Hickman, K4RIK; Gene Robinson, N5LDX; Jenks Garrett, K5YNZ; J.B. Jenkins, W5EU; Gene Duprey, K1GD; Glen Kitto, N5OD and Dr. Maury Guzick, W5BGP, plus a lot of help from the Dallas Amateur Radio Club, Rockwell-Collins ARC of Dallas, and the Collins Radio Club of Cedar Rapids. It's going to be tough to follow this one, but you can sure a bunch of folks are already hard at work right now. The next scheduled meeting is at this year's Dayton Hamvention. See you there!

and continues to grow as word of its existence spreads. The group is fortunate indeed to count among its membership some of the very same people who were responsible for the design of many of the Collins radios that we have come to own and admire.

The stated mission of the CCA is to: "Promote the care and use of Collins Amateur Radio equipment, preserve the history and lore of Collins Radio equipment and provide an information archive for Collins Radio equipment." As Floyd Soo, an early CCA member and current board member recently said, "We have the job of being caretakers, responsible for preserving Arthur Collins' name, the history of his company, and the equipment that

he and many of employees made."

Weekly Collins Nets

As noted earlier, the 20-meter net meets every Sunday on 14.263 MHz at 2000 UTC. This is a formal, directed net, dedicated to both technical subjects and the listing of equipment for sale, as well as folks wishing to purchase specific items.

There are also three weekly 75-meter nets. The first meets Tuesday evening on 3805 kHz at 0200 UTC, the second meets Thursday nights on 3875 kHz at 0200 UTC and the CCA West Coast Net meets Friday nights on 3895 kHz at 0400 UTC. The 75-meter nets are designed to be informal with open discussions

and the least amount of structure possible.

If you're interested in learning more about membership in the Collins Collectors Association, just drop a note to:

The Collins Collectors Association
PO Box 963
St Cloud, MN 56302-0963

Or e-mail membership@collinsradio.org. Also, you check the CCA Web site at <http://www.collinsradio.org>.

You can contact the author at 64 Shadow Oak Dr, Sudbury, MA 01776; gmaier@ultranet.com.



By Tom Harrell, K8XP

The ZK1XXP Expedition to Penrhyn Atoll, North Cook Islands

Following a successful January 1996 stint as AL7EL/KH9, this group of DXers dreamed of further exploits. Although the road to the North Cook Islands snaked through Murphy's backyard, ZK1XXP's 15,000 QSOs made it all worthwhile.



The weekly Air Rarotonga flight lands at Penrhyn.

Before the Wake Island operation, Don, N1DG, suggested we name our group "The Dateline DX Association." He based the name on the fact that Wake Island straddles the International Dateline (in the Pacific) and is the first American possession to see the dawn of each new day. The Dateline DX Association was born.

Soon after Wake Island, we wondered whether we could handle another operation and where we might go. We considered KP5, T31 and ZL8. For many reasons, each was eliminated. Lloyd, W4AO (then K4HQI), mentioned North Cook. Its DX availability has been sporadic and, to my knowledge, any major operating efforts from North Cook had taken place years ago, if at all. The island was especially sought after by European hams and RTTY ops. Our North Cook operation was planned for the fall of 1997.

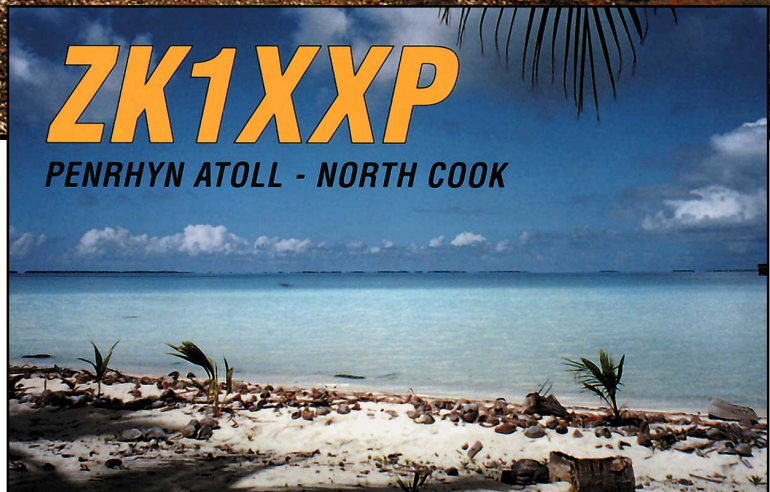
Further study showed that air/ship transportation existed, but was quite expensive.

To balance the scales, however, we soon learned that we'd have the support of Warwick, ZK1WL, who lived on Penrhyn. Warwick's assistance would prove to be invaluable. The more I studied the trip's logistics, the more I began to understand why a full-scale operation had never taken place!

In late 1996 I began to arrange sponsors and the logistical requirements that are required for an operation of this type. Scheduled flights to the island flew weekly from Rarotonga, but allowed no heavy cargo. All

equipment and supplies would have to be shipped via sea transport at least three months in advance.

We announced the operation on March 6, 1997, and started a fundraising effort to subsidize a shipping bill we expected to top \$3000 (an understatement, as it turned out!). Assistance was requested from DX organizations, clubs and individuals. Soon after the announcement donations started to arrive. Equipment manufacturers generously provided much of our gear.





The ZK1XXP crew just after unloading their equipment in the sweltering heat.

At this point I learned that our DXpedition team would be changing. N1DG and W4AO, withdrew because of business commitments, and Bob, N6EK was involved in the Heard DXpedition. All of a sudden, I was “the team!” Despite the changes I decided to recruit other members and continued to plan expedition details. The equipment would be trucked to Oakland for transport in late June. N7RO, N4RF, WA4YBV and KI6AN joined my team. At this point we established a timeline for our arrival on Penryhn.

Because there were no medical facilities on the island, we needed a “medical DXer.” ZS6EZ suggested Chris, ZS8IR, a trained physician’s assistant who was finalizing a tour on Marion Island. Chris eagerly accepted via e-mail. The addition of Mike, N6MZ, totaled the required seven operators.

The team now had a broad range of operating expertise on three modes, and four operators with low-band, high-noise experience. Also, four members had DXpedition experience. All bases were covered. The team soon grew to eight, however, with N1DG managing the DXpedition Web site, information disbursement and online log checking.

Coordination was almost exclusively by e-mail. Each member was assigned several responsibilities. As planning became reality, numerous friends and associates volunteered to assist by building or providing specialty equipment such as keying interfaces and preamps.

In late April we began staging equipment at Rick’s (N4RF) QTH. The UPS driver knew Rick’s address by heart! Because I had arranged for shipment from Oakland on June 30, I traveled to Rick’s place the first week of June so we could build a shipping container and test the equipment prior to packing.

Welcome to the Twilight Zone...

With the equipment on the way we figured our preparations would become less stressful. Wrong! For some reason, Warwick failed to answer our daily e-mail.

Several weeks passed with no contact. After e-mailing Air Rarotonga, Warwick’s employer, I learned that Warwick had taken ill and had been flown to a New Zealand hospital to care for his kidney stones. We were concerned for Warwick’s health, and for our operation.

We waited and hoped that Warwick would return in good health. In the interim we had no contact with our destination. Our equipment was “on the high seas.”

About a week later I received a note from the freight company in Rarotonga advising me of Warwick’s instructions to forward the crate to Penryhn with the local inter-island freight company, which used cargo vessels running a “round robin” route.

The shippers also advised me that forwarding freight was “unscheduled,” meaning that the ship sails when it’s ready to sail. No formal schedule exists!

Warwick soon advised us that he was back on Penryhn and was recovering without complications. One of the cargo vessels wasn’t so lucky. It had caught fire and burned while enroute to another island. Just what we needed—no scheduled transport and a crippled fleet!

In late July the crate arrived in Rarotonga and was awaiting forwarding to Penryhn. Finally, communications arrived informing us that the crate was underway. The inter-island transport vessel, however, would take six weeks to complete its route. That would put the crate on Penryhn in late September and our arrival was set for September 20!

Despite the speed of modern communications and business systems, there was nothing we could do to encourage the process. We were at the mercy of the freight forwarder and all we could do was wait. Concerns about purchased tickets, paid lodging and scheduled vacation time suddenly loomed large.

With the arrival in question, Don continued to send information via the Web site. Each team member looked forward to September 17, the date we would meet in Los

Angeles for departure to Rarotonga.

As September arrived the crate still hadn’t made it to Penryhn. We were really becoming concerned. Had Murphy decided to pay us special attention? We *really* wondered when we learned that an epidemic of “Dengue Fever” had swept the island during the prior two weeks. Penryhn is infested with mosquitoes that often carry the infection. W0GJ and K9AJ, our medical advisors, seemed unconcerned and suggested that we carry antibiotics and bring plenty of bug repellent. That’s easy for them to say! They weren’t going!

On September 15, we learned that our precious crate of radio gear had arrived in good condition and was taking up space in Warwick’s garage. This was the boost we needed as we neared our September 17 meeting at LA International Airport.

On the Move

On Wednesday, September 17, each team member left home and headed for LAX to meet and fly together on the evening flight to Rarotonga. N7RO and KI6AN arrived mid-morning. Soon thereafter Rick, N4RF, and I made an appearance. WA4YBV arrived in the afternoon along with ZS8IR. N6MZ showed up last, arriving at about 6 PM.

We gathered at the Air New Zealand gate and were soon talking exclusively about North Cook. Our flight departed on time. We were really on the way! After hurdling one obstacle after another, it looked as if we’d actually make it to Penryhn.

The Air New Zealand 747 Jumbo jet landed at Rarotonga, using virtually every foot of the runway. The early morning weather was chilly. After retrieving our baggage we passed customs without difficulty and were soon on the way to our hotel, the Edgewater. After breakfast we headed to the Cook Islands TELECOM to pick up our Amateur Radio licenses, which took less than an hour.

As soon as we returned to the hotel, N7RO and KI6AN installed a wire antenna that had been provided by ZK1CC. Our IC-706 transceiver was soon on the air. Within minutes, a pileup was rocking on 20 meters. Later that day we practiced using the logging program, developed team assignments and set our operating procedures as we waited for our Saturday morning departure to Penryhn.

Early Friday morning I visited the airport terminal and was advised of more strict weight requirements and a new departure time, now set for 4 AM. I left the terminal somewhat concerned about the amount of our carry-on baggage. Many small items, plus all of the medical supplies, totaled much more than the revised 10-kg figure now authorized. We spent Friday afternoon trying to discard gear, but finally gave up and decided to bring almost everything to the terminal in the hope it would be accepted.

We arrived at the airport at 3 AM as directed. As we watched Air Rarotonga agents weighing our bags, we let out a sigh of relief as they took each bag and loaded it on a cart destined for a small turboprop airplane parked on the ramp at the rear of the terminal.



N6MZ wades through the RTTY pileups.

We boarded just before 4 AM.

Once airborne, the trip would take four and a half hours. At just before 8:30, the pilot motioned Chris to the front of the aircraft. It was our first sight of Penrhyn Atoll, North Cook!

Landfall!

Soon we were rolling down a runway that seemed to be made of crushed shells, or something similar. A crowd had gathered to wait for the weekly airplane. We soon learned that the regular landing was the highlight of the week on Penryhn!

As the door opened we were hit with intense heat and humidity—a total change from the weather on Rarotonga. As we deplaned a light rain began to fall. We gathered at the wingtip and Warwick introduced himself. Next came a welcome by the church choir!

After the ceremony we gathered our bags and left the airport in Warwick's pick up truck and headed for his home at the far end of the runway. The rain was now substantial. As we pulled into Warwick's yard we heard the plane climbing into the stormy skies.

Standing in Warwick's garage, we watched the rain fall in buckets. How could we assemble the antennas in this mess? We needed to erect as many of the antennas as possible because we would be unable to do any outside work on Sunday—a law in the Cook Islands. Amazingly, about an hour after we arrived, the rain simply stopped and the sun appeared. Then it *really* got hot! We unpacked the crate and got to work.

The Battle Creek Special antenna was erected by 11:30, and by mid-afternoon we were ready to raise the A3 beam antenna on Warwick's 45-foot tower. The other tri-banders, a TH3 and an A3WS, were perched atop their respective 21-foot masts. We were all exhausted as Warwick used his forklift to raise the tower as high as possible. We pulled the tower the rest way up and affixed the guy wires to concrete boulders. The antennas were up, but in the process, several team members flirted with heat exhaustion.

I started unpacking the radio equipment. Because it had all been tested and configured prior to shipment, set up was a breeze. Soon we were on with one radio, then two. Because we were physically exhausted, we shut down after a brief period on the air. Mike, N6MZ,

decided to rest early and get up for some low-band work in the middle of the night. I would operate 80 CW until I went to bed. It was soon apparent that something was wrong with the Battle Creek Special, but I dismissed it as "bad conditions" as I worked most parts of North and South America.

On Sunday morning, two stations were up and running, but Mike echoed my thoughts about the Battle Creek Special "not acting right." Mike went out to fetch the antenna's matching device, working quickly because of the "Sunday" rule. As he opened the box, insulation fell to the floor. We decided to wait until nightfall to reinstall the repaired box.

Propagation on all bands was good, and the pileups were intense. Everything seemed to be working. As the evening gray line approached I readied the CW position for 80 meters. N6MZ was waiting for 160.

Again, we noticed that we were "straining" for Qs while using the Battle Creek Special. As I worked 80 meters, Mike again went to the base of the Battle Creek Special, removed the matching box and connected the feed line directly to the antenna. It loaded fine on 40 but needed an in-shack antenna tuner for 80 and 160. From that point on our signals were much improved.

Murphy Lives Down Under

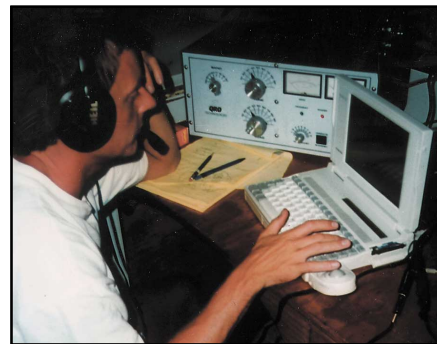
During Tuesday morning's "dead band period" we took time to eat and survey the equipment. As the day progressed, the pileups were steady and we thought we were in the clear. As I was working 15 meters in the afternoon, however, the ac power suddenly failed. We rushed to the generator shed, which was now "scary" quiet after having droned steadily since we arrived.

The main generator had stopped without reason. Warwick ran from the weather shed, where he had been in the final stages of his daily weather radar tracking session. We all stood around helplessly watching Warwick try to troubleshoot the problem.

The main power breaker was charred and black. Warwick soon had the external components of the large 10-kW diesel generator in many pieces on the floor, but the cause remained elusive. After several hours we decided to activate an alternate generator. It had a fuel problem, but would run. As darkness fell we were back on the air, but limited to 100 W. Murphy had appeared.

Our late-night low-band operations would be barefoot, a major disadvantage. On Wednesday morning, Warwick changed every major component on the generator, to no avail. We continued with exciter power only. The 100-W signals seemed to work just fine on all bands above 80 meters. We guessed that the generator would be down for quite a while. Wednesday evening gray line came and went. Without amplifiers we were stuck.

By Thursday afternoon Warwick had exhausted his "bag of tricks" and was very frustrated. We were searching for a way to use the amplifiers with the standby power source. Several of the team members met with Warwick and discussed the possibility of rewiring the amplifiers to the New Zealand



N4RF at the SSB position.

mains configuration, which was also available from the generator. It would reduce the draw by half. We modified one amplifier, which worked fine and didn't excessively load the generator. The remainder of the day provided good conditions on the higher bands.

Although we were back in business for at least one more night on the low bands, we heard no Europeans on 80 or 160 meters (many stations from the Americas the Pacific made it into the logs, however).

Friday was pack-up day. We needed to have all the gear packed in the shipping crate by Saturday morning. We decided to leave the A3 on Warwick's tower in hopes that it would boost his interest in operating!

On Saturday, the aircraft arrived on time. We loaded and said good-bye to our friend Warwick. Without any delay, the pilot directed us to board. We were soon heading south toward Rarotonga. Our DXpedition was behind us.


As we headed back, everyone was quiet. We arrived at Rarotonga at about 3 PM. Warwick's wife met us and provided transportation back to the hotel. Rest and recovery was in order for the remainder of the trip.

On Sunday we enjoyed dinner at the local spaghetti house with Warwick's wife and family. On Monday we toured touring the island on mopeds! Our flight to the States took off that evening.

Conclusion

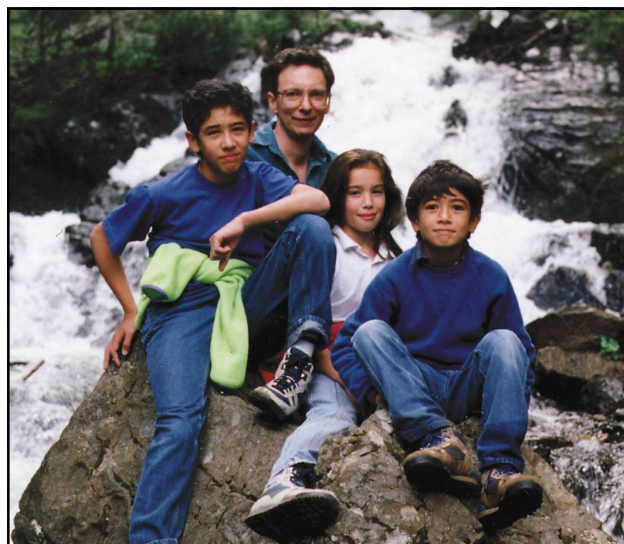
We knew we'd have problems, but we didn't figure on one problem after another. It seemed as if we would solve one and two more would appear. Early planning allowed us to strive toward the final goal of operating from ZK1/N. We made more than 15,000 QSOs on three modes during five and a half days of operating, most of which were hindered by power problems, which limited our low-band efforts.

Without the support of various equipment manufacturers, associations, foundations and individuals, this operation could not have taken place. The members wish to sincerely thank each and everyone who helped.

You can contact the author at 2011 New High Shoals Rd, Watkinsville, GA 30677; n4xp@juno.com. 

Kurashiki-Pasadena— DX Fun for the Entire Family!

Two ham radio families—one in Kurashiki, Japan, the other in Pasadena, California—made nearly 70 QSOs during their three-year “cultural exchange program.” Their story is refreshing, inspiring and deeply personal. If you’ve become jaded by cookie-cutter QSOs, here’s a roadmap to ham radio recovery!



Our family friendship began after the first contact when Dave Rutledge, KN6EK, sent this photograph. From left to right: Robb, KD6PFL; Dave, KN6EK; Kate, KD6PFK; and Alan, KE6OMO.

Thanks to ham radio, my family, the Sakamotos, first met the Rutledge family on 40 meters. Over the three-year period from September 1993 through December 1996, we completed 68 scheduled QSOs between Kurashiki, Japan, and Pasadena, California. Most of the contacts were made by our children—Mieko, Shin, Robb, Kate and Alan (see Table 1 for names, call signs and station data). I wrote this article after reviewing our many log extracts. We’ll remember these contacts forever—and I hope that this article inspires you to seek similar adventures!

First Contact

I met Dave, KN6EK, the 41-year-old father of the Rutledge family, for the first time on September 18, 1993. Dave replied to my CQ call on 7.022 MHz. I sent his RST and my QTH and name. He replied similarly. It was a “rubber stamp” QSO. Seven days later, Dave’s QSL card arrived in the mail.

My son, Shin, met KN6EK on 40-meter CW the day before I received Dave’s first QSL card. I sent two QSL cards in my reply—one from me and one from Shin. I was 42 years old, and Shin was 13.

Enclosed with Dave’s second QSL card (sent to Shin) were family pictures. Although ours wasn’t a typical exchange, it was impossible to imagine that these

initial QSOs would be the start of such a satisfying three-year adventure!

Robb, Meet the Sakamotos!

In a letter, Dave mentioned that his son, Robb, would soon qualify for his General license and would try to call me on 7.028 MHz CW at 1330Z on October 10. I remembered what it felt like to be QRV on a new band, with a new license, for the first time. I sent Robb a fax confirming the schedule.

At the appointed time, Shin turned on the rig at 1300Z and started listening near 7.028 MHz. Our entire family was in the shack watching Shin twist the VFO knob left and right.

Forty meters is usually very busy in Japan, and I thought it might be difficult to receive Robb’s 100-W signals. Thankfully, I was wrong! Robb’s signals were strong, and had a distinctive DX “flutter.”

Shin replied to Robb’s call, sent a 599 RST and congratulated Robb on his new license. Robb’s keying was excellent, and receiving his Morse code signals was quite easy. We soon found out why.

Robb was running a kilowatt of RF to a four-element Yagi from the California Institute of Technology club station, W6UE! In contrast, our rig was a barefoot Yaesu FT-767GX feeding a modest Butternut vertical. Before signing, we made an appointment for another contact on October 24.

On October 24, Robb called right on schedule. My daughter Mieko, JI4GBM, made contact, but conditions were poor. She gave Robb an RST of 559, and there was QRM. Robb’s code work was fine, but our reception was difficult. Mieko scheduled another QSO and said good-bye. For our next QSO we’d be running 500 W as JR4YRL.

Kate’s Turn

In a letter, Kate, KD6PFK (10), wrote that she would be getting her General license November 13 and would be able to work a schedule on November 14—the very same day we had planned to attend a speech contest in Tokyo. Shin would be presenting his ham radio experiences with Ray Eichman, WA6IVM, a radio friend from San Francisco. I sent a fax to Kate, telling her that if we took the fastest train home, we could be in our shack by 1430Z.

Right at 1430Z, Kate called with very strong signals. Shin gave her an RST of 599. Kate, like her brother, was operating from the Caltech club station. Shin told her the results of his speech contest and how exciting it was to ride on the “NOZOMI” super express train.

This was a very good contact and we enjoyed talking with Kate for half an hour. My son, Shin, who had just started junior high school, was impressed that his keyed dits and dahs were riding the radio



The Sakamoto family. From left to right: Shin, J14GBK; Mitsu, JA4FVE; Mieko, J14GBM.

waves—in English—across the Pacific.

The Wabun QSO

One day in early 1994, I was very surprised to receive DADIDIDADADA SHINKUN KONBANWA DEIBU DESU.... What? Dave was sending me a message—in Japanese—using perfectly sent characters in Japanese Wabun code. Morse code fans will no doubt understand the great difficulty involved.

Japanese hams typically master Wabun code before moving on to International Morse code. It's not so difficult for them, as Japanese is their native language. English-speaking hams, however, often are surprised by Wabun's degree of difficulty.

Streams of Wabun characters have no spaces between words. The long code streams sound like machine-gun chatter, and punctuation can be difficult, even for Japanese hams. That Dave sent this mes-

sage in smoothly keyed Wabun is a great accomplishment!

Shin and Mieko Visit America

When I told Dave that we would be visiting Ray, WA6IVM, in San Francisco, on December 26, 1994, he immediately invited us to his home in Pasadena. We were very happy to receive his invitation, as our families had been corresponding via radio, letter and fax for more than a year.

Friendships that start with ham radio QSOs happen every so often on UHF and VHF (mostly domestic), but this was the first time that we were invited to visit a "DX family." We had, however, previously agreed to attend Ray's birthday party! A few days later, Dave sent a fax asking if the children could come to his home. Problem solved! Shin and Mieko would visit on December 28.

That was our first trip to the US. Shin and Mieko visited their American ham radio friends, flew on a domestic airline and stayed with the Rutledge family for one night. Mieko even celebrated her birthday party in California.

Shin and Mieko met other visitors, including Dave's parents. They even visited Dave's departmental laboratory at Caltech. It was a good experience, as the two hope to pursue studies in science.

Alan's First QSO

We met Alan, KE6OMO (10), on March 5, 1995, thanks to a QSO with Kate on March 2. Conditions were poor. My RST was only 339. Kate's RST was a decent 579. We could hear her just fine, however, and we easily received her message: Alan will get his Novice license and will call you on 21.140 MHz at 0100Z on March 5.

I hesitated for an instant because I thought conditions on 15 meters might be inconsistent. But Kate persuaded me to give it a try because it would be a great experience to be Alan's first on-air QSO.

A leaflet from our local power company indicated that our neighborhood's ac power might be turned off for system maintenance

at 9 AM (0000Z). I prepared a low-power rig and made sure my portable power generator was working in case I had to power my main rig.

I started listening for Alan on 21.140 MHz at 2345Z because I was worried about the power outage. At 2354Z I heard Alan calling me. I gave him an RST of 539. Because there was no band noise, interference or fading, conditions were really pretty good. Alan's signals were quite clear. Nine AM came and went, but the power stayed on. The power company must have known that it was Alan's first QSO! I sent my congratulations and signed clear at 0025Z.

I did manage to work Robb on March 23, but the band was crowded and I couldn't copy him very well. Our next scheduled QSO was set for 2300Z on April 8. We received a letter asking that we make our regular contacts on 21.140 MHz, the first Sunday of every month, until Alan could get his General license. But no matter how hard we tried, we couldn't complete contacts on 15 meters after March 5.

Alan called us with very strong 40-meter signals on July 13. Shin welcomed Alan to the group and congratulated him on earning his General ticket!

QRP Kate

In early May of 1995, Kate sent a letter coordinating our next scheduled QSO. She wanted to try a 40-meter contact while running only 2 W from her home-brew transmitter. The sked time was 1230Z—a busy time to be on 40 meters in Japan!

I would find a clear channel near 7.028 MHz and call KD6PFL at 1230Z, transmitting for the first 30 seconds of each minute while listening during the last half of each minute. I connected a tape recorder to my rig and made a test run.

On May 11, I turned on my rigs at 1130Z and started listening on 7.028 MHz. Everything was working well, but the band was a bit crowded. At 1230Z I started calling KD6PFL on our agreed-on frequency,



The two families finally met face-to-face in Pasadena. From left to right: Eunice (Dave Rutledge's mother); Kate, KD6PFL; Alan, KE6OMO; Robb, KD6PFL; Dave, KN6EK; and his father, Robb. Immediately in front of Dave and his father are my daughter, Meiko, J14GBM, and my son Shin, J14GBK.

Table 1
Operators

<i>Pasadena, California</i> <i>Rutledge Family</i>	<i>Kurashiki City, Japan</i> <i>Sakamoto Family, JR4YRL</i>
Dave, KN6EK, Amateur Extra	Mitsu, JA4FVE, 1st Class
Robb, KD6PFL, Amateur Extra	Mieko, J14GBM, 1st Class
Kate, KD6PFL, Amateur Extra	Shin, J14GBK, 1st Class
Alan, KE6OMO, General	

Table 2

Radio Gear

<i>Pasadena</i>	<i>Kurashiki City</i>
<i>Transceivers</i> TS-850, 100 W; NorCal 40-A, 2 W (QRP kit)	FT-767GX, 100 W
<i>Amplifiers</i> SB-200, 500 W; ETO 91B, 1500 W; Home-brew 300-W Class-E amplifier; Home-brew 500-W Class-E amplifier	FL-7000, 500 W
<i>Antennas</i> R7 vertical; Four-element Yagi, Thirty meters high; Horizontal dipole, Fifteen meters high	Butternut vertical (ground-mounted)

sending, then listening in the proper sequence.

I thought I heard Kate some time later. Conditions could have been better. My entire family was in the shack waiting to copy Kate's signals. At that time, Robb's higher-power signals were coming through with an RST of 599.

At 1233Z Robb asked me to zero-beat his frequency, and when I did, there was Kate, KD6PFK, with an RST of 539! As my family began copying her message, conditions improved. Her QRP signal was now at RST 569. To make the exchange easier we chose to complete a "rubber stamp" QSO that lasted a bit more than 10 minutes.

Kate was QRPing with Caltech's four-element Yagi, which helped her 2-W signal span the 9000-km path between us. I sent 73 and 88, promised to send Kate a tape recording of the QSO from my end and chatted with Robb for a few minutes. Conditions between JA and W6 were good that day. We decided to set our next sked for May 25.

The Land of the Rising Sun

In November 1995, Dave and Kate vis-

ited us in Japan. The two arrived at Okayama station, and my family and I were waiting. Mieko and Shin, having stayed with the Rutledge family in Pasadena some 10 months ago, said hello, as did my wife, Chikako. Meeting on-air friends face-to-face is a profound ham radio pleasure.

To get things started, we went sightseeing at the Oohara museum and toured the Seto inland sea and bridge. We had dinner and locally brewed sake in Kurashiki. Our conversations were pleasant and varied.

At 1230Z, Dave had a DX QSO with his two sons, while Kate had a DX QSO with her two brothers—across the Pacific!

Our families' time together consisted of conversation and more sightseeing. On November 6 we drove to see a Japanese National Treasure, Himeji-jyo (Himeji castle). The Himeji-jyo is about 100 km east of Kurashiki. The castle, famous among Japanese castles, is also known as Shirasagi-jyo (the Egret castle).

The Red River of the...Southwest?

Between August 10 and August 18, 1996, Robb was on the air during a family vacation in Red River, New Mexico. Robb's signals were RST 339. He was running 100 W to a dipole antenna, and we could complete only a rubber stamp QSO.

During the same vacation, Dave was QRV with a dipole and an ETO linear amplifier! His signals were RST 599. We chatted for 30 minutes or so, as usual.

The Class-E Power Amplifier

Not long after the Red River QSO, Dave asked us to help him test a Class-E power amplifier that he and his lab students had constructed (see "High-Efficiency Class-E Power Amplifiers" in the May and June 1997 *QST*s). I've seen amplifiers running in Classes A, B, C, AB1 and AB2, but I'd never seen a Class-E amplifier and I was very interested in it. Especially when he said he could obtain 500 W output from only 2 W of drive!

Our part in the test was recording the signals (sent via the Class-E amplifier) and sending the cassette tape to Dave in Pasadena. To test the system, Shin and I con-

nected a hi-fi tape recorder to the audio output jack of our FT-767GX transceiver. For a test signal, we connected a dummy load to a low-power transmitter and keyed a test message, which Shin recorded. With the AGC turned off and the RF level set to low, the audio recording was clean and clear.

After our initial test transmission I repeated the process while recording the test signal as a PCM computer sound file I called TEST.WAV. I sent the sound file to Pasadena on the Internet. Dave received it, decoded it and sent us a digital "thumbs up."

The official amplifier test sked started at 1230Z on September 15. We were lucky, and conditions were quite good. Robb's signal was RST 599, with no fading, noise or interference.

Shin recorded the entire 30-minute "Class-E" QSO. We converted the recording to a digital format and sent it to California as ROBB.WAV. It's amazing that we can send a CD-quality audio file across the globe in just a few minutes via the Internet.

Conclusion

We made our scheduled CW contacts near 7.028 MHz. Working 40-meter CW is my favorite Amateur Radio activity. The band is very good for domestic QSOs during the daytime, and good for working into the western US and northern Europe at night—especially in the winter.

After making these QSOs with Dave and his family for more than three years, I understand the band even better. Poor conditions prevented us from completing contacts only three times out of 68 scheduled QSOs (and only once when we couldn't find each other at all).

Thanks to ham radio, we can contact almost anyone, anywhere, at any time. We can forge solid friendships in the process—and we can further enjoy the thrills, the uncertainty and the "unexpectedness" of communicating with radio waves.

When you've talked with another family 68 times, you build a lot of trust and mutual respect. We scheduled many QSOs at 5:30 AM California time. I think it took a lot of patience and effort to wake up at 5:30 AM for scheduled ham radio QSOs—especially considering that it was 9:30 PM in Japan!

Keeping our promises and being on time are important parts of maintaining friendships, and our children did exactly that. In addition to our ongoing friendships, we have many wonderful memories that will last a lifetime.

As I've mentioned, we have another US ham friend in San Francisco. Ray Eichman, WA6IVM, taught us how to have fun while working DX. And when he visited in 1992, he encouraged my children to strive for their First-Class licenses. I will never forget Ray's leadership, and I'd like to thank him here, in *QST*.

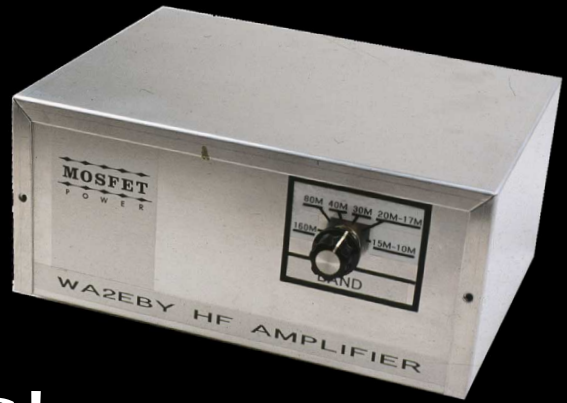
You can contact the author at 7-5-39 Minamise, Kurashiki City, Okayama, Japan; science_service@ma2.justnet.ne.jp. 



Kate and Dave Rutledge visit Japan. From left to right: Shin, JI4GBK; Mitsu, JA4FVE; Dave, KN6EK; Kate, KD6PFK; and Meiko, JI4GBM.

By Mike Kossor, WA2EBY

A Broadband HF Amplifier Using Low-Cost Power MOSFETs



Part 1—With only 1 W of drive, you'll get over 40 W out—from 160 through 10 meters!

Many articles have been written encouraging experimenters to use power MOSFETs to build HF RF amplifiers. That's because power MOSFETs—popular in the design of switching power supplies—cost as little as \$1 each, whereas RF MOSFET prices start at about \$35 each!

Over the years, I tucked away several of these articles, waiting for an opportunity to experiment with them. That opportunity came when I received a call from Al, W2OBJ. Al wanted a low-cost linear amplifier to use with his 5 W QRP transmitter when band conditions got poor. Ideally, the amplifier would generate at least 25 W on all the HF bands. Al's inquiry renewed my interest in the topic and provided the motivation I needed to get my project underway.

Al provided me with an extensive list of RF-amplifier construction articles that use power MOSFETs.¹⁻⁸ These articles provided useful information about MOSFETs and general guidelines for working with them, including biasing, parasitic-oscillation suppression, broadband impedance-matching techniques and typical amplifier performance data. It was clear from the performance data that Al's desire to get 25 W output from power MOSFETs on 1.8 to 30 MHz was going to be a challenge! The RF output power of most of the amplifiers described in the articles drops off to 10 W or less as frequency increases just to 14 MHz.

An Idea Brews

After hundreds of hours of experimentation, I came up with a design that exceeds our original objective: One watt of input power produces over 40 W of output (after harmonic

filtering) from 160 through 10 meters. To the basic amplifier, I added an RF-sensed TR relay and a set of low-pass filters designed to suppress harmonic output and comply with FCC requirements. The amplifier is built on double-sided PC board and requires *no tuning*. Another PC board contains the low-pass filters. Power-supply requirements are 28 V dc at 5 A, although the amplifier performs well at 13.8 V dc.

Several of these amplifiers have been built and exhibit similar performance. Al has been using his amplifier on each of the HF bands, logging well over 500 contacts in 18 months. Signal reports indicate a noticeable improvement in readability (about two S units on average) over his 5 W rig. No indications of instability, CW key clicks or distortion on SSB have been reported. To make it easy for you to duplicate this project, PC boards and parts kits are available, all at a cost of about \$100!⁹

An Overview of MOSFETs

MOSFETs operate very differently from bipolar transistors. MOSFETs are voltage-controlled devices and exhibit a very high input impedance at dc, whereas bipolar transistors are current-controlled devices and have a relatively low input impedance. Biasing a MOSFET for linear operation only requires applying a fixed voltage to its gate via a resistor. With MOSFETs, no special bias or feedback circuitry is required to maintain the bias point over temperature as is required with bipolar transistors to prevent thermal runaway.¹⁰ With MOSFETs, the gate-threshold voltage increases with increased drain current. This works to turn off the device, especially at elevated temperatures as transconductance decreases and $R_{DS(on)}$ (static drain-to-source *on* resistance) increases. These built-in self-regulating actions prevent MOSFETs from being affected

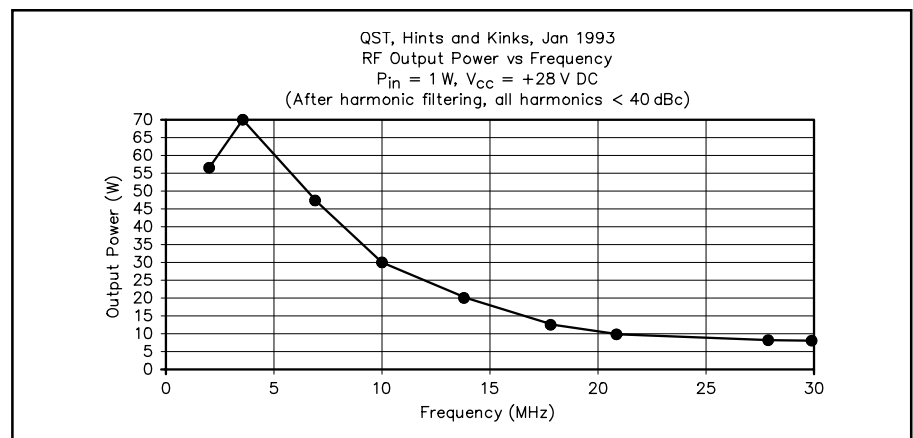


Figure 1—Jim Wyckoff, AA3X, "1 W In, 30 W Out With Power MOSFETs at 80 M," Hints and Kinks, QST, Jan 1993, pp 50-51.

¹Notes appear on page 43.

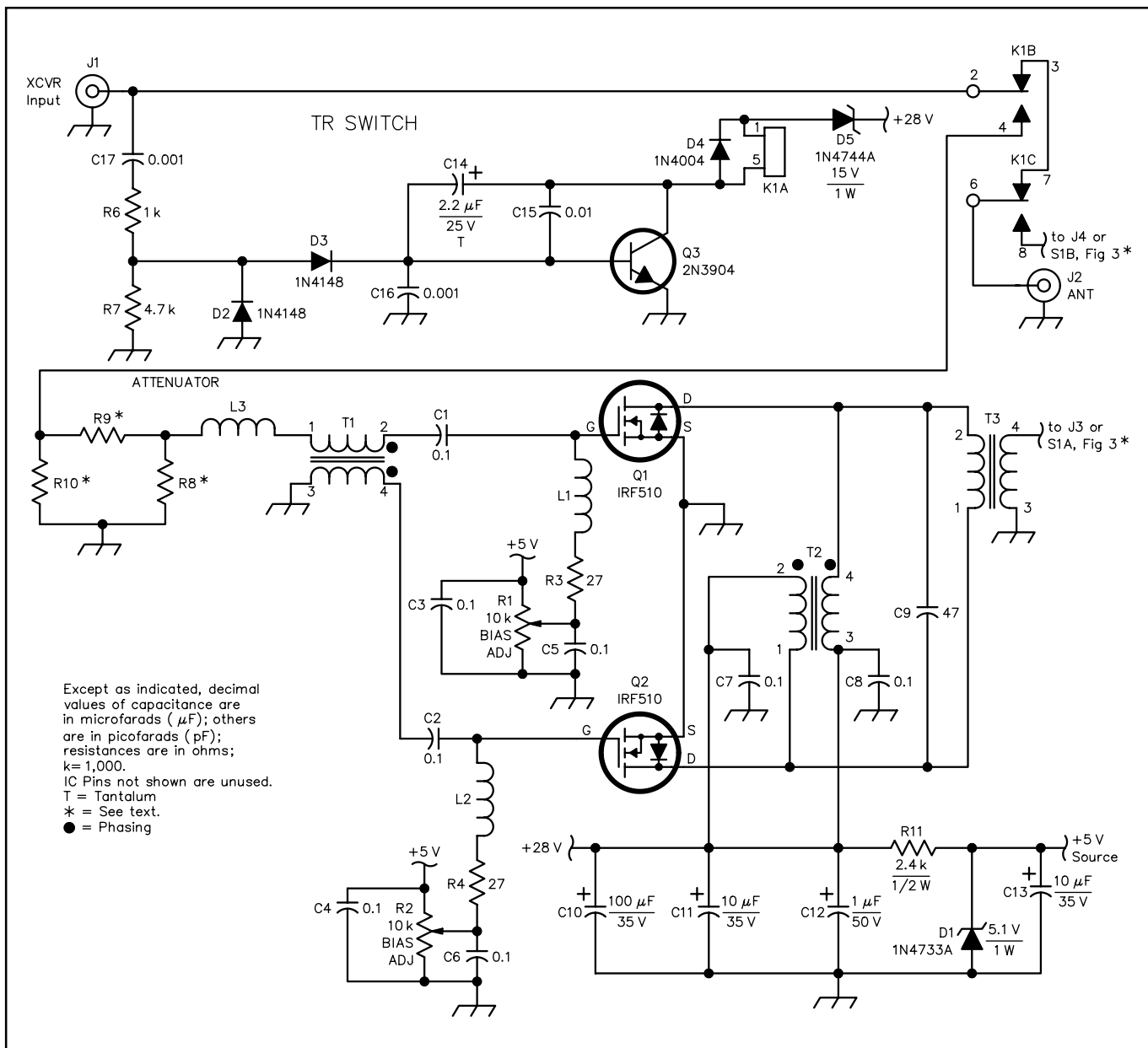
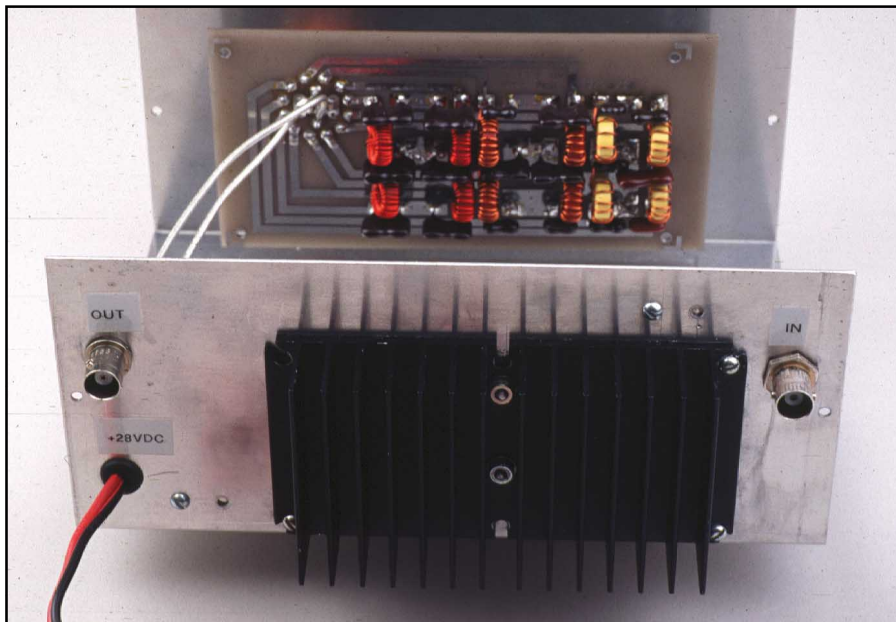


Figure 2—Schematic of the MOSFET all-band HF amplifier. Unless otherwise specified, resistors are $\frac{1}{4}$ W, 5% tolerance carbon-composition or film units. Equivalent parts can be substituted. Part numbers in parentheses are Mouser (Mouser Electronics, 968 N Main St, Mansfield, TX 76063; tel 800-346-6873, 817-483-4422, fax 817-483-0931; sales@mouser.com; <http://www.mouser.com>); see Note 9.

C1-C8—0.1 μF chip (140-CC502Z104M)
 C9—47 pF chip (140-CC502N470J)
 C10—100 μF , 35 V (140-HTRL35V100)
 C11, C13—15 μF , 35 V (140MLR35V10)
 C12—1 μF , 50 V (140-MLRL50V1.0)
 C14—2.2 μF , 35 V tantalum (581-2.2M35V)
 C15—0.01 μF chip (140-CC502B103K)
 C16, C17—0.001 μF chip (140-CC502B102K)
 D1—1N4733A, 5.1 V, 1 W Zener diode (583-1N4733A)
 D4—1N4004A(583-1N4004A)
 D2, D3—1N4148 (583-1N4148)
 D5—1N4744A, 15 V, 1 W Zener diode (583-1N4744A)
 J1, J2—SO-239 UHF connector (523-81-120)

K1—12 V DPDT, 960 Ω coil, 12.5 mA (431-OVR-SH-212L)
 L1, L2—9 $\frac{1}{2}$ turns #24 enameled wire, closely wound 0.25-in. ID
 L3—3 $\frac{1}{2}$ turns #24 enameled wire, closely wound 0.190-in. ID
 Q1, Q2—IRF510 power MOSFET (570-IRF510)
 Q3—2N3904 (610-2N3904)
 R1, R2—10 k Ω trim pot (323-5000-10K)
 R3, R4—27 Ω , $\frac{1}{2}$ W (293-27)
 R6—1 k Ω chip (263-1K)
 R7—4.7 k Ω chip (263-4.7K)
 R8—130 Ω , 1 W (281-130); for 7 dB pad (5 W in, 1 W out)
 R9—43 Ω , 2 W (282-43); for 7 dB pad (5 W in, 1 W out)
 R10—130 Ω , 3 W (283-130); for 7 dB pad (5 W in, 1 W out)

R8, R10—300 Ω , $\frac{1}{2}$ W (273-300); for 3 dB pad (2 W in, 1 W out)
 R9—18 Ω , 1 W (281-18); for 3 dB pad (2 W in, 1 W out)
 R11—2.4 k Ω , $\frac{1}{2}$ W (293-2.4K)
 T1—10 bifilar turns #24 enameled wire on an FT-50-43 core.
 T2—10 bifilar turns #22 enameled wire on two stacked FT-50-43 cores.
 T3—Pri 2 turns, sec 3 turns #20 Teflon-covered wire on BN-43-3312 balun core.
 Misc: Aluminum enclosure 3.5 \times 8 \times 6 inches (HWD) (537-TF-783), two TO-220 mounting kits (534-4724), heat-sink compound (577-1977), amplifier PC board (see Note 9), heat sink (AAVID [Mouser 532-244609B02]; see text), about two feet of RG-58 coax, #24 enameled wire and #20 Teflon-insulated wire.



A rear panel view of the amplifier showing the heat sink.

by thermal runaway. MOSFETs do not require negative feedback to suppress low-frequency gain as is often required with bipolar RF transistors. Bipolar transistor gain increases as frequency decreases. Very high gain at dc and low frequencies can cause unwanted, low-frequency oscillation to occur in bipolar transistor RF amplifiers unless negative feedback is employed to prevent it. Low-frequency oscillation can damage bipolar transistors by causing excess power dissipation, leading to thermal runaway.

MOSFET Limitations

Of course, MOSFETs do have their limitations. The high gate impedance and the device structure make them susceptible to electrostatic discharge (ESD) damage. Some easily applied precautions prevent this: Use a soldering iron with grounded tip; use a wrist strap connected to ground through a 1 M Ω resistor to bleed off excess body charge while handling MOSFETs and do all work on an anti-static mat connected to ground via a 1 M Ω resistor.

The sensitivity of a MOSFET's gate to static and high-voltage spikes also makes it vulnerable to damage resulting from parasitic oscillation. This undesired self-oscillation could result in excessive gate-to-source voltage that permanently damages the MOSFET's gate insulation. Another MOSFET limitation is gate capacitance. This parameter limits the frequency at which a MOSFET can operate effectively as an RF amplifier. I recommend reviewing the referents of [Notes 1, 2 and 3](#) if you are interested in more detailed information about MOSFETs.

Power MOSFET RF Amplifiers

Of the several power MOSFET amplifiers I built to check their performance, the one providing the best performance is the push-pull design described by Jim Wyckoff, AA3X, in *QST* (see [Note 3](#)). I used IRF510 power

MOSFETs rather than the IRF511s specified. The performance of this power MOSFET amplifier design is summarized in [Figure 1](#); its basic design is very similar to another amplifier described in the referent of [Note 4](#), written 10 years earlier. That amplifier uses a pair of more-expensive MRF138 MOSFETs designed specifically for RF applications.

As [Figure 1](#) shows, the Hints and Kinks amplifier performance is excellent from 1.8 MHz to 7 MHz and far exceeds the published figure of 30 W output on 3.5 MHz. As frequency increases above 10 MHz, however, output drops off rapidly, falling below 10 W above 21 MHz. (These levels were measured after harmonic filtering.)

Although the amplifier is identified as stable, my first attempt at duplicating the amplifier resulted in oscillations that destroyed one of the IRF510s. I was puzzled by this. At first, I thought the problem was caused by my substitution of the slightly more robust IRF510 MOSFETs for the called-for IRF511s. That idea proved wrong when my second attempt to power up the amplifier with IRF511 MOSFETs installed also resulted in a blown IRF511. (Thank goodness these are \$1 power MOSFETs, not \$35 RF MOSFETs!) I finally achieved good stability when I added a small amount of inductance in series with the MOSFET source to ground (just two turns of #24 wire, 0.125 inch diameter). With this added inductance, I was able to remove the ferrite beads from the circuit without any sign of instability. I believe the substitution of the IRF510 and minimizing source lead inductance are the reasons I obtained significantly higher RF output power and wider bandwidth than described in the referent of [Note 3](#). This experiment underscores the need to observe *exact* construction techniques and physical layout if similar performance is to be expected. Even though I used PC board construction, I got significantly different

results because my layout was not the same as the author's.

Modifying the Design

Although the amplifier performed better than expected, its bandwidth was significantly less than desired. Considerable experimentation (and I do mean considerable!) resulted in the circuit shown in [Figure 2](#). This amplifier consists of two power MOSFETs operating in push-pull and employs an RF-sensed TR relay.

During receive, TR relay K1 is deenergized. Signals from the antenna are connected to J2 and routed through K1 to a transceiver connected to J1. (This path loss is less than 0.3 dB from 1.8 MHz through 30 MHz.) In transmit, RF voltage from the transceiver is sampled by C17 and divided by R6 and R7. D2 and D3 rectify the RF voltage and charge C16. Q3 begins conducting when the detected RF voltage across C16 reaches approximately 0.7 V. This energizes K1, which then routes the transmitted RF signal from J1 to the input of the amplifier and sends the output of the amplifier to the antenna at J2. RF-sensed relay response is very fast. No noticeable clipping of the first CW character has been reported.

I made provisions to include an RF attenuator (consisting of R8, R9 and R10) to enable adjusting the amplifier input power to 1 W. (The parts list contains resistor values to reduce the output of 2 or 5 W drivers to 1 W.) The 1 W signal is then applied to the primary of T1 via an input impedance-matching network consisting of L3. T1 is a 1:1 balun that splits the RF signal into two outputs 180 degrees out of phase. One of these signals is applied by C1 to Q1's gate. The other signal is routed via C2 to Q2's gate. The drains of Q1 and Q2 are connected to the primary of output transformer T3, where the two signals are recombined in phase to produce a single output. T3 also provides impedance transformation from the low output impedance of the MOSFETs to the 50 Ω antenna port. Dc power is provided to the drains of Q1 and Q2 by phase-reversal choke, T2. This is a very effective method to provide power to Q1 and Q2 while presenting a high impedance to the RF signal over a broad range of frequencies. The drain chokes for Q1 and Q2 are wound on the same core, and the phase of one of the chokes (see the phasing-dot markings on T2) is reversed. C9 increases the bandwidth of impedance transformation provided by T3, especially at 21 MHz.

The 5 V bias supply voltage is derived from 28 V by Zener diode D1 and current-limiting resistor R11. Bypass capacitors C3, C4, C5, C6 and C13 remove RF voltages from the bias supply voltage. Gate bias for Q1 and Q2 is controlled independently. R1 adjusts Q1's gate-bias voltage via R3 and L1. R2 works similarly for Q2 via R4 and L2.

At low frequencies, the amplifier's input impedance is essentially equal to the series value of R3 and R4. L1 and L2 improve the input-impedance match at higher frequencies. The low value of series resistance provided by R3 and R4 also reduces the Q of

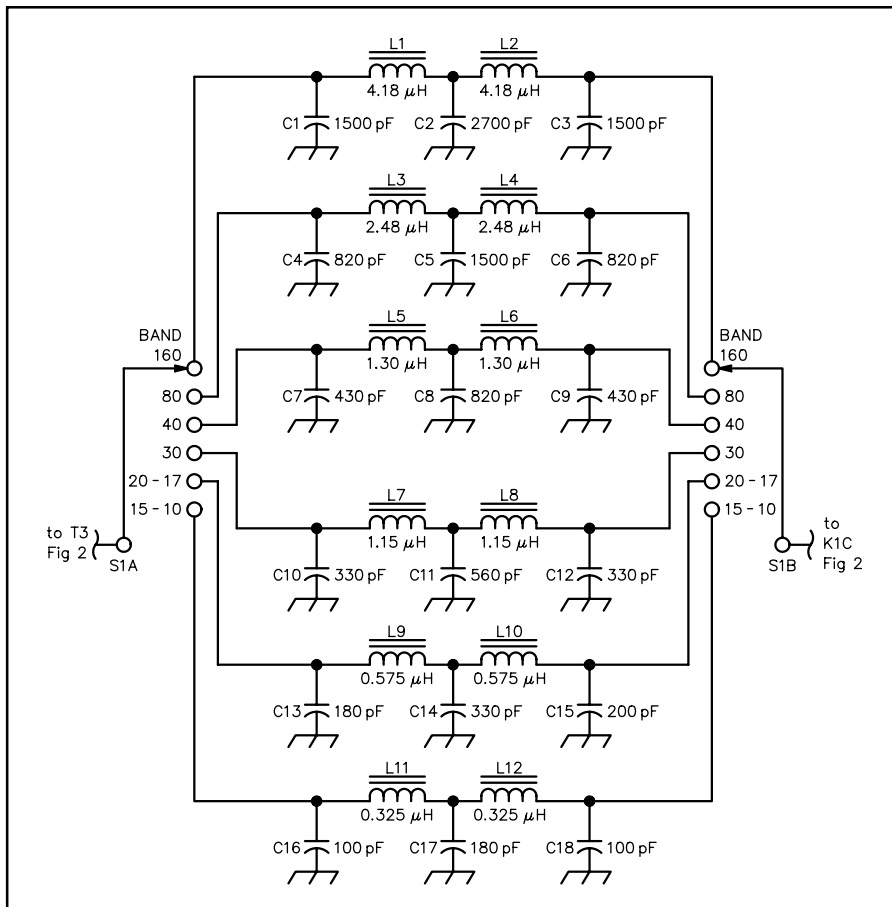


Figure 3—Low-pass filter schematic. In some cases, the actual filter component values differ from the calculated values of a standard 50 Ω -input filter. Such differences improve the impedance matching between the amplifier and the load. Capacitors are all dipped mica units.

- C1, C3, C5—1500 pF (5982-19-500V1500)
- C2—2700 pF (5982-19-500V2700)
- C4, C6, C8—820 pF (5982-19-500V820)
- C7, C9—430 pF (5982-15-500V430)
- C10, C12, C14—330 pF (5982-19-500V330)

- C11—560 pF (5982-19-500V560)
- C13, C17—180 pF (5982-15-500V180)
- C15—200 pF (5982-15-500V200)
- C16, C18—100 pF (5982-10-500V100)
- S1—2 pole, 6 position rotary (10YX026)
- Misc: low-pass filter PC board (see Note 9)

impedance-matching inductors L1 and L2, which improves stability. Dc blocking capacitors C1 and C2 prevent loading the gate bias-supply voltage.

C14 keeps transistor Q3 conducting and K1 energized between SSB voice syllables or CW elements. Without C14, K1 would chatter in response to the SSB modulation envelope and fast keying. Increasing the value of C14 increases the time K1 remains energized during transmit. The reverse voltage generated by K1 when the relay is deenergized is clamped to a safe level by D4. D5 drops the 28 V supply to 13 V to power 12 V relay K1. D5 can be replaced with a jumper if K1 has a 28 V dc coil or if you intend to operate the amplifier with a 13.8 V dc supply.

Harmonic Filtering

Although biased for class AB linear operation, this amplifier (like others of its type) exhibits some degree of nonlinearity, resulting in the generation of harmonics. This push-pull amplifier design cancels even-order harmonics (2f, 4f, 6f, etc) in the output transformer, T3. Odd-order harmonics are

not canceled. Second-order harmonics generated by the amplifier are typically less than 30 dBc (30 dB below the carrier) whereas third-order harmonics are typically only 10 dBc. FCC regulations require all HF RF-amplifier harmonic output power to be at least 40 dBc at power levels between 50 to 500 W. To meet this requirement, it is common practice for HF amplifiers to use low-pass filters. Separate low-pass filters are needed for the 160, 80, 40 and 30 meter bands. The 20 and 17 meter bands can share the same low-pass filter. So, too, the 15, 12 and 10 meter bands can share a common low-pass filter; see Figure 3.

Switching among the six filters can be a messy wiring problem, especially on the higher-frequency bands where lead lengths should be kept short for optimum performance. This problem is solved by mounting all six low-pass filters on a PC board. A two-pole, six-position rotary switch (S1) mounted directly on the same PC board manages all filter interconnections. One pole of S1 connects the amplifier output to one of the six filter inputs, while S1's other pole simul-

taneously connects the corresponding filter's output to the TR relay, K1. Only two coaxial-cable connections are required between the RF amplifier and the low-pass filter board.


Next Month

In Part 2, I'll wrap up with amplifier construction and adjustment, and discuss the amplifier's overall performance. See you then!

Notes

- ¹Doug DeMaw, W1FB, "Power-FET Switches as RF Amplifiers," *QST*, Apr 1989, pp 30-33. See also Feedback, *QST*, May 1989, p 51.
- ²Wes Hayward, W7ZOI, and Jeff Damm, WA7MLH, "Stable HEXFET RF Power Amplifiers," Technical Correspondence, *QST*, Nov 1989, pp 38-40; also see Feedback, *QST*, Mar 1990, p 41.
- ³Jim Wyckoff, AA3X, "1 Watt In, 30 Watts Out with Power MOSFETs at 80 Meters," Hints and Kinks, *QST*, Jan 1993, pp 50-51.
- ⁴Doug DeMaw, W1FB, "Go Class B or C with Power MOSFETs," *QST*, March 1983, pp 25-29.
- ⁵Doug DeMaw, W1FB, "An Experimental VMOS Transmitter," *QST*, May 1979, pp 18-22.
- ⁶Wes Hayward, W7ZOI, "A VMOS FET Transmitter for 10-Meter CW," *QST*, May 1979, pp 27-30.
- ⁷Ed Oxner, ex-W9PRZ (SK), "Build a Broadband Ultralinear VMOS Amplifier," *QST*, May 1979, pp 23-26.
- ⁸Gary Breed, K9AY, "An Easy-to-Build 25-Watt MF/HF Amplifier," *QST*, Feb 1994, pp 31-34.
- ⁹Parts for this project are available in five modular kits. The following three kits are available from Mouser Electronics (Mouser Electronics, 958 N Main St, Mansfield, TX 76063; tel 800-346-6873, 817-483-4422, fax 817-483-0931; sales@mouser.com; <http://www.mouser.com>): Amplifier components (Mouser P/N 371-HFAMP1) consisting of the amplifier PC board and all PC-board-mounted components (except for the ferrite cores). Price: \$35, plus shipping. Amplifier hardware kit (Mouser P/N 371-HFAMP2) consisting of the aluminum enclosure, two UHF connectors, two TO-220 mounting kits, AAVID heat sink and one container of heat sink compound. Price: \$30 plus shipping. Low-pass filter kit (Mouser P/N 371-HFAMP3) consisting of the low-pass filter PC board, rotary switch and all PC-board-mounted capacitors (inductor cores are not included). Price: \$35, plus shipping. Part-placement diagrams accompany the PC boards. PC boards only are available from Mouser Electronics: HF amplifier board (#371-AMPPWB-2); filter PC board (#371-LPPWB-2). Price \$15 each, plus shipping.
- The following two kits are available from Amidon Inc (Amidon, Inc, 240 Briggs Ave, Costa Mesa, CA 92626; tel 1-800-898-1883, 714-850-4660, fax 714-850-1163): Amplifier ferrite kit (Amidon P/N HFAFC) containing the ferrite cores, balun core and magnet and Teflon wire to wind the transformers for the HF amplifier. Price: \$3.50 plus shipping. Low-pass filter cores kit (Amidon P/N HFFLT) containing all iron cores and wire for the low-pass filters. Price: \$4.50 plus ship.
- ¹⁰See Motorola Application Reports Q1/95, HB215, *Application Report AR346*.

Thermal runaway is a condition that occurs with bipolar transistors because bipolar transistors conduct more as temperature increases, the increased conduction causes an increase in temperature, which further increases conduction, etc. The cycle repeats until the bipolar transistor overheats and is permanently damaged.

Mike Kossor, WA2EBY, was first licensed in 1975. He earned his MSEE degree in 1987 from Stevens Institute of Technology in Hoboken, New Jersey. Mike has been employed by Lucent Technologies for 15 years, where he designs high-linearity RF amplifiers for PCS and cellular base stations. You can reach Mike at 244 N 17th St, Kenilworth, NJ 07033; mkossor@lucent.com. 

A Binaural I-Q Receiver



A receiver with presence... to fully appreciate this receiver, you've got to hear it!

I built this little receiver to illustrate an idea that I've been exploring for a number of years. It replaces the narrow filters and interference-fighting hardware and software of a conventional radio with a wide-open *binaural I-Q detector*. If you liken a conventional receiver to a high-powered telescope, this receiver is a pair of bright, wide-field binoculars. The receiver's classic junk-box-available-parts construction approach achieves better RF integrity than that of commercial ham gear. A PC board and parts kit is available for those who prefer to duplicate a proven design.¹

My goal was a project that could be constructed in one weekend. With two working parents and three teenagers in the house, that "one weekend" wound up being spread over a period of about two months! Nevertheless, the total construction time was only 17 hours. There are a number of toroids to wind, and performance was not compromised to simplify construction or reduce parts count.

¹Notes appear on page 48.

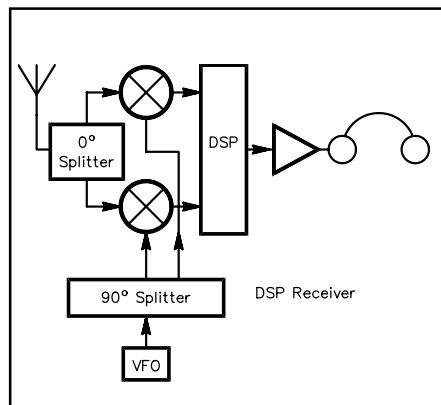


Figure 1—Simplified block diagram of a receiver using a DSP detector; see text.

Binaural I-Q Reception

Modern receivers use a combination of band-pass filters and digital signal processing (DSP) to select a single signal that is then amplified and sent to the speaker or headphones. When DSP is used, the detector often takes the form shown in Figure 1. The incoming signal is split into two paths, then mixed with a pair of local oscillators (LOs) with a relative 90° phase shift. This results in two baseband signals: an in-phase, or *I* signal, and a quadrature, or *Q* signal. Each of the two baseband signals contains all of the information in the upper and lower sidebands. The baseband pair also contains all of the information needed to determine whether a signal is on the upper or lower sideband before multiplication. An analog signal processor consisting of a pair of audio phase-shift networks and a summer could be used to reject one sideband. In a DSP receiver, the *I* and *Q* baseband signals are digitized and the resulting sets of numbers are phase-shifted and added.

The human brain is a good processor for information presented in pairs. We have two eyes and two ears. Generally speaking, we prefer to observe with both eyes open, and listen with both ears. This gives us depth of field and three-dimensional hearing that allows us to sort out the environment around us. The ear-brain combination can be used to process the output of the I-Q detectors as shown in Figure 2.

The sound of CW signals on a binaural I-Q receiver is like listening to a stereo recording made with two identical microphones spaced about six inches apart. The same information is present on each channel, but the *relative phase* provides a stereo effect that is perceived as three-dimensional space. Signals on different sidebands—and at different frequencies—appear to originate at different points in space. Because SSB signals are

composed of many audio frequencies, they sound a little spread in the perceived three-dimensional sound space. This spreading also occurs with most sounds encountered in nature and is pleasant to hear.

To keep the receiver as simple as possible, a single-band direct-conversion (D-C) approach is used. A crystal-controlled converter can be added for operation on other bands, changing the receiver to a single-conversion superhet. Alternatively, the binaural I-Q detector can be used in a conventional superhet, with a tunable first converter and fixed-frequency BFO. If proper receiver design rules are followed, there is no advantage to either design.

The Receiver Proper

Figures 3, 4 and 5 show the complete schematic of the receiver. In Figure 3, signals from the antenna are connected directly to a 1 kΩ **GAIN** pot on the front panel. J1, a BNC antenna connector, is used in keeping with my "VHF construction techniques" theme. Adjusting the gain before splitting the signal path avoids the need for a two-gang volume control, and eliminates having to use separate RF and AF-gain adjustments. This volume-control arrangement leaves the "stereo background noise" constant and varies the signal-to-noise ratio. The overall gain is selected so that the volume is all the way up when the band is quiet. Resistor values R9 and R31 may be changed to modify the overall gain if required. After the volume control, the signal is split with a Wilkinson divider and connected to two SBL-1 diode-ring mixers. (The TUF-1 is a better mixer choice, but I had more SBL-1s in my junk box.) The VFO signal is fed to the two mixers through a quadrature hybrid, described by Reed Fisher.² All

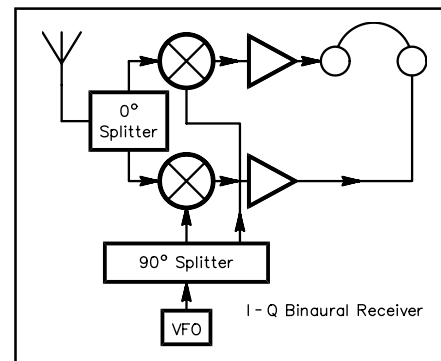


Figure 2—Block diagram of an I-Q binaural receiver that allows the ear-brain combination to process the detector output resulting in stereo-like reception.

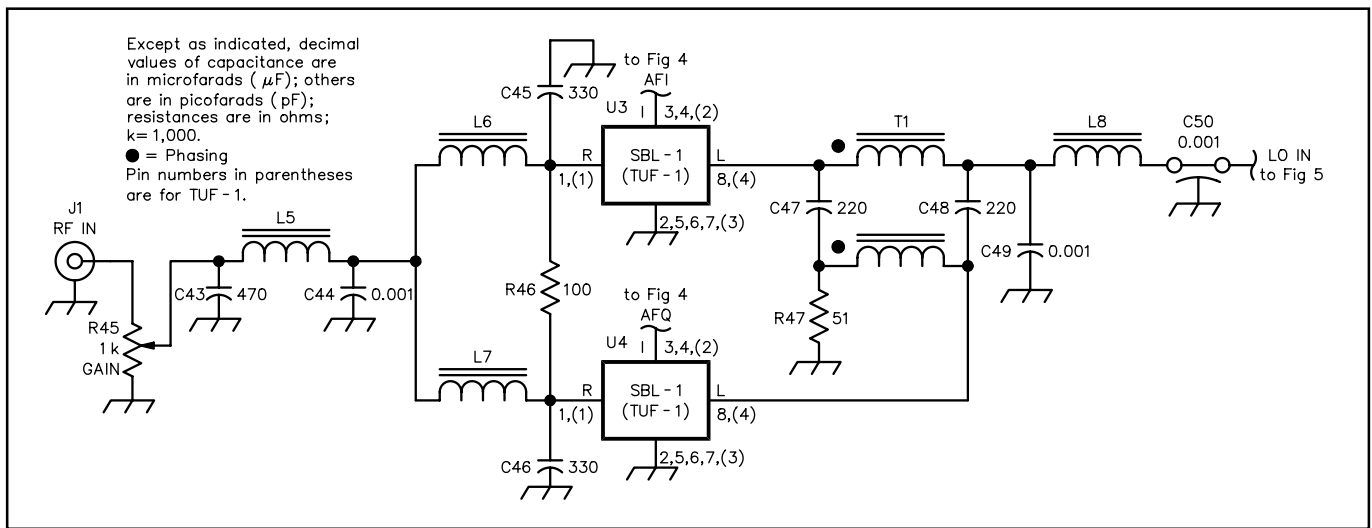


Figure 3—Front end and I and Q demodulators of the Binaural Weekender receiver. Unless otherwise specified, resistors are 1/4 W, 5% tolerance carbon-composition or film units. Equivalent parts can be substituted. Pin connections for the SBL-1 and TUF-1 mixers at U3 and U4 are shown; the TUF-1 pin numbers are in parentheses. A kit is available (see Note 1). Parts are available from several distributors including 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>; Mouser Electronics, 958 N Main St, Mansfield, TX 76063; tel 800-346-6873, 817-483-4422, fax 817-483-0931; sales@mouser.com; <http://www.mouser.com> and 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>.

- C43—470 pF disc ceramic
- C44, C49—0.001 μ F metal polyester
- C45, C46—330 pF disc ceramic
- C47, C48—220 pF disc ceramic
- C50—0.001 μ F feed-through capacitor
- J1—Chassis-mount female BNC connector

- L5—1.6 μ H, 24 turns #28 enameled wire on T-30-6 powdered-iron core
- L6, L7—1.3 μ H, 21 turns #28 enameled wire on T-30-6 powdered-iron core
- L8—350 nH, 11 turns #28 enameled wire on T-30-6 powdered-iron core

- R45—1 k Ω panel-mount pot
- T1—17 bifilar turns #28 enameled wire on T-30-6 powdered-iron core
- U3, U4—Mini-Circuits SBL-1 or TUF-1 mixer

of the circuitry under the chassis is broadband, and there are *no* tuning adjustments.

The audio-amplifier design of Figure 4 is derived from that used in the R1 High-Performance Direct-Conversion Receiver,³ with appropriate simplifications. The R1 high-power audio output is not needed to drive headphones, the low-pass filter is eliminated, and the diplexer has fewer components. Distortion performance is not compromised—well over 60 dB of in-band two-tone dynamic range is available. The original article, and the additional notes in Technical Correspondence for February 1996,⁴ describe the audio-amplifier chain in detail.

The VFO

Figure 5 is the schematic of the receiver's VFO, a JFET Hartley oscillator with a JFET buffer amplifier. Components for the VFO tuned circuit are chosen for linear tuning from 7.0 to 7.3 MHz with the available junk-box variable capacitor. Setting up the VFO is best done with a frequency counter, receiver and oscilloscope. The frequency counter makes it easy to select the parallel NP0 capacitors and squeezing and spreading the wire turns on L1 achieves the desired tuning range. After the tuning range is set, listen to the VFO signal with a receiver to make sure the VFO tunes smoothly and has a good note. Interrupt the power to hear its start-up chirp. The signal may sound ratty with the frequency counter on, so turn it off. The VFO is one area where craftsmanship pays off. Solid construction, a self-aligning variable-capacitor mounting, complete RF and air shielding and good capacitor bearings all contribute to a receiver

that is a joy to tune.

Both connections to the VFO compartment are made with feed-through capacitors. The power supply connection is self-explanatory, but passing RF through a feed-through capacitor (at LO Out) may seem a bit unusual. Electrically, the capacitor is one element of a low-pass pi network. Using feed-through ca-

“Once my ears got used to the effect, they had to drag me away from this radio. This is one I gotta have!”—Ed Hare, W1RFI, ARRL Lab Supervisor

pacitors keeps local VHF signals (high-powered FM broadcast and TV signals near my location) out of the VFO compartment. A second pi network feeds the VFO signal to the detector circuit below the chassis. The use of VHF construction techniques in a 40 meter receiver may seem like overkill, but the present KK7B location is line-of-sight to broadcast towers serving the Portland area. Using commercial HF gear with conventional bypassing under these circumstances provided disappointing results.

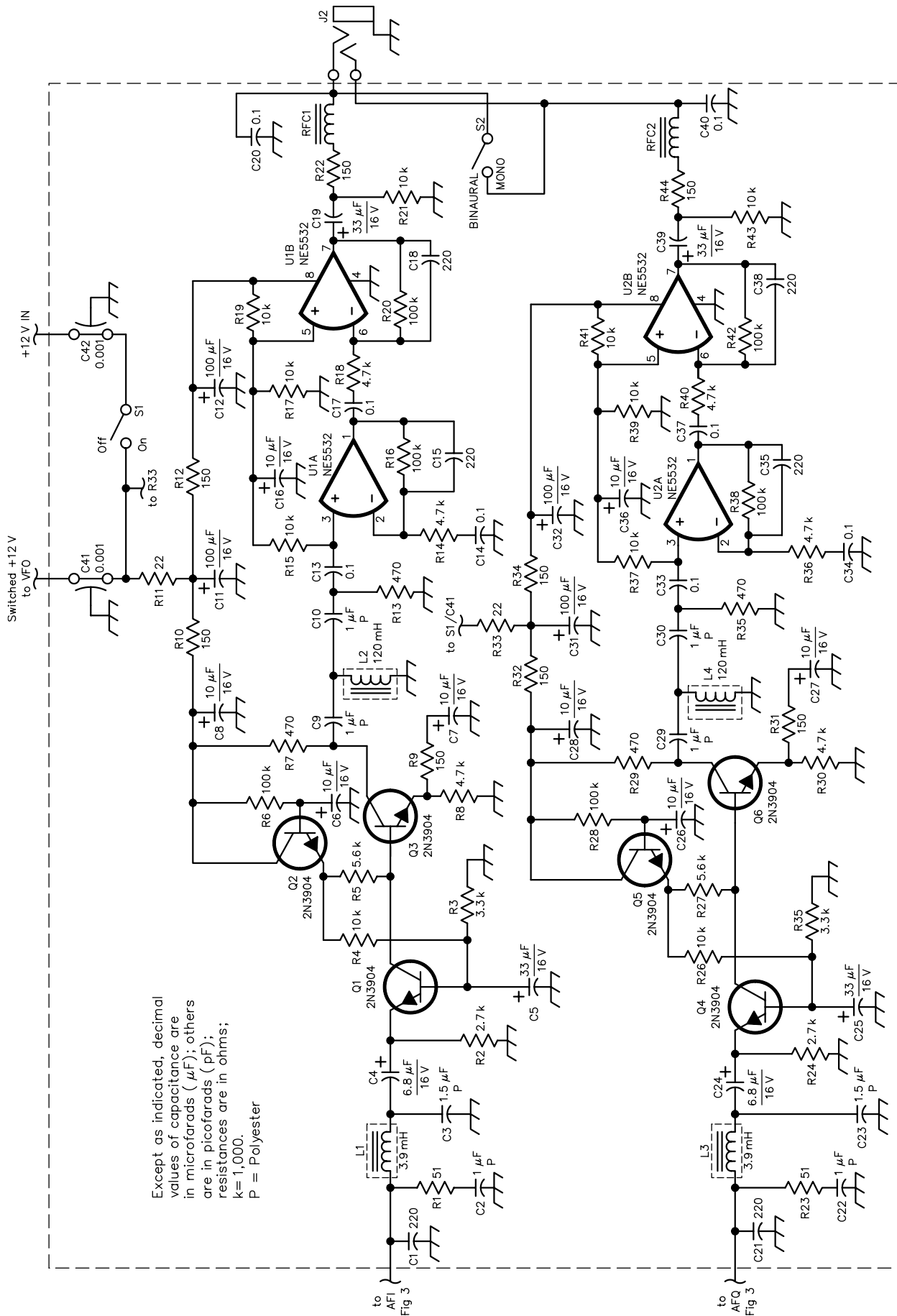
The accompanying photographs show the prototype receiver. Receiver controls are simple and intuitive. The ear-brain adjusts so

naturally to binaural listening that I added a **BINAURAL/MONO** switch to provide a quick reminder of how signals sound on a conventional receiver. The switch acts much like the **STEREO-MONO** switch on an FM broadcast receiver—given the choice, it always ends up in the **STEREO** position on my receiver!

I used Koss SG-65 headphones because they have some useful features. First, at \$32, they are inexpensive. Second, they have relatively high-impedance drivers, (90 Ω) so they can be driven at reasonable volume directly from an op amp. Finally, they make an attempt at low distortion. Other headphones in the same price bracket are acceptable, but some have much lower impedance and won't provide a very loud audio signal using the component values given in the schematic. Those \$2.95 bubble-packed, throw-away headphones are *not* a good choice! Audiophile headphones are fine, but don't really belong on an experimenter's bench. A stray clip-lead brushing across the wrong wire in the circuit can instantly burn out a driver and seriously ruin your day.

Building a Binaural Weekender

A few construction details are generally important, while others were determined by the components that happened to be in my junk box. The big reduction drive is delightful to use, but doesn't contribute to electrical performance. I purchased it at a radio flea market. The steel chassis provides a significant reduction in magnetic hum pickup, something that can be a problem if the receiver is operated near a power transformer. (Steel chassis are available from parts houses



Except as indicated, decimal values of capacitance are in microfarads (μF); others are in picofarads (pF); resistances are in ohms; k=1,000. P = Polyester

Figure 4—The receiver's audio-amplifier design is derived from one used in the R1 High-Performance Direct-Conversion Receiver (see [Note 3](#)), with appropriate simplifications.

- C1, C15, C18, C21, C35, C38—220 pF disc ceramic
- C2, C9, C10, C22, C29, C30—1 μ F metal polyester (Panasonic ECQ-E(F) series)
- C3, C23—1.5 μ F metal polyester (Panasonic ECQ-E(F) series)
- C4, C24—6.8 μ F, 16 V electrolytic (Panasonic KA series)
- C5, C19, C25, C39—33 μ F, 16 V electrolytic (Panasonic KA series)
- C6, C7, C8, C16, C26, C28, C27, C36—10 μ F, 16 V electrolytic (Panasonic KA series)
- C11, C12, C31, C32—100 μ F, 16 V electrolytic (Panasonic KA series)
- C13, C14, C17, C20, C33, C34, C37, C40—0.1 μ F metal polyester (Panasonic V series)
- C41, C42, C50—0.001 μ F feed-through capacitor
- J2— $\frac{1}{8}$ -inch stereo phone jack
- L1, L3—3.9 mH Toko 10RB shielded inductor
- L2, L4—120 mH Toko 10RB shielded inductor
- Q1-Q6—2N3904
- RFC1, RFC2—10 turns #28 enameled wire on Amidon ferrite bead FB 43-2401 (six-hole bead shown in photos)
- S1, S2—SPST toggle switch
- U1, U2—NE5532 dual low-noise high-output op amp

What Do You Hear?

Even the earliest solid-state direct-conversion (D-C) receivers had a presence or clarity that is rarely duplicated in more elaborate receivers. Many of us remember the first time we heard this crispness in a "homebrewed" D-C receiver. As we try to "enhance" our rigs through the addition of IF filters and other "features," we still hope that the result will be as clean as that first D-C receiver.

This binaural D-C receiver is such an experience—but even better. The binaural processing supplies the ears with additional information without compromising what was already there, enhancing the presence.

As you tune through a CW signal on a quiet band (best done with your eyes closed while sitting in a solid chair), a centered signal enters, but moves to the left background, undergoes circular motions at the back of your head as you tune through zero beat, repeats the previous gyrations on the right side, fades to the right background, and finally drops away in the center. Multiple signals within the receiver passband are distributed throughout this perceived space. With training, concentration on one signal allows it to be copied among the many. An SSB signal seems to occupy parts of the space, left and right, with clarity when properly tuned, leaving others vacant. Static crashes and white noise appear distributed throughout the entire space without well defined position. Receiver noise, although present, has no perceived position.

It's vital that this receiver include a front-panel switch to shift between binaural and monaural output. Although useful during the learning process, it becomes indispensable for the demonstrations that you *will* want to do. I used the switch to set up my son, Roger, KA7EXM, for the experience. We entered the shack and I handed him the headphones. He put one phone to just one ear, but I told him that he had to use both, that it would not work with just one. He put the phones on his head, casually tuned the receiver through the 40-meter CW band, removed the phones and commented, "Well, it sounds just like a direct-conversion receiver: A good one, but still just a direct-conversion receiver." I smiled and asked him to put the headphones on again. As I flipped the switch to the binaural position his hand reached out, seeking the support of the workbench. His facial expression became more serious. He eased into the chair and began tuning the receiver, very slowly at first. After a minute he took the headphones off, but remained speechless for a while—an unusual condition for Roger. Finally, he commented, "Wow! The appliance guys have never heard that!"

A builder of the Binaural Weekender should prepare for some truly unusual experiences.—*Wes Hayward, W7ZOI*

that cater to audio experimenters.) The VFO mounting and mushroom-can shield are a simple way to eliminate mechanical backlash, keep radiated VFO energy off the antenna, prevent hand capacitance from shifting the tuning, and reduce VFO drift caused by air currents.

Experienced builders can duplicate this receiver simply using the schematic and construction techniques shown in the accompanying photographs. Unlike a phasing receiver, there is *no need* to precisely duplicate the exact amplitudes and phases between the

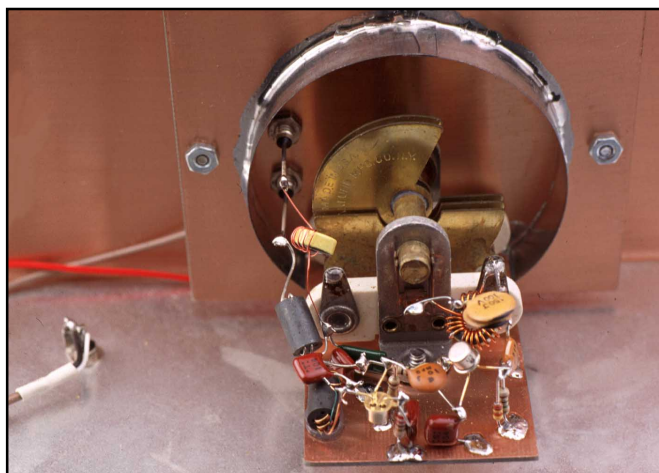
two channels. The ear-brain combination is the ultimate adaptive processor, and it quickly learns to focus on a desired signal and ignore interference. Small errors in phase and amplitude balance are heard as slight shifts in a signal's position. Standard-tolerance components may be used throughout. A kit version is also available (see [Note 1](#)).

One note about the kit version: A very good VFO can be built on an open PC board if the variable oscillator is not running on the desired output frequency. The Kanga kit VFO runs at one-half the desired RF frequency,

and is followed by a balanced frequency doubler and driver amplifier.

Other Experiments

My earliest experiments with binaural detectors feeding stereo audio amplifiers were done in 1979, using two antennas. The technique works very well, but requires two antennas either physically spaced some distance apart, or of different polarization. Listening to OSCAR 13 on a binaural receiver with cross-polarized Yagis was an unsettling experience. The need for two antennas is a



Close-up of the VFO. The simple VFO used in the prototype works exceptionally well, but must be completely shielded for good D-C receiver performance. An empty mushroom can lives again as a VFO shield.

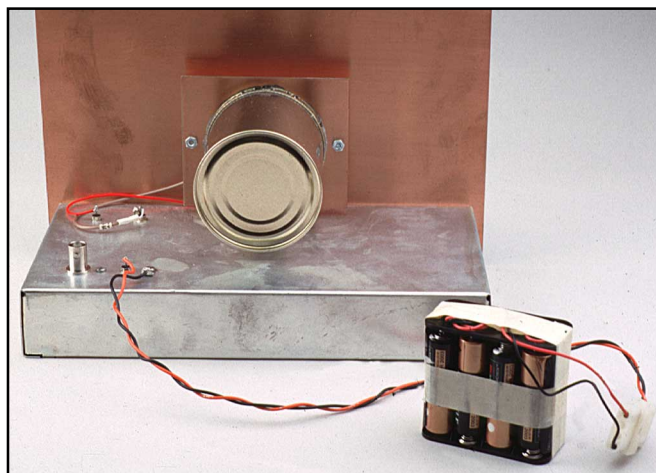
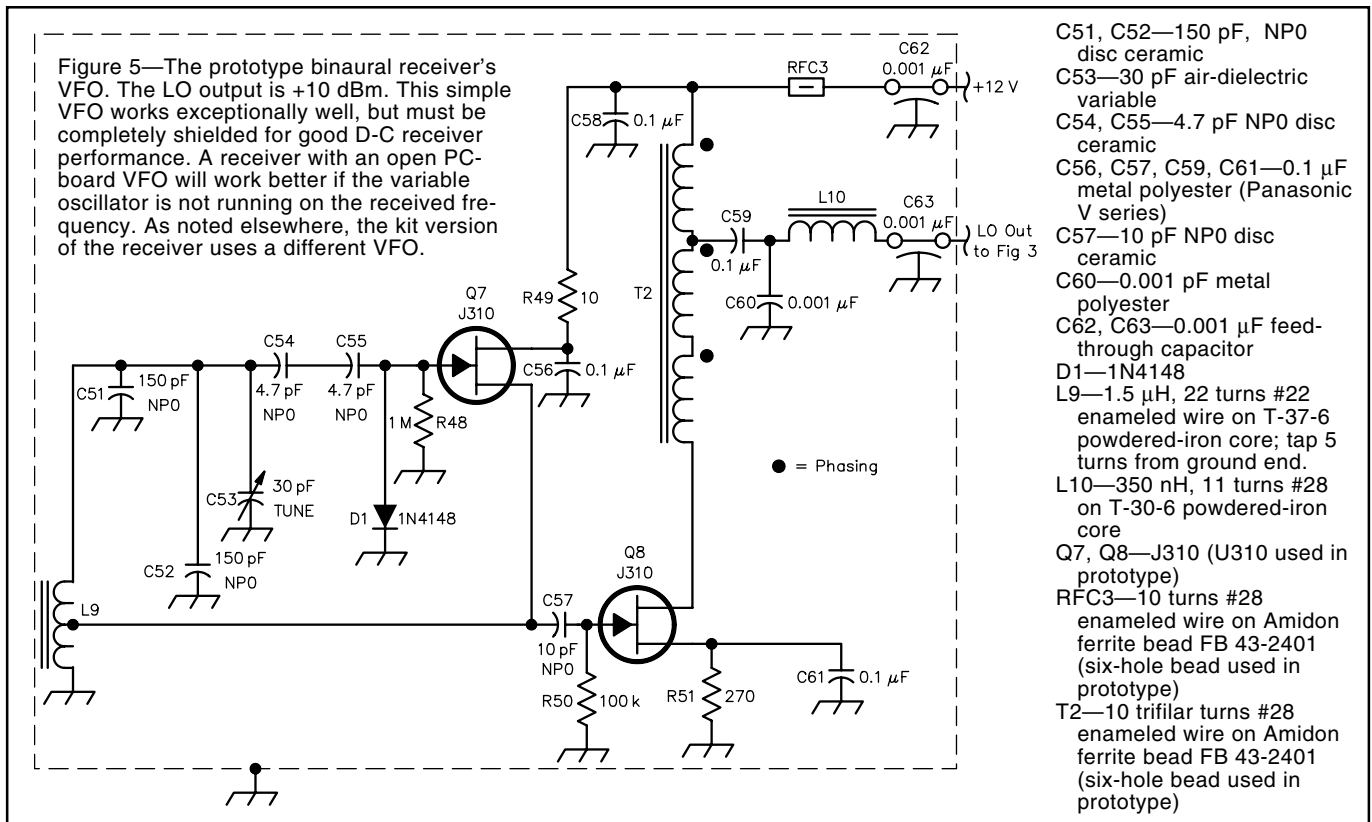


Figure 5—The prototype binaural receiver's VFO. The LO output is +10 dBm. This simple VFO works exceptionally well, but must be completely shielded for good D-C receiver performance. A receiver with an open PC-board VFO will work better if the variable oscillator is not running on the received frequency. As noted elsewhere, the kit version of the receiver uses a different VFO.



- C51, C52—150 pF, NPO disc ceramic
- C53—30 pF air-dielectric variable
- C54, C55—4.7 pF NPO disc ceramic
- C56, C57, C59, C61—0.1 μ F metal polyester (Panasonic V series)
- C57—10 pF NPO disc ceramic
- C60—0.001 pF metal polyester
- C62, C63—0.001 μ F feed-through capacitor
- D1—1N4148
- L9—1.5 μ H, 22 turns #22 enameled wire on T-37-6 powdered-iron core; tap 5 turns from ground end.
- L10—350 nH, 11 turns #28 on T-30-6 powdered-iron core
- Q7, Q8—J310 (U310 used in prototype)
- RFC3—10 turns #28 enameled wire on Amidon ferrite bead FB 43-2401 (six-hole bead used in prototype)
- T2—10 trifilar turns #28 enameled wire on Amidon ferrite bead FB 43-2401 (six-hole bead used in prototype)

liability—these days, most of us struggle to put up one. A number of experiments have also been done with binaural independent sideband (ISB) reception. These are profoundly interesting for AM broadcast reception, and could be used for amateur AM or DSB reception using a Costas Loop for carrier recovery. Binaural ISB detection of shortwave AM broadcasting can be analyzed as a form of spread spectrum with the ear-brain serving the despreading function, or as a form of frequency diversity, with the ear-brain as an optimal combiner.

The binaural techniques described here are analogous to binocular vision: They present the same information to each ear, but from a slightly different angle. This provides a very natural sound environment that the brain interprets as three-dimensional space. There are other “binaural” techniques that involve the use of different filter responses for the right and left ears. My experiments with different filter responses for the left and right ears have not been particularly interesting, and I have not pursued them.

Summary

This little receiver is a joy to tune around the band. It is a serious *listening* receiver, and allows digging for weak signals in a whole new way. Digging for weak signals in a three-dimensional sound field is sometimes referred to as the “cocktail party effect.” It is difficult to quantify the performance of a binaural receiver, because the final signal processing occurs in the brain of the listener—you. The experimental literature of psycho-acoustics suggests that the

ear-brain combination provides a signal-to-noise advantage of approximately 3 dB when listening to speech or a single tone in the presence of uncorrelated binaural noise. The amount of additional noise in the opposite sideband is also 3 dB, so it appears that the binaural I-Q detector breaks even. In some applications, such as UHF weak-signal work, the binaural I-Q detector may have an advantage, as it permits listening to a larger slice of the band without a noise penalty. In other situations, such as CW sweepstakes, the “cocktail party” may get entirely out of hand. Binoculars and telescopes both have their place.

Notes

¹The complete kit version, available from Kanga US, uses a different VFO circuit than the one shown here. The kit VFO runs at one-half the desired output frequency, and is followed by a balanced frequency doubler and driver amplifier. Price: Receiver and VFO PC boards with all board-mounted components, \$115 plus shipping. Contact Kanga US, Bill Kelsey, N8ET, 3521 Spring Lake Dr, Findlay, OH 45840; tel 419-423-4604; kanga@bright.net; <http://www.bright.net/~kanga/>.

Steel chassis such as the Hammond 1441-12 (2x7x5 inches [HWD]) with 1431-12 bottom plate and the Hammond 1441-14 (2x9x5 inches [HWD]) with 143-14 bottom plate are suitable enclosures. These chassis and bottom plates are not available in single quantities directly from Hammond, but are available from Allied Electronics, 7410 Pebble Dr, Fort Worth, TX 76118; tel 800-433-5700, <http://www.allied.avnet.com>; and 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>.

²Reed Fisher, W2CQH, “Twisted-Wire Quadrature Hybrid Directional Couplers,” *QST*, Jan 1978, pp 21-23. See also *IEEE Transactions*

MTT, Vol MTT-21, No. 5, May 1973, pp 355-357.

³Rick Campbell, KK7B, “High-Performance Direct-Conversion Receivers,” *QST*, Aug 1992, pp 19-28.

⁴Rick Campbell, KK7B, “High-Performance, Single-Signal Direct-Conversion Receivers,” *QST*, Jan 1993, pp 32-40. See also Feedback, *QST*, Apr 1993, p 75.

References

Rick Campbell, KK7B, “Direct Conversion Receiver Noise Figure,” Technical Correspondence, *QST*, Feb 1996, pp 82-85.

Campbell, Richard L., “Adaptive Array with Binaural Processor,” *Proceedings of the IEEE Antennas and Propagation Society International Symposium*, Philadelphia, PA, Jun 1986, pp 953-956.

Rick Campbell, KK7B, “Binaural Presentation of SSB and CW Signals Received on a Pair of Antennas,” *Proceedings of the 18th Annual Conference of the Central States VHF Society*, Cedar Rapids, IA, Jul 1984, pp 27-33.

Rick Campbell taught himself code and theory and passed the Novice test as a young teen. His early interest in radio has profoundly influenced his career. He has been a US Navy Radioman, studied surface physics at Bell Labs in the '70s, and designed direct-conversion image-reject satellite navigation receivers in the early '80s. From 1983 through 1996, he was a faculty member in Electrical Engineering at Michigan Technological University. During the early '90s, he held a summer appointment at the US Department of Commerce Institute for Telecommunications Science in Boulder, Colorado. In 1996, he left academia to join the advanced receiver development group at TriQuint Semiconductor in Hillsboro, Oregon. In addition to designing and building receivers, Rick also enjoys windsurfing, playing the violin and raising a family.

You can contact Rick at 4105 NW Carlton Ct, Portland, OR 97229; rickc@tqs.com.

PIC Development on a Shoestring

Are you itching to develop PIC-based projects yourself? Here are some ideas on how to go about it.

Embedded microprocessor development can seem to be an expensive task, requiring lots of specialized equipment that is beyond the means of most amateurs. Although developing projects using PIC¹ microprocessors can be expensive, it *doesn't have to be*. PIC development can be done with just a handful of parts: an EPROM eraser, some kind of programming language and a low-cost PIC programmer.² That's an exact list of the equipment that I use. I don't have access to specialized professional equipment, but I do develop many useful projects with PICs.^{3,4}

Why Pick PICs?

PICs are an *enabling* technology. All those logic, control, communication and display functions that our projects need can be packed into a single chip—a chip that can be reconfigured at your pleasure! Similarly, we can add features to our projects that make them even more professional and easier to operate.

The simplest, popular PICs are contained in a single 18-pin package, have 13 I/O pins and need only an external clock for operation. For usefulness, the PIC is truly the '90s version of the venerable 555 timer!

Most of the PICs you likely will be using are flash EEPROM or windowed EPROMs. This means that they can be programmed over and over again. In fact, the legs on my frequently used PICs break off long before the write/erase cycle limit of the PIC is ever reached! In higher-volume commercial applications, PICs are available at lower cost in a one-time programmable (OTP) version. The OTP version allows the code to be burned into the PIC *once*. Obviously, this "cheaper" device wouldn't be cheaper to use when you're developing new code, but when the code is stable, a

commercial manufacturer may choose to use OTP versions to reduce cost.

Basic PIC Uses

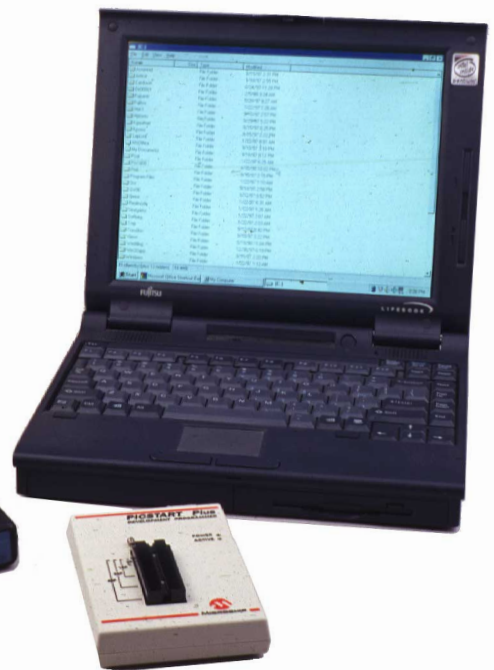
I break PIC applications up into two overlapping categories:

- Stand-alone applications such as CW keys, ID modules, etc. These PIC applications use the device as a *programmable logic array* (PLA). That is, the program you write for the PIC can take the place of hundreds of discrete logic gates. Such projects usually stand by themselves and have simple user interfaces that may include an LCD (see the sidebar "[Simple Project Displays](#)") and some user-interaction switches. My 2-meter PC-controllable FM receiver (see [Note 4](#)) is an example of this type of application.
- The other application category involves using the PIC as a PC interface. Because the PIC can communicate easily using RS-232 connections, you can use a PIC as a sophisticated "programmable UART." This follows the electronics industry trend toward *virtual instruments* (VI), that is, electronic equipment that does not have a *physical* front panel, but a communications interface to a computer that processes the instrument's data and displays the instrument's *virtual* front-panel controls. My Personal Network Analyzer (see [Note 3](#)) is one example of such a project.⁵

The two PIC-usage categories may overlap, as they do in my 2-meter receiver. That project uses a PIC to operate a user interface, including an LCD, knobs and switches. When it detects the presence of an RS-232 connection, it operates like a virtual radio with a PC controlling the receiver.

PC Control of a Virtual Instrument

The key to operating a virtual instrument is the program running on the PC. MS-DOS is a simple environment in which to operate,



Ready for another programming assignment! My shoestring development station includes a Microchip programmer, an EPROM eraser and, of course, a PC.

but the availability of DOS-based development tools is nonexistent now, except for shareware. This leaves *Windows*—and the tools here are quite good. Microsoft's *Visual Basic* is a very reliable and useful development tool. You may be able to find someone's old copy of *Visual Basic 3* for *Windows 3.1* or *95* development. Or, if you want to start with the latest 32-bit versions, use *Visual Basic 5* or *6* for *Windows 95/98* programming.

Because each PC-based language uses its own way of controlling the serial port, it's impractical to list them all here. But, the serial port is a commonly supported communication method under DOS and *Windows*, so it's a part of all these languages. Check the language manuals and help files for more specific information.

For an example of the PIC code that controls a virtual instrument via RS-232, visit my Web page describing the Personal Network Analyzer project and download the PIC source code.

Which PICs to Use?

At first, you seem to be faced with a bewildering array of PICs from which to choose. Your choice of which PICs to use may well start with the language you'll be using and/or what your programmer can support. I use four devices for all of my fun projects: the mid-range 16C6x, 16F84 and 16C7x; this keeps costs down and ensures I will always have devices available when I need them. Here are the reasons I chose these devices:

16F84—A low cost 18-pin device with moderate memory size (1 kB). This device is used for basic control applications that won't be large, need analog input (ie, an ADC) or use a lot of I/O pins (My Web site⁶ shows several robots that my kids and I have

¹Notes appear on [page 51](#).

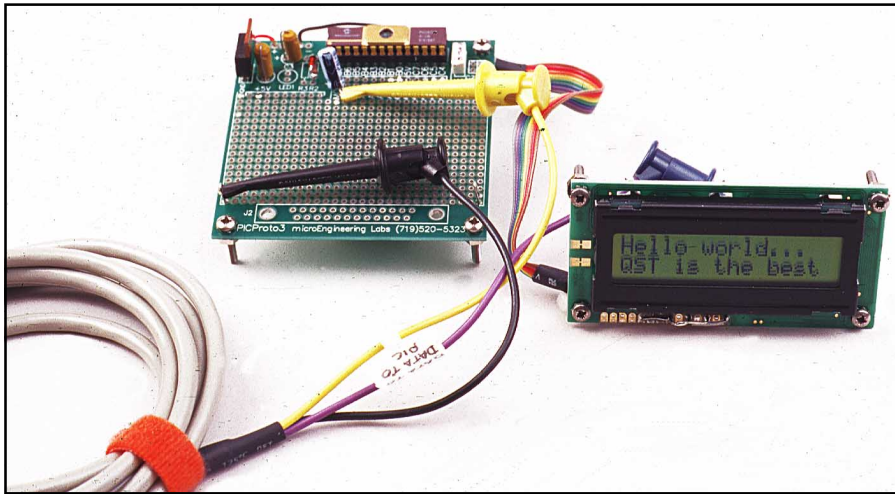


Figure 1—My universal RS-232 debugging cable simply clips to the circuit I'm testing. Three leads are all that is required to get bidirectional communication from a PIC breadboard to any PC terminal program.

built with this device). This is the most popular hobbyist PIC of all time (an older device was called the 16C84). This device uses flash memory and does not need to be erased in an EPROM eraser before it can be reprogrammed.

16C71—Like the 16F84, but it also has a built-in four-channel, 8-bit ADC. This device is used where I need to get analog signals into the PIC for control applications (such as the Personal Network Analyzer; see Note 3). The newest replacement to this device is the 16C711.

16C63—This device is in a 28-pin package, contains one five-bit I/O port and two 8-bit I/O ports. The device also has a hardware UART and 4 kB of memory. I use this device where I need the execution speed of the built-in UART, the extra ports or the 4 kB of memory for large, complicated projects.

16C73—Like the 16C63, but also has a built-in, four-channel, ADC like the 16C71. I use this device in all the applications a 16C63 would be used for, but also need an ADC.

With just these four devices, I can keep my investment low and put together nearly any project I likely have the time for! To program these PICs, I use a Microchip PicStart programmer.⁷ It's a bit on the expensive side, but it can program *all* of the currently available PICs.

How to Program a PIC

Programming a PIC is no harder than writ-

ing a small program for a PC; the exact sequence of steps is different, but it's not difficult to learn. If you want to program in assembly language, the tools are free from Microchip.⁸ Programming in higher-level languages such as *BASIC* and *C* can be accomplished using low-cost (under \$100) tools.^{9,10} These higher-level language tools are usually referred to as *compilers* because they take the high-level statements and compile them into processor-specific machine language. I program my projects in *C*, a high-level language that keeps the code close to the hardware. This is the perfect language to use to talk to a PIC because controlling hardware is the whole idea. However, *BASIC* is also a viable language to use for amateur projects.

Once a program is written (in whatever language you have chosen), the assembler or compiler generates a binary image of the target PIC's memory. This image file is usually called a *hex* file, because it is in a format called the Intel hex 8 format. You don't need to know the technical details of this format for successful application of the PIC. Microchip's tools produce this format, so most of the low-cost programmers available support it as do the compiler manufacturers, and it's become the de-facto standard for PICs. All you really need to know is how to load the image file into your programmer and download it to your PIC, usually a simple task.

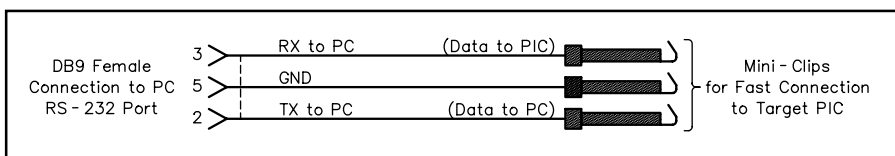


Figure 2—This simple adapter cable allows easy debugging of PIC applications with any PC-based terminal program. Employing clip leads makes it easy to do on-the-spot debugging and probing of the inner workings of your PIC programs. You will want to make one of these early on, because you won't feel like making it when you really need it!

Debugging an Application

Debugging is where the fun starts—and stops, sometimes! The need for debugging can arise for two basic reasons: Because the program doesn't appear to work as you planned, or because you think up features to add as you're writing the programs. Professionals may debug with expensive *in-circuit emulators* (ICE systems) that allow stepping through the code line by line while connected to the target hardware. Although this is the most effective way to see how the program actually works from a time standpoint, its cost is usually beyond the means of most amateurs.

Debugging Tip 1

I use a slightly less time-effective debugging method than ICE, but it's a lot friendlier to your pocketbook! Most applications are best built in stages. Each stage adds a function, and I fully test that function before adding the next one. This way, the potential problem areas are kept small. If the program stops working after a new stage is added, then I know to look at the new stage first! Sometimes problems can be found by observing the action of the hardware and looking at the source code again. More often than not, you'll spot an obvious error and be able to correct it.

In fact, the programs for my 2-meter receiver project are built exactly this way. In past projects, I have used LCDs, so I reused this already-tested code to display program output when testing the other hardware code (described later). I had also used the PIC's built-in ADC and RS-232 UART, so these controlling subroutines were reused. I had not used an interrupt-driven rotary encoder before with a PIC, so I wrote some simple programs to experiment with how to best do this. I even used a 16C84 processor for this development because I had a breadboard already built up and wanted to reuse that also. When I had the encoder working correctly, I added the switch inputs and worked on debouncing routines and getting the RC networks connected to these switches properly.

When all the lower-level hardware-control routines were built and tested, I started building the final application safe in the knowledge that when my program said "read a debounced switch," if the program didn't work, I knew it was the *main program's* logic and not the previously written and tested subroutines. This is, in fact, my first approach to developing PIC applications: Work on the hardware-control stuff in small increments. It saves time in the long run.

Debugging Tip 2

My second approach to debugging on a shoestring is simply to keep five or more PICs in an EPROM eraser at all times. Doing so allows me to execute almost instantaneous write, compile, program, test cycles. Many times during development, I may work with a piece of code for only a few minutes before I decide it needs improvement. Sometimes, it just doesn't run at all! Being able to immediately get another blank PIC into the pro-

grammer's socket keeps the development cycle short and productive (much like it is on a PC). This also saves time in the long run at the minor expense of having a few extra PICs lying around.

Debugging Tip 3

My third and last debugging tip is to use an RS-232 link to a PC during development, to show what is happening inside the PIC during program execution. In the early stages of development, I usually use the LCD (if the project has one) to show what is happening in the program. I write to the display much like you would use PRINT statements in BASIC to print the values of internal variables, or just to print out where the program is while it's running.

As I get farther along in writing the software, I'll likely have the LCD tied into the main program, so it's not convenient to use the LCD for debugging any more. At that point, I switch to using an RS-232 link to a PC. All of the better programming languages have built-in RS-232 serial commands that can be used on PICs with or without UARTs. My compiler recognizes nonUART devices and automatically adds software routines that perform the RS-232 input and output. These routines may take up a little of your code space, but they really help debugging.

In its simplest form, an RS-232 link only uses one PIC pin. The C compiler I use can configure any I/O pin for RS-232 I/O, and there is usually one pin available for debugging purposes. The PIC's RS-232 pin is connected to the PC's RS-232 receive pin, a ground wire is added to connect the PC's ground to the PIC's and off we go! (See Figure 2). Using any terminal program (Windows or DOS, configured for the right number of bits and data rate), the data from the PIC can be viewed as the program executes. If you need to pause the program at various points, you can add an RS-232 input to another of the PIC's pins and use it to have the PIC wait until it receives a character from the terminal program.¹¹

Using RS-232 for debugging really reinforces Debugging Tip 2. That is, you will probably be making rapid changes to the program as you move debugging PRINT statements around, and you want to keep your efficiency high. You won't want to wait while another PIC is erased before trying the next experiment. So, keep plenty of PICs roasting in the EPROM eraser at all times! I'm not suggesting that you keep hacking code until it seems to work! Even the most experienced professionals learn by doing. I'm saying that while "learning more by doing more," you keep your debugging efficiency high.

For your next project, you can probably reuse much of the code that you developed for previous projects and speed your development time even more. As I mentioned earlier, that's how I develop many of the pieces for my projects.

Notes

¹Microchip Technology Inc, 2355 W Chandler Blvd, Chandler, AZ 85224-6199; tel 602-786-

Simple Project Displays

You may notice many articles nowadays that include LCDs. Available from many manufacturers, LCDs are really complete display subsystems.* They are commonly programmed in four-bit nibbles and can display the full upper- and lowercase ASCII character set.

Different display models are available ranging from 16 character and one line to 40 characters and four lines. LCD costs start at under \$20. The displays are 14 pin devices, with 11 pins to deal with when programming. LCDs have an 8-bit mode and a 4-bit mode. In 4-bit mode, you only need four data lines and two control lines to completely control the display; see the accompanying figure. Using the four-bit mode saves on I/O pins, which with a PIC, is usually important (see Figure A).

Although it is relatively easy to program these displays, it can be made even easier by buying one of the many add-on serial adapters.[†] These serial adapters allow the display to be accessed with serial bit streams from a single PIC pin. Interestingly enough, these serial adapters are themselves usually built with PIC microprocessors!

Using one of these displays boils

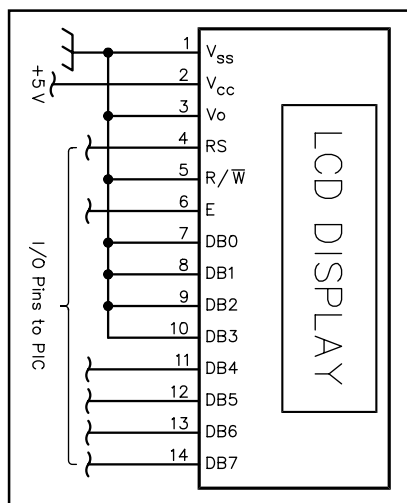


Figure A—By using an LCD's four-bit nibble mode, the number of I/O pins required for operation are reduced to six.



Figure B—These simple-to-use character-based displays really give a professional appearance to our projects. They can be programmed serially themselves, or connected directly to a PIC through six I/O pins.

down to three simple functions:

- Initialize the display; this clears the entire display.
- Set the line (ie, the first, second, etc) to write to. This also sets the cursor to the beginning of the line.
- Write text to the display. You can write single characters or entire strings to the display. The display itself takes care of positioning each character.

Translated into C code, these statements look like this:

```
init_lcd();
// Initialize and clear the LCD Display
first_line();
// Set cursor to first line
write_lcd("Hello World...");
// Write something
second_line();
// Set cursor to second line
write_lcd("QST is the best");
// Write something else
```

The result can be seen in Figure B. These are exactly the functions I include in my PIC projects that use the LCDs. For an example of the code used to drive a display, see my 2-meter FM receiver Web page.[‡] —Steve Hageman

*For example, see the Optrex character displays available from Digi-Key and others (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.digkey.com>).

[†]Serial Backpack from Scott Edwards Electronics, <http://www.seetron.com>

[‡]http://www.sonic.net/~shageman/2_meter.html

7200, fax 602-899-9210; <http://microchip.com>.

²See John Hansen, W2FS, "Using PIC Microcontrollers in Amateur Radio Projects," QST, Oct 1998, pp 34-40.—Ed.

³Steve Hageman, "Build Your Own Network Analyzer—Part 1," QST, Jan 1998, pp 39-45; Part 2, QST, Feb 1998, pp 35-39.

⁴Steve Hageman, "A 2-Meter FM Receiver with PC Control," QST, Feb 1999, pp 35-40.

⁵<http://www.sonic.net/~shageman/pna.html>

⁶<http://www.sonic.net/~shageman>

⁷See Note 1.

⁸microEngineering Labs, Inc, Box 7532, Colo-

rado Springs, CO 80933, tel 719-520-5323; fax 719-520-1867; <http://www.melabs.com>.

⁹See Note 6.

¹⁰CCS PCM, A C compiler for mid-range PICs is available at <http://www.ccsinfo.com>.

¹¹Be sure to note that since we are not using any handshaking lines with the RS-232 connection, set your terminal program's handshaking parameters to none, or as it is sometimes called, no flow control.

You can contact Steven Hageman at 9532 Camelot Dr, Windsor, CA 95492; shageman@sonic.net



NEW HAM COMPANION

The Doctor is IN

QI'm about to install a homebrew vertical antenna and a system of buried wire radials. My only question concerns the radials. What sort of wire should I use? I would imagine that some wires would corrode in soil faster than others.

Divining an answer to this question is trickier than it seems. Being more of a general practitioner, the Doctor opted to consult with three prominent antenna specialists: Dean Straw, N6BV, Roy Lewallen, W7EL, and Tom Rauch, W8JI. The following answer summarizes their comments.

A Noninsulated copper wire can be expected to last several years in just about any kind of soil. Insulated copper wire is even better. Copper-clad steel wire should be avoided, however, because it has a relatively short life. And stay away from aluminum wire; it will turn to powder in a year or less!

The problem isn't just the pH of the soil, but what the radial eventually connects to via the shield at the station end. It's quite easy, even in what appears to be "favorable soil," to have an electric potential that erodes the radials since there is a complex dc path that involves everything connected to the radial system. The only safe solution is to use copper wire—#16 or larger—bare or otherwise. Some bare copper radial systems buried at broadcast sites in the 20s have been uncovered and found to be virtually perfect! It's hard to go wrong with copper.

QWhat is a BNC connector and what does "BNC" stand for?

A BNC is a "quick connect/disconnect" coaxial cable connector (see [Figure 1](#)). Unlike common PL-259 or male N connectors that require several rotations of their shells to secure them, a BNC latches with a single twist. According to Press "The Wireman" Jones, N8UG, "BNC" is an abbreviation for "Bayonet Neill Concelman." The word "bayonet" refers to the connector's style and Paul Neill and Carl Concelman were Bell Labs engineers who developed it. BNC connectors can be used well into the microwave range and can tolerate as much as 500 V peak-to-peak.



Figure 1—A typical BNC connector.

QNT9N asks, "I'd like to install a 40-W, 2-meter mobile transceiver in my car. Why can't I tap the +12 volts from the fuse block inside the vehicle instead of going directly to the car battery? Getting a wire through the firewall seems difficult and I don't want to drill holes. Any ideas?"

A Even though you could indeed power a 40-W rig from the fuse block, there are still benefits to connecting to the car battery directly. By obtaining your power at the battery you reduce the possibility of causing voltage drops at various points in the car's electrical system—drops that might cause sensitive electronics to malfunction. In addition, the low internal resistance of the car battery may act like a filter capacitor and short any stray RF to ground instead of allowing it to propagate through the rest of the wiring.

Getting through the firewall to the battery isn't as hard as it seems. You should be able to find a little rubber plug about the size of a bottle cap (or larger) on the firewall that can be removed or sliced open to allow your power cables to pass. You may also be able to snake your power cable through a grommet used by an existing wire harness. Just be careful not to damage the other wires.

There is much more information available. Mobile installation subjects are covered in the *ARRL Handbook* and the *ARRL RFI Book*.

QWhat is a W2DU balun?

A Common-mode currents on antenna feed lines are often the culprits when directional patterns are distorted or SWR readings become unpredictable. The solution is a balun—a contraction of the words *balanced* to *unbalanced*. Baluns eliminate these common-mode currents while making the transition between an unbalanced feed line (such as coaxial cable) and a balanced load (such as an antenna).

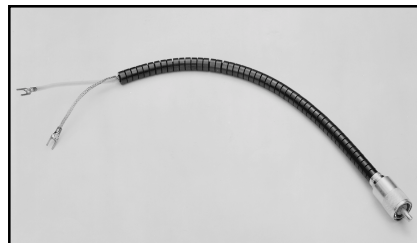


Figure 2—The W2DU balun consists of ferrite cores over a length of coax.

There are many types of balun designs, but Walt Maxwell, W2DU, developed the one you're asking about. It is a choke-type balun that consists of a number of small ferrite cores placed directly over a section of coaxial cable where it is connected to the antenna. The W2DU balun in [Figure 2](#) is a low-power version using 50 Amidon FB-73-2401 cores slipped over a 1-foot length of RG-58 coax. Twelve Amidon FB-77-1024 cores on RG-8 or RG-213 will do the same job. The 70-series cores are best for HF work. Type 43 or 61 is best for VHF. The W2DU balun is very effective and, best of all, very easy to make.

QPaul Taylor, WB2GIN, asks, "While repairing a rig I installed a replacement transistor, but now the circuit oscillates on a frequency near TV channel 2! I have read that tiny ferrite beads can be employed to correct this problem. How are they used?"

A We occasionally see this on replacement transistors—they can have a higher cutoff frequency than the original so they may oscillate. This happens because parasitic resonances in the circuit that would not have mattered with the original device now become a problem because the replacement transistor is able to amplify at the higher frequency.

Most of the time, a ferrite bead and/or a 10-Ω resistor in the base circuit usually tames things down. If you have a few beads, you may need to experiment, perhaps with two beads on the base lead. Try different material (for VHF, I would use #43 or equivalent material) and perhaps even adding a bead to the emitter and/or collector if the base bead didn't do it. Unfortunately, the exact

circuit configuration often determines where suppression is needed. If the resonance is in the base circuit, base beading will be most effective. If it is in the collector circuit, a bead on the collector would be most useful.

Q Ray, WX3A, asks, “I have two towers of different heights: one with a 2-meter beam above an HF tribander, and the other with a 440-MHz Yagi above a 6-meter-beam. I’d like to determine what my ERP would be at:

Frequency (MHz)	Power (W)	Antenna Height (feet)
14.0/21.0/28.0	1500	65
50.0	1500	52
144.0	1500	72
440.0	1500	58

Is there a simple way to do this?”

A Effective Radiated Power (ERP) is actually fairly easy to calculate, as long as you know the gain figures of your antennas and can live with a few (supportable) approximations. ERP is related to the gain of a dipole in free space. To calculate ERP, you simply multiply the power at the antenna by the gain of the antenna, referenced to a dipole. The actual gain of an antenna over ground is about 4 dB higher than the “published” gain of the antenna, due to ground reflections.

Let’s start with the HF calculation. To determine the RF power radiated by the antenna, we must reduce the transmitter power in the shack by the amount of loss in the feed line, then boost that by the gain of the antenna. Assume that your HF tribander has 6.5 dBi of gain at 29 MHz in free space, with a transmission-line loss of 1.5 dB. This is about the loss that can be expected for 100 feet of RG-213 coax at this frequency for a low SWR. This is a net gain of $6.5 - 1.5 = 4.0$ dBi. Next, you must reference the net gain to a dipole (dBd), not an isotropic radiator (dBi), so subtract 2.15 dB. This gives a net gain of 1.85 dBd, but this is in so-called “free space.”

You’re obviously going to be placing the antenna over ground rather than in theoretical free space, so there will be some “ground gain,” at a peak angle determined by how high the antenna is located over ground. The exact angle isn’t important for this discussion, since we’re looking for the peak radiated power. EPA documentation assumes that reflection from typical ground will give another 4 dB over the net gain in free space. So, now we’ve got $1.85 + 4.0 = 5.85$ dBd, due to ground gain. Convert this to a numerical ratio by raising 10 to the power of 5.85 divided by 10 = $10^{5.85/10} = 3.85$. This is the number we now use to multiply the transmitter output power to give the ERP: $3.85 \times 1500 \text{ W} = 5775 \text{ W} = 5.78 \text{ kW}$.

For VHF, let’s assume that you have a high-gain Yagi with 15 dBi gain in free space on 432 MHz. Here, the feed line loss will be more significant than on HF. Assume that you are using 100 feet of high-quality Belden 9913 coax, which will have about 2.8 dB of loss on 70 cm. The net gain, in dBd over ground is: $15.0 - 2.8 + 4.0 - 2.15 = 14.05$ dBd, which is a numeric ratio of 25.41. Thus the ERP at 432 MHz would be $1.5 \times 25.41 = 38.11 \text{ kW}$, a very substantial number indeed.

Now, there is another term in use, EIRP, or Equivalent Isotropically Radiated Power. This term is not referenced to a reference dipole in free space but to an isotropic radiator in free space. You can get EIRP by multiplying ERP by 1.64, the equivalent of 2.15 dB.

Q Evan Scarborough, N1ZHD, asks, “Is it possible to work OSCAR 27, the FM repeater satellite, using 1/2 W of power on the 2-meter uplink?”

A For those unfamiliar with the bird, OSCAR 27 is a low-orbiting Microsat that presently functions as an FM repeater. It listens on 145.850 MHz and repeats on 436.800 MHz. The satellite is available during daylight passes only.

You could probably work OSCAR 27 with 1/2 W, but you would need a beam antenna—possibly a long-boom model with a number of elements—to focus your power. Of course, the higher the gain of the antenna, the narrower the radiation pattern. This means that aiming becomes much more critical.

The problem with running low power while trying to work

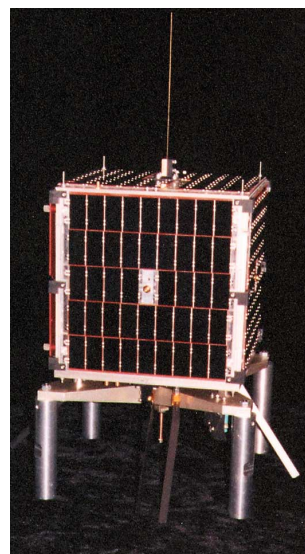
OSCAR 27 is that this satellite can only accommodate one signal at a time. Whenever it speeds over the US, many operators attempt to use it simultaneously. With the FM “capture effect,” only the strongest signal “wins.”

Q What are loop Yagi antennas and why can’t you use them at HF frequencies?

A No one said that you couldn’t use a loop Yagi on the HF bands, but you’d really be pushing the envelope of practicality!

Loop Yagis are members of the quad family since each element is a closed loop of approximately one wavelength at the operating frequency. Line up a number of loops on the same boom and you create a fairly high-gain antenna. The loop Yagis in Figure 3 can develop about 20 dBi gain (each) at 1296 MHz, but the individual loops are only a few inches in diameter. That’s a substantial amount of gain in a relatively compact space.

But imagine supporting a similar collection of one-wavelength loops at, say, 14.2 MHz. The antenna would be monstrous! If you’re a lover of rotatable loop-style antennas at HF frequencies, a traditional quad design is far more practical.



AMRAD-OSCAR 27



Figure 3—Twin loop Yagis for 1296 MHz.

Do you have a question or a problem? Ask the doctor! Send your questions (no telephone calls, please) to: “The Doctor,” ARRL, 225 Main St, Newington, CT 06111; doctor@arrl.org

Salvaging Waterlogged Gear

Few radios are waterproof...or Coca Cola proof. But if your favorite hand-held falls into the drink—of either variety—all is not lost. By taking quick, decisive action, your rig can be back in action before you know it.

It's a classic Amateur Radio moment... KB3ZR is motoring his new ham-equipped sailboat to a landing in winds that make trailering the vessel difficult. The ramp is busy, so, with ICOM 2ATs in hand (the little rigs are probably the most popular 2-meter hand-helds ever made. The serial number on this one is 98,884—nearly enough for every licensed US ham to have one), we coordinate the event. In the clumsy ballet that follows, I set my radio on the trailer tongue and back the whole affair into the water. Standing in knee-deep water, I remember the radio as my foot touches a snake (bad) or a rubber ducky (worse).

It's not the first time I've dunked radio gear, so I quickly retrieve the little radio and make an oath: "With God as my witness, this one is going to survive!" After landing the boat almost 30 minutes later, I dump the hand-held into a cooler with what remains of our fresh water. My son gives me the "you're nuts" look that I've become accustomed to.

Several things happen when radios get soaked, and none of them are good. But if you know the drill, the odds of recovery are surprisingly good. The first and foremost problem is that the water can couple high-impedance circuits to nearby voltage sources, making sensitive devices draw currents they normally wouldn't.

The ICOM was powered when it hit the water, which is bad. I quickly remove the battery, knowing that fresh water isn't all that conductive and that the cooling action of the water might have prevented transistors and integrated circuits from frying.

As I count my blessings, I remember that this is just stuff, and that we can experience fates far worse than the loss of a piece of ham gear! This dunking is simply a challenge, a test of my radio skills. I feel better, but I know the truth. Sometimes, no matter how unfair it seems, radios *do* go to heaven.

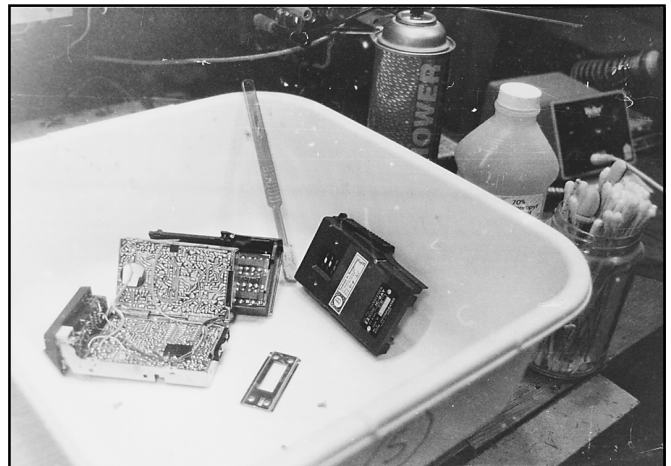
Two-Meter Triage

Simply drying the radio will leave it full of organisms and deposits from the lake. The lake in question is pretty clean as far as lakes go, but it's not *that* clean. Because the radio is already wet, putting it in clean water probably won't hurt it much more and will dilute the evil lake stuff. From this point, resuscitation is a race against time. The trip back home takes three hours and, thanks to a veto by my wife, we stop for dinner. When we finally arrive I can smell the lake water in the cooler.

Once home, I take the radio's case off and rinse it thoroughly under the cold water faucet for five minutes. Next comes the heat gun (set to deliver cold air). After five minutes the radio is merely damp.

The speaker's cardboard cone (or is it a waterproof composite?) might be in danger, but it's cheap and easy to replace. The microphone element leaked, got crushed, or survived. Mentally, I prepare to replace these items.

The rest of the parts are fairly waterproof. Switches and pots are the most exposed and the hardest to clean. I'm grateful the rig doesn't have an LCD. My luck with those has never been good, and replacements are almost always expensive and difficult to obtain.



The dunked 2AT awaits its alcohol rinse. A dishpan serves as the container. A clean toothbrush and cotton swabs are a must.

When the unit is mostly dry, I empty three bottles of rubbing alcohol (I don't have the good stuff around), and for five minutes I swish the radio (except for the speaker and microphone) in a tray, working the alcohol into every nook and cranny. Good ventilation is important during this step. Having a fire extinguisher handy would be a good idea, too. The alcohol bath is followed by more cold air. At this point the patient is stable. I can pause here, but I decide to take on the final cleaning and drying.

I have a can of Blue Shower from the Tech Spray people. It's a mild and fairly safe solvent spray used to clean contacts and electronics. Whatever chemical cleaners you use, it's important to use preparations that don't leave excessive residues (they all leave some) and don't "eat" or dissolve anything they shouldn't. Cleaners that incorporate drying agents help displace water.

Of my five 2ATs, this one is the newest. I picked it up at a swap meet just one week before the dunk in the lake, and I'd like it to look good when I'm done...even if all I can salvage is the case. Cleaning the case separately still leaves a lot of little plastic chassis parts that protrude through the case. Visible or not, plastics used in switches, pots, jacks and LEDs/LCDs—once exposed to plastic-eating chemicals—are never the same again. I test a few drops in a discreet area inside the case to make sure.

I swab the circuit boards with a Q-tip and spray large amounts of cleaner into pots and switches. After moving the pots and switches through their full range of motion (to make sure I'm getting the cleaner dispersed thoroughly) I'll leave it for the night.

I haven't yet addressed the battery, and I see that the charging LED is glowing softly. Because the radio isn't charging, this is a bad sign. I apply more spray cleaner, but the LED remains on. I decide to deal with it in the morning after everything dries, so I unsolder the battery lead to prevent further damage.

It appears that one of those previously mentioned high-impedance paths has let the battery wreck something in the charging and protection circuitry.

It's 30 minutes later, and time for bed. For me and the hand-held!

A New Day Dawns

In the morning, everything is dry. (If you want to be super-cautious, give it an entire week to dry.) I spray the controls with a lubricating cleaner, put the radio together and connect a power supply set to 9 V, which is less than the rig's rated 13 V and just enough to make the 2AT function. If something smokes, the current-limited supply will reduce the damage. A car battery wouldn't be a good choice for the critical first application of power.

Gee! It makes noise, lights up when it should and I can talk! But the microphone sounds rough. It will dry out in the next day and be *almost* fine.

The battery pack (which does not have a schematic) needs a new transistor. No big deal. The radio even looks new except for some residue on the control knobs, which cleans up with soap, water, a toothbrush and a Q-tip.

Why This Works

I've tried to rejuvenate waterlogged gear incorrectly in the past, with poor results. If you understand what goes wrong with environmentally challenged electronics, this counter-intuitive process makes sense.

Basically here's what happens. Things that can soak up water and warp, do. Paper products are key culprits and include older capacitors, separators, cloth, cotton wire insulation, dial cords and speakers. Thankfully, these materials aren't used much these days. Most modern speakers are made of composites and use sealed magnets. Even they survive! It's not the soaking that does the bulk of the damage, it's the dry out.

Pressure is also a problem. If the electronics sink far enough, they simply get crushed. Water can be driven into things such as microphones, speakers, sealed switches and controls and, if the depth is great enough, capacitors and other "sealed" components can be infiltrated. On the other hand, if the water is that deep, you probably won't be able to retrieve the radio anyway.

Cold water can cause thermal shock. Tubes and solid-state power components can crack when the temperature drops suddenly. I suppose the worst case example might be a linear amplifier that gets dunked while it's operating....

That leaves the fun stuff. Organisms, pH levels and the sugar content of the liquid, soda, or whatever gets spilled into the electronics can eat away at fine wires and contacts, insulation on coils and especially thin PC-board traces.

If you drop a radio into a punch bowl, it'll likely survive if you move fast enough. But it's not uncommon for severe damage to occur in only a few minutes, hence the need to get the already wet radio into a large bath of clean water as soon as possible. Merely drying the circuit board can leave stuff that will eat away the substrate, traces and contacts in hours or days.

Salt water, beer and soft drinks are the worst. Minutes can mean the difference between success and failure. I learned that lesson the hard way. After spilling diet cola into an audio mixer, everything cleaned up and operated nicely until 10 days later, when the unit's funky symptoms were "traced" to missing circuit board traces. The small copper lines on the PC board simply vanished, leaving behind nothing but glue.

What's Next?

If you've done all the right stuff and the radio still doesn't play, you simply have a broken device to fix. You can, however, make some good guesses as to what the problems are.

Check visibly waterlogged items such as microphones, speakers and moving parts. Thermal shock is also likely if there was an opportunity for that kind of failure. Check the power supply com-

ponents and power output components. After that, we're back to the old problem with high-impedance circuits that suddenly accessed "bad" voltages.

If you have a schematic you can identify the high-exposure areas. Look for all of the 100 k Ω devices and what they're attached to. Ask yourself what would happen if a good connection to the power rail or ground came along. Front ends and low-level audio stages, as well as unprotected CMOS circuits, are often trouble spots. Any sensitive circuit with microvolts and microamps is a candidate.

Avoid the temptation to apply power until everything's completely dry. Leave it at least overnight before you wreck something because you've lost your patience. This process takes at least 12 hours from start to finish.

The bottom line is, if you have clean water, alcohol and a can of electronics cleaner on hand, your next "hopeless" situation may merely cost you an hour of your time—and a little anxiety.

257 Meadow Station Rd
Parker, CO 80138
baumgartner.fredm@tci.com



New Products

BUCKMASTER HAMCALL CD NOW UPDATED WEEKLY

◇ The latest version of *HamCall*, Buckmaster's comprehensive CD-ROM call sign directory, has many new features and is now updated weekly using CD-R technology (each disk has an "updated through" date printed on the label). Forget about waiting for the April or October release. The current versions are updated with the latest data on more than 1.5 million US (complete) and international (extensive) Amateur Radio call signs, including individuals, club stations, military, RACES, Silent Keys and vanity calls.

Other features include more than 150,000 call sign cross references (old call signs to new call signs); 73,000 e-mail addresses; 8300 QSL managers; and more. Data displayed includes call sign, license class, name, address, grid square, county, time zone, area code, distance, beam heading and more. All data can be edited by the user.

HamCall requires an IBM-compatible computer running PC DOS 3.1 or later, a CD-ROM drive and at least 640 kbytes or RAM. An SVGA monitor and video card are recommended. *Windows* (3.x/95/98) operation is supported.

Price: \$50 plus shipping and handling (\$5 US, \$8 DX). For more information, contact Buckmaster, 6196 Jefferson Hwy, Mineral, VA 23117; tel 800-282-5628, fax 540-894-9141; info@buck.com.

G4ZPY KEYS FROM MORSE EXPRESS

◇ Morse Express is now handling the entire line of premium-quality keys and paddles made by veteran British craftsman Gordon Crowhurst, G4ZPY. Models (55 total) include brass keys on stone bases; presentation keys with engraved bases; precision mini paddles; and a jewel-encrusted high-speed paddle made from solid gold! Each key is hand-assembled and adjusted by G4ZPY before being shipped to the US.

For prices and information on the entire G4ZPY line, contact Morse Express, 3140 S Peoria St, Unit K-156, Aurora, CO 80014-3155; tel 303-752-3382; info@morsex.com.



Next New Product

Test Your Knowledge!

Here is a different spin on the usual multiple-choice quiz. You might call it “backing workwards.”

If you have ever played the game “Balderdash” you’ll recognize the format of this month’s quiz right away—the answer comes *first* and you have to figure out the right *question!*

1. 468
 - a. length in inches of an 80-meter quarter-wavelength stub of open-wire line
 - b. product of feet times frequency in MHz for the length of a half-wavelength dipole
 - c. number of DXCC entities
 - d. yellow-orange-red
2. Only when you’re called.
 - a. when to call a DX station
 - b. you can take emergency action ...
 - c. send the text of a message on a net frequency ...
 - d. when to respond to intentional interference
3. OO
 - a. a popular award program from Oman
 - b. the CW abbreviation for “Over and Out”
 - c. what you say when you receive an FCC “pink slip”
 - d. ham radio’s friendly observer corps
4. 66%
 - a. velocity of propagation in RG-58/U coaxial cable compared to free space
 - b. ratio of carrier to sideband power in FM signals
 - c. ratio of American to Russian amateurs
 - d. maximum safe-to-rated power dissipation for wirewound resistors
5. center frequency divided by bandwidth
 - a. Q-factor of a tuned circuit
 - b. modulation index
 - c. Carson’s Rule
 - d. impedance transformation ratio of a pi-net tank circuit
6. sunrise
 - a. best time for auroral propagation
 - b. grey-line propagation occurs then
 - c. traditional start of the ARRL 160-meter contest
 - d. time of lowest galactic noise on VHF/UHF bands
7. gold
 - a. color of a 3-500Z anode
 - b. required surface metal for RF conductors at microwave frequencies
 - c. the worth of a new transceiver by weight
 - d. 5% tolerance band color for resistors
8. split
 - a. ac line transformer core configuration
 - b. common DX operating technique
 - c. what to do after accidentally QRMing a net
 - d. outdated method of modulating plate current

9. unbalanced
 - a. another term for elliptical polarization
 - b. AB-class amplifier operation
 - c. a load with one terminal connected to system ground
 - d. digital protocols that don’t require full-duplex operation
10. 300
 - a. speed of light in millions of meters per second
 - b. number of QSLs required for the 5B-WAS award
 - c. length in cm of a 10-meter quarter-wavelength whip
 - d. number of kHz in the General class allocation on 10-meters
11. 15
 - a. maximum power output in watts for QRP stations
 - b. Amateur Extra code speed requirement
 - c. number of ARRL sections
 - d. number of ARRL divisions
12. PL
 - a. abbreviation for “powered load”
 - b. Motorola trademark for CTCSS system
 - c. prefix for amateurs in Papua-New Guinea
 - d. designation for “pirate” used by DXCC administrators

Total Your Score!

There are a total of 12 possible answers in this quiz. Give yourself one point for each correct answer.

- | | |
|------|--|
| 9—12 | You know your “stuff” forward and backward! |
| 5—8 | A good score for a difficult quiz. |
| 1—4 | Uh, holding the quiz up to a mirror does not make it easier. |

Answers

1. b—Know this by heart!
2. c—A Net Control Station (NCS) will direct you when (and where) to pass your traffic.
3. d—Official Observers are the backbone of Amateur Radio’s self-policing history.
4. a—A number of coaxial cables with polyethylene center insulators have this characteristic.
5. a—The lower the resistive loss for the circuit’s components, the sharper the frequency response becomes.
6. b—HF propagation is often enhanced along a path parallel to the sunrise/sunset terminator.
7. d—Silver indicates 10% value tolerance, gold 5% and no band 20%.
8. b—DX stations often transmit on a single frequency, while listeners one or more kHz away to help speed things along. (Answer c isn’t too bad, either!)
9. c—Baluns (balanced-to-unbalanced transformers) are often used to drive these loads.
10. a—You’ll find this is also the ratio of wavelength in meters to frequency in MHz.
11. d—Look in this issue to find which is yours.
12. b—Motorola pioneered the commercial use of sub-audible tones

Contest Fun for Everyone

On weekends, the HF bands are often occupied by frenzied operators calling "CQ contest." Why do competitors spend entire weekends in front of their radios? As this teenage contest convert discovered, to increase their operating skills, chase awards, compete on multiple fronts and have tons of fun! You can, too! Here's how.

Need a few more states to earn your Worked All States award? Just a few countries short of making the DXCC ranks? Want to experience the excitement of making lots of contacts in a single weekend? How about increasing your operating skills and Morse code proficiency? Contesting, dear friends, is for you—and it's a lot of fun!

The exact thrill of contesting is almost indescribable. Imagine staying up late into the night, sitting in front of your radio and contacting more than 60 stations in a single hour. You can watch the sunset through the window while listening to an operator halfway around the world give you a signal report and a contest exchange. I still get shivers when I hear Japanese hams because it's simply amazing that these operators, thousands of miles away, are copying stuff that I send and sending stuff meant for me.

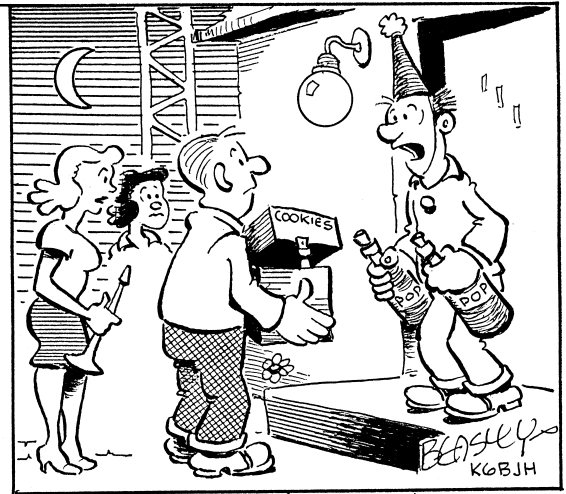
What is contesting? Contests are usually on-air events in which hams work as many different stations as possible in a defined period of time (often a weekend). Depending on the particular contest, a premium is placed on working stations in different geographical regions (states, countries, grid squares, islands, and so on), or stations with different call sign prefixes (KA2AAA, KB2AAA, KC2AAA, and so on).

These geographical regions or differing prefixes are called "multipliers." In the simplest sense, contest scores are determined by multiplying the number of two-way contacts (QSOs) by the number of multipliers (subject to the fine points of each particular contest, of course!). Contest periods range from a scant four hours for the North American Sprints to 48-hour marathon DX brawls.

When the dust settles, the contestants with the highest scores (there are usually several categories of competition, such as power level, number of station operators, bands used, and so on) receive certificates or plaques and have their scores listed in *CQ*, *QST* and *NCJ*.

Contest operating is fast and furious. Sometimes, thousands of signals from every corner of the globe are crowded into a relatively small part of the band. A typical SSB contest QSO may only last a few seconds. Ops exchange signal and location reports, and perhaps consecutive serial numbers or power-level identifiers. At first, the whole scene may seem overwhelming, but once you get your feet wet, you'll get the hang of it in no time.

Look at it this way: You could spend days looking for a Wyoming or New Hampshire contact to finish your Worked All States (WAS) Award, or you could work them both in one afternoon in the ARRL November Sweepstakes. The same thing holds true for DX contacts and DX awards. Contesters regularly work all 50 states and 100 or more DX countries in one weekend by participating in the right contest! Although you may not finish your certificate's requirements in one sitting, you'll probably be amazed at your progress.



PHIL SAYS THE PARTY'S OFF-- HE'S CONTESTING AND THE JA'S AND ZL'S ARE COMING IN LIKE LOCALS, WHATEVER THAT MEANS

Big Antennas and Other Contesting Myths

Don't worry about not having a killer station with multiple towers and a five-acre antenna farm. Heck, from July 1996 to September 1998, my antenna farm consisted of exactly one antenna, a modest 40-meter dipole up about 14 feet. I've since added a 20-meter dipole at 25 feet and plan to add a vertical for the low bands. When finances allow I hope to put a tribander on the roof.

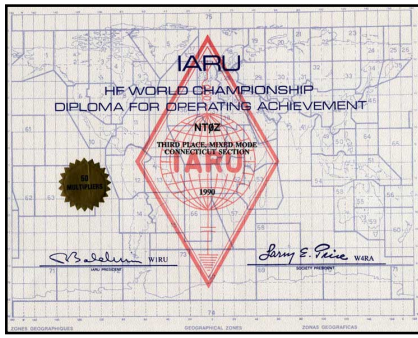
Contrary to popular belief, antennas aren't *that* important—especially for ops with average stations. Big antennas help, of course, but the most important factor in contest success is the operator. "Big Guns" don't always win contests simply because they have impressive antenna farms. Backing up the "aluminum" with 20+ years of contest experience doesn't hurt! Many of today's "Big Guns" started when they were teenagers (I was licensed in 1992, just before I turned 12; I'll be 16 in March of 1999, about the time this appears in print).

In adding to the "skill versus brute power" argument, contest ops must also know when to change bands, when to call CQ (as opposed to looking for stations), when to stick to a plan, when to play a hunch and, above all, when to keep pushing and improving.

I have become a much better operator since becoming a contestant. My CW skills have gone through the roof, from 10 WPM when I started in 1996, to well over 30 WPM now. I have learned to copy weak signals on CW and SSB, and how to cope with poor band conditions.

Table 1
HF Contests Beginners Will Enjoy in 1999

Month	Contest	Activity
March	ARRL DX Contest, SSB	W/VE stations work DX
March	CQ WPX Contest, SSB	All stations work all others
May	CQ WPX Contest, CW	All stations work all others
June	ARRL Field Day	Mostly W/VE
July	IARU HF World Championship	All stations work all others
October	CQ Worldwide DX Contest, SSB	All stations work all others
November	ARRL Sweepstakes, SSB and CW	W/VE stations work W/VE only
	CQ Worldwide DX Contest, CW	All stations work all others
December	ARRL 10-Meter Contest	All stations work all others



If you think that only big-gun contest stations win contest awards, think again! I'm a pretty versatile operator, but my attention span is often measured in minutes—which isn't a very useful characteristic for a top contender! Nevertheless, I've been able to snare at least a couple of contest certificates. The first is for third place, mixed mode, Connecticut Section, in the 1990 IARU HF World Championship. The second is for second place overall/first place North Dakota in the 1986 QRP Amateur Radio Club International's Hoot Owl Sprint. If I can do it, so can you. Why not collect some wallpaper of your own? —Kirk Kleinschmidt, NT0Z

“Crazy” Contesters?

Some people think contesters are crazy. Enduring 48 straight hours of contest operation probably contributes to that perception! And I suppose that hearing CW pileups emanating from household appliances for a week after the contest is a bit suspect.

Contesting, however, boils down to simply doing your best. If that means turning on your radio, making a few contacts and shutting things down, you win. If it means making an all-out 48-hour effort, you win, too. And if it means testing and perfecting a new antenna in your backyard, that's just fine.

Although every contest has its “official” winners, every participant wins in one way or another. This is the true beauty of contest participation. You know that no matter how high (or low) your score, you've achieved *something* useful.

Another important and enjoyable aspect of ham radio contest-

ing is the camaraderie. Through e-mail and the various contest and DX e-mail “reflectors” I have met many interesting people, a group of truly experienced contest operators, learned a lot, and have received answers to a lot of perplexing questions.

In a similar vein, joining your local DX or contesting club can produce additional benefits. I joined the Western Washington DX Club and have met a lot of hams who find contesting and DXing as interesting as I do—and that's a tall order!

Getting Started

Sound fun? You bet! The easiest way to get started is to look in the *Contest Corral* section of *QST* to find a list of upcoming contests. Read through the descriptions and choose a contest that seems interesting and within your capabilities. The official rules for each ARRL-sponsored contest are printed in *QST*, usually a couple months before the contest period. Read the rules, check out your station equipment and, when the contest starts, have at it! **Table 1** lists several major contests that feature a lot of beginner participation. There are many more contests spread throughout the year. The *ARRL Operating Manual* has plenty of detailed information on the fine points of contesting. It's a popular subject. See the “Contesting Resources” sidebar for more information.

The following tips will help to make contesting more enjoyable.

- Don't expect to make 1000 QSOs in your first contest. Even after a solid year of serious contesting, my best single-op record is only 437 QSOs in the 1998 ARRL CW Sweepstakes.

- Set goals for yourself. Try to better your score from last year, or the year before that. You might also challenge a fellow contester who has a similar station to see who can achieve the highest score. The Western Washington Club does something like this every year during the ARRL DX CW contest. Several (we had around 10 serious competitors in 1998) of us work in the Assisted category and connect via PacketCluster to chat while we see who works up the highest score. Late at night, when you're searching in vain for new stations, it helps to commiserate with someone else!

- Don't try to go too fast, especially on CW. Your goal is to copy the exchanges correctly, not impress everyone with your speed. If you need a repeat, ask! If you can only copy at 13 WPM and the station you want to call is sending at 35 WPM, try sending at 13 WPM and adding a “QRS” to your call sign. Remember, other ops *want* to work you. Most considerate contesters will slow down to match your speed.

- Use computerized logging software if at all possible. Because you don't need a top-of-the-line computer, a 286 or 386 PC will work fine. Your logging software computes your score as the contest progresses, checks for duplicate contacts, can send CW, point out needed multipliers and provide other useful information that will greatly simplify the contest process.

Contesting Resources

To learn more about contesting, check out the following:

Books

- The latest edition of *The ARRL Operating Manual* covers a wide range of Amateur Radio operating interests, including the hows and whys of contest operating.

Magazines

- Published six times a year by the ARRL, *The National Contest Journal* covers the competitive aspects of Amateur Radio. Each issue is loaded with information of interest to contesters—from casual observer to hard-core competitor. *NCJ* details the latest innovations in contesting hardware and operating techniques and profiles the world's best contesters. Subscription prices start at \$18 per year.

Columns

- “Contest Corral,” *QST*'s monthly contest column, details dozens of upcoming contests, big and small.

Contesting Software

- A variety of contest logging software packages is available for IBM-compatible PCs (primarily) and other popular or once-popular machines (secondarily). Popular packages include *CT*, *NA*, *TRLog*, *SD*, *WriteLog* and *LogPlus!* It's beyond the scope of this article to present a detailed comparison of the various software offerings. For more information, talk to local contesters, see the ads for these (and other) packages in *QST* and other ham magazines, or check out the wealth of information on the Worldwide Web (addresses listed below).

Contest-related Web Sites

- ARRL's Contest Corral web site: <http://www.arrl.org/contests/>.
- Scott Neader, KA9FOX, has a large contesting Web site at: <http://www.qth.com/KA9FOX>.
- The contesting supersite, <http://www.contesting.com/>, contains information about *CT*, *WriteLog* and *NA*, among many other topics.

11427 110th Ave NE
Kirkland, WA 98033
kk7gw@hotmail.com



Board Welcomes Return of FCC Enforcement; Embraces Technology for the Future

The ARRL Board's first meeting of the year began with a tribute to former Northwestern Division Director Mary Lou Brown, NM7N, who passed away on December 3 of last year while serving in office. It was led by new Division Director Greg Milnes, W7AGQ. Mrs Brown was a friend to many and an effective ambassador for Amateur Radio, domestically and globally. The Board observed a special moment of silence in her memory (see Minute 2).

President's Technology Initiative

Turning to the busy meeting docket, the Board adopted an initiative proposed by President Stafford to promote new technology in Amateur Radio. The League's policymakers created the "Amateur Radio Technology Task Force" to develop a strategy for exploring new technologies and assessing their applicability and potential for incorporation into Amateur Radio. Stafford will appoint members to the task force who have been actively involved in experimenting with (or developing) new technology. An initial report is due next January (see Minute 54). In a collateral move, the Board reconstituted the Future Systems Committee as the "Amateur Radio Technology Working Group" to serve as a resource for the Technology Task Force (see Minute 55).

Good News: More Enforcement

In his report to the Board, Vice President Joel Harrison, W5ZN, heralded an apparent return to enforcement by the FCC. Harrison summarized longstanding League efforts to gain more enforcement. He said that these persistent efforts, plus recent changes in the Commission's administration and staffing, apparently pushed open the door to a reprioritization of enforcement. More FCC action against willful violators has been a historical and primary concern of the amateur community. Harrison summarized recent FCC actions as the Board applauded (see Minute 35).

The League's Board of Directors met in Houston, Texas on Friday, January 15, and Saturday, January 16, 1999. Here's your guide to the ARRL policymakers' actions.

The Board amended its legislative positions to guide staff in working with the new 106th Congress. The League's legislative agenda appears in the [sidebar](#) (see Minute 21).

The Board reviewed a draft petition for rule making for possible joint submission with the National Frequency Coordinators' Council (NFCC), to seek rules requiring that all repeater and auxiliary facilities must be frequency coordinated. A majority of the Board did not find that there was compelling evidence warranting a move beyond the existing rules at this time, but the NFCC was invited to revisit the matter (see Minute 17).

The International Humanitarian Award was given to Radio Amateur du Québec, Inc. (RAQI) for its service to the citizenry of Québec during the 1998 ice storm, which

devastated the region. Look for the full story to appear in a future issue of *QST* (see Minute 25).

Following a study of the Y2K computer issue by its Volunteer Resources Committee, the Board recommended that Section Managers, Section Emergency Coordinators, and ARES groups enter into MOUs and conduct drills, with public utilities and public safety agencies, for emergency communications necessitated by possible Y2K problems (see Minute 26).

New Executive Committee to Revisit a Possible Name Change

Directors Kay Craigie, WT3P, Frank Fallon, N2FF, Fried Heyn, WA6WZO, and Tod Olson, K0TO, were elected to the Executive Committee for the 1999 term.

Summary of Major Board Actions

Minute	Purpose	Disposition
8	Executive Committee director-members	Elected
9	Foundation directors	Elected
19	Committee appointments	Announced
21	ARRL legislative positions	Amended
25	International Humanitarian Award to Radio Amateur du Québec	Conferred
26	Recommendation for SMs, SECs, ARES, to sign MOUs, conduct drills for Y2K emergency communications	Adopted
28	1999 operating plan	Approved
29	1999 capital spending plan	Approved
33	Bylaw 4	Amended
34	Bylaw 45	Amended
47	Wayne Mills, N7NG, re-appointed DXAC chair	Adopted
50	Executive Committee to study possible ARRL name change	EC study
51	ARRL accepts offer to sponsor "Kid's Day"	Adopted
52	ARRL to cast aye votes on IARU proposals to ratify election of W4RA as IARU president, and VK3ADW, vice president	Adopted
53	Consignment policy rescinded	Adopted
54	Technology Task Force	Created
55	Technology Working Group	Created

Legislative Positions of the ARRL

(as amended at the 1999 Annual Meeting)

1. Support for Federal Preemption of Telecommunications Regulation

Whereas: A strong, coordinated national system of telecommunications is in the national interest;

Therefore Be It Resolved: The American Radio Relay League supports measures to improve federal management of telecommunications, including strengthening and improving the ability of the FCC to promulgate and enforce reasonable regulation of transmitter and antenna issues, of the resolution of electromagnetic interference, and of operating rules.

2. Radio Spectrum Management

Whereas: The management of allocation, assignment and auction of radio frequencies is a complex technical task;

And Whereas: Spectrum auctions were introduced as a means of ensuring fair and timely assignment of licenses, not as a means of generating revenues to satisfy short-term objectives;

And Whereas: Amateur Radio saves lives and property on an entirely non-commercial basis, but lacks the resources to participate in spectrum auctions;

Therefore be it resolved: The American Radio Relay League believes that spectrum auctions should not be used as a means to offset specific budget items, and that specific spectrum decisions should be made by expert professional agencies;

And be it further resolved: The American Radio Relay League believes that public service (including Amateur) radio frequency allocations under current US regulations should now be statutorily exempt from auction or reallocation to commercial services, whether on a primary or secondary basis, and that compensatory spectrum should be allocated whenever FCC or NTIA determine that an existing public service frequency must be reallocated to another radio service.

3. Preserve and Protect Amateur Radio Frequency Allocations

Whereas: Frequencies allocated to the Amateur Radio Service are the technological equivalent of a "national park," where all may enjoy a natural resource for the purpose of experimentation, education and voluntary emergency communications, provided they demonstrate, through testing, that they are responsible users;

And whereas: Americans, through the Amateur Radio Service, may use a limited range of frequencies throughout the radio spectrum, often shared with government services, and where an increasing amount of spectrum is subject to public auction to the benefit of private economic interests;

Therefore be it resolved: That the American Radio Relay League supports legislation that would preserve and protect, on a primary basis, Amateur operator access to existing Amateur Radio Service [and Amateur Satellite Service] frequen-

cies as a natural resource for the enjoyment of all properly licensed individuals.

4. Enforcement of Telecommunications Law

Whereas: Users of the radio spectrum are entitled to the full protection of the law from those who would use the spectrum unlawfully;

And whereas: The Federal Communications Commission is charged by Congress with the enforcement of radio regulations;

And whereas: Amateur Radio operators are encouraged by the FCC's recent efforts to assign a higher priority to enforcement activities;

Therefore be it resolved: That the American Radio Relay League supports legislation permitting FCC or its Administrative Law Judges to issue summary suspension of Amateur Radio licenses in cases of repeated and willful misconduct;

And therefore be it further resolved: That the American Radio Relay League supports higher levels of funding to the FCC, and other legislation as necessary to support broader enforcement activities.

5. License Fees Only for Services or Benefits

Whereas: Throughout its long and distinguished history, the Amateur Radio Service has accepted the responsibility of a private, not for profit, volunteer group trained in emergency communications, advancing the radio art, promoting technical skills, expanding the reservoir of trained electronic experts leading the nation in emergency communication, and enhancing international good will;

And whereas: The Amateur Radio Service has been exempt from annual fees and other charges by Congressional intent, in recognition and promotion of the voluntary service provided to the FCC and the people of the United States;

Therefore be it resolved: That the American Radio Relay League supports legislative or regulatory measures providing for exemption from annual fees for the licensing or operation of Amateur Radio, unless such fee provides for services or benefits to the Amateur Radio Service.

6. Mandatory RFI Standards for Consumer Electronic Devices

Whereas: Devices that emit radio energy are proliferating dramatically;

And whereas: Many home electronic devices lack the necessary filtering and shielding to function properly near the types of transmitters commonly found in residential areas;

And whereas: it is in the public interest to have a robust, interference free telecommunications environment;

Therefore be it resolved: That the American Radio Relay League supports requiring the Federal Communications Commission to develop and implement effective mandatory standards for radio frequency susceptibility of consumer electronic devices within the scope of Public Law 97-259.

Committee Reports Available

Copies of the reports of the Standing Committees of the Board, Ad Hoc Committees and Advisory Committees are available to members for the cost of reproduction and mailing. Here's a list of these reports, as presented at the 1999 Annual Meeting, with the number of pages and cost of each. Please order by document number and include your remittance with your order. Send orders to Secretary, ARRL.

Committee	Document No.	Pages	Cost (\$)
Membership Services	18	1	1
Volunteer Resources	19	1	1
Administration and Finance	20	3	1
Election	21	1	1
Enforcement Task Force	23	2	1
SAREX/ARISS	24	4	1
Computer	25	1	1
RF Safety	28	4	1
Public Relations	29	2	1
Industry Advisory	31	2	1
1998 Plenipotentiary Conference	32	1	1
Contest	33	5	1
DX	34	16	2

Among other things, the committee conducts the League's business on behalf of the Board between Board meetings. The Executive Committee was tasked with developing a proposal for changing the name of the ARRL to one that more clearly reflects the focus and purpose of the organization to both insiders and outsiders. The Board felt that the year 2000 would be a natural point for such a change. A previous proposal was considered by the Board, but was set aside (see Minutes 8 and 50).

In Other Actions . . .

...ARRL votes to ratify the elections of ARRL and IARU leader Larry E. Price, W4RA, as IARU President and David A. Wardlaw, VK3ADW, as IARU Vice President for the 1999-2004 term were enthusiastically authorized by the Board

7. Adequate Regulatory Protection for the Amateur Radio Service

Whereas: Amateur Radio provides a valuable voluntary public service that may not compete in the commercial arena, hence requiring adequate regulatory protection;

Therefore be it resolved: The American Radio Relay League favors traditional values and regulatory measures that promote Amateur Radio operation, licensing or spectrum allocation, and opposes measures intended to de-regulate Amateur Radio to the extent that the Amateur's unique ability to contribute would be damaged by commercial interests. De-regulation or privatization of Amateur Radio functions of the FCC should be considered only where it would provide superior service to the Amateur Radio community.

8. Amateur Radio License Exam Reimbursement

Whereas: Amateur Radio license examinations are administered by a corps of trained volunteers, coordinated through Volunteer Exam Coordinator (VEC) organizations, who receive no compensation and are restricted by Section 4(f)(4)(l) of the Communications Act to the amount of out of pocket expenses for which they may seek reimbursement from those taking such exams;

And Whereas: Examinations for Amateur Radio licenses help ensure that only qualified and tested operators may operate transmitters on Amateur Radio frequency allocations, and the volunteer testing system results in substantial cost and manpower savings to the Federal Communications Commission;

Therefore be it resolved: That the American Radio Relay League supports legislation increasing the current ceiling on reimbursement for out-of-pocket costs for individuals or organizations which provide or coordinate authorized volunteer license examination services from \$4 to \$10, adjusted annually every January 1 for changes in the Department of Labor Consumer Price Index.

9. Opposing Restrictions on Radio Reception

Whereas: In response to a widely publicized incident some in the 105th Congress attempted to tighten the laws prohibiting the interception and disclosure of cellular telephone conversations;

And Whereas: Laws already exist prohibiting such conduct both in the Communications Act (Sec. 105) and in the "Electronic Communications Privacy Act" provisions of the Criminal Code (18 USC 2510 et seq);

And Whereas: Communications privacy in general is better achieved by technological advancement than by law or regulation;

And Whereas: Statutory privacy prohibitions impede technological development and have a detrimental effect on a broad range of lawful radio users including some amateur operators, volunteer fire departments, emergency medical services and others;

Therefore be it resolved: The American Radio Relay League opposes efforts to expand current prohibitions against cellular and PCS eavesdropping beyond those that already exist, except insofar as such efforts strengthen or clarify existing prohibitions, and are specifically restricted to cellular and PCS services that interface with wireline communication.

10. Support for the Military Affiliate Radio System

Whereas: Congress has repeatedly emphasized the importance of the Military Affiliate Radio System (MARS) to the well-being of American military personnel overseas, specifically supporting the program in reports on the National Defense Authorization Act for Fiscal Years 1998 and 1999, and this view is shared by the Department of Defense;

And Whereas: The MARS system is estimated to save the American taxpayer as much as \$27 million a year;

And Whereas: The volunteers in the Amateur Radio Service provide key communication links in the effective utilization of this important program;

Therefore be it resolved: The American Radio Relay League urges Congress to support funding, legislation and other measures to maintain a healthy and robust Military Affiliate Radio System.

11. Opposing Future Antenna Restrictions

Whereas: Congress has acknowledged the need to protect certain classes of residential antenna installations from restrictive local zoning regulations;

And whereas: The proliferation of cellular, PCS and other commercial telecommunications antenna support structures has resulted in increasing concern on the part of local zoning authorities around the country;

And whereas: Some of this concern was reflected in legislation in the 105th Congress that could have created additional obstacles to the erection of antennas and support structures by ceding authority previously reserved for the federal government to municipalities;

And whereas: Local officials in some parts of the country tend to be indiscriminate in developing local ordinances restricting not just the construction and erection of large telecommunications facilities, but also significantly less obtrusive antennas such as those utilized by Amateur Radio operators;

Therefore be it resolved: That the American Radio Relay League opposes the introduction of legislation restricting the siting of commercial telecommunications facilities unless such legislation reflects the legitimate needs of all telecommunications interests;

And therefore be it further resolved: That the American Radio Relay League supports the statutory exemption of reasonable Amateur Radio antenna and support structures from local ordinance and covenant restrictions.

(see Minute 52).

...Eugene Hastings, W1VRK, and ARRL Directors John Kanode, N4MM, and Greg Milnes, W7AGQ, were elected to three-year terms as directors of the ARRL Foundation (see Minute 9).

...Responding to an offer by the founding sponsor of "Kid's Day," ARRL will assume sponsorship of this operating event that introduces Amateur Radio to hundreds of kids in a creative format. See page 46, January 1999 *QST* for more on this innovative program (see Minute 51).

...Following the recommendations of its Administration and Finance Committee, the Board approved operating and capital spending plans for 1999 (see Minutes 28 and 29).



New Vice Directors enjoy their first Board meeting: Northwestern Division's Jim Fenstermaker, K9JF (left), joins Coy Day, N5OK, of the West Gulf Division.

...The Board rescinded its policy providing for consignments of publications to be sent on request to ARRL conventions and hamfests. Several years of experience had shown that the policy was not financially successful (see Minute 53).

...The Bylaws were amended to permit International membership without receipt of *QST*. To receive *QST* each month, International members must pay for additional postage. Instead, International members may now opt to pay the regular dues rate and to receive the annual ARRL periodicals CD ROM, including *QST*, *QEX*, and *NCJ*, along with other membership benefits such as access to the members-only Web site and reduced DXCC fees (see Minutes 33 and 34). **QST**

Moved & Seconded

1999 ANNUAL MEETING OF THE ARRL BOARD OF DIRECTORS JANUARY 15-16, 1999

Summary Agenda

1. Roll Call
2. Moment of Silence
3. Consideration of the Agenda for the meeting
4. Approval of the Minutes of the 1998 Second Meeting and Special Meeting
5. Election of Executive Committee members
6. Election of ARRL Foundation Directors
7. Reports by the Officers
8. Reports on Legislative and Technical Regulatory Affairs
9. Receive Reports and Consider Recommendations of the Committees
10. New business
11. Directors' motions

1. Pursuant to due notice, the Board of Directors of the American Radio Relay League, Inc., met in annual session at the Houston Airport Marriott Hotel, Intercontinental Airport, Houston, Texas, on Friday, January 15, and Saturday, January 16, 1999. The meeting was called to order at 8:37 AM CST, January 15, with President Rodney J. Stafford, W6ROD, in the Chair and the following Directors present: Kay C. Craigie, WT3P, Atlantic Division; Edmond A. Metzger, W9PRN, Central Division; Tod Olson, K0TO, Dakota Division; Rick Roderick, K5UR, Delta Division; Frank Fallon, N2FF, Hudson Division; Lew Gordon, K4VX, Midwest Division; Tom Frenaye, K1KI, New England Division; Greg Milnes, W7AGQ, Northwestern Division; Brad Wyatt, K6WR, Pacific Division; John C. Kanode, N4MM, Roanoke Division; Walt Stinson, W0CP, Rocky Mountain Division; Frank M. Butler, W4RH, Southeastern Division; Fried Heyn, WA6WZO, Southwestern Division; Jim Haynie, W5JBP, West Gulf Division.

Also present without vote were Stephen A. Mendelsohn, W2ML, First Vice President; Joel M. Harrison, W5ZN, Vice President; Larry Price, W4RA, International Affairs Vice President; Treasurer James McCobb, W1LLU; and David Sumner, K1ZZ, Executive Vice President and Secretary. Chief Financial Officer Barry J. Shelley, N1VXY, was present in his capacity as an officer of the Corporation. Vice President Hugh A. Turnbull, W3ABC, was unable to join the meeting because of health reasons.

Also in attendance at the invitation of the Board as observers were the following Vice Directors: Howard S. Huntington, K9KM, Central Division; Jay Bellows, K0QB, Dakota Division; Henry R. Leggette, WD4Q, Delta Division; George Race, WB8BGY, Great Lakes Division; J. P. Kleinhaus, W2XX, Hudson Division; Bruce Frahm, K0BJ, Midwest Division; Mike Raisbeck, K1TWF, New England Division; James E. Fenstermaker, K9JF, Northwestern Division; Jim Maxwell, W6CF, Pacific Division; Dennis Bodson, W4PWF, Roanoke Division; Marshall Quait, AG0X, Rocky Mountain Division; Evelyn Gauzens, W4WYR, Southeastern Division; Art Goddard, W6XD, Southwestern Division; and Coy Day, N5OK, West Gulf Division. Also present were General Counsel Christopher D. Imlay, W3KD; Publications Manager Mark Wilson, K1RO; Membership Services Manager Bill Kenamer, K5FUV; Field Services Manager Richard Palm, K1CE; Technical Relations Specialist Walter Ireland, WB7CSL; and Legislative and Public Affairs Manager Steve Mansfield, N1MZA. Present as a guest of the Board was Radio Amateurs of Canada (RAC) President Patrick Doherty, VE3PD.

Vice Director Race assumed the seat of Great Lakes Director Dave Coons, WT8W, who had encountered travel difficulties owing to weather and was expected to join the meeting later.

2. Mr. Milnes rose to a point of personal privilege. He stated that he was shocked and saddened over the passing of former Northwestern Division Director Mary Lou Brown, NM7N, who died while in office, December 3, 1998. Mr. Milnes also stated that Mrs. Brown was a friend with whom he worked well as a team, and was an effective ambassador for Amateur Radio and ARRL. The assembly observed a moment of silence in her memory.

3. The assembly observed another moment of silence in recollection of other Radio Amateurs who have passed away since the previous Board meeting, especially Dick Adachi, W6RVS; Jose Alvarez, K2KMO; Harry Angel, VK4HA; Thomas E. (Ack) Atkerson, W4RRW; Ev Ayers, K0ZYM; Lenny Babin, WA6CQF; Herman Baker, N6ARP; Alvin Battison, W2IEG; Chris F. Bednarek, K2RAG; Henry Beitler, KA6ELQ; Richard A. Bernstein, KA2YZM; Cliff Betson, ZL1MQ; Howard Bobbitt, WA6BUH; Loretta Bokemeier, KD6OMU; Arnold R. Brillhart, K6GF; Forrest Brower, N7PKQ; Don Brust, W8QCU; Andy Clark, W4YIT; Dick Cole, KO6OF; Donald Coleman, KC7GAM; Clarence Creery, WD6HAY; Nathan Crowe, KE6CIZ; James Dean, KF6DHB; Otto Dedrick, W6NGK; Robert Dow, WB2CJL; Douglas Embrey, KH6JFV; Merv Enos, N6FZS; Eldo Gibbs, W5LL; Roy H. Gregson, W6EMT; John S. Harvey, WB4KIT; Bob Hayes, W7ZYK; Thomas Hori, KH6OS; Homer J. (Joe) Johnson, W5QFU; L.T. Jones, W8RLW; Michael Karp, N2FM; Chuck King, KO4LP; Paul Krugh, N2NS; Leonid Labutin, UA3CR/AB4LZ; Al Libby, KB1FK; Fred M. Link, W2ALU; June Linnehan, KD6LSU; Dave Melarkey, WA7ANA; Clark Magness, N1IU; Charles Michaels, W7XC; Luke H. Montgomery Jr., WA4UDB; Lloyd Novak, AB6SM; Jennifer Nugent, N7TUA; Leslie Nunes, KH6KB; Kenneth E. Palm, AB1N; Edward Peters, WB6MCG; Mary Ann Simmons, K16TE; Charles R. Sine, W3JIW; Herb Swartz, N6ELV; Milan Terkla, W6RHA; William C. Wells, WA8HSU; Sherman Winings, WB4RDV; Hon Cho Wong, KH6IN; and Roy Young, KA6NKS.

4. On motion of Mr. Race, seconded by Mr. Metzger, the agenda of the meeting was ADOPTED as presented.

5. On motion of Mr. Mendelsohn, seconded by Mr. Kanode, the Minutes of the 1998 Second Meeting and Special Meeting were ADOPTED as printed in *QST*.

6. Mr. Doherty conveyed the greetings of the Radio Amateurs of Canada, Inc., and thanked the Board for its continuing support.

7. Mr. Metzger conveyed the greetings of the ARRL Foundation, and reported that the Foundation had enjoyed an excellent year. The Foundation reached the \$2 million mark in assets for the first time in its history, thanks in part to a large bequest.

8. The Chair opened nominations for four Director members of the Executive Committee for one-year terms. Mr. Kanode nominated Mrs. Craigie. Mr. Roderick nominated Mr. Fallon. Mr. Gordon nominated Mr. Heyn. Mrs. Craigie nominated Mr. Butler. Mr. Stinson nominated Mr. Olson. On motion of Mr. Roderick, seconded by Mr. Race, it was VOTED that nominations are closed. The Chair appointed Vice Directors Maxwell, Bodson, and Quait as Tellers, who distributed, collected, and tallied paper ballots. The Tellers found that Mrs. Craigie, Mr. Fallon, Mr. Heyn, and Mr. Olson were elected. (Applause.)

9. On motion of Mr. Olson, seconded by Mr. Race, it was VOTED that Mr. Milnes, Mr. Kanode, and Eugene Hastings, W1VRK, are elected as Directors of the ARRL Foundation for three-year terms. (Applause.)

10. At this point, the officers reported on their activities during the second half of 1998. President Stafford referred to his written report, which addressed the state of Amateur Radio and his perceptions of the need to inject stimulating, new aspects of the radio art, especially technology. A three-point strategy for meeting this need was introduced. Mr. Stafford's report also addressed declining membership, the need to study the basis for the decline and to identify enhanced membership benefits to stem it. His report also addressed possible changes to the League's strategic planning processes in light of recent experience.

11. First Vice President Mendelsohn supplemented his written report with his recommendation that the organization should prioritize membership development, and position the League's products and services so as to attract young people. Mr. Mendelsohn also reported that the Computer Committee, on which he serves as chairman, has finished its work and seeks to be discharged.

12. Vice President Harrison reported that he is in agreement with his fellow officers on the need to focus efforts on stemming the membership decline as a major organizational objective. Mr. Harrison called for a full effort to win FCC approval of the League's license restructuring proposals. For the future, he recommended that ARRL look to its own resources for facilitating strategic planning.

13. International Affairs Vice President Price supplemented his memorandum on ITU and IARU affairs with a summary of his work on behalf of ARRL and IARU in 1998 and plans for ITU and other meetings in 1999, including the IARU Region 1 Conference set for Lillehammer, Norway, in September. In response to questions, Mr. Price discussed the status of Amateur Radio in other countries and consequent experience of the League's sister societies; and the budget, operations, and election policies of the IARU and its regional organizations. The Board was in recess from 9:53 AM until 10:22 AM.

14. Mr. McCobb, as Treasurer, reported on the composition and performance of the investment portfolio over the past year; the sale of equity securities on which significant gains have been realized; and investment strategies for this year.

15. Chief Financial Officer Shelley referred to his written report, and addressed the League's financial position at year-end, which is generally sound. He expressed concern about the general contraction in Amateur Radio as indicated by fewer new licensees and turmoil in the industry. For ARRL, this has resulted in fewer members and reductions in revenues from sales of publications and advertising, as well as member dues. Offsetting this decrease in revenues during the past year were less-than-planned operating expenses and the realization of gains from the sale of equity securities. Excluding the realized gains, operations produced a roughly break-even result, before any estimated income tax liability, for the past year. The Board was in recess for luncheon from 11:51 AM until 1:23 PM, reconvening with all persons hereinbefore mentioned. Mr. Coons joined the assembly at this time and took his seat for the Great Lakes Division.

16. Executive Vice President Sumner referred to his extensive written report on Headquarters operations in the second half of 1998, and commented on membership development strategies; the membership experience of sister societies; the

"Radio Coaches" youth development program; and the results of the public service conference program. Mr. Sumner answered questions on his responsibilities, including membership recruitment, product marketing, electronic publishing, member longevity awards, and volunteer examiner suspension policies.

17. General Counsel Imlay supplemented his extensive written report, noting that the experimental station license sought by the ARRL for the 5 MHz band study had just been issued by the FCC. Mr. Imlay also commented on the striking renewal of FCC enforcement activity; FCC restructuring and staffing; and the League's reply comments and strategies undertaken in the FCC's biennial review proceeding. The Board was in recess from 2:47 PM until 3:15 PM. The Board reviewed a draft petition for rule making for possible joint submission with the National Frequency Coordinators' Council (NFCC), to seek rules requiring that all repeater and auxiliary facilities must be frequency coordinated. A majority of the Board did not find that there was compelling evidence warranting a move beyond the existing rules at this time, but the NFCC was invited to revisit the matter.

18. On motion of Mr. Olson, seconded by Mr. Mendelsohn, it was VOTED at 4:00 PM that the Board sit as a Committee of the Whole for the purpose of discussing personnel matters. The General Counsel and staff were excused from the meeting at this time. At 4:25 PM, on motion of Mr. Olson, seconded by Mr. Kanode, it was VOTED that the Committee arise and report. On motion of Mr. Harrison, seconded by Mr. Mendelsohn, it was VOTED that the report of the Committee of the Whole is adopted. The Board was in recess from 4:25 PM, January 15, until 8:34 AM, January 16, 1999, reconvening with all persons hereinbefore mentioned.

19. At this point, the Chair announced committee appointments as follows:

Administration and Finance: Directors Haynie, Chairman; Stinson, Gordon, Metzger, and Frenaye; Vice President Mendelsohn; and Vice Director Goddard. Membership Services: Directors Roderick, Chairman; Wyatt, and Kanode; Vice President Harrison; and Vice Directors Bellows, and Race. Volunteer Resources: Directors Milnes, Chairman; Coons, and Butler; Vice President Turnbull; and Vice Director Fuller. Election: Directors Metzger, Chairman; Heyn, and Frenaye. Enforcement Task Force: Vice President Harrison, Chairman; Directors Fallon, Craigie, and Heyn; Vice President Turnbull; Vice Director Quiat; General Counsel Imlay; and Field Services Manager Palm. RFI Task Group: Vice President Turnbull, Chairman; Vice Director Bodson; and Lab Supervisor Ed Hare, WIRFI. RF Safety: Vice Director Maxwell, Board Liaison. SAREX/ARISS Working Group: Vice President Harrison, Board Liaison. Public Relations: Dave Bell, W6AQ, Chairman; and Vice Director Kleinhaus, Board Liaison. Industry Advisory Council: Director Stinson, Chairman; and Vice Director Kleinhaus, Vice Chairman. Mr. Mendelsohn assumed the Chair at 9:03 AM.

20. Mr. Mansfield, as Manager of Legislative and Public Affairs, supplemented his written report with comments on the climate on Capitol Hill with the presidential impeachment trial underway, and briefly reported on the outcome of bills of ARRL interest considered in the previous 105th Congress. Mr. Mansfield also reviewed proposed amendments to the League's legislative agenda, to guide his work with the recently convened 106th Congress.

21. On motion of Mr. Heyn, seconded by Mr. Kanode, it was VOTED that the package of ARRL legislative positions, as amended, is adopted.

22. Mr. Ireland, as Technical Relations Specialist, supplemented the written report on technical regulatory affairs with updates on additional Washington office staffing; successful lobbying for changes to the ITU convention allowing for IARU participation in future plenipotentiary conferences; efforts to exempt the amateur-satellite service from ITU satellite cost recovery filing fees; continuing threats to amateur interests from

the search for a new frequency for the Global Positioning System (GPS), little LEOs, Synthetic Aperture Radars (SAR) at 70 cm, and Fixed Wireless Access (FWA); and status of efforts to realign the 7 MHz band. The Board was in recess from 9:50 AM until 10:20 AM, with Mr. Stafford returning to the chair at this point.

23. Mr. Gordon, as Chairman, presented the written report of the Membership Services Committee, which studied possible new DXCC entities; the reduced WIAW schedule; adjustments to the QSL bureau fee structure; and the local club eligibility radius for ARRL contests, which was increased. Mr. Gordon also noted a staff proposal for a contest to kick off the new millennium.

24. Mr. Wyatt, as Chairman, presented the written report of the Volunteer Resources Committee, and reviewed committee work on Y2K problems and emergency communications; and a pilot program based on a congressional district liaison field appointment to develop a "grassroots" network for advancing the League's legislative agenda.

25. On motion of Mr. Fallon, seconded by Mr. Butler, it was unanimously that the following resolution is ADOPTED:

WHEREAS, the Radio Amateur du Quebec, Inc., established in 1951, signed a memorandum of understanding in 1978, renewed in 1994, with the Direction de la Securite civile of the ministere de la Securite publique du Quebec; and

WHEREAS, under the memorandum, the RAQI emergency network and its amateur radio operators have unfailingly responded to requests from the Securite civile du Quebec for support communications during emergencies; and

WHEREAS, on January 6, 1998, the Securite civile du Quebec asked the RAQI emergency network to establish emergency communications in the Monteregion region in Quebec when a severe ice storm plunged the region into darkness and cold, with public and commercial telecommunications services collapsing; and

WHEREAS, the RAQI emergency network responded to requests from 10 hospitals in the region that were without communications or electricity, and to requests from the Red Cross for communications between its shelters and the Securite civile center; and

WHEREAS, from January 6 to January 21, more than 700 Quebec amateur operators in the RAQI emergency network provided coverage in more than 60 municipalities, despite being affected by the storm themselves;

NOW, THEREFORE, BE IT RESOLVED, that in view of the nomination tendered by the Director, Securite civile du Quebec, the International Humanitarian Award is hereby conferred upon the Radio Amateur du Quebec, Inc., for its profound commitment to civic responsibility as exemplified by its service to the citizenry of Quebec during the 1998 ice storm, by the ARRL Board of Directors convened in annual session, January 16, 1999. (Applause).

26. On motion of Mr. Quiat, seconded by Mr. Frenaye, it was VOTED that staff is directed to recommend to Section Managers, Section Emergency Coordinators, and ARES groups that they enter into special agreements (MOUs), and conduct drills, with public utilities and public safety agencies for the provision of emergency communications should regular communication systems be disrupted by potential problems such as Y2K.

27. Mr. Olson, as Chairman, presented the written report of the Administration and Finance Committee, and the 1999 Spending, Revenue, and Capital Plans. Mr. Olson also commented on the conduct of standing committee business; membership contact travel policy; management reporting practice; and the need for development of data as the basis for future planning.

28. On motion of Mr. Olson, seconded by Mr. Frenaye, it was VOTED that the operating plan for 1999 as presented to the Board is approved.

29. On motion of Mr. Olson, seconded by Mr. Metzger, it was VOTED that the capital spending plan for 1999 as presented to the Board is approved.

30. On motion of Mr. Olson, seconded by Mr.

Kanode, it was VOTED that the variances to the 1998 spending plan by the following are approved: Administration and Finance Committee (\$928); Enforcement Task Force (\$134); President (\$2,471); Officers (\$8,332); Strategic Planning Steering Committee (\$3,072).

31. Mrs. Craigie, as Chairman, presented the written report of the Election Committee, and noted that the eligibility of new Northwestern Division Vice Director James E. Fenstermaker, K9JF, had been certified.

32. Mr. Stafford, as Chairman, presented the report of the Executive Committee, and commented on its review of the bylaws; and a proposed new policy to permit International membership without receipt of *QST*. To receive *QST* each month, International members must pay for additional postage. Under the new plan, International members could opt to pay the regular dues rate and to receive instead the annual ARRL periodicals CD ROM, including *QST*, *QEX*, and *NCJ*, along with other membership benefits such as access to the Members-only Web site and reduced DXCC fees.

33. It was moved by Mrs. Craigie, seconded by Mr. Butler, that the second sentence of Bylaw 4 is amended to read: "For members outside the United States, except for International members who elect not to receive *QST* by mail, the Executive Vice President shall assess such additional mailing costs as are consistent with the postal rates for destinations outside the United States." A roll call vote being required, the question was decided in the affirmative, with all Directors voting aye.

34. It was moved by Mrs. Craigie, seconded by Mr. Heyn, that the second sentence of Bylaw 45 is amended to read: "A copy of this journal shall be supplied each month to every member of the League in good standing, except those International, blind, and family members who have elected a category of membership that does not include receipt of *QST*." A roll call vote being required, the question was decided in the affirmative, with all Directors voting aye.

35. Mr. Harrison, as Chairman, presented the written report of the Enforcement Task Force, and jubilantly commented that strategies to gain more FCC enforcement action have begun to bear fruit: Changes in the administration and staffing at FCC have resulted in a reprioritization of enforcement. Mr. Harrison reviewed recent FCC enforcement actions and warnings. (Applause). The Board was in recess for luncheon from 12:06 PM until 1:18 PM, reconvening with all persons hereinbefore mentioned.

36. Mr. Harrison, as Board Liaison, presented the report of the SAREX/ARISS Working Group, and commented on the status of the Amateur Radio manifest aboard the International Space Station (ISS); and the last scheduled SAREX mission STS-93, slated for launch in April.

37. Mr. Mendelsohn, as Chairman, presented the final report of the Computer Committee and summarized the committee's accomplishments, which included overseeing a major computer conversion at headquarters, and the implementation of new electronic communication services benefiting the entire organization. Mr. Mendelsohn commended staff for its efforts, and noting that the committee's work had been concluded, called for the committee to be discharged.

38. Mr. Frenaye, as Chairman, presented the written report of the Strategic Planning Steering Committee, and commented on the results of the strategic planning session conducted at the close of the 1998 Second Meeting.

39. Mr. Bodson, on behalf of Mr. Turnbull, Chairman, presented the report of the RFI Task Group, commenting on the committee's work with the Accredited Standards Committee C63 meetings regarding EMC issues, and its sub-committees; a new edition of the *ARRL RFI Handbook*; and efforts to address interference problems stemming from new wireless telephone jacks.

40. Mr. Maxwell, as Board Liaison, presented the written report of the RF Safety Committee, and observed that no significant new information had been added to the body of scientific knowledge since the previous meeting. The committee supported staff efforts on the publication of re-

lated ARRL literature; participated in standards committee work; and enjoyed a good working relationship with FCC's Office of Engineering and Technology (OET).

41. Mr. Frahm, as Board Liaison, presented the report of the Public Relations Committee, and thanked the Board for inviting chairman Dave Bell, W6AQ, to address the group on the eve of the instant meeting. Mr. Frahm also commented that electronic mail services had enhanced committee communication.

42. Mr. Bodson, as Board Liaison, Future Systems Committee, reported on the publication of the PACTOR II description, rendering the code as an approved digital mode; the new mode PSK31, which has been described in *RadCom*, the journal of the Radio Society of Great Britain; and committee work on identifying emission designators missing from Part 97 of the FCC rules.

43. Mr. Stinson, as Chairman, presented the written report of the Industry Advisory Council, commenting that the council solicited and received input from several major Japanese manufacturers for the continuing study of possible industry-wide product standards; and on manufacturers' policies on replacement of detachable control heads for amateur transceivers.

44. Mr. Olson, as Chairman, presented the final report of the 1998 Plenipotentiary Conference Planning Committee, which oversaw the successful and visible Amateur Radio participation in the hosting of the ITU conference held last October, in Minneapolis, Minnesota.

45. Mr. Harrison, as Board Liaison, presented the written report of the Contest Advisory Committee, commenting on its consideration of items referred to it by the Membership Services Committee and the field, which included possible changes to the 10 GHz contest operating period, and other ARRL contest rules. Mr. Harrison conveyed the chairman's appreciation for the Board's support of the contest community.

46. Mr. Maxwell, as Board Liaison, presented the written report of the DX Advisory Committee, and commented that no new entities were considered during the second half of the year. The committee assessed membership acceptance of the new DXCC 2000 program and suggestions for improving awareness; and suggested criteria for selecting DXCC field checkers.

47. On motion of Mr. Gordon, seconded by Mr. Stinson, it was VOTED that Wayne Mills, N7NG, be appointed DXAC chairman, notwithstanding the Rules and Regulations concerning Advisory Committees, which state in part, the "Chairman will serve in that post for no more than two one-year terms consecutively." At this point, the Chair also announced the appointment of Lew Sayre, W7EW, as CAC chairman for 1999.

MINUTES OF THE EXECUTIVE COMMITTEE

Number 458

Houston, Texas - January 14, 1999

Agenda

1. Approval of minutes of July 16, 1998 Executive Committee meeting
2. FCC matters
3. Legislative matters
4. Antenna/RFI matters
5. Other legal matters
6. International matters
7. Organizational matters
8. Recognition of new Life Members
9. Affiliation of clubs
10. Approval of conventions
11. Other business

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 9:06 AM Thursday, January 14, 1999, the day before a meeting of the Board of Directors, at the Houston Airport Marriott Hotel, Intercontinental Airport, Houston, Texas. Present were the following committee members: President Rodney Stafford, W6ROD, in the Chair; First Vice President Stephen A. Mendelsohn, W2ML; Executive

48. The Board noted the written report of ARDF Coordinator Joe Moell, K0OV, which addressed his efforts to promote direction finding as a technical, sporting activity within the framework of the amateur service. The report covered the ninth ARDF World Championships, held at Nyiregyhaza, Hungary, September 1-6, 1998, with 32 countries sending their best on-foot foxhunters. The successful US team was led by Dale Hunt, WB6BYU. The report also addressed upcoming activities, including IARU Region 2 ARDF Championship foxhunts as part of the Friendship Radiosport Games (FRG-99) to be held August 10-14, in Portland, Oregon.

49. The Board next moved to consider new business. Mr. Bodson exhibited the new Virginia state motor vehicle license plate incorporating the ARRL diamond logo. The Board was in recess from 2:05 PM until 2:36 PM.

50. The Board next moved to consider Directors' motions. On motion of Mr. Fallon, seconded by Mr. Stinson, it was VOTED that the following resolution is adopted:

WHEREAS, the ARRL was originally named when message handling by radio relay was an innovative and growing activity of amateur radio operators; and

WHEREAS, the breadth of amateur radio activities is adequately characterized no longer by our name; and

WHEREAS, it is important that the name of this organization clearly reflect our focus and purpose—Amateur Radio—to those both inside and outside our organization; and

WHEREAS, we are about to enter a new millennium; and

WHEREAS, the year 2000 is a natural point for change;

NOW, THEREFORE, BE IT RESOLVED, that the Executive Committee is tasked with developing a name change proposal for consideration by the Board at the 1999 Second Meeting.

51. On motion of Mr. Frenaye, seconded by Mr. Milnes, it was VOTED that the ARRL Board accepts the offer from the Boring (Oregon) Amateur Radio Club for the ARRL to become the sponsor of the Kid's Day operating event which has steadily grown in activity over the past few years, and introduced Amateur Radio to hundreds of kids in a creative format.

52. On motion of Mr. Butler, seconded by the entire assembly, it was unanimously VOTED that the Secretary is instructed to cast affirmative votes on International Amateur Radio Union Proposals 229 and 230, to ratify the election of Larry E. Price, W4RA, as IARU President and David A. Wardlaw, VK3ADW, as IARU Vice President for the 1999-2004 term. (Applause).

53. On motion of Mr. Haynie, seconded by Mr. Gordon, it was VOTED that the standing order created in Minute 32 of the 1992 Annual Meeting re-

Vice President David Sumner, K1ZZ; and Directors Kay Craigie, WT3P, and Fried Heyn, WA6WZO. Director Frank M. Butler, Jr., W4RH, was absent owing to travel on behalf of the International Amateur Radio Union, but was expected to join the meeting later. Also present were General Counsel Christopher D. Imlay, W3KD, and International Affairs Vice President Larry E. Price, W4RA. Other ARRL officers, directors, and vice directors, and Legislative and Public Affairs Manager Steve Mansfield, N1MZA, attended portions of the meeting.

The meeting was opened with a moment of silence in memory of committee member Mary Lou Brown, NM7N, who died the previous month.

1. On motion of Mr. Heyn, the minutes of the July 16, 1998, Executive Committee meeting were approved in the form in which they had been distributed.

2. FCC matters were considered as follows:

2.1. Update on actions involving the FCC:

2.1.1. Mr. Imlay distributed copies of the ARRL reply comments in WT Docket 98-143, to be filed on January 15. He reviewed the ongoing efforts to encourage early and favorable FCC action on the League's license restructuring proposal.

2.1.2. Mr. Imlay reported that the FCC has

granted consignments sent to ARRL conventions and hamfests be rescinded. The Board was in recess from 3:06 PM until 3:20 PM.

54. On motion of Mrs. Craigie, seconded by Mr. Butler, it was VOTED that the "Amateur Radio Technology Task Force" is hereby created. The Amateur Radio Technology Task Force shall be responsible for, among other related things, developing a strategy and plan of work exploring new technologies, assessing their applicability to amateur radio and also developing a plan as to how to incorporate such new technology in the amateur radio service.

The Technology Task Force shall be appointed by the President and shall consist of such members of the ARRL Board of Directors or Officers, ARRL HQ staff and League members who have been actively involved in experimenting with or developing new technologies that may have some applicability to the amateur radio service.

The Technology Task Force may, from time to time, bring proposals to the Board of Directors to further the development and implementation of such new technologies in amateur radio.

The Technology Task Force may meet with other amateur radio organizations involved in experimental work or developing new technologies for the purpose of exploring joint sponsorship of research and/or development.

The Technology Task Force chairperson shall recommend to the President such additional members to the Task Force as reasonably are necessary to carry out the duties and work of the task force. The task force shall report to the Board at the 2000 Annual Meeting regarding the progress of its work.

55. On motion of Mr. Olson, seconded by Mr. Gordon, it was VOTED that the Future Systems Committee shall be reconstituted as the Amateur Radio Technology Working Group. The Technology Working Group shall serve as an adjunct to, and a resource for, the Technology Task Force. The Technology Working Group shall conduct such experiments, research and development regarding newer technologies as requested by the Technology Task Force. The Technology Working Group shall consist of such persons appointed by the President and who are knowledgeable about newer technologies or experimenting with or developing such technologies as may be incorporated into the amateur radio service.

56. There being no further business, those present were invited to make informal closing comments and the meeting was adjourned at 3:58 PM. (Time in session as a Board: 9 hours, 51 minutes; as a Committee of the Whole: 25 minutes; direct authorizations: \$14,937.00.)

Respectfully submitted,

David Sumner, K1ZZ
Secretary

granted the experimental license sought by the ARRL to permit small networks of amateur stations to demonstrate the desirability of an amateur allocation in the vicinity of 5 MHz.

2.1.3. Mr. Imlay reported that the ARRL has filed a petition for reconsideration in the FCC ULS proceeding, WT Docket 98-20. The petition seeks to ensure that the FCC will continue to issue amateur license documents, and will make appropriate arrangements for licensees who are not residents or citizens of the United States, and therefore do not have Taxpayer Identification Numbers; and seeks to correct some omissions in the Form 605 that will replace Form 610.

2.2. Mr. Imlay distributed a draft description of an ARRL Mediation Service, to be added to the existing ARRL Arbitration Service as a means of resolving disputes involving radio amateurs. After discussion, on motion of Mrs. Craigie, it was voted to recommend adoption to the Board.

2.3. Mr. Imlay noted the League's continuing interest in having the Amateur Service upgraded to primary status in the band 2300-2305 MHz, and reported on ongoing efforts to achieve that objective.

3. Mr. Mansfield reported briefly on legislative matters, and received feedback from committee members on draft legislative positions for the

106th Congress to be presented to the Board for approval.

4. Mr. Imlay briefly noted the status of legal proceedings concerning amateur and other telecommunications antennas in which the League has an interest.

5. Mr. Imlay reported briefly on the status of legal proceedings to which the ARRL is a party.

6. Mr. Price reported briefly on international matters:

6.1. Mr. Price noted that Mr. Butler's absence from the first part of the meeting was the result of his representing the International Amateur Radio Union at a meeting of ITU-R Task Group 1/5 in Phoenix. Technical Relations Manager Paul Rinaldo, W4RI, is at the same meeting, representing the ARRL as a member of the United States delegation. Technical Relations Specialist Walt Ireland, WB7CSL, will present the report on technical regulatory matters to the Board.

6.2. Mr. Price observed that the newly installed President of the Radio Amateurs of Canada, Pat Doherty, VE3PD, will be attending the meeting of the ARRL Board for the first time.

6.3. Mr. Price reported that in one week he would be travelling to Geneva to represent the IARU at an ITU meeting on Satellite Network Cost Recovery. If the ITU were to charge fees for required notifications of planned amateur satellite launches, it could have a chilling effect on the Amateur-Satellite Service.

6.4. Mr. Price described the IARU voting process that is now underway to ratify nominations for IARU President and Vice President.

7. Organizational matters were considered as follows:

7.1. Mr. Mendelsohn noted that the review of the ARRL Bylaws has not progressed as quickly as anticipated because of a heavy work schedule. Mr. Sumner presented a proposal to amend the Bylaws to permit a category of International membership that does not include monthly receipt of *QST*. After discussion, on motion of Mr. Heyn, it was voted to recommend adoption of the proposal to the Board.

The committee was in recess for lunch from 12:05 to 1:30 PM.

7.2. The committee reviewed recent experience with strategic planning, concluding that it is important to continue the planning effort and that for now, the League's internal resources should be used.

7.3. The scheduling and site selection of National Conventions following National Convention 2000 in Dayton was discussed briefly. It was agreed that no solicitation of convention applications would be undertaken at this time.

7.4. A complaint submitted by a member seeking the expulsion of other members was reviewed. The committee found that the material submitted was not sufficient to support consideration of expulsion. The secretary was instructed to advise the complainant accordingly.

7.5. Mr. Heyn inquired as to the status of the work of the subcommittee charged with developing a Board Member Code of Ethics as called for at Minute 23 of the July 1996 Meeting of the Board. A draft was circulated to Board members for review and comment. First Vice President Mendelsohn and Directors Frenaye and Heyn agreed to continue to work on this item.

7.6. Without taking formal action, the committee also discussed the directors' annual reports required by Bylaw 17, enhancements to Web-based membership benefits, and staff travel to conventions.

At this point, 2:55 PM, Mr. Butler joined the meeting.

8. On motion of Mr. Butler, 109 newly elected life members were recognized and the Secretary was instructed to list their names in *QST*.

9. On motion of Mrs. Craigie, the following clubs were declared affiliated or their earlier affiliation by mail vote was ratified:

Category 1

Bitterroot Amateur Radio Club, Sula, MT
Capital City Repeater Association, Worthington, OH

Chesco Amateur Radio Association, Malvern, PA
Dixie Amateur Radio Group, West Memphis, AR
East Greenbush Amateur Radio Association, Rensselaer, NY

Florida Contesters, Miami, FL
Ham Operators Group, Albany, OR
Heartland DX Association, Omaha, NE
Hickory Withe DX Club, Collierville, TN
Kamiak Butte Amateur Repeater Association, Spokane, WA

Lauderdale Repeater Group, Meridian, MS
Lenoir Amateur Radio Club, Hudson, NC
Lewis & Clark Trail DX Society, Orofino, ID
Lighthouse Amateur Radio Club, Palm Harbor, FL

Redmond Top Key Contest Club, Redmond, WA
Rhea County Amateur Radio Society, Spring City, TN

Southern California Repeater and Remote Base Association, Newport Beach, CA

Southern Pennsylvania Communications Group, Shrewsbury, PA

Tri-County Amateur Radio Club, Trinity, NC
Tuolumne County Amateur Radio & Electronic Society, Sonora, CA

Category 2

Minnesota QRP Society, Eagen, MN

Category 3

Foundations Amateur Radio Society, Foundations Bible College & Seminary, Dunn, NC
University of Notre Dame Amateur Radio Club, Notre Dame, IN

The ARRL now has the following numbers of active affiliated clubs: Category 1, 1773; Category 2, 17; Category 3, 129; Category 4, 15; total, 1934.

10. On motion of Mr. Butler, the holding of the following ARRL conventions was approved or their earlier approval by mail vote was ratified: Eastern VHF/UHF Conference, Aug. 21-23, 1998, Enfield, CT

South Carolina Section, Oct. 24, 1998, Sumter, SC

Mississippi State, Jan. 29-30, 1999, Jackson, MS
Northern Florida Section, Feb. 12-14, 1999, Orlando, FL

Vermont State, Feb. 27, 1999, Milton, VT
Roanoke Division, Mar. 13-14, 1999, Charlotte, NC

Maine State, Mar. 19-20, 1999, Lewiston, ME
Oklahoma State, Mar. 19-20, 1999, Tulsa, OK
Southeastern VHF Conference, Apr. 9-10, 1999, Atlanta, GA

International DX, Apr. 9-11, 1999, Fresno, CA
Delaware State, Apr. 25, 1999, New Castle, DE
Washington State, May 22-23, 1999, Yakima, WA
Iowa State, June 4-5, 1999, South Sioux City, NE
Eastern Pennsylvania Section, June 12, 1999, Bloomsburg, PA

Tennessee State, June 13, 1999, Knoxville, TN
Midwest Division, July 10, 1999, Kansas City, MO

Montana State, July 16-18, 1999, East Glacier, MT

Arizona State, July 23-25, 1999, Flagstaff, AZ
Texas State, Aug. 6-7, 1999, Austin, TX
Dakota Division, Aug. 6-8, 1999, Watertown, SD
Eastern Washington Section, Aug. 7-8, 1999, Spokane, WA

Eastern VHF/UHF Conference, Aug. 20-22, 1999, Enfield, CT

New Orleans International DX, Aug. 27-28, 1999, New Orleans, LA

Kentucky State, Sept. 11-12, 1999, Louisville, KY
W9DXCC, Sept. 18, 1999, Rolling Meadows, IL
Connecticut State, Oct. 10, 1999, Wallingford, CT
Florida State, Nov. 20-21, 1999, Tampa, FL
Maryland State, Mar. 25-26, 2000, Timonium, MD

11. There being no further business, on motion of Mr. Heyn, the meeting was adjourned at 4:00 PM.

Respectfully submitted,

David Sumner, K1ZZ
Secretary

Life Members Elected January 14, 1999

◇ Glenn E. Adams, KD7C; Alan R. Ahasic, W9AN; Randolph E. Allen, KA0AZS; Robert F. Applegate, K2UT; Douglas D. Awe, N9VA; Daniel Baker, K4DB; Edward E. Baker, W3NXV; Chris Baumgartner, WA2AMX; Brad C. Bayro, WA9AYM; Brian E. Bayus, N1KC; Scott Blixt, KA0JWC; John P. Boyd, KE4RJ; Edward K. Braaten, K6EKB; Eric R. Burger, KBOUJ; Ted R. Busenbark, KC0ADF; Edward H. Chubb, WE3G; Carl W. Clawson, WS7L; Jack A. Coleman, AC5DI; Barron G. Collier, K0WY; Duane M. Cook, NL7X; Bradford G. Corpening, N4IYE; Ernest L. Cote, NO1V; Hilory B. Cox, W3HBC; Robert J. De Mattia, AK1J; John F. Donatello, KA0MQR; Thomas J. Dooley, K4TJD; Lawrence W. Dove, WN8NXI; Timothy S. Duerson, WB9GCL; Pauline K. Durden, KB5TJN; Richard W. Farley, KG5KO; Ronald I. Farris, WA1RF; John P. Fischer, N8RQX; Shellie L. Forbis, W5SLF; Robert J. Forgey, K7LFY; Larry N. Fraysier, N4HIT; Harry R. Freeman, NK9R; Richard S. Garrett, AA0CR; Peter T. Gonos, K6GZN; Alexander Goren; Danny G. Grandstaff, KB8RIM; Tom Guyer, KG6AO; Chuck Gysi, N2DUP; Jeffrey G. Hammer, N9NIC; Catherine S. Hardy, KD5BLK; Daniel J. Hausauer, W0CN; Jerome H. Hawkins, WA4SP; Chris Hendricks; Charlie Hoffman, N3IOE; Ronald Holtzman, WD2AJC; Frank G. Hovie, N6FH; Michael Jandro, N0WX; Dennis J. Johnson, N0WA; Terrance P. Jones, K6TPJ; George Kaelin, KD4UKH; Thomas S. Keyser, N3HNQ; Mark E. Kraieski, KU4IM; Lawrence J. Kwant, KF8YY; Gregory A. Landuyt, N0BPM; Jeffrey G. Lewis, KJ7TX; Jen Ling; Steve M. Lopez, KE0NQ; Deane A. Loughmiller, K5DAL; Dale L. Loughmiller, KB5TZN; Fred M. Lowell, N7QBD; Alexander Magocsi, W2OV; William J. Mc Partland, WB1DYZ; Carl J. Middlekauff, K7ZYV; Tim Moore, KK4TK; Jimmie L. Myers, W0NZ; Robert E. Naumann, N5NJ; Nels A. Nelson, K7CQO; Mark Nill, W5AT; Robert Novak, KD6CTY; James R. Petro, K4FMB; Tom E. Prust, N9WI; David B. Rankin, AF4HI; Michael Raymond, N7JZT; George Reasoner, NB8L; Jerry L. Reed, W5RCQ; James A. Robertson, KK6NK; Walter C. Robinson, W8AR; David M. Rogers, KA9ZGH; Andrew Rosengarten, KD4ZGJ; Paul A. Sadowski, AH6LS; Steve Sawyers, N0YVY; Michael A. Serafin, KC5GRW; Motoyuki Seta, AA8QU; Richard Simmons; Gary P. Standorf, KB2YOX; James V. Stevens, K4MA; Robert M. Storwick, K7RS; Robert K. Stratton, KA0WTK; Gary M. Suddreth, KD4YTU; John R. Suker, W1TX; Brian R. Swann, N1BS; Arthur G. Tan, AB4RL; Nick J. Thomas, AA1LN; Roger V. Thompson, AD5T; Jerry Toth, WJ8E; Joseph B. Travis, N6YPC; Florence P. Valentine, K8OVV; Herbert Van DenHouten, N2QPJ; Don E. Vavra, M6DEV; Theodore P. Walker, KJ7V; Dara H. Weinerman, KB2RTH; Clarence Whaley, KD4PT; Cathy S. Williams, KF4ZYF; Patrick Wilson, W4PW; and Jean A. Wolfgang, WB3IOS. **QST**

New Products

THE PK-2 KEYSER KIT FROM JACKSON HARBOR PRESS

◇ New from Jackson Harbor Press is the PK-2 PIC-based memory keyer kit. The tiny unit features potentiometer or paddle-input speed control (5-39 WPM); two 52-character RAM-based memories; pin-to-pin compatibility with Tick or K8 keyer chips (except for potentiometer control); and very low power consumption (1.5 mA active, 7 microamps idle).

Price: \$18 (kit); \$7 (PK-2 chip with instructions); plus shipping (USA \$2, DX \$5). For more information, contact Jackson Harbor Press, RR1 Box 91C, Washington Island, WI 54246; [jacksonharbor@worldnet.att.net](http://www.jacksonharbor.com); <http://home.att.net/~jacksonharbor>. **QST**

Next New Product

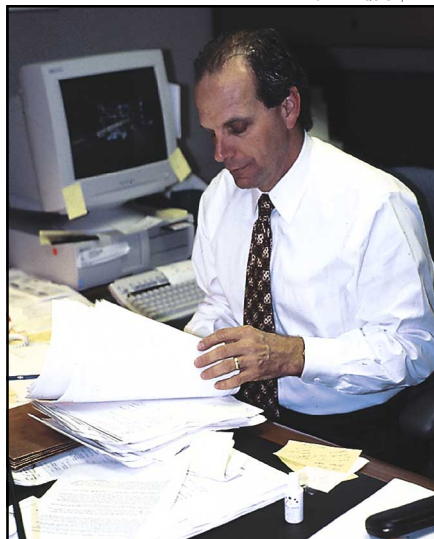
FCC Official Meets Hams on their Own Turf

The FCC's Amateur Radio enforcer, Riley Hollingsworth, K4ZDH, turned up in an unexpected place January 13—75 meters! In what could be an unprecedented move, Hollingsworth, legal advisor for amateur enforcement within the FCC's Compliance and Information Bureau, showed up on 3894.5 kHz—a well-known "hot spot"—to discuss enforcement and encourage compliance.

"A couple of them were pretty shocked," he said. "This has never been tried before," Hollingsworth said the next morning. He said he broke in on an argument that was growing increasingly nasty in an effort to settle things down, then stayed to discuss enforcement with the hams on frequency.

Hollingsworth says he thinks one key to compliance is just getting people to listen to what he has to say. "Most people, if you can just get to them on a one-to-one basis, they'll listen," he said, reflecting his overall enforcement approach to attempt to reason violators into voluntary compliance rather than writing them up. During his time on the air, Hollingsworth confronted one individual he'd already been in touch with about alleged on-air misbehavior.

Among other things, he told those on hand that noncompliance and inappropriate on-air behavior could even threaten the



RICK LINDQUIST, N1RL

The FCC's Amateur Radio enforcer, Riley Hollingsworth, K4ZDH, pages through the stack of e-mail messages he received in the wake of his appearance on 75 meters to discuss on-the-air compliance and behavior. "I've gotten a lot of feedback by phone and e-mail asking me to do it more often," he said, adding that most of the comments were very supportive. "We'll be listening more and asking to be allowed in QSOs more."

hobby's HF allocations. Hollingsworth advised hams to be more tolerant and patient and to avoid confrontation or retaliation.

"We all have to realize we're on a mission here—to save Amateur Radio," he said the day after his 75-meter appearance. "There are going to be licenses lost and fines owed." The jammers already are well on their way to "hanging themselves" right now, he said.

Even as he preached better behavior, Hollingsworth says he understood from the others on frequency that someone was attempting to jam his signal. "I hope the monitoring folks were on the frequency too," he said, referring to the FCC's HF Direction Finding facility in Columbia, Maryland.

Hollingsworth advised the hams on 75 to contact him with enforcement problems, and he gave out his e-mail address and telephone number (rholling@fcc.gov; 717-338-2502). "I don't know what effect it will have," he said of his on-air foray. Hollingsworth vowed to "do what it takes" to improve amateur compliance, and that could include future on-air visits with amateurs.

Based in Gettysburg, Pennsylvania, Hollingsworth took over the FCC's most recent Amateur Radio enforcement initiative last September (see sidebar "FCC Warns, Visits Alleged Major Amateur Offenders").

FCC ISSUES 5-MHZ EXPERIMENTAL LICENSE TO ARRL

The FCC has issued an Experimental Radio Service license to the ARRL to permit two-way tests in the vicinity of 5 MHz, the most likely site of the next amateur HF band. The license, bearing the call sign WA2XSY, was issued January 8. A group of 15 current amateurs in various parts of the US and the Caribbean will conduct experimental, two-way RTTY and SSB transmissions within the band 5.100 to 5.450 MHz. To avoid interfering with existing services, the participants will confine their operations to the least-populated 50-kHz segment.

"The idea is to show that an amateur allocation there will improve our emergency communication capabilities by filling the gap between the 3.5 and 7.0 MHz bands," said ARRL Executive Vice President David Sumner, K1ZZ. Sumner pointed out that several of the participants are phone net members in the Caribbean and Gulf area who frequently handle hurricane-related traffic and now must alternate between 75 meters and 40 meters. Other participants are members of a nationwide

digital data-forwarding network.

The Experimental license is good for two years. Two studies by the National Telecommunications and Information Administration (NTIA) include an allocation at 5 MHz among the future spectrum needs for the Amateur Service. The subject is not likely to show up on the agenda of a World Radiocommunication Conference for several years, however.

"Even if the experiment demonstrates the desirability of an amateur allocation in the vicinity of 5 MHz, it is likely to take several more years to win an allocation, even on a domestic (US-only) basis," Sumner said, adding that gaining an international allocation would be more difficult and will take even longer.

No additional participants are being sought at this time. Operating schedules had not been established at press time but will be announced if monitoring reports are solicited as a part of the experiment. Operation by participants will consist of short transmissions to determine propagation characteristics.

Participating stations are located in New

Hampshire, Tennessee, Ohio, Florida, Mississippi, Wisconsin, Indiana, California, Utah, New York, Texas, the US Virgin Islands, and Maryland.

COOPERATION CURBS "WIRELESS MODEM" QRM

A maker of "wireless modems" and a cable TV company that's been installing the units across the US have told the ARRL they'll do whatever it takes to keep them from causing interference to amateur HF bands. The ARRL contacted the two companies after receiving reports from members of the Northern California Contest Club about 80-meter interference from the devices. The devices, manufactured overseas by Phonex Corporation of Midvale, Utah, operate under Part 15 of the FCC's rules. This means that they may not cause interference to licensed services.

"We have several hams in our organization, and we do not want to cause any interference to any amateur band," said Phonex Senior Engineer Scott Bullock, KK7LC.

Wireless modems are first cousins to wireless telephone jacks used to provide additional telephone jacks without wiring.

Both are sold in pairs that plug into convenient ac outlets. One unit plugs into the telephone connection while the other serves as a telephone or modem jack. The carrier-current devices transmit data in the form of wideband FM.

Other units made by Phonex and sold as wireless extension telephone jacks under the GE, RCA/Thompson, and Radio Shack brand names operate on 3.025 and 6.436

MHz, where they generally will not affect the ham bands. Unfortunately, the Phonex wireless modems operate on 3.52 and 8.27 MHz. Cable giant TCI has been installing these units in some subscribers' homes to make a convenient connection from the cable box to the telephone line to transmit billing information. Wireless jacks and modems transmit a continuous carrier on the lower frequency, whether the phone

connection is in use or not, and on both frequencies when the remote line is in use.

ARRL Lab Supervisor Ed Hare, W1RFI, says the League received reports in mid-December about persistent interference on the low end of 80 meters and on other bands. The interference, consisting of discrete, somewhat noisy and drifting carriers, typically showed up around 3520 to 3530 kHz, but harmonics of these signals also have been reported as high as 20 meters. ARRL Lab tests verified that the devices pose a serious problem for reception on the lower part of 80 meters and possibly on other bands because of harmonics. Likewise, the devices also are very susceptible to interference from signals on 80 meters and probably on other bands.

FCC rules permit the unlicensed devices to radiate signals on HF of up to 30 μ V/meter, even if it's on an amateur band. Device operators—TCI in this case—must correct any resulting interference, however.

TCI Senior Engineer Tony Werner says TCI plans to eliminate the 3.52 MHz wireless jacks it's installed "as expeditiously as possible" by replacing them with 3.3 MHz units or by running a hardwired telephone connection. TCI immediately will replace units that cause interference and automatically replace other 3.52-MHz units during routine customer service. Werner said TCI will use only 3.3-MHz units in the future. In the meantime, hams experiencing harmful interference believed related to these devices should contact their local TCI office.

Phonex says it's made the necessary production changes to move the operating

FCC Warns, Visits Alleged Major Amateur Offenders

The FCC has issued strong warnings to two amateurs in Indiana, another in New York, and a fourth in Florida. All are on the Commission's top ten list of alleged major amateur offenders. The FCC's amateur enforcement point man, Riley Hollingsworth, K4ZDH, said the warning letters sent in January were a last step before the FCC initiated formal enforcement proceedings. The FCC also visited stations in North and South Carolina.

"We have been cutting bait a while, now it's time for us to fish," said Hollingsworth, the legal advisor for enforcement within the FCC's Compliance and Information Bureau.

The FCC did not make the names or call signs of those receiving letters public, but Hollingsworth said all were put on the FCC's Alert List with FCC field offices. "The Alert List is the FCC equivalent of an all-points bulletin," Hollingsworth explained. He said Field Office monitors would make a special effort to listen for further violations by stations on the Alert List.

Since taking over Amateur Radio enforcement within the CIB last fall, Hollingsworth says he's sent out dozens of warning letters of a much milder nature. "Now, we're distilling that activity to the worst offenders," he said of the January epistles.

The letters spell out the agency's expectations in no uncertain terms. In the cases of two alleged HF offenders, Hollingsworth's letters state that the Commission "has additional evidence that you have been deliberately and maliciously interfering with the operations of other licensed amateurs," primarily a 75-meter net. Both hams—whose cases are related—already had received official Notices of Violation last fall for similar conduct, and the FCC had imposed restricted operating hours on one of them. But the FCC says that the troublesome behavior has continued.

Hollingsworth said the alleged illegal activities not only put the hams' licenses in jeopardy but open them up to possible fines and even put transmitting equipment at risk of seizure. He said he also has cautioned the controllers of the net involved to not engage hecklers or those attempting to harass or interfere, nor to call up the net on a busy frequency. "One thing these nets have to understand is that the nets don't own the frequency," he said.

The case of an alleged VHF offender had a similar pattern. The amateur license of the ham in question already had been suspended at one point, but violations are said to have continued, even during the suspension period. Beyond amateur violations, Hollingsworth said that the FCC's evidence indicated the amateur had threatened FCC employees and others. He told the ARRL that additional warning letters went out to eight other individuals whom he described as "cohorts" of the alleged prime VHF offender.

Hollingsworth requested that all of the amateurs receiving letters contact him immediately to discuss the allegations. After a lengthy telephone conversation with one of them, Hollingsworth expressed optimism that the situation would be resolved.

The FCC issued its fourth stern warning to an Indian River County, Florida, ham who, the FCC said, had been using the amateur airwaves to transmit information on, among other things, the credit reports, criminal records, and mortgage foreclosures of other hams and their families. "You have apparently made these disclosures and broadcasts for the purpose of deliberately and maliciously interfering with licensed Amateurs operating on those bands, and for harassment or perceived retaliation," Hollingsworth's letter said.

"We view this matter as extremely serious," he told the ARRL. Hollingsworth called the alleged operation "contrary to the purpose of Amateur Radio as stated in our rules and international treaties, and endangers the entire Amateur Radio frequency allocation internationally."

In an unrelated case, Hollingsworth sent warning letters to six individuals in the Pittsburgh, Pennsylvania, area regarding alleged malicious interference on VHF.

Meanwhile, FCC engineering and legal staff conducted unannounced Amateur Radio station inspections January 21 and 22 in North and South Carolina, Hollingsworth said.

"Commission personnel inspected the stations of John A. Abernethy, K4OKA, an Extra Class licensee in Hickory, North Carolina, and Richard Whiten, WB2OTK, a General Class licensee in Easley, South Carolina," Hollingsworth said.

In both cases, FCC officials were accompanied by local law enforcement personnel. Hollingsworth said both amateurs cooperated with the inspections, which lasted approximately two hours apiece.

FCC officials said that both operators "were the subjects of many complaints about their operations on the 75 and 20 meter Amateur bands." The FCC said the results of the inspections were "under review." Officials declined to comment on what they found at the stations, nor would they say what subsequent action might be taken.



ROCK LINDQUIST, W1RL

frequency of its units to 3.3 MHz. If one of its units causes interference, he said, Phonex will retune or replace it. Hams can contact Phonex Customer Service at 800-437-0101.

"Both companies have been refreshingly cooperative," said Hare, who—as his W1RFI call sign reflects—is the League's point man for interference issues. "If every RFI problem that involves Amateur Radio could be fixed so quickly, I would probably be out of a job." Hare said hams with questions about this issue may contact him directly at ARRL HQ at 860-594-0318; ehare@arrrl.org. Additional information is available at <http://www.arrrl.org/tis/info/rfitejx.html>.

ISS HAM GEAR INCHES CLOSER TO SPACE

The first Amateur Radio gear to be used on the International Space Station has moved a bit closer to its rocket ride into space. Although the inauguration of Amateur Radio aboard the International Space Station—ARISS—is at least a year away, the so-called Phase 1 ham gear was on a tight proveout and delivery schedule and due at Kennedy Space Center in Florida in January.

Delays in the ISS program have put off the first crew deployment until next January. The first crew will consist of US astronaut William M. Shepherd, as the expedition commander. Shepherd is studying for his ham ticket. Accompanying him will be Russian cosmonauts Yuri Gidzenko and Sergei Krikalev, U5MIR. All three have previous space flight experience. The crew has been training for their launch on a Soyuz vehicle and a planned five-month mission on the ISS.

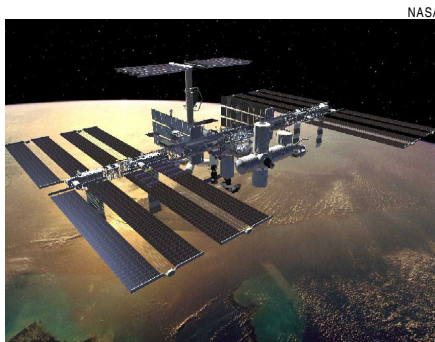
The interim ISS ham gear package will consist of Ericsson 2-meter and 70-cm hand-held transceivers set up for FM voice and packet operation, plus power supplies, cables, and accessories. Ericsson donated the commercial transceivers for the project, while the Italian ARISS team is providing the external antennas.

Earlier this year, the equipment and accessories were checked out in an end-to-end integration. Additionally, the transceivers underwent EMI testing to ensure that they will not cause problems for other ISS onboard equipment. The radios also were to be programmed and labeled in accordance with NASA procedures and protocols for space flight. AMSAT members who happen to work for NASA at Goddard Space Flight Center conducted the EMI testing.

Preparing to carry Amateur Radio gear for use aboard the ISS involves careful attention to detail all along the way. Crew safety is the primary consideration, but cost and crew time—and aggravation—also are important. “Because of the high cost of space travel, it’s critical that hardware be thoroughly tested and documented,” said Will Marchant, KC6ROL, AMSAT’s human spaceflight hardware manager. “Flight crews frustrated by buggy hardware are also less likely to want to participate in Amateur Radio operations.”

The qualification process also requires multiple versions of the same equipment. In this case, six complete hardware systems will be fabricated and configured. The complement includes one flight system, a flight spare, systems for training both in the US and in Russia, one for development and testing, and one spare.

Getting Amateur Radio a permanent berth in space aboard the ISS has involved efforts in several countries. The primary players include the US, Russia, the UK, France, Germany, Italy, Canada and Japan. “The ARISS team is truly an international, democratic, organization and is cooperat-



An artist's conception of the International Space Station as it will appear when completed.

ing to provide human spaceflight Amateur Radio operations to the entire ham community well into the next decade,” said Marchant.

Amateur Radio has been manifested aboard the ISS as “necessary crew equipment.” The cost of providing just the interim Phase 1 amateur gear for use aboard the ISS is expected to exceed \$60,000. The total cost of putting Amateur Radio aboard the ISS is expected to approach \$700,000.

Still unclear at this point are the actual frequencies and the call signs the crew will use from the ISS. The ultimate ISS ham radio complement—Phase 3—will include equipment to operate from HF through the microwave bands with SSB, CW, FM, packet, ATV, compressed ATV and SSTV capabilities. The German team will supply a digi-talker and full-duplex repeater. Once aboard the ISS, Amateur Radio will serve as an educational tool through worldwide school contacts and as an outreach to the general public.

FIELD SERVICES, EDUCATIONAL ACTIVITIES JOIN FORCES

The sound of moving furniture, books, and equipment punctuated the holiday season at League headquarters as two ARRL departments prepared to merge into one entity. Effective January 4, the Field Services and Educational Activities departments consolidated to become Field and Educational Services (F&ES).

ARRL Executive Vice President David Sumner, K1ZZ, explained that the new department brings together staff members with similar missions and functions—primarily supporting ARRL volunteers who, in turn, support ARRL objectives and promote ham radio on a local and regional level. Working within a single department, Sumner said, HQ staffers could more easily share expertise, ideas, and resources. The move also was designed to reduce expenses in the face of a decline in both ARRL membership and overall Amateur Radio licensing and activity over the past year or so.

“The primary reason is efficiency,” Field Services Manager Rick Palm, K1CE, explained in a letter to ARRL section managers. Palm will continue as the main con-

tact person for section managers. He will focus on representing the League to the outside agencies it serves and on promoting and supporting the field organization.

Former Educational Activities Department Manager Rosalie White, WA1STO, has assumed the title of Educational Services Manager. She will oversee day-to-day operation of the combined department and will continue as the primary staff contact for Amateur Radio in space issues.

“We expect the greater efficiency of the combined departments to benefit our members by putting related resources in the same place,” White said of the move. Now that the two departments are in the same location, staff members have begun to settle in and work as a team. Telephone and e-mail addresses for individual staff members remain the same.

AA1DO is New TIS Coordinator

The League’s new Technical Information Service Coordinator Al Alvareztorres, AA1DO, here helping a member with a technical inquiry, recently moved over to “the big building” from W1AW, where he’d served as the weekend operator for a number of

RICK LINDQUIST, N1RL



years. First licensed as WV2VGD while in high school and living in River Edge, New Jersey, he joined the US Air Force and went to electronics and nuclear weapons schools in Colorado. In the service, he spend a year in Korea, then later held WB6UHO while at Vandenberg AFB in California in the 1960s “and fired Titan IIs into the Pacific.” He later was stationed in Germany (and held DL4AA). He left the regular Air Force in 1970 and joined the Connecticut National Guard, retiring with 23 years of service. In the meantime, he became WA1NPX, then AA1DO (he’s an Extra). As a civilian, he’s worked in electronic manufacturing production control and has been at the League since 1994. Members having technical questions may pose them to Al Alvareztorres at 860-594-0214; tis@arrl.org, or write TIS, ARRL, 225 Main St, Newington, CT 06111.

LEAGUE FILES "RESTRUCTURING" REPLY COMMENTS

The ARRL has suggested that its plan to restructure Amateur Radio licensing represents the best compromise among the many that have been put forth. In reply comments filed January 15 with the FCC, the League held firm to its restructuring proposals that would reduce the number of license classes from six to four by eliminating the Novice and Tech Plus tickets; provide 5 WPM and 12 WPM Morse code testing tiers; and permit Technician operators to use Morse code on the current General class CW bands.

The League's plan also would reformat the Novice/Tech Plus CW allocations among the remaining license classes and revise both written and Morse examination requirements to make them more relevant and more comprehensive. In general, the League's reply comments reiterated its initial comments filed last December 1 in the proceeding, WT Docket 98-143, which the FCC refers to as its 1998 Biennial Regulatory Review of Part 97.

The FCC received around 2000 comments—mostly from individual amateurs—in response to its Notice of Proposed Rule Making last August. "The number of comments filed by radio amateur licensees and amateur groups is impressive and heartening," the League said. "The comments reveal that the Amateur Service is active, vital" and show that hams are willing to participate in their own regulatory affairs. "To a greater extent than in other services, the Commission should heed the suggestions and advice of its licensees," the ARRL advised.

Most of the comments focused on the number of license classes, Morse code requirements, and HF subband allocations. But, the League said, there was no real consensus in terms of an overall approach the FCC should take.

Amateur Radio iconoclast Wayne Green, W2NSD, publisher of 73 magazine, suggested one license class. A number of commenters suggested three. CQ Communications suggested three plus a Basic Amateur Permit—a kind of learner's permit. Others wanted four or even five. The ARRL said four license classes provided a manageable gap between license classes to encourage upgrading. "Looking at the matter this way, four license classes is a good plan, and three classes is not," the League said. Under the League's plan, current Novice and Tech Plus licensees would be automatically upgraded to General.

Comments on Morse testing ranged from eliminating the code requirement altogether to keeping the present system. The ARRL held to its proposed two-tier Morse code examination regime, with a 5 WPM test for General class and a 12 WPM test for Advanced and Extra. "It would appear that the majority of the comments agree that there is currently an overemphasis on telegraphy as an examination requirement," the League said. At the same time, the ARRL said that Morse is still relevant to ham radio and should continue as a require-

ment. The League also cited support for its plan to let Technician licensees operate Morse code in the General CW bands without prior testing. The proposal "received no significant opposition in the comments," the League noted, although some did question whether the League's proposal was consistent with international regulations.

The League found an ally in CQ Communications' comments on reformatting the Novice/Tech Plus CW allocations among the remaining classes for additional phone bands. CQ called it "the correct approach, as it is its proposal to 'grandfather' existing Novices into the General class."

Noting the present slowdown in Ama-

teur Radio growth, the League also urged the Commission to "not leave the Amateur Service in limbo" on the matter of restructuring but to act promptly. The pending restructuring "has a dampening effect on the inclination of newcomers to proceed with amateur licensing and on existing licensees to upgrade" the League asserted. The ARRL predicted that simplifying the licensing structure will help to boost growth in the hobby.

"The League's comprehensive proposal provides the best means of accommodating the diverse views of the parties filing comments in this proceeding," the ARRL concluded.

In Brief

• **New OK SM:** Charlie Calhoun, K5TTT, has been appointed Oklahoma Section Manager. He replaces Coy Day, N5OK, who took office as West Gulf Division Vice Director January 1, 1999. Calhoun's term as SM ends September 30, 2000.

• **QSLing up:** Ham radio numbers may be off, but DX QSLs are up, probably due to improved propagation. The ARRL QSL Service reports it handled 1,596,740 QSLs during 1998—including cards to incoming US bureaus—a 15% increase (218,500 cards) from 1997's total.

• **New Canadian prefix:** The territory of Nunavut comes into existence April 1, 1999, and with it, a new Amateur Radio prefix. Radio Amateurs of Canada has announced that Nunavut will get the prefix VY0 "to ensure a unique identification for the new territory." However, there are no plans to add the new territory to the list of ARRL November Sweepstakes multipliers. Nunavut, which means "our land" in the Inuktitut language, will be comprised of the eastern portion of the present Northwest Territories. The new territory will be about five times the size of Alberta but has a population of just 24,000, some 85% of whom are Inuit. The VE8 prefix will remain in use for the western Northwest Territories, which may get a new name as a result of the partitioning. For more information on Nunavut, see <http://www.ccu-cuc.ca/en/library/nunavut.html>.

• **DARA scholarships:** The Dayton Amateur Radio Association is accepting applications for its annual scholarship awards. The DARA Scholarship Program is open initially to any Amateur Radio operator graduating from high school in 1999. There are no restrictions on course of study, nor does the student need to be pursuing a four-year baccalaureate degree, but schools selected must be accredited. Awards are made on a nondiscriminatory basis. Selection criteria include financial need, scholastic achievement, contributions to Amateur Radio, and community involvement. Decisions of the DARA Scholarship Committee are final. Maximum individual awards are \$2000. For an application and full details, send an SASE to DARA Scholarships, 45 Cinnamon Ct, Springboro, OH 45066. Application deadline is June 15, 1999.—*Stan Kuck, NY8F*

• **QST Cover Plaque Award:** Joel Thurtell, K8PSV, was the winner of the November 1998 QST Cover Plaque Award for his article "Zenith's 'One-and-Only' Ham Receiver." Manfred Mornhinweg, XQ2FOD, won the December 1998 QST Cover Plaque Award for his article, "A 13.8-V, 40-A Switching Power Supply." Congratulations, Joel and Manfred!

• **Changes at Agrelo:** Agrelo Engineering, maker of the DF Jr direction-finding unit, has appointed SWS Security of Street, Maryland, as exclusive distributor for Agrelo's DF and transmitter products. SWS Security is run by Steve Uhrig, WA3SWS. Agrelo President Joe Agrelo, N2OOC, apologized for problems with product delivery and support and said Agrelo now will concentrate on the commercial market. He said products or services "still owing as of November 1998" would be shipped from Agrelo "as time permits," but that all inquiries should go to SWS, 1300 Boyd Rd, Street, MD 21154-1836; tel 410 879-4035; sales@swssec.com; <http://www.swssec.com>. SWS says it is now taking orders for Agrelo products.

• **HAARP listening test set:** The High Frequency Active Auroral Research Program (HAARP) facility in Gakona, Alaska, will conduct a second HAARP Listening Test in mid-March, seeking reports from hams and SWLs in Alaska and in the "Lower 48." Exact times and dates were not known as of press time. Transmissions will be on or near 3.4 MHz and 6.99 MHz. HAARP will send a CW message and request signal strength reports. QSLs will be available only for reports mailed to HAARP, PO Box 271, Gakona, AK 99586.—*HAARP*

EDUCATORS "GO THE GRANT ROUTE" TO FUND HAM STATIONS, PROGRAMS

Three educators have received grants to set up ham radio stations in their classrooms. The biggest grant—a whopping \$12,000—was garnered by electronics teacher Fred Usherson, N2EGQ, of Floral Park, New York. In his grant proposal to the World of Knowledge Foundation, Usherson cited the need to create an Amateur Radio program so that his Queens Vocational Technical High School students could handle emergency messages and gain marketable electronics skills. "Amateur Radio will be integrated into our electronic curriculum," he said. "I want to get all students in my classes as licensed hams."

Teacher Sarah Cowan isn't even a ham yet, but she still managed to get a \$1,500 grant through Los Alamos National Laboratory to set up an Amateur Radio station at Pajaro Middle School in Monterey County, California. The grant, from the US Department of Energy's Teacher Opportunities to Promote Science (TOPS) program, will allow students to learn about technology in general and radio waves in particular, study for their ham licenses, and take field trips to see scientists at work.

The project is tied into scientific work at Los Alamos. Cowan's mentor there is Don Casperson, AA5PA, an ARRL Life Member who has volunteered his technical expertise. The Santa Cruz Amateur Radio Club also is assisting. Cowan says the community could benefit from having more youthful ham operators to help with emergency communications, since Pajaro is near an earthquake zone.

This year's ARRL Professional Teacher of the Year, Bob Lavin, K6BOB, of Calabasas, California, got \$3,000 from his school's parent-teacher organization earlier this year to purchase a ham radio station. He has integrated ham radio into his classes, and 30 students and teachers now hold Technician or Tech Plus tickets.

For those who wish their school had a ham radio station and activities for kids, ARRL Educational Services Manager Rosalie White, WA1STO, offers some suggestions. "Ask around to learn who are the innovative teachers in your district, and offer a hands-on geography or science lesson," she said. White says hams also might check with their employers or with other local industries to learn if funding for educational projects is available.

Getting grant money from various sources to fund Amateur Radio activities in the school is not a new idea, but it's one White says more teachers should explore. In 1995, four different grants gave teacher Sheila Perry, N0UOP, \$155,000 for her school district. The money funded curriculum development, Amateur Radio equipment, electronic kits, a computer lab and other items.

Teachers interested in learning more about how to write grant proposals should read "A Trip Through the Teaching Uni-

LUKE H. MONTGOMERY JR, WA4UDB, SK

Luke H. "Jack" Montgomery Jr, WA4UDB (ex-W4ADF), of Nashville, Tennessee, died October 12, 1998. He was 91. Montgomery and Jack DeWitt founded WSM radio in 1922, and Montgomery engineered the first broadcast of the *Grand Ole Opry* in 1925. He served as chief engineer at WSM radio and later at WSM television. In 1938, he built the first commercial FM station in the US. Montgomery became the son-in-law of George Bailey, W2KH, who served as ARRL president from 1940 until 1952. Beyond radio engineering, Montgomery served as a research associate and later as an assistant professor of anatomy at the Vanderbilt University School of Medicine. He was an early pioneer of the pacemaker (among other developments) and was named a Fellow of the Institute of Radio Engineers for his contribution to medical electronics. Survivors include his stepson, Dick Crouch, N6RC.—*Dick Crouch, N6RC*

FLORIDA SKIP FOUNDER ANDY CLARK, W4IYT, SK

Andy Clark, W4IYT, a veteran Amateur Radio editor and public service leader in South Florida, died December 31, 1998. He was 75 and a Life Member of the ARRL. Clark was first licensed in 1939. In 1957 he founded and edited *Florida Skip*, a monthly ham radio newspaper. In 1992, Clark sold the publication, now *CyberSKIP Digest*, to Gerry Wentz, KC4EHT.

Clark was a leader in emergency communications. He was SEC of the former East Florida section of the ARRL, and EC of Dade County for 25 years. He created emergency stations for the Red Cross, the National Hurricane Center, and the City of Miami Springs. He was trustee of W4EHW at the National Hurricane Center and of the Miami Springs Radio Club, K4OSQ. Along with George Thurston, W4MLE, he authored several books on emergency preparedness and traffic handling.

The City of Miami Springs designated December 14, 1998, as Andy Clark Day, in recognition of his nearly 50 years of service to his community and his hobby. Among Clark's survivors are his wife Betty, W4GGQ, a son Andy Lee, KA4MHL, and five daughters.—*Sandy Donahue, W4RU*

verse," by Connie Dunn, KB5LES, *QST*, June 1995, p 44 or visit *ARRLWeb*, <http://www.arrl.org/ead/teacher/perry.html>.

K9JF APPOINTED NORTHWESTERN DIVISION VICE DIRECTOR

James E. Fenstermaker, K9JF, of Vancouver, Washington, is the new Northwestern Division Vice Director. ARRL President Rod Stafford, W6ROD, announced the appointment January 6, following the recommendation of Northwestern Division Director Greg Milnes, W7AGQ, and certification of eligibility by the Election Committee.

Fenstermaker, 53, fills the position left vacant when Milnes, the former vice director, succeeded Mary Lou Brown, NM7N, as director. Brown died suddenly December 3. Fenstermaker's term expires January 1, 2001.

"I am excited to have the opportunity to serve the US Amateur Radio community as the Northwestern Division Vice Director," Fenstermaker said.

A ham since 1959, Fenstermaker was first licensed as KN9TZH. A DX enthusiast, he's also operated as DL5JF, OJ0SUF, and VP2V/K9JF. He's on the DXCC Honor Roll with 354 countries, 5BWAZ, 5BDXCC, and 160 Meter DXCC, as well as numerous contest honors.


Fenstermaker attended his first ARRL Board meeting in Houston, Texas, January 15-16. Members may contact him at k9jf@arrl.org.

VICE DIRECTOR BODSON WINS IEEE STEINMETZ AWARD

The Institute Of Electrical And Electronics Engineers has named ARRL Roanoke Division Vice Director Dennis Bodson, W4PWF, as the recipient of the prestigious 1999 Charles Proteus Steinmetz Award. The award, sponsored by the IEEE Standards Association, is given for major contributions to the development of standards in the field of electrical and electronics engineering.

Bodson, who retired last year as chief of the Technology and Standards Division for the National Communications System in Arlington, Virginia, was cited "for leadership and technical contributions to standards for digital facsimiles and other telecommunications technologies."

In addition to the bronze medal and a certificate, the Steinmetz award carries a \$5000 honorarium. A formal presentation will be made in June at the IEEE Communications Society's International Communications Conference in Vancouver, British Columbia.

A Registered Professional Engineer, Bodson, 59, was first licensed when he was a teenager. He's an ARRL Life Member, a Fellow of the IEEE and of the Radio Club of America. He holds six patents and has published approximately 50 technical papers. Bodson also has received the IEEE Centennial Medal and, in 1995, was named Engineering Manager of the Year by the IEEE Engineering Management Society. 

Edited by Joe Bottiglieri, AA1GW • Assistant Technical Editor

The Alinco DR-140TQ 2-Meter FM Mobile Transceiver

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

Many of us live for the “bells and whistles.” We delight with the ever-increasing sophistication of each new offering from the manufacturers. We’ve come to expect it.

What we technophiles often fail to realize is that there is an equally important segment in the ham population that longs for radios that are simply user-friendly. They find more enjoyment in the communications aspect of our hobby.

Perhaps you have a family member or friend that you cajoled into ham radio with promises of convenient, relatively inexpensive local personal communications. You get them licensed and help them select a state-of-the-art transceiver. Unfortunately, several months later they’re still trying to figure out how to program the thing, frustrating their efforts to join the fun on the local repeaters. You program some memory channels for them and send them on their way, only to find out later that they managed to press the wrong button combination and ended up spending the rest of that afternoon trying to strike up a conversation with the local National Weather Service broadcast.

Let’s face the facts. While a handful of us are using some of the expanded capabilities—pocket beep, automatic answer-back, group DTMF paging, alphanumeric message swapping, autodial memories... *ad infinitum*—these “features” typically only contribute to the confusion of the “technically challenged.”

Simplicity

The DR-140T replaced the DR-130T in Alinco’s product line about two years ago. In a *QST* *Compares* 2-meter mobile round-up that appeared in *QST* January 1995, the earlier transceiver received praise from our review team for its relative simplicity and ease of use. In the ’140, Alinco has further refined this concept—adding just a handful of useful additional features while reducing the number of front panel buttons and controls.

Three versions of this transceiver are available: the DR-140T, the DR-140TQ and the DR-140TPKT. The “T” version includes CTCSS tone encode only. The “TQ” version includes CTCSS encode and decode standard. (The decode board can be installed in the “T” later as an optional accessory, the EJ-20U.) The “TPKT” is intended for 1200-bit/s packet or APRS ap-



plications. In this particular version the mobile microphone and mounting bracket are not included. Four stick-on rubber feet and an unterminated microphone cord for connection to your TNC are substituted.

The satin black textured faceplate of the DR-140T supports just two large knobs—one is the frequency encoder, the other the volume control. Five large buttons along the lower edge control nearly all of the unit’s various features. The second, third and fourth buttons are slightly recessed (stay tuned for details). Also included is a small orange button in the upper right corner for switching the transceiver on and off, a dual color LED TX/BUSY indicator, an RJ-45 jack for the mike and the display window—and that’s it!

The main LCD window displays information in black segments on an amber background. The display itself is not particularly large. The digits and alphanumeric characters for memory number, frequency and menu information and the icons that indicate the active features, however, are sufficiently sized for very easy viewing. The level of the display backlighting is fixed.

Memory channel information can be represented in three different formats. You can display the actual frequency, the memory channel number (ie “CH 5”) or an

alphanumeric name up to 7 characters long (ie “WIINF/R”).

The uncluttered front panel and the generously sized buttons and knobs make operating this radio, especially in mobile applications, simple and convenient. Once you’ve programmed your favorite frequencies into the 51 memory channels, most of the controls you need for everyday operation can be accessed using just four buttons—and one of these is a **FUNCTION** button! The remaining keys are **V/M MW**, **CALL MONI** and **H/L SQL**. (We’ll explore one additional button—**SET**—later.)

Press the first of these keys and you toggle between VFO and memory, press another and you switch from your present frequency to a “call” frequency, press the last key and you alternate between high and low power (50 W/5 W).

If you hit the **FUNCTION** button first, you’ll access the secondary operations. Now you can use the **V/M MW** to write VFO information to a memory channel. Pressing the function button and pushing the **CALL MONI** key opens the squelch when operating simplex, or switches to the transmit frequency and opens the squelch when in duplex operation. Push the function button, then the **H/L SQL** key, and you toggle between two fixed squelch levels—high and low.

All other programming and control operations are contained in two separate settings menus. To enter the “channel parameter settings” menu, press the **SET** button. Pushing the buttons to the left or right of the **SET** button or pressing the microphone’s **UP** or **DOWN** buttons now allows you to scroll through the menu selections. Turn the main tuning knob to change the value of the specific setting. You’ll find menu settings for tuning step size, inde-

Bottom Line

With a fine blend of just the right features and a heaping helping of user-friendliness, the DR-140 might be precisely the concoction needed to perk up the activity level of a “technically challenged” ham.

Table 1**Alinco DR-140TQ, serial number T003282****Manufacturer's Specifications**

Frequency coverage: receive, AM, 118-136 MHz; FM; 136-174; transmit, 144-148 MHz.
 Power requirements: 12.4-15.2 V dc; receive 0.8 A (squelched); transmit, 10.5 A (max, high power).
 Size (HWD): 1.6×5.6×6.1 inches; weight, 1.9 lb.

Receiver

Sensitivity, 12 dB SINAD: 0.18 μ V.

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

Adjacent channel rejection: Not specified.

Spurious response: Not specified.

Squelch sensitivity: Not specified.

Audio power output: >2.5 W at 10% THD into 8 Ω .

Transmitter

Power output (H / L): 50 W / 5 W.

Spurious signal and harmonic suppression: \geq 60 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time ("tx delay"): Not specified.

*Measurement was noise-limited at the value indicated.

Measured in ARRL Lab

Receive and transmit, as specified.

Receive, 0.56 A; transmit, 9.1 A, tested at 13.8 V.

Receiver Dynamic Testing

12 dB SINAD: 0.23 μ V.

AM (120 MHz): 0.87 μ V for 10-dB (S+N)/N.

20 kHz offset from 146 MHz, 65 dB*.

10 MHz offset from 146 MHz, 92 dB.

20 kHz offset from 146 MHz, 64 dB.

IF rejection: 102 dB; image rejection, 74 dB.

0.18 μ V at threshold.

2.53 W at 10% THD into 8 Ω .

Transmitter Dynamic Testing

56 W / 4.8 W.

69 dB. Meets FCC requirements for spectral purity.

Squelch on, S9 signal, 200 ms.

68 ms.

pendent tone encode and tone decode frequencies, CTCSS tone and tone squelch activation and frequency offset and direction. Most of these are displayed as word tags—"STP," "TONE" and "SHIFT" for example—making identifying and adjusting these often-used settings a breeze.

If you're in the memory channel mode when you enter this set menu, you'll also have access to the alphanumeric memory tag programming and a "SKIP" setting for locking individual channels out of a memory scan operation.

Some of the more advanced settings, such as scanning parameters, a time out timer, tone burst, a toggle lock feature for PTT, a busy channel lock out and key beep on/off are available from the "functional parameter settings" menu. You press the function key, then the **SET** key to enter this menu. These are also alphanumerically named for easy identification.

Once you understand the key combinations needed to enter and move through the two settings menus, programming this transceiver is a snap—the alphanumeric titles act as a guide. The 52-page "Instruction Manual" (don't panic, it includes separate sections for four different languages), though not particularly detailed, is well organized and provides easy to follow programming steps. A complete and legible schematic is also included.

For those interested in listening in on the frequencies above and below the Amateur band, the receiver covers from 118 to 173.995 MHz. Tune below 136 MHz and AM is automatically engaged. The unit will scan memory channels or *all* of the frequen-

cies in the receiver's range. No provisions are included for scanning between user selected frequency limits. You can use menu settings to lock out specific memory channels and to change the scan type from "BUSY"—stopping on busy frequencies and remaining until the activity ends, or "TIMER"—stopping and holding on an active frequency for 5 seconds before scan resumes.

The '140TQ and 'T versions come with Alinco's EMS-45 DTMF microphone. **UP** and **DOWN** buttons, a **LOCK** switch and a 16-button DTMF keypad are provided. The keys are not backlit and direct frequency entry from this keypad is not available. No DTMF autodial capabilities are included.

Field-testing revealed that although this transceiver may be outgunned by the competition on features, it more than holds its own when comparing performance and ease of use. Transmit audio reports ranged from very good to excellent. Receive audio from the upward firing built-in speaker was clear and more than adequately loud in my moderately noisy SUV. The relatively small number of large controls and the uncluttered LCD display made operating the unit while underway surprisingly easy.

As you look over the ARRL Lab test data presented in [Table 1](#), you'll notice that the numbers for 10-MHz offset IMD measured a very respectable 92 dB. This is typically a good indication of a receiver's ability to fight off interference from commercial radio and paging operations. FM receive sensitivity on our review unit missed Alinco's published specification slightly.

When you compare the DR-140T to some of the other radios in this price class, it's very important to bear in mind Alinco's design philosophy with this transceiver. If you were expecting this to be a radio jam-packed with cutting edge capabilities and features, you've missed the point completely! Alinco offers these in their DR-150T. (See "Product Review," *QST* November 1996.) The hook with this transceiver is *simplicity*.

Murphy Resistant

By now you are probably wondering what's going to keep your "Elmer" from wandering off into the "functional parameters settings" menu, never to be heard from again.

Many of the transceivers marketed in the United States as Amateur Radios, particularly those for VHF and UHF, are also used in various commercial communications applications in other parts of the world. In those assignments, individuals who have little use for complicated "features" will be operating the units. Riding the crest of the latest advances in radio technology is not their objective. Someone else does the programming, installs the power and antenna systems and explains the finer points of push to talk. The provided radio needs to be uncomplicated and reliable.

The DR-140T is specifically tailored to those needs. Do you know a ham with similar requirements?

Included in the hardware pack is a small plastic cover for those three recessed front panel keys. After you've programmed information for the local amateur repeater and simplex frequencies—plus any other interesting public service, AM aircraft and National Weather Service listening frequencies—you *could* switch the unit into memory mode and stick on the little cover. The remaining exposed buttons—the **FUNCTION** key and the **H/L SQL** key—allow the operator to adjust the transmitter power output and the squelch level. The only other accessible controls are the memory channel selector, the volume control and the power switch.

One word of caution: you may want to consider reducing the amount of adhesive tape on the back of the cover. Otherwise, it could be difficult or impossible to remove it later for any subsequent reprogramming, or for a time when the operator may want to explore some of the additional control flexibility (like VFO for example!) that the cover eliminates.

The resulting transceiver is a "communications appliance." You simply switch it on and operate. Virtually foolproof! I'm sure we all know hams who will benefit from and actually *appreciate* this level of simplicity.

Manufacturer: USA Alinco Branch, 438 Amapola Ave Suite 130, Torrance, CA 90501; tel 310-618-8616; fax 310-618-8758; <http://www.alinco.com>. Manufacturer's suggested retail price: DR-140TQ: \$290. Typical current street price: \$215.

The Ten-Tec RX-320 PC Radio

Reviewed by Joe Bottiglieri, AA1GW

Are you looking for a convenient way to keep tabs on current HF propagation conditions? Do you enjoy listening to shortwave broadcast and utility stations but can't always find the time away from your blasted computer to visit your primary receiver in the shack?

While the computer has quietly weaseled its way into our offices, dens and living rooms, your ham equipment, in spite of recent improvements in enclosure styling, is often relegated to a dark, lonely corner of our recreation rooms or basements.

A Virtual Visit to the Shack

The Ten-Tec RX-320, a very nicely featured PC-based shortwave (100 kHz to 30 MHz) receiver in an unobtrusive black box, might be just the item we need to help radio regain a foothold in our computer obsessed existences.

This little unit can hide out in a dusty corner or on a nearby shelf taking up little more space than that external zip drive you blew your ham equipment budget on last year. Connect it to the "time pirate" with the included 6-foot DB-9 cable through one of its COM ports (come on, you can spare just one!) and hook the included audio output cable to your sound card input, or use the unit's external speaker jack and a separate speaker. Screw in its little telescoping antenna (or better still, attach a decent antenna to its separate RCA external antenna connector), plug the wall-wart power supply into that already overloaded power strip, install the software for *Windows 3.1* or *95/98*, and you're surfing the *ether* again!

Now, as you sift through the latest pile of unsolicited e-mails or wander aimlessly through the links that resulted from the Internet search you started hours ago (*what was it I was looking for?*), you can simultaneously listen to the soothing sounds of actual human voices, sports or music on AM broadcast or shortwave, or tune in to the activity on an HF ham or utility frequency.

"Knobs" and "Buttons"

The control panel that appears on your monitor is visually reminiscent of the rapidly disappearing days when most consumer electronics had actual buttons and knobs you could feel with your fingertips. It just floats there on the opposite side of the glass, looking for all the world like the actual front panel of a tabletop radio, but just out of reach (see [Figure 1](#)).

Your mouse now acts as a cyberspace finger, allowing you to twiddle the tuning knob, press the virtual buttons and slide the big volume control. You can even tune around and control many features using keyboard commands. (Look Ma... no mouse!)

It's capable of AM, USB, LSB and CW



reception, and there's DSP-based filtering that provides bandwidths of 500 Hz and 1.8, 2.5, 5 or 8 kHz. Tuning steps are selectable at 10 or 100 Hz, or 1, 5 or 10 kHz. The current settings for these are clearly shown in the virtual radio's display window.

Frequency is indicated in big yellow digits, and also on a nostalgic analog sliding frequency scale, harking back to Ten-Tec gear of old. There's a large analog style signal-strength meter with dual needles for instantaneous and peak readings that can be shown or hidden with a check box in the **OPTIONS** window. The meter scale is not calibrated in S units, but only provides an indication of relative signal strength. Additional settings in this same menu activate automatic mode sensitive tuning step size and filter selection, UTC/local time offset, CW pitch, audio output level for the sound card and a frequency display calibration adjustment.

Navigating

There are several ways you can tune to a desired frequency. You can use the mouse pointer to rotate the main tuning knob or drag the sliding frequency scale, or enter frequency digits directly from your keyboard. You can also use the keyboard's up and down arrow keys, or use the mouse to press frequency step or scroll buttons on either end of the sliding scale. Additional tuning methods are available from the

Bottom Line

If you're considering exploring shortwave or HF ham band listening for the first time, looking for a reasonably priced second receiver, or are simply searching for a cool new accessory to connect to your home, office or laptop computer, the RX-320 is an excellent choice.

memory and spectrum scope modes.

A button labeled **WORLD TIME** will bring up a window with keys to instantly tune WWV at 2.5, 5, 10 or 15 MHz, or CHU time broadcasts on 3.33, 7.335 or 14.670 MHz. I found this feature especially handy for making a quick check of propagation.

One of the obvious benefits of computer-based radio equipment is the virtually unlimited amount of storage space for frequency memories and related information. The RX-320's **MEMORIES** or **RECALL STATION** buttons bring up a memory window (see [Figure 2](#)). Ten-Tec includes a file with information for 25 popular shortwave broadcast stations on the program disk. This information is copied onto your hard drive when you initially install the software.

You can instantly tune to any station on the list by double-clicking on it, or with a single click and a press of the **TUNE** button. If you highlight a station and press the **EDIT** button, you'll bring up a "Station Information Sheet" (see [Figure 3](#)). This window includes fields for the station name (up to 30 alphanumeric characters), frequency, mode, filter setting, country, language and a large "notes" section. Additional buttons on the memory window allow you to **ADD** or **DELETE** entries. Three check boxes along the bottom of the window let you sort the listings alphabetically by station name or country, or in ascending frequency order. Press the **CLOSE** button to exit the memory window. The radio will be tuned to the selected station and its name will now appear in a small box on the left side of the front panel.

It's important to remember that memory information is retained in the computer. If you install the software on another computer and want to access stations you previously added to the list, you'll need to make a copy of your expanded *.rmf* file. You'll find this in the directory where you installed the radio software.

Scoping Things Out

One other neat feature is a multifunction spectrum scope (see [Figure 4](#)). You can adjust the limits of the sweep to seven different ranges from 3 kHz to 1.5 MHz. Press the **SWEEP** button and the receiver slowly tunes through the selected range plotting relative signal strength versus frequency. Audio is muted during this operation. When the sweep is complete, you can use a mouse cursor crosshair to determine the frequency and level of any point in the spectrum field; the values are instantly displayed at the lower edge. Double-click, and the radio will tune to that frequency, making investigating signal peaks easy.

Documentation and Updates

The 31-page "User's Manual" packed with the receiver devotes about 10 pages to

instructions on connecting the unit to your computer, installing the software and basic operation. Once you've set up the connections and installed the program, a few minutes spent exploring the features and

playing with the buttons is probably all the operating instructions you'll need. There is an extensive help menu with sections on operation and troubleshooting available from the tool bar on the main screen.

Most of the rest of the manual is an excellent *Introduction to Shortwave Listening* tutorial by Joseph J. Carr, K4IPV, with loads of information on shortwave and HF radio listening for the beginner. You'll find chapters with explanations of frequency and wavelength, bands, modes, World Time, propagation and antennas. A useful "What's on the Bands" section gives a short description of the type of activity you are likely to find in each of 39 separate frequency segments, together covering the entire range of the receiver.

During the course of this product review period, Ten-Tec released a new version of the control software. This update covered some minor bug fixes and added some additional features. Free updates are available for download from their web site: <http://www.tentec.com>. This is also a great way to investigate the '320's control capabilities. Download and install the software and you can play around with all the buttons and knobs yourself (you just won't get any receive). An "uninstall" routine is included in the program, making it easy to remove later.

If you are interested in developing your own software, you can download a "Programmers Reference Guide." A sample control program, written in *BASIC*, is included. A schematic diagram and parts list is posted as well.

Listening In

We used the receiver with several different computers. Tests were run using both the included whip and various external antennas. When using the short whip, the level of unwanted noise introduced by the computers themselves varied widely. External antennas, attached through coax feedlines, consistently provided very good reception with no perceivable computer noise. While satisfactory reception with noise-free computers using the whip is certainly possible, the enhanced performance provided by the

Table 2

Ten-Tec RX-320, serial number 07A10608

Manufacturer's Claimed Specifications

Frequency coverage: Receive, 0.1-30 MHz.¹
 Power requirement: Receive, 0.5 A, 13.5-15 V dc.
 Modes of operation: SSB, CW, AM.

Receiver

SSB/CW sensitivity, 2.5 kHz bandwidth, 10 dB S+N/N: 0.3 μV.

AM sensitivity, 12 dB S+N/N, 1-kHz tone, 80% modulation: 0.64 μV.

Blocking dynamic range: Not specified.

Two-tone, third-order IMD dynamic range: 90 dB.²

Third-order intercept: +10 dBm.²

Second-order intercept: Not specified.

S-meter sensitivity: Not specified.

Receiver audio output: 1.0 W into 4 Ω, THD not specified.

IF/audio response: Not specified.

Measured in the ARRL Lab

As specified.
 Receive, 0.33 A. Tested at 13.8 V.

As specified.

Receiver Dynamic Testing

Noise floor (MDS), 500 Hz filter:

1.0 MHz -117 dBm
 3.5 MHz -133 dBm
 14 MHz -134 dBm

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

1.0 MHz 7.4 μV
 3.8 MHz 1.36 μV

Blocking dynamic range, 500 Hz filter:

3.5 MHz 111 dB*
 14 MHz 109 dB*

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

3.5 MHz 84 dB*
 14 MHz 82 dB*
 3.5 MHz -7.4 dBm
 14 MHz -10.7 dBm

-29 dBm.

Maximum indication at 14.2 MHz: 484 μV.

2.9 W at 10% THD into 4 Ω.

Range at -6 dB points, (bandwidth):

CW-N (500 Hz filter): 769-1250 Hz (481 Hz);
 CW-W: 794-3333 Hz (2539 Hz);
 USB: 118-2667 Hz (2549 Hz);
 LSB: 111-2667 Hz (2556 Hz);
 AM: 67-3793 Hz (3726 Hz).

First IF rejection, 14 MHz, 54 dB;
 image rejection, 14 MHz, 102 dB.

Size (HWD): 3.0×6.3×6.5 inches; weight, 2.5 pounds.

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

*Measurement was noise-limited at the value indicated.

¹Specification table states "degraded performance below 1 MHz."

²Two-tone, third order IMD and Third-order intercept specifications were met. These figures are based on a 2.4 kHz bandwidth and 50 kHz spacing.

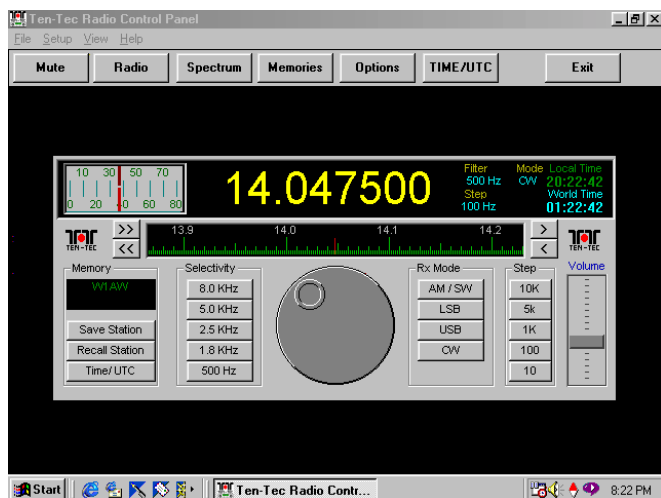


Figure 1—The virtual front panel of the RX-320. The signal strength meter can be shown or hidden using a setting on the **OPTIONS** menu.

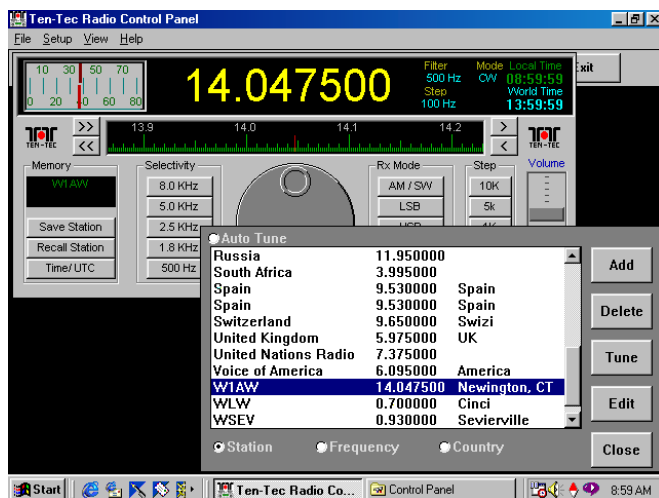


Figure 2—Click on the **MEMORIES** or **RECALL STATION** button on the main window and you'll bring up a list of your currently programmed memory information. Double-click on a station and the receiver will instantly tune to it.

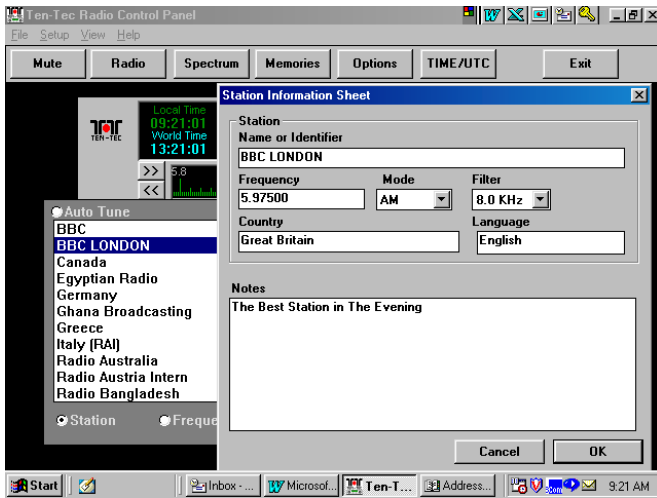


Figure 3—Memories are added or edited using this “Station Information Sheet” window. The “Notes” field is very handy for keeping program and schedule information.

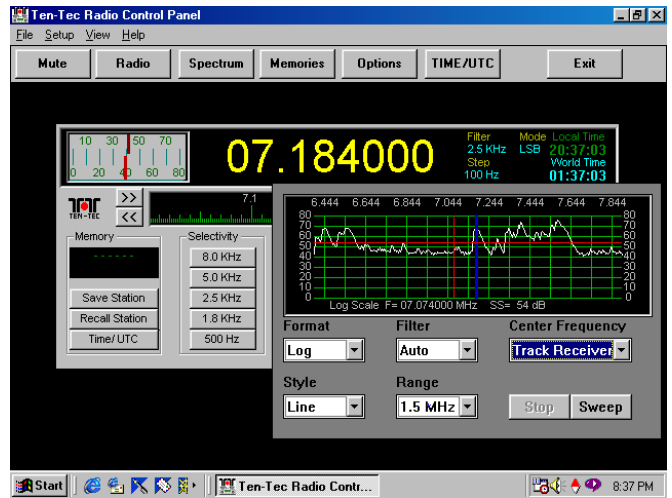


Figure 4—The RX-320’s spectrum display. Activate the sweep and the unit will create a graph of relative signal strength versus frequency. Simply click on a peak to tune there.

installation of an external antenna is certainly worth the effort.

The performance of the RX-320 is very good for a receiver in this price class. I did most of my listening while connected to a 40-meter dipole. Tuning through crowded CW portions of the ham bands with the 500 Hz filter engaged revealed reasonably good selectivity, but not quite up to par with most of the currently available ham transceivers. SSB reception was also very good. The 1.8 kHz filter worked well for carving out signals on 20 meters on a busy Sunday afternoon. AM shortwave sounded great when using an external speaker, audio quality when using sound card connections varied a bit between individual computers, but generally sounded very nice.

ARRL lab test data (see Table 2) shows two-tone third-order IMD dynamic range and blocking dynamic range measurements consistent with other mid-priced shortwave receivers we’ve tested, and considerably better than the HF performance of the ICOM IC-PCR1000 PC receiver we featured in *QST* Product Review, July 1998. Our review unit missed spec on first IF rejection. A second RX-320 we looked at did achieve the published specification.


The strong signal handling capabilities are good, but it would be nice if the unit included an RF gain control or an attenuator, especially for those of us using external antennas.

This radio is plenty sensitive for both shortwave and ham band listening. As stated in Ten-Tec’s specifications, performance drops off as you tune below 1 MHz. This is due to a high-pass filter designed to reduce interference that could be caused by strong nearby AM Broadcast stations. While the RX-320 is certainly usable for listening to AM broadcast stations, those interested in DXing the LF navigation beacons or European AM broadcast

band may be a bit disappointed.

Overall, I was very pleased with the performance and ease of use of this receiver. Hams currently active on HF will appreciate it for its convenience—you can check propagation or keep an ear on a DX or net frequency while performing other computer-related tasks.

If you don’t yet own a receiver for the HF frequencies, and are curious about the activity there, or if you are considering trying shortwave listening as a means of sparking radio interest in a computer consumed individual, the RX-320 certainly deserves a closer look.

Manufacturer: Ten-Tec, 1185 Dolly Parton Parkway, Sevierville, TN 37862; tel 800-833-7373; fax 423-428-4483; <http://www.tentec.com>. Manufacturer’s retail price: \$295. 

New Products

ONLINE CATALOG FROM VINTAGE RADIO KIT COMPANY

◊ As illustrated in the company’s new catalog, kits from the Vintage Radio Kit Company are tube-type Amateur Radio transmitters, receivers and transceivers. Many use venerable cake pan-type chassis, and every kit comes complete with all components, a fully punched chassis, all hardware, color pictorials and detailed instructions. Check out VRKC’s online catalog, complete with color photos, at <http://www.mnsinc.com/bry/vintage.htm>.


TITANIC REPLICA KEY FROM ALPHA DELTA

◊ Alpha Delta’s TK-1 is a full-scale working replica of the Morse code key used to

sound the distress call from aboard the ill-fated *Titanic*. Meticulously researched by Robert Kent of England’s Kent Engineers, the smooth-working TK-1 is beautifully crafted from precision-machined brass. Each serialized key has a matching certificate signed by Kent.

Price: \$149 plus s/h. For more information, contact Alpha Delta Communications, PO Box 620, Manchester, KY 40962; tel 606-598-2029, fax 606-598-4413.

1999 HAMCO CATALOG FEATURES HIDDEN ANTENNAS

◊ Hamco’s 1999 catalog features dozens of stealth antennas for HF, VHF and UHF ops who need to get on the air while keeping a low profile. Indoor and outdoor models include verticals, dipoles, quads, J-poles, Yagis, wires—even the company’s “stick-on” *TapeTennas*. To get a catalog, which is packed with useful technical info, send \$2 to cover shipping and handling to Hamco, Suite F239193, 3590 Round-bottom Rd, Cincinnati, OH 45244-3026. 

[Next New Product](#)

Strays

AREA CODE CHANGE FOR SSB ELECTRONIC

◊ SSB Electronic, a well-known supplier of equipment and accessories for VHF through the extreme microwaves (and a long-time *QST* advertiser) is suffering through a change of area code. Please take note of these very subtle corrections in their contact information: SSB Electronic, 124 Cherrywood Dr, Mountaintop, PA 18707; tel 570-868-5643, fax 570-868-6917, <http://www.ssbusa.com>.

Hints & Kinks

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

MODIFYING FT-1000D FOR TWO RECEIVING ANTENNAS

[This hint also appears in the March 1998 issue of *Amateurradio*, our Norwegian sister publication—*Ed.*]

◇ The FT-1000D (and the FT-1000 with the band-pass filter option) has two separate receivers, a main and a sub receiver. However, an internal switch, S1001, controls which receiver is connected to the receiving antenna.

Some time ago, I read a hint about a ham who had moved this switch for easy external access to it. I decided to try the same trick, but soon found that this involved removing a PC board and other work I was very reluctant to do.

After studying the wiring diagram, I found an easy solution that makes it possible to control both antenna relays externally: Remove the transceiver's bottom cover as described in the manual. In the corner behind the RX-ant phono jack, you'll see two small black antenna relays, RL1001 and RL1004. Locate diode D1002, between relay RL1001 and the rear of the cabinet. Solder a 160-Ω resistor to the red end of this diode. The resistor is not necessary, but precautionary. Solder a thin insulated wire to the resistor's open lead. When this wire is grounded, relay RL1001 will



Figure 1—WOMLG's plywood sandwich prevents unwanted climbers from ascending the extension-ladder antenna support.

operate. Check that it does with switch S1001 remaining in the BPF position. Pull the wire through a small hole in the rear panel, or better yet, pull it through the IF-phono jack—if you don't use this plug. Mount a small switch to the ground-terminal post, and connect the wire from the resistor to the switch. The receiving antenna going into the rear RX-ant phono jack is called RX-ant 1, and the RX-ant going into the BPF module is RX-ant 2. Now you have the options shown in [Table 1](#).

With both switches on you can run a contest on 160 meters with a vertical antenna (TX-ant) and Beverage (Main RX from RX-ant 1), while listening for something interesting to happen on another band (Sub RX from RX-ant 2). Good luck.—*John Lien, PO Box 208, 1601 Fredrikstad, Norway*

MORE ON THE EXTENSION-LADDER ANTENNA SUPPORT

◇ I like the hint about using an extension ladder to support small antennas (Hints and Kinks, October 1997, pp 80-81), but I'm concerned that young climbers might find the ladder irresistible. The installation would be safer with a plywood sandwich around the lower ladder rungs.

Cut two strips of plywood to fit between the ladder rails, then place one on each side of the ladder and bolt them together, trapping the rungs between them. (See [Figure 1](#).) Two or three 1/4-inch bolts with fender washers should do the job.—*Willard Kampmeier, WOMLG, PO Box 308, Silver Lake, KS 66539*

BEWARE OF WIRELESS PHONE-JACK SYSTEMS!

Editor's Note: see "Cooperation Curbs 'Wireless Modem' QRM" on p 66 of this issue.

◇ For quite some time, I noticed very strong interference occurring only on the 15-meter phone band at my location in the country. I first noticed the interference about one year after we moved to our new home. Being an ARRL Technical Specialist and an engineer by trade, I had tracked down quite a

few power-line and similar interference problems. I noted that from week to week, the interference signal would drift up or down around a center frequency of about 21.249 MHz. Furthermore, disconnecting the antenna in the shack made the signal vanish, so it was not conducted into the radio by the ac line.

I received the interference almost equally well with three different antennas: a four-element beam located on the far side of the house and about 56 feet high, my dipole at 45 feet and my sloper at 32 feet on the tower with the beam. Even more interesting is that if I turned the beam north-east—to where power and telephone lines enter my property—the signal got very strong. With the beam at 90° off that heading, the interference nearly vanished! It's as if the device conducted interference onto the ac and/or telephone lines and the interference radiated from the lines.

The signal was not present on any band other than 15 meters, so I reasoned that it wasn't a typical power-line problem (especially since the lower bands were quiet).

My schedule leaves little time for ham radio, so I pursued the problem no further. Then—after about a year of tolerating the interference on those few occasions when I worked the 15-meter phone band—I noticed one day the raspy signal was gone! Pleasantly surprised, but suspicious, I went on with my radio operations and hoped that the cause of the interference had “magically” vanished.

Alas, the signal returned about six months later, as strong as ever. Again, the signal centered around 21.249 MHz. I decided it was time to find the source and began by switching off circuit breakers to determine whether the signal originated from within my home. One by one, my wife, N4URO, and I switched off breaker after breaker. Finally, success! Now all we had to do was find the culprit on the last circuit switched off. We switched the breaker back on and we went room by room, checking all the outlets, lights and appliances—only to find that the interference remained strong!

Table 1

FT-1000 Antenna Selection with Added Switch

Front RX Antenna Switch	Rear RX Antenna Switch	
	OFF	ON
OFF	Main RX: TX-ant Sub RX: TX-ant	Main RX: RX-ant 1 Sub RX: RX-ant 1
ON	Main RX: TX-ant Sub RX: RX-ant 2	Main RX: RX-ant 1 Sub RX: RX-ant 2

I was just about to give up, when I noticed a strange device plugged into an outlet in the living room, hidden behind some books on a shelf.

It was an RCA RC926 wireless telephone-jack system. The main unit plugs into an existing telephone jack and a nearby ac receptacle. A remote unit plugged into any other ac receptacle in the house functions as a telephone jack. When I unplugged the device, the interference ceased. When I plugged it back in, the interference started at about 21.230 and drifted upward until it stabilized at about 21.249 MHz. (Possibly, this is the seventh harmonic of 3.03 MHz.—*Ed.*)

We had found the source, but the strange activity pattern still puzzled me. I didn't hear the signal when we first moved into the house, then heard it for about a year, didn't hear it for about six months or so, only to have it reappear.

My wife remembered some other pertinent details. She had a barn built in the back of the property about a year after we moved in. The barn had water and electric service, but no telephone. In an attempt to provide telephone capabilities in the barn, she had purchased the wireless phone-jack system and used it for about a year. Then we extended the house telephone line to the barn, and the offending device was removed. About six months later, my wife decided to reconnect the wireless system—inside the house—to please my teenage daughter who desired a telephone in her room.

Having found the offending device, I contacted RCA. It took several attempts; the 800 number is usually busy! Once I explained the situation to an operator and a supervisor, they advised me to call another number (801-566-0100)—for Phonex, the company that actually makes the device. (Phonex has a toll-free number, 800-437-0101.—*Ed.*) That company is in Utah, and I have not been able to reach them because of the time difference and my travel schedule (I can only call on weekends). At this point, I can't justify investing more time (and money for the call) on the situation. Labeling on the device indicates that there is yet a *third* manufacturer associated with this item: Thomson Consumer Electronics in New Jersey! (RCA and Thomson are the same company. They distribute the Phonex, as does GE, RadioShack and others.—*Ed.*) That sounds like more time and telephone calls to me! Besides, there is a typical FCC Part 15 device warning on the box:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. COMPLIES WITH PART 68, FCC RULES.

I share this information for others who may have one of these devices to make them aware of the possibility of the interference. I rarely work 15 meters, and the device doesn't seem to interfere on any other band.

If it bothered me, I would simply unplug it. Then my telephone would be available to make calls more often (with no extension in my teenage daughter's room.).

Thus, the mystery of the on again, off again, 15-meter phone interference was finally solved. I hope this information helps other hams who may have similar devices. (Information about solving this problem is now available at <http://www.arrl.org/tis/info/rfitejx.html>.—*Ed.*)—*Tim Moore, KK4TK, ARRL Technical Specialist, 180 Grass Farm Rd, Titus, AL 36080; kk4tk@worldnet.att.net*

REVISIONS TO SIMPLIFIED ANTENNA CURRENT MONITORING

◇ Two errors crept into W0OPW's "Simplified Antenna Current Monitoring," in the January column (*QST*, Jan 1999, pp 61-62). First, the text and figure describe a wire link between the transmitter's output coax and the current-sensing toroid; that is incorrect. There should be no such wire link, but the coax center conductor should form a one-turn primary by passing through the toroid on its way to the antenna connector, as shown here in [Figure 2](#). Second, [Figure 4](#) of the original article shows pins 2, 4, 8 and the **Calibrate** pot connected. This is correct, but the junction should also be grounded.—*Bob Schetgen, KU7G, Hints & Kinks Editor*

SPEAKER-MIKE MODIFICATION

◇ I'm writing in response to "Speaker-Mike Modifications to Generate a 1750-Hz Tone Burst," (*QST*, Feb 1997, pp 74-75). Based on my numerous European trips in different countries, I would advise against using

the Twin-T oscillator approach, which I have tried. Temperature drift can be a problem and some European repeaters have a very narrow acceptance window for the 1750-Hz tone. The only approach that works consistently is to use a crystal-controlled oscillator with a divider IC. This is the scheme used in several speaker-mikes sold in Europe. I don't know the details, but I purchased one such speaker mike in Germany a few years back. It uses a miniature crystal, an SMD IC and one capacitor to generate the tone. Perhaps some reader knows the details and can send them in.¹ It works well on every European repeater I have used.—*John Schultz, W4FA, 302 Glasgow Ln, Greenville, NC 27858*

¹Here's a start: Old TV color-burst crystals operate at 3.579545 MHz. When you divide that frequency by 2048, you get 1748 Hz. RadioShack sells a crystal clock oscillator (RSU11321288, about \$4) that operates at four times the color-burst frequency, 14.318180 MHz. When divided by 8192, that gives 1748 Hz. Therefore, the oscillator and a 14-stage binary CMOS counter (8192 is 2¹³; RadioShack #RSU11392214) should do the trick! I haven't built this.—*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**

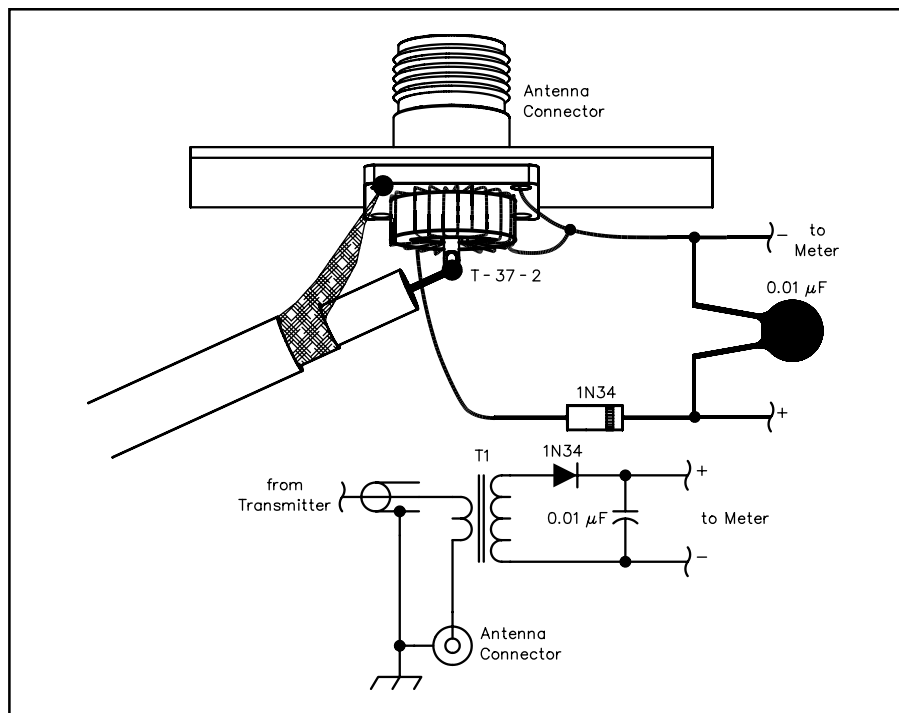


Figure 2—A corrected pictorial for W0OPW's current monitor, with a schematic added for clarity.

Hurricane Georges: The Saba Story

Compiled by John McHugh, KU4GY
Volunteer Coordinator,
National Hurricane Center
Miami, Florida

Amateur Radio volunteers from different countries rallied to help the people of a small Caribbean island when it was pummeled by Hurricane Georges last September. Saba is a volcanic island of about five square miles, rising to 2880 feet out of the deep blue water in the Leeward Islands chain. It is located about 30 miles south of Saint Maarten and is the home of Don McGehee, PJ8DM. Don is a member of the Hurricane Watch Net (HWN), a net that supports the operations at the National Hurricane Center and several other island emergency nets. In fact, in the days before the hurricane hit Saba, Don had been on the air for many hours as net control for the HWN.

The Strike and the Aftermath

During the night and early morning of September 20 and 21, Hurricane Georges pounded the island with sustained winds of 115 mph and higher gusts. After the hurricane passed, McGehee checked his house and found a hole in his roof, his antennas destroyed and no commercial electrical power on the island. Saba also had no internal communications except for a few telephones.

McGehee, despite his property damage, managed to get an antenna working. Using his generator for power, he checked into HWN on 14.325 MHz to report the damage sustained by the island and let us know that he and his wife were okay.

The island's trunking radio system failed completely since its antennas and transmitters were located at the top of Mt Scenery (2880 ft), accessible only by hiking or by helicopter. The local power company, telephone company, government administration, and hospital all used the system.

On September 22, Brett Ruiz, PJ2BR, contacted McGehee on HWN to advise that hams from Curacao and Aruba were on their way to help. They were: Michael da Costa Gomez, YV5LBB/PJ9, and Ruiz from Curacao; and Tony Thiel, P43T, and Lisandro Arends, P43LMA, from Aruba. To their credit, they came as a self-sustaining unit with their own food, water, flashlights and other basics.

Help Arrives

Lisandro arrived first on Saba and



Emergency repeater equipment is offloaded on Saba.

brought a 2-meter repeater. The following day Michael and Brett arrived on Saba with Tony. Lisandro and Tony went on to nearby St. Eustatius while Michael and Brett stayed on Saba.

The 2-meter repeater was set up in the only room left with a roof over it—at Scout's Place, a small hotel that had an emergency generator. The repeater immediately linked the entire island.

The Dutch Royal Marines arrived from Curacao by ship to assist in the recovery effort. One of Don's 2-meter base stations was set up at the public works building that served as the Marines' command post. The base station was used to communicate with troops deployed to outlying villages.

Michael traveled with the fire chief who assessed damage, while Brett stayed with the head of public works. Don's wife, Martha Walsh-McGehee, PJ8WM, operated the base station at their house. Don shuttled between home and other affected locations, providing radio communications.

Don also purchased 10 RadioShack 2-meter hand-helds with accessories. Kevin Poslusny, KJ4PR, the manager of the Town and Country RadioShack store in Miami, spent the entire Sunday driving all over the city picking up the needed equipment and shipping it all to Don on September 28. Don used the radios to assist the power company with communications.

The Dutch Royal Marines moved out and the 2-meter base station was relocated to the power plant. A Cushcraft Ringo Ranger II antenna was jury-rigged to a long piece of galvanized pipe on the roof. Amateur Radio gave the power company reliable communications between the power plant, their people who were mobile in the field, and the crews at poles.

The police also needed radio communication, for directing traffic when it was rerouted on one-lane streets to allow the power company to install new poles. Don supplied five CB hand-helds that were used by school children and the police to direct traffic for several days. Power was restored by October 7, a week ahead of schedule.

Don commented on the "general spirit of cooperation that prevailed on the island." On Saba, there was "no looting, no price gouging, and ordinary citizens turned out to start clearing the roads of debris before the wind had stopped blowing."

Power is Back

When power was restored, Don moved the repeater to his house at an elevation of 1200 feet in the hope that hams on St Kitts could make use of it for relief effort emergency communications there. Ultimately, hams on Anguilla, St Maarten, St Kitts, and Montserrat accessed it.

McGehee expresses his thanks to the in-

ternational team that came to assist Saba in its time of need. Amateur Radio once again served as a beacon in the darkness of colossal disaster.

COLORADO ARES PREPS FOR Y2K PROBLEMS

The Year 2000 (Y2K) problem or "millennium computer bug," has become a major global issue. Computer and imbedded processor applications are entrenched in almost every aspect of our daily lives. The Y2K issue presents a profound public service opportunity for Amateur Radio.

Y2K planning is a key initiative for the ARRL Colorado Section. Their plans call for "awareness building," with visits to clubs to solicit assistance, and agencies to build awareness of Amateur Radio capabilities. The Public Information Coordinator will work with local media to publicize Amateur Radio efforts.

The section's technical preparedness plan calls for working with key repeater groups to assure that repeater equipment is Y2K compatible. They will develop a log of Y2K compliant repeaters as well as emergency power capabilities. They will also work to educate ARES operators to assure that personal equipment is compliant, and that they are trained in emergency power systems and basic emergency communication procedures.

ARES efforts will focus on setting expectations and plans for its ECs, developing joint contingency plans with served agencies, planning a statewide SET around a Y2K scenario, and recruiting additional members and support for New Year's Eve.

Each ARRL section official will have a specific responsibility. The Section Manager and his Assistant SMs are to provide overall leadership, guidance and support. The Affiliated Club Coordinator is responsible for communicating with, and soliciting club support. The Technical Coordinator will distribute information on potential repeater and personal equipment Y2K problems, and on emergency power systems.

The State Government Liaison will build awareness for amateur communication support at the state level. The Section Traffic Manager is to prepare nets for potential traffic handling needs. The Section Emergency Coordinator's responsibility is to coordinate overall ARES planning and response, and serve as overall Y2K coordinator for the section.

The Public Information Coordinator will develop plans to build public awareness of Amateur Radio's role. And lastly, the Bulletin Manager will use his bulletin network and other media, including the section's Web page, to distribute information.

Y2K-related problems may result in communication disruptions, and Colorado has taken the lead in preparing Amateur Radio's response in the state. Is your section preparing? (Thanks to Mike Morgan, N5LPZ, Colorado Section Emergency Coordinator)

HAM WINS 1998 NATIONAL WEATHER ASSOCIATION (NWA) PUBLIC SERVICE AWARD

Randy Johnson, N4TYV, of Orlando, Florida, nominated by the staff of the National Weather Service (NWS) Office in Melbourne, has won the 1998 National Weather Association (NWA) Walter J. Bennett Public Service Award. The award is usually presented to someone within the professional emergency management community. It is quite an honor for a ham to win such an award.

The award reads, "As an Amateur Radio operator and a SKYWARN volunteer, [Johnson] provided outstanding service to the citizens of central Florida during the most damaging tornado outbreak in Florida history on February 22, 1998." (Thanks Scott Spratt, KT4PD, WX4MLB, Senior Meteorologist, National Weather Service, Melbourne, Florida)

National Traffic System SECTIONS: GROW YOUR TRAFFIC HANDLERS

By William Thompson, W2MTA
Section Manager, Western New York
Manager, Second Region Net
Eastern Area Staff Chairman

In my capacity as Eastern Area Staff Chairman, and over the course of 40 years in traffic handling with the National Traffic System, I have seen a continuing need to bring experienced traffic handlers that have served apprenticeships at the section level, up to the Region levels and above. For the future vitality of NTS, and the long haul aspects of the system, we must continue to develop operators for net control and liaison functions above the section level.

Training and development of traffic handlers begin at the local and section levels in the Field Organization. There, traffic handlers learn the ropes under the guidance of Net Managers, Section Traffic Managers and other traffic handling Elmers in the interest of seeing that intrasection message traffic is handled expeditiously. Although this function is clearly important, training serves another purpose. That is to hone the skills of operators so they can be moved up to the faster-paced requirements of NTS nets that operate above the section level. These include the region and Area Nets, and ultimately the Transcontinental Corps operations, where an elite group of operators are entrusted with moving traffic across large areas of the country.

It is apparent to me that section management, in addressing its daily needs and tasks, is failing to look outside of its own backyard. Their development of operators is falling short. Net Managers and Section Traffic Managers must encourage their operators to move up into other levels of the NTS both as their assigned section liaisons to region nets and as the region's net controls and liaisons with the area nets. Too often, at all levels,

we observe the few carrying the load with daily, other multiple assignments. In times of emergency, this situation could be catastrophic in terms of NTS providing a viable support function. In normal times, it leads to operator burnout and system staffing problems. Today, we NTS officials are experiencing the pinch in many functions. We need the support and attention of section management for remedies. We also offer our services as NTS officials to assist in efforts in developing their public service communications operators.

A final note: Section Traffic Managers should respond when there is a call for nominations to fill a vacancy in one of the NTS official positions on the NTS area staff. Without your support, the lack of qualified operators and leaders will see the end of a viable National Traffic System.

KEN PALM, AB1N, SK

Dad introduced me to ham radio when I was 7 or 8 years old, growing up in the farm country in southern New Jersey. (He had been licensed as W9ZZC just prior to World War II.) He took me to visit South Jersey Radio Association members' ham shacks in the Camden area. I recall those visits with great fondness; hams were nice people. After we moved to Massachusetts, baseball and girls intervened in my teenage years. But finally, while in college, Dad and I sat down to hone our code skills and pass the Novice test together. He became WA1YIM; I was WA1YIU. The race was on: Who would get to Amateur Extra first? I remember secretly studying the license manual and passing the exam at the FCC in Boston. Thrilled, I immediately drove to Dad's office in the middle of the day to tell him the news—he was equally thrilled. He passed his Amateur Extra exam a little later. I became K1CE; he was AB1N. We loved getting on the air.

I think he had hoped that ham radio would steer me toward a related career. (He was an electrical engineer at RCA.) Engineering was not my thing, but I did get my degree and a job with ARRL HQ; I guess you could call that a "related career"! Dad was a Life Member of the ARRL, and he followed my work closely. He read my *QST* articles and columns, and always had a kind word to say about League affairs. He enjoyed ham radio, and was a member of the local Billerica Amateur Radio Society, teaching Novice classes when he could. He enjoyed DXing and ragchewing on CW.

Dad passed away last summer. Of course, there are no words that can express the significance of one's relationship with his or her father, but suffice it to say that he was simply a wonderful, selfless and humble man who gave so much to our close family. Among his gifts to me was ham radio, for which I will always be grateful. I've been at HQ almost 20 years and I still love getting on the air. Thanks, Dad.—
K1CE

Checking Your Message

The "check" in an ARRL formatted message, or radiogram, is the number of words of text in the message only. This excludes everything before the text and the signature.

Traffic handlers don't have to dine out to fight over the check! Even good operators find some confusion when counting the text of a message. You can eliminate some of this confusion by remembering these basic rules:

1. Punctuation ("X-ray," "Query") count separately as a word.
2. Mixed letter-number groups (1700Z, for instance) count as one word.
3. Initial or number groups count as one word if sent together, two if sent separately.
4. The signature does not count as part of the text, but any closing lines such as "Love," "Best wishes," or "73" do. Here are some examples:
 - Charles J McClain—3 words
 - W B Stewart—3 words
 - St Louis—2 words
 - 3 PM—2 words
 - SASE—1 word
 - ARL FORTY SIX—3 words
 - 2N1601—1 word
 - Seventy three—2 words
 - 73—1 word

Telephone numbers count as 3 words (area code, prefix, number) and ZIP codes count as one. ZIP + 4 codes count as two words. Canadian postal codes count as two words (first three characters, last three characters).

Although it is improper to change the text of a message, you may change the check. Always do this by following the original check with a slash bar, then the corrected check. On phone, use the words "corrected to."

Importance of STM and SEC Reports to HQ

While most Section Traffic Managers have been filing their monthly reports with Headquarters, Section Emergency Coordinators have not been as diligent in their reporting. No one likes to fill out report forms for anything, myself included, but ARES and NTS reports are very important to us at HQ. These reports are the "hard data" that prove Amateur Radio's public service and emergency communications capabilities. They also help us gauge the health and vitality of the League's two major public service programs, and justify continued administrative support from Headquarters.

Please, STMs and SECs, send your monthly reports to Headquarters!—K1CE

Field Organization Reports

Public Service Honor Roll December 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.

1028	223	182	163	148
WB0WUNJ	WA4GQS	W3BBQ	W9CBE	W9YCV
854	222	181	160	KC5PNM
NM1K	KF4NFP	N2OPJ	W5YQZ	KA4UIV
465	221	180	146	WA7EES
KB8ZYY	K6YR	WA1TBY	NR2F	N3DRM
435	218	178	159	145
K9RTB	KA4FZI	N5IKN	KB2VVB	KE4JHJ
354	217	KA2GJV	N8FPN	KD2AJ
WA9VND	KE4OAV	KT1Q	KE4DNO	WB4TVY
328	215	176	158	W6QZ
K7BDU	N2OJI	N2JBA	WD4MIS	WNOY
313	N5JZ	174	157	KC5OZT
W7TVA	213	KU4IJ	W4ZJY	144
261	NN7H	171	WX8Y	W4CAC
KB2WII	212	WBSZED	155	143
259	WB5NKC	170	N2AKZ	K3JL
KF4PRB	208	N4ZNO	KC5OGI	N0KJ
244	K4SCL	N2RPI	154	KOIBS
WB4GM	205	WA5AA	K4RBR	W7NWP
236	NZ4O	200	168	142
N1LKJ	K7VVC	K4IWW	K9FHI	153
234	W4EAT	196	W5GKH	AA3GV
W0OYH	190	KE4PAT	150	K2BCL
233	N2YJZ	165	WA1FNM	AD4BL
WB0ZNY	188	N1VXP	AA4HT	AF4GF
231	KC2ACL	N5NAV	149	141
W4PIM	N2LTC	W6IVV	KB5W	K5DPG
229	183	164	N5OUJ	W3YVQ
K2AZNZ	N8FWA	N2YV	KF1L	WA4QXT
			K5OZZ	W2EAG
				KD4GR
				140
				W0LAW
				WD4JJ
				NX1A

N2XOJ	K8GA	N3RB	K3UWO	KB8UEY
139	AF2K	113	101	K8AI
WA4DOX	126	K0PIZ	KF6GFV	KD4JMV
W2MTA	W7WAT	N8DD	KG0IV	86
138	N7AIK	WA8EYQ	WA2UXK	KC8HTP
W1PEX	125	W2MTO	100	WD4ZNB
N9BDL	N2CCN	KB2UQZ	KE6MIW	AC5Z
KC4ZHF	124	W4BNY	WB2IJH	KD7ME
W7GB	KK3F	112	99	85
W7ZIW	KA0KPY	K5MC	KB9GGA	N0UOD
WX4H	KA7AID	W1JX	AA2NX	KF6RDI
137	KC5VLW	WB2IV	AA8PI	N2JRS
KC2AHS	N4JQA	111	WA2GUP	84
AA2ED	123	WD0GUF	KB4WBY	KE4CAP
WA5I	K2VX	N3WKE	98	N7MPS
136	W2PII	KD4PWK	KG5GE	K1SEC
KC4RNF	122	KA4LRM	K0PY	K8SH
KA1GWE	W1ALE	W5MEN	K8LEN	83
K2CSS	KI4YV	110	AA4AT	KF4HJW
135	K5IQZ	KA1VEC	W18K	82
KA1JXH	K5VV	NR9K	KE4WBI	KE4NYY
N9PF	KC4TLG	AB5RV	97	WB9GIU
KB2KLIH	KC8GMT	K7MQF	WD9FLJ	79
K2DN	WWASC	109	W4RRX	WA4GLS
134	121	K4AIF	K5UCQ	WA4EYU
WB2GTG	K9GBR	K2PB	96	78
KG2D	K2BTP	WA5FXQ	K8IG	WA8AHV
133	KC7ZZB	N7YSS	95	KB2YJR
W00A	119	AC4CS	KB2GEK	KC2DNO
KL5T	AG9G	KB5A	KF5A	KA1VAX
N3XPK	W9ZY	WB2CZW	94	WB4PAM
K0GRZ	K4MTX	KT4SJ	77	KA1OTN
N2WDS	WB4UHC	107	AA8SN	WJ3K
132	W3OKN	KB3AMO	K2IWK	76
N5XGI	W2AKT	K8QIP	KG2OY	AE4NW
KA9KLZ	W2JHO	WA8SI	KC7NYR	KS4DW
131	118	W5CU	93	KS4FB
WA0TFC	N1CPX	KB2ETO	N8TDE	75
W5CDX	KG6TU	106	92	WEP
WA8DHB	N3WK	KH6GR	W7VSE	74
N2XJ	W4CKS	N5JUJ	N1SGL	73
W7LG	N7DRP	AB7NK	91	AF4CD
130	WA4EIC	105	WB1GXM	KC5VOG
KJ3E	117	K5YV	W4CC	N4MM
129	N3WAV	N4GMU	73	73
WA1JVV	WBSNKD	104	KF4FXT	KE3FL
KB2VVD	104	W4DGH	90	KA9FVX
128	116	KO4OL	N4YYQ	72
N9KHD	N9KHD	103	KA7TTY	W5XX
N1DHT	W7HH	89	71	K5GY
115	W1IU	AE4WP	71	71
KA5KLU	KE3OX	W2CC	WAZBA	70
NZID	KE0K	KC6SKK	N1IST	70
K7GXZ	W2FR	K8VJZ	KL7N	70
127	114	K10J	87	70
KD5CRX	KB0DTI	KD4GHU	N3ZKP	KA0DBK
W5ZX	KC4PZA	102	KC3Y	N1LAH
		W4XI	WA1QAA	

The following stations qualified for PSHR during the month of November, 1998, but their results did not appear in last month's column: KC5VLW 110, WB1GXM 87.

Section Traffic Managers Reporting December 1998

AL, AR, AZ, CO, CT, DE, EMA, ENY, EPA, EWA, IA, ID, IL, IN, KS, KY, LA, MDC, MI, MN, MO, MS, MT, NC, ND, NE, NFL, NH, NLI, NM, NNJ, NNY, NTX, NV, OH, OK, OR, ORG, RI, SB, SC, SD, SFL, STX, TN, VA, WI, WMA, WNY, WPA, WV, WWA.

Section Emergency Coordinator Reports December 1998

There are 41,839 ARES members accounted for in SEC records. The following section emergency coordinators reported: AZ, CO, CT, EWA, IN, KY, MDC, MI, MN, NC, NFL, NLI, SD, SFL, TN, VA, VT, WMA, WV.

Brass Pounders League December 1998

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

Call	Orig	Rcvd	Sent	Divd	Total
WB0WUNJ	900	409	2108	0	3497
WX4H	4	998	1617	15	2634
NM1K	739	310	843	1	1893
N2LTC	0	796	818	20	1634
K7BDU	158	562	778	2	1510
WA9VND	161	391	633	45	1230
K10J	0	529	649	0	1178
KE4DNO	28	439	694	8	1169
K7VVC	28	510	561	4	1103
W1PEX	2	934	66	22	1024
K4FOU	375	128	459	11	973
W3KOD	0	503	446	6	955
K9JPS	0	530	37	266	833
N3DRM	10	426	364	28	828
K9RTB	0	425	87	277	789
AB4XK	1	386	318	18	723
W7AMM	163	233	289	32	722
KA4FZI	9	365	277	51	702
W0YMB	0	337	359	0	696
KA2ZNZ	12	338	266	79	695
KT1Q	0	379	367	40	686
WA1TBY	2	346	283	20	651
W5SEG	115	173	288	31	607
KF1L	4	279	288	7	578
W5YQZ	0	293	275	2	570
W4EAT	15	250	289	3	557
W7TVA	82	187	156	113	538
W9IHW	2	294	41	184	521
KA2GJV	0	265	251	0	516
K4SCL	13	227	217	57	514
AB4E	2	241	268	2	513
N0KJ	—	—	—	—	507
KA1VEC	30	245	221	8	504
WB2IJH	0	252	240	0	501

BPL for 100 or more originations plus deliveries: NZ4O 160, K9GU 155, W4PIM 125, K1TQY 123, N1LKJ 107, WB0NY 107, WB4GM 106, W3IVS 105.



The United Arab Emirates

The United Arab Emirates (UAE) is one of the world's youngest nations, consisting of seven *sheikhdoms*: Abu Dhabi, Dubai, Sharjah, Ras al Khaimah, Umm al Qaiwain, Ajman and Fujairah. The United Kingdom and five of the sheikhdoms entered into agreements in 1820 whereby the British promised to suppress the slave trade and piracy. In those days the area was called Trucial Oman or the Trucial States (truce). In the 1960s great quantities of oil were discovered off the coast and the oil was soon exported. Despite the huge amounts of oil, the British—under the pressure of popular independence movements—decided to withdraw from the Indian Ocean region in 1968. On December 2, 1971, UAE gained full independence.

A61AJ

In the fall of 1997 I was asked to be the QSL manager for Ali Al Futtaim, A61AJ, who was a relatively new ham but was gung ho and interested in contesting. Dave Collingham, K3LP; Rich Boyd, KE3Q; and Ali installed five towers with monobanders for 10 through 80 meters, making it one of the largest stations in the Middle East. Check out Ali's home page at <http://www.a61aj.com>.

An Invitation to Visit UAE

During 1998 Ali asked me if I would be interested in joining him in Dubai to operate in the CQ World Wide CW DX Contest in November. It didn't take long to say yes. Not having a passport and previously only been to Canada, Mexico and the Virgin Islands, I was very excited to have the opportunity to travel and be on the DX side of the pileup. In the early fall I received my letter of invitation which was needed for a visa to enter the UAE. Others who would be joining us would be Rich, KE3Q; Boris, T93Y; Edin, T97M; and Sam, T94S/PA4AO.

First Time Across the Atlantic

As the departure date drew closer my anticipation grew. Sooner than I imagined, I found myself on a British Airways jet from Washington to Heathrow. I took off Sunday evening November 22, 1998, and arrived Monday morning. Unfortunately, I had a four-hour layover. It would have been nice to have a little more time to visit with some hams from England. Having not slept



A bird's eye view of the A61AJ station, sleeping quarters, kitchen and pool (under the canopy).

at all on the first flight, I was extremely tired but managed a few winks during my layover. Then I was back on British Airways for another 7½ hours to Dubai.

Final Destination—Arabia

The plane landed just prior to midnight on Tuesday and Ali was waiting in his traditional dress, which included a *kandura* (white robe), *gahfiyya* (white cap), *ghitra* (cloth attaches to the gahfiyya and covers the head) and *agal* (black cord that holds the ghitra in place). He quickly walked me through customs. After picking up my luggage we met his friend Chris, an American college buddy, who was waiting curbside with Ali's car. Ali lives in Dubai, a commercial and cosmopolitan city with a liberal atmosphere. His station is located on a farm to the southwest of the city and this would be my home for the next eight days.

The A61AJ Station

Once we arrived at the farm we quickly went into the A61AJ shack, a very nice 24×24-foot finished room with a refrigerator, air conditioning and four complete stations, which consisted of one FT-1000D, one FT-1000MP, two IC-781s and one Henry and four Alpha 87A amplifiers. It was one o'clock in the morning local time and I was not tired at all. Ali asked me if I wanted to operate and I quickly responded "You bet!" Sitting down on 20-meter SSB listening to the band at 2115 UTC I found XZ1N begging for QSOs and logged him

after one call. Afterwards it was down to 20-meter CW to see if I could stir up some activity of my own. It didn't take long for an audience to show up, including some friends like Bill, K5FUV, and Hollis, KC3X.

Getting Ready for CQ WW CW

After awakening on the morning of November 24, Ali, Chris and I started working in the shack setting up computers and the rest of the equipment. Each evening many of Ali's friends and family would stop by to see what work had been done, and eat dinner with us. Ali would cook something wonderful on the BBQ using real charcoal. We feasted on lamb chops, chicken, steak and hamburgers. It was a real joy meeting and talking each night with all of the different people from the UAE, England, Libya, Kazakhstan, India, Pakistan and Bosnia.

On the Air Again

Before going to the UAE I knew that A6 was somewhat rare on the 12, 17 and 30-meter bands. Seeing how most of the nationals do not operate CW, I thought 30 meters would be fun. After working the first station the pileup began and I was still able to work them simplex. However, after a few minutes I could tell someone had spotted me on the PacketCluster on the East Coast of the US. The excitement just kept building each time I worked a friend who said "Thanks, Bernie, for the new one on

*3025 Hobbs Rd
Glenwood, MD 21738-9728
howsdx@ar1l.org



Here I am at the gate to the A61AJ contest farm.



This is the A61AJ team just before the start of the CQ WW CQ Contest. From left to right: Sam, T94S/PA4AO (ex PA3GIP); Ali, A61AJ; Boris, T93Y; Bernie, W3UR; Edin, T97M; and Rich, KE3Q.



Jamal, A61AO, stopped by to loan us an Alpha 87A amplifier.

30 meters." It was also a highlight working the locals from my home area including Bob, W4MYA; Brian, ND3F; Frank, WB3AVN; and Tom, W4BQF.

Early each morning I would get up about an hour before sunrise for 160 CW, 80 SSB and 40 SSB hoping to work North America. Due to propagation and an inadequate 160 vertical, few were worked on Topband. On 80 meters mostly East Coast stations were logged. Only a few W5s and W9s were worked. Forty-meter SSB was the pits with broadcast interference spread from 7100 to 7300 and making QSOs extremely difficult. Many stations reported that A61AJ was very loud. I am sure they were also, but the broadcasters were much louder. Those that were worked were either very lucky or very strong.

More Operators Arrive

Although I enjoyed having the time with Ali all to myself it was nice to see reinforcements show up late in the evening on the 24th. First Edin, T97M, and Boris, T93Y and then my long time friend and fellow American, Rich, KE3Q, who would have flown over with me except he had been doing Sweepstakes from WP3R the previous weekend in Puerto Rico. The next few days were spent fixing antennas and amplifiers, installing Beverages and hooking up the computer network. Each operator in our group had unique talents.

Sam, PA4AO/T94S (ex PA3GIP), arrived from the Netherlands on the evening of the 25th. On Thanksgiving, my favorite

holiday, I was really missing my family and I knew they too were missing me. Amy, W3AMY, Rich's wife, sent over Thanksgiving decorations to help us remember the holiday and our families. Around 1300 UTC Rich was on 10-meter SSB and I was on 15-meter SSB. We were busy working the US stations and exchanging holiday greetings along with signal reports. I could see the thrill in Rich's face. I am sure I must have had the same look on my face. The two of us have worked many contests together but nothing was quite like this. Occasionally we would announce each other's frequency. While the band was open to the states I kept trying to work further and further west, every few minutes asking for W6s and W7s from the West Coast.

Contest Time

During our time in the UAE we only had one difference of opinion. Should we go multi-single or multi-multi? Of course everyone had an opinion and comments. We never really did make a formal decision. It was, however, settled when four of the five operators sat down in front of the four radios prior to the contest, each wanting to operate. Working a contest from such a rare location created instant pileups. We were using *DXTelnet*, a software program, to help us find multipliers. If a multiplier showed up on our screen we would simply tell the pileup to QRX, go work the mult and come back to the pileup. Many of the people were still there when we came back. By the end of the contest everyone had had plenty of operating time and we had smashed the 1992 VS6WO Asian multi-multi record.

West Coast 80-Meter Delight

I knew Ali's station was capable of working JAs on 80-meter SSB, so the day after the contest (at around 1400 UTC) I sat down at the 80-meter station hoping to find them. As I started to tune up the band I quickly discovered an American voice on 3788 kHz. Surely it must be an American in Asia with a signal like this. It wasn't long before he gave his callsign W6 Very Strong Signal. It was Dale,

a friend of a friend, and what a signal it was. I broke in and his reply was "You're very loud, and are you going to make some West Coast boys happy today!"

After a few exchanges he suggested that I listen split and sure enough the fun began. Many of the guys were an honest S9 and reported "Thanks for the new one." Several asked, "What are you running?" The Alpha 87A and 2-element KLM at 150 feet were obviously doing great!

I worked about 50 guys and thought that propagation had died. However, someone came on my listening frequency and said, "You still have stations calling you." I guess I had worked the first and second layer stations and was really struggling with the next layer. I wish I had hooked up the 160-meter east Beverage to help me on the receive side.

A Tour of Dubai

On our last day Ali and Chris drove us around the city of Dubai to do some sightseeing. It's a beautiful city and worth the time to see. While out on the town we had a victory dinner at a nice restaurant. Next we visited Ali's city home and met his family. Many pictures were taken and desserts eaten since this was our last evening together.

When It Was All Over

When all the dust settled we had made 15,986 QSOs of which 13,891 were during the CQ World Wide CW DX Contest. Many new friendships and memories were also made that will last a lifetime. While there I had tasted many different kinds of food and a taste of what it was like to be on the DX side of the pileup. Both were very enjoyable.

I would like to thank Ali, Chris, Rich, Edin, Boris, Sam and most importantly my wife Becky, N3OSH, for allowing me to have this unique opportunity. Boris has many more pictures of this operation at <http://www.qsl.net/t93y/a61aj/> and the A61AJ logs can be found at http://www.dailydx.com/a61aj_search.html. Would I do it again? Insh'Allah (God willing)!

Until next month, see you in the pileups!—Bernie, W3UR



Part 76: Cable Regulations and the Amateur—Part 2

In the last installment of this column, we discussed Part 76 cable television regulations as they relate to amateurs (see December 1998 *QST*, page 88). This installment will continue our discussion of the specific Part 76 regulations affecting amateurs and assistance available to amateurs.

Q. My cable company isn't interested in fixing the leakage problems in my neighborhood. How can I convince them that it is their responsibility?

A. Most cable operators understand their requirements with respect to signal leakage, and do a good job maintaining their networks. In some serious cases, the FCC can (and does) shut down cable channels if the leakage is persistent. This is especially true for leakage in the 108-136 MHz aircraft bands. Hams can use this to good advantage. If a leak is heard on the amateur bands, it will almost always be heard equally well on the aircraft bands. If the latter is reported to the cable company along with the report of interference in the ham bands, it will certainly get their attention! The FCC has set maximum individual signal leakage-levels for cable systems. As a further prevention, the FCC requires cable operators to have a periodic on-going program to inspect, locate and repair leaks on their systems. In light of the potential for catastrophic harm that may be caused by a cable system interfering with aeronautical navigational and communications radio systems, the Commission requires more stringent regulations for cable systems that use aeronautical frequencies. Let the cable company know that you know what the rules say, but don't be confrontational. Cooperation is generally the best approach.

Q. What is "ingress" and "egress"?

A. When outside signals leak into a cable system, it is called *ingress*. When signals leak from a cable system, it is called *egress*.

Q. Once it is clear that the cable company understands that they are responsible, what additional steps should I take?

A. If faced with an interference problem to and/or from a cable system, send a letter to the cable company's chief technician or a supervisor in the technical section and remind the cable company of its obligation. Cable systems should have an interference resolution process. Your ARRL Section Technical Coordinator (TC) may know who the best contact is and his or her name

can be obtained from your ARRL Section Manager or from ARRL HQ. Keep copies of the correspondence and a record of all personal contacts. If you do not receive a satisfactory response within a reasonable amount of time (usually 30 days), send a certified letter to the cable system's General Manager, and send a copy to the National Cable TV Association (NCTA), Director of Engineering, Science and Technology Department, 1724 Massachusetts Ave NW, Washington, DC 20036; tel 202-775-3550; <http://www.ncta.com/>.

If you need assistance explaining to the cable company who is responsible for cable TV interference after all of the steps above have been followed, contact the ARRL Liaison to the NCTA. He is Robert V. C. Dickinson, W3HJ, President, Dovetail Surveys, Inc, 961 Marcon Blvd, Suite 450, Allentown, PA 18103.

If there is no solution after these steps have been taken, contact the FCC in writing and explain the steps taken to solve the

problem. *Contact the FCC only as a last resort.* ARRL Technical Advisor and NCTA Liaison Bob Dickinson emphasizes the value of cooperation. He states "The FCC wants the cable industry and amateurs to work together to eliminate interference problems; if the FCC gets involved, both may lose."

Q. What additional sources of information are available for amateurs faced with cable television interference problems?

A. The *ARRL RFI Book* is an excellent resource for amateurs faced with RFI problems and it contains an entire chapter on cable television interference as well as a chapter on regulations governing interference. Recently completely rewritten, it is available from Amateur Radio book dealers across the country and from ARRL HQ for \$20.

The FCC Rule Book, published by the ARRL, is a superb source of information about all Amateur Radio regulations and

From Part 76: Interference from a CATV System

§76.613 contains specific obligations of cable companies when harmful interference is caused to licensed radio services:

§76.613 Interference from a cable television system.

(a) Harmful interference is any emission, radiation or induction which endangers the functioning of a radio-navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with this chapter.

(b) The operator of a cable television system that causes harmful interference shall promptly take appropriate measures to eliminate the harmful interference.

(c) If harmful interference to radio communications involving the safety of life and protection of property cannot be promptly eliminated by the application of suitable techniques, operation of the offending cable television system or appropriate elements thereof shall immediately be suspended upon notification by the Engineer in Charge (EIC) of the Commission's local field office, and shall not be resumed until the interference has been eliminated to the satisfaction of the EIC. When authorized by the EIC, short test operations may be made during the period of suspended operation to check the efficacy of remedial measures.

(d) The cable television system operator may be required by the EIC to prepare and submit a report regarding the cause(s) of the interference, corrective measures planned or taken, and the efficacy of the remedial measures.

In §76.617, the FCC clearly states that interference from a cable system is the responsibility of the cable operator to resolve:

§76.617 Responsibility for Interference

Interference resulting from the use of cable system terminal equipment (including subscriber terminal, input selector switch and any other accessories) shall be the responsibility of the cable system terminal equipment operator in accordance with the provisions of this chapter: provided, however, that the operator of a cable system to which the cable system terminal equipment is connected shall be responsible for detecting and eliminating any signal leakage where that leakage would cause interference outside the subscriber's premises and/or would cause the cable system to exceed the Part 76 signal leakage requirements. In cases where excessive signal leakage occurs, the cable operator shall be required only to discontinue service to the subscriber until the problem is corrected.

CATV Regulations: Subpart K

Most of Part 76 details cable television regulations of little or no interest to amateurs, but Subpart K details technical standards that may be the key to finding a solution to a cable television problem. Selected parts have been included in this sidebar.

§76.601—Performance tests—states that the operator of cable systems “shall be responsible for insuring that each such system is designed, installed, and operated in a manner that fully complies with the provisions of this subpart.” In addition, they must be prepared to show the FCC on request that the system does, in fact, comply with the rules. Cable operators are required to conduct complete performance tests of that system at least twice each calendar year.

§76.605—Technical standards—details specific performance standards of systems. §76.605 covers the technical standards for the operation of a cable system such as visual carrier signal level and carrier-to-noise ratio. This section also specifies the maximum signal leakage allowed from a cable system. Regarding harmful interference from a cable system, §76.613 clearly places responsibility on the cable company. In essence, Amateur Radio operators who receive harmful interference from local cable television systems have legal recourse to cause the cable company to “clean-up their act.” Nonetheless, if their signals can exit the system, amateur signals can penetrate it and interfere. As with all RFI problems, “cooperation” is a key word when solving cable interference problems.

§76.605 Technical standards.

(a) As of December 30, 1992, unless otherwise noted, the following requirements apply to the performance of a cable television system as measured at any subscriber terminal with a matched impedance at the termination point or at the output of the modulating or processing equipment (generally the headend) of the cable television system or otherwise as noted. The requirements are applicable to each NTSC or similar video downstream cable television channel in the system:

(7) The ratio of RF visual signal level to system noise shall be as follows:

(iii) As of June 30, 1995, shall not be less than 43 decibels.

(8) The ratio of visual signal level to the RMS amplitude of any coherent disturbances such as intermodulation products, second and third order distortions or discrete-frequency interfering signals not operating on proper offset assignments shall be as follows:

(i) The ratio of visual signal level to coherent disturbances shall not be less than 51 decibels for noncoherent channel cable television systems, when measured with modulated carriers and time averaged; and

(ii) The ratio of visual signal level to coherent disturbances which are frequency-coincident with the visual carrier shall not be less than 47 decibels for coherent channel cable systems, when measured with modulated carriers and time averaged.

Specific signal leakage limits are:

Frequency	Signal leakage limits ($\mu\text{V}/\text{meter}$)	Distance in meters
Less than and including 54 MHz, and over 216 MHz	15	30
Over 54 up to and including 216 MHz	20	3

related rules. It includes a current copy of Part 97 as well as hundreds of pages of interpretation material. For a catalog of ARRL publications, contact ARRL HQ, or download the catalog from the Web at <http://www.arrl.org/catalog/index.html>.

The ARRL Technical Information Service also has an informational package called “The EMI/RFI Package” that lists parts suppliers for filters, ferrites and other EMI-control devices as well as the technical and diplomatic aspects of interference problems. The ARRL TIS “CATVI Package” lists specific technical remedies to cable TV interference. For ordering information, contact ARRL HQ or download them from the ARRL Web at <http://www.arrl.org/tis/>.

In addition, *The FCC Interference to Home Electronics Entertainment Equipment Handbook*, FCC Bulletin CIB-2, can be downloaded from the FCC’s Web page at <http://www.fcc.gov/cib/Publications/tvibook.html>, ordered from the FCC’s

National Call Center at 1-888-CALL FCC or ordered by mail from the FCC National Call Center, 1270 Fairfield Rd, Gettysburg, PA 17325-7245. There is no charge for this helpful publication.

Q: My cable company states that they may adopt less stringent technical standards because of their size. Is this true?

A. Yes. “Mom and Pop” cable systems serving fewer than 1000 subscribers may adopt less stringent technical standards as can operators serving rural areas. This also applies to cable systems using specialized digital technologies.

Section 76.605(b) states, in part, that “Cable television systems distributing signals by using methods such as nonconventional coaxial cable techniques, noncoaxial copper cable techniques, specialized coaxial cable and fiber optical cable hybridization techniques or specialized compression techniques or specialized re-

ceiving devices, and which, because of their basic design, cannot comply with one or more of the technical standards set forth in paragraph (a) of this section, may be permitted to operate: Provided, That an adequate showing is made pursuant to Sec. 76.7 which establishes that the public interest is benefited. In such instances, the Commission may prescribe special technical requirements to ensure that subscribers to such systems are provided with an equivalent level of good quality service.”

This section goes on to state that “Local franchising authorities of systems serving fewer than 1000 subscribers may adopt standards less stringent than those in Sec. 76.605(a). Any such agreement shall be reduced to writing and be associated with the system’s proof-of-performance records.” It also states that “For systems serving rural areas as defined in Sec. 76.5, the system may negotiate with its local franchising authority for standards less stringent than those in Secs. 76.605(a)(3), 76.605(a)(7), 76.605(a)(8), 76.605(a)(10) and 76.605(a)(11). Any such agreement shall be reduced to writing and be associated with the system’s proof-of-performance records.”

Q. How does the FCC define a “rural area?”

A. §76.5 defines it as “A community unit with a density of less than 19 households per route kilometer or thirty households per route mile of coaxial and/or fiber optic cable trunk and feeder line.”

Q. Where can I find entire FCC rule parts?

A. To obtain entire copies of nonamateur rules such as Part 76 from Title 47 (Telecommunications) of the Code of Federal Regulations, contact the Government Printing Office, PO Box 371954, Pittsburgh, PA 15250-7954 or call the Government Printing Office Order Desk between 8 AM and 5 PM Eastern time, Monday through Friday, at 202-512-1800 or fax 202-512-2250. The Government Printing Office (GPO) operates 24 US Government Bookstores throughout the country. Each bookstore carries a selection of at least 1500 of the most popular Federal government publications, subscriptions and electronic products.

If you have access to the World Wide Web, the following pages allow you to download needed parts of any section of Title 47 (Telecommunications) of the Code of Federal Regulations. For a copy of the Parts 0-101 as a PDF file, see <http://www.fcc.gov/wtb/rules.html>. For a copy of Parts 0-101 as a text file, see <http://www.access.gpo.gov/nara/about-CFR.html#page1/>. A GPO product list can be found at http://www.access.gpo.gov/su_docs/index.html. Caution: these rule parts are very large!

Thanks to Ed Hare, W1RFI, Ron Hranac, N0IVN, and Bob Dickinson, W3HJ, for their assistance with the review of this installment.



The World Above 50 MHz

Emil Pocock, W3EP*

Microwave Help

The microwave bands, generally considered those above 1 GHz, are the last frontier of Amateur Radio. (See [Table 1](#).) With the possible exception of 23 cm, these bands were almost entirely ignored by the average VHF enthusiast as recently as 20 years ago. Recent advances in solid-state microwave technology, prompted by a variety of new consumer, commercial and satellite uses, have helped make the microwaves more accessible to amateurs, who have adapted new devices and techniques for their own uses.

Despite rapid strides in microwave technology, no off-the-shelf CW/SSB transceivers cover any microwave band, with the exception of 23 cm. The mid-1980s-vintage ICOM IC-1271A, a 10-W, 1.2 GHz rig, is now difficult to find in the used market. The multiband VHF/UHF Yaesu FT-726R (1983) and FT-736R (1987) have options for a 1.2 GHz module, as does the Kenwood TS-790A, designed primarily for satellite work. The latter two rigs may still be available new.

This means that microwave operators still must put together their own stations. That is the great attraction for many amateurs who still love to design, build and experiment—and there are tremendous opportunities. Fortunately for others who are interested in the bands above 1 GHz, but do not have the time, inclination, or expertise to build their own, there are relatively easy ways to get on the bands.

The easy way is to purchase commercial transverters or transverter modules. Some transverters use an existing 144 or 432 MHz transceiver as an intermediate frequency. You retain all the features of your “low band” transceiver well into the microwave region. Transverters, modules and antennas—both as fully assembled units and as kits—are available for all the bands from 1.2 to 76 GHz! Several of the leading US distributors are listed below.

Manufacturers and Distributors

Down East Microwave (954 Rte 519, Frenchtown, NJ 08825; voice tel 908-996-3584, fax 908-996-3702; <http://www.downeastmicrowave.com>) manufactures and distributes a wide range of transverters and modules (as kits or assembled), com-

Table 1
The US Amateur Microwave Bands

Band Name	Frequency (GHz)	Wavelength (mm)
23 cm	1.240-1.300	242-231
13 cm	2.300-2.310 and 2.390-2.450	130-130 126-122
9 cm	3.300-3.500	91-86
5 cm	5.650-5.925	53-51
3 cm	10.0-10.5	30-29
12 mm	24.0-24.25	12.5-12.4
6 mm	47.0-47.2	6.4-6.4
4 mm	75.5-81.0	4.0-3.7
2.5 mm	119.98-120.02	2.5-2.5
2 mm	142.0-149.0	2.1-2.0
1 mm	241.0-250.0	1.2-1.2

ponents and antennas for 50 MHz through 10 GHz. There's a complete catalog on the Web page.

SSB Electronic (124 Cherrywood Dr, Mountaintop, PA 18707; tel 570-868-5643, fax 570-868-6917; <http://www.ssbusa.com>) distributes German-built SSB Electronic modules for 50 MHz through 10 GHz; DB6NT-designed modules (including power amplifiers) for 1296 MHz through 76 GHz from Kuhne Electronics; and Danish ProCom dishes and feeds for 10, 24 and 47 GHz, among other excellent product lines.

SHF Microwave Parts (7102 W 500 S, La Porte, IN 46350; fax 219-785-4552; <http://www.shfmicro.com>) distributes a variety of microwave components and modules.

Handbooks

There is plenty of help to get started in the microwaves. The *ARRL Handbook for the Radio Amateur* (ARRL Order No. 1816) and other standard VHF handbooks contain introductory chapters on equipment, antennas, operating and propagation above 1 GHz. The ARRL also publishes the *ARRL UHF/Microwave Experimenter's Manual* (ARRL Order No. 3126) and the *ARRL UHF/Microwave Projects Manual* (ARRL Order No. 4491 Vol 1, 6311 Vol 2), which are standard works for microwave enthusiasts. The

Radio Society of Great Britain offers its own *Microwave Handbook* in three volumes (ARRL Order No. 2901 Vol 1, 3606 Vol 2, 3975 Vol 3), now in its second edition. These excellent volumes are available from your local ARRL dealer or directly from the ARRL. (See the [ARRL Bookcase ad](#) in this issue).

Clubs and Conferences

Specialized clubs and conferences provide a way to get first-hand information and advice on the microwave bands. Many general VHF clubs have members who are interested in microwaves and can provide a good deal of practical advice and help. There are also several well-established microwave organizations in the US.

The North Texas Microwave Society's monthly meetings are held at various places in the Dallas-Ft Worth area. They are announced in *Feedpoint*, the society's 16-page newsletter. *Feedpoint* is published six times a year and includes a wide variety of features for the microwave enthusiast, including activity reports, contest information, building notes and classified advertisements. Membership, which includes a *Feedpoint* subscription, is \$12 per year; contact Wes Atchison, WA5TKU, Rte 4, Box 565, Sanger, TX 76266.

The San Bernardino Microwave Society meets the first Thursday of each month at 7:30 PM at the American Legion Hall, 1024 Main St, Corona, California. The society maintains <http://www.ham-radio.com/sbms/sbms.html>, which is geared for Southern California activity and publishes the *San Bernardino Microwave Society Newsletter*. The eight-page monthly newsletter typically contains activity reports and short construction projects. Memberships are \$15 per year; contact Bill Burns, WA6QYR, 247 Rebel Rd, Ridgecrest, CA 93555.

The Microwave Update Conference is held in a different US location each year, usually in the autumn. Check this column for the 1999 conference dates and site. The ARRL has published the conference proceedings since 1987, most of which are still available. You can view the tables of contents of the *Microwave Update Proceedings* and those of other VHF conferences at <http://set1.setileague.org/articles/proceed.htm>.

Journals and Newsletters

Several excellent journals and newsletters, especially those from Europe, provide

This Month

March 21	Transequatorial propagation peaks (2 weeks)
March 28	Good EME conditions

*Send reports to Emil Pocock, Box 100, Lebanon, CT 06249. Leave voice messages at 860-642-4347, or fax 860-594-0259 or w3ep@arrl.org.

a wealth of technical information. European microwavers seem to be somewhat ahead of their American counterparts in terms of activity levels and practical expertise. Fortunately, much of that experience is transnational and can be obtained from their publications. Among the established English-language journals distributed in the US are several from Germany and the United Kingdom.

DUBUS is published quarterly in English and German by Dubus Verlag, Grutzmühlenweg 23, D-22339 Hamburg, Germany (dubus@marsport.demon.co.uk and <http://www.marsport.demon.co.uk/dubus.htm>). The average 100-page issue contains state-of-the-art building projects, European activity reports, EME news and other features. Subscriptions are \$30 a year from US agent Russel L. Miller, N7ART, 12041 SW Peninsula Dr, Crooked River Ranch, OR 97760.

VHF Communications is published quarterly by KM Publications, 5 Ware Orchard, Barby, Rugby, CV23 8UF, UK (<http://www.vhfcomm.co.uk>). Despite its name, this 60-page magazine features sophisticated microwave building projects. US subscriptions are the equivalent of £18, from the US agent Gene Harlan, 5931 Alma Dr, Rockford, IL 61108; tel 800-557-9469.

Microwave Newsletter is a publication of the Radio Society of Great Britain. The 16-page newsletter is published six times a year and features UK and European activity news on the bands above 1 GHz and short building notes. Subscriptions are £15.45 (credit cards accepted) direct to the RSGB, Lambda House, Cranborne Rd, Potters Bar, Hertfordshire EN6 3JE, UK (microwave@star-trek.com; <http://www.rsgb.org>).

Web Sites

The explosion of Web sites over the past few years provides another rich source of microwave information. Some of the most widely reported sites in Europe and the United States are listed below, but these are only a small portion of the total that exist. These are good starting points, as most have links to many other useful Web pages.

European Microwave News (<http://www.pacsat.demon.co.uk/main.htm>) is the impressive homepage of Simon Lewis, GM4PLN, and the *European Microwave Newsletter*. It contains many links to microwave organizations and distributors, contest and operating information and other useful Web pages.

World Above 1000 MHz (<http://www.qsl.net/g3pho>), the homepage of Peter Day, G3PHO, is another excellent site in the UK that emphasizes operating, including beginners' pages, microwave records, beacons, contests and operating news.

The well organized Radio Society of Great Britain Microwave Committee pages (<http://www.rsgb.org/society/mc.htm>) present basic operating information for the UK amateur, but much of the material is



Geoff Lord, XE1GE, at his station in Cuernavaca (EK08). Geoff is the last surviving founder of the Mexican Amateur Radio League. He is still active on 6 meters.

useful for all microwave beginners.

A Domain for Microwave Amateur Radio (<http://www.walmba.org>) maintained by Tom Williams, WA1MBA, focuses on 10 GHz and general microwave operating.

The N1BWT 10 GHz Page (<http://www.tiac.net/users/wade>), put together by Paul Wade, W1GHZ, emphasizes 10-GHz operators and activities. The site also has a short bibliography of articles on narrow-band 10-GHz equipment.

Amateur Radio at Microwave Frequencies (<http://www.rac.ca/microwave.htm>) is sponsored by Radio Amateurs of Canada. This site contains useful links to microwave information designed especially for Canadian amateurs.

ON THE BANDS

December's propagation fare was sluggish, despite all the promises that the month held. No auroral or tropospheric openings were reported, and the Geminids meteor shower created little excitement. Six-meter DX did not progress significantly from November. Only the winter sporadic-E season came up to expectations. Thanks to WB2AMU, WA5IYX, KE6SHJ, N8ZJN, N0LL, W0MTK and *Internet Six News*, whose detailed reports contributed to the summaries. Dates and times are UTC.

Sporadic E and FAI

Six-meter sporadic-E propagation was reported somewhere across the US on December 1, 8-11, 14, 19-22, 24-26 and 30-31—not a bad showing for the winter season! Most of the openings were single-hop opportunities that occurred in the afternoons and evenings. The most interesting events (December 11, 19, 20, 22 and 26) provided stations in the southern half of the nation with contacts into Mexico and South America. On other days, a sporadic-E hop linked into the transequatorial zone, providing stations as far north as the Great Lakes area and New England with contacts into South America.

December 19-20 was an especially good day for 6-meter sporadic-E DX. Steve Swatloski, K15GF (EL09), worked ZF1DC, HP2CWB, HP3XUG and TI5KD beginning around 2300. Tom Glaze, K4SUS (EL95), worked some of the same stations, along with TI2AL, TI2ALF, V31PC and W1LP/mm (EL62) as early as 2225. John Butrovich, W5UWB (EL17), added ZF1DC

to the list of Central Americans worked that evening.

The openings shifted a bit further west on December 21-22, when stations from Oregon to southern Texas found the band filled with strong signals. XE1NVX, XE1/SM0KAK, XE1/G3SVD and other stations in Mexico also worked widely throughout the Southwest. After 0140 on December 22, N6YM (CM88) north of San Francisco made 144-MHz FAI contacts with AA7A, N5JEH, W7GZ, N5JHV, W7RV and WA7KSF, primarily in Arizona and New Mexico. FAI has rarely been reported outside the May to August season.

Ed Rodriguez, WP4O (FK68), and others in Puerto Rico worked into Florida on December 8, 21 and 30, at least. Ed also found VE9AA and K1MUC on the evening of the 21st. During the latter half of the month, W1LP/mm worked stations throughout much of the US from at least a dozen grids as he steamed from New Orleans, through the Panama Canal and north along the Mexican Coast.

Six Meter F-Layer DX

F-layer propagation on 50 MHz did not result in massive openings in December, as many had hoped. Most of the reported DX was still via familiar north-south transequatorial (TE) paths or adjacent to the equator. Midlatitude east-west openings, such as from the US to Europe, just did not materialize, despite solar-flux readings that exceeded 175 for several days late in the month.

There were at least half-a-dozen days when PY, LU and CX stations worked into the southern US via TE. PY5CC worked Cliff Kellam, N9BJG (EM57), as well as others in New Jersey, New York and Connecticut with the help of a sporadic-E hop on December 19. W1JJM (FN41), Dave Sumner, K1ZZ (FN31), and several others in New England worked PY5CC by the same means on December 30.

WP4O also worked N5JHC and N0IPL (both in New Mexico) after 1710 on December 11 via what was probably a single F-layer hop. W5UWB worked several Mexican stations on December 13 via what may have been F-layer backscatter. Similarly, CO2OJ worked HP2XUG via a scatter path while both stations were beamed west on December 19. K15GF heard KH6IAA when the Hawaiian was in contact with HP2CWB around 2330 on the same day.

A few trans-Pacific contacts also teased West Coast and Central American operators. Mike Foubiser, ZL3TIC, provided much of the story of the month's happenings. On December 3 around 2350, he worked N6XQ. On the 11th, he heard the XE2UZL beacon in Baja California and worked K6QXY at 2310. VK2BA, VK3AMK and other VK3s worked TI2KD, while VK7GK found XE1/SM0KAK. The next day after 0000, ZL3TIC logged V31PC, TI4KD (for a new country) and N5JHV. XE1/G3SVD ran off nine ZL and two VK stations on December 14. Finally, on December 24 after 2240, ZL3TIC worked N6XQ and NK7J with "55" signals and listened to N6XQ for more than an hour, but reported no other North Americans.

144 MHz TE

Transequatorial contacts on 144 MHz persisted into December as well. WP4O and LW5EJU reported contacts from Puerto Rico to Argentina and Uruguay on December 4, 7 and 15. Other stations participating were WP4EIT, LU7DJZ and CX6DH.

Geminids Meteor Shower

Veteran meteor watcher Shelby Ennis, W8WN, judged the 1998 Geminids to be poor, and the scarcity of 144 MHz reports seems to confirm that assessment. Jon Jones, N0JK

EME Annals

EME (moonbounce) standings are compiled each January 1 for publication in the March *QST*. To ensure that the standings reflect recent activity, information must be submitted within the previous two years. Stations dropped for lack of recent reports will be reinstated with a current update. You don't have to work additional stations to remain in the standings, but please confirm your continued interest at least every two years. Reporting forms are available with an SASE to: Steve Ford, WB8IMY, ARRL, 225 Main St, Newington, CT 06111. You can also submit reports by e-mail to standings@arrl.org.

Call Sign	Total Contacts	US States	DXCC	Call Sign	Total Contacts	US States	DXCC	Call Sign	Total Contacts	US States	DXCC	Call Sign	Total Contacts	US States	DXCC	Call Sign	Total Contacts	US States	DXCC
6 meters (50 to 54 MHz)																			
K6QXY	29	9	12	W0PT	134	29	27	K2UYH	601	—	—	NL7F	37	10	14	W3XS	58	21	20
W6JKV	19	7	9	SV1BTR	130	26	40	N4GJV	598	50	52	UA4API	33	—	—	VE6TA	66	19	22
W7HAH	15	6	5	SM3AKW	128	22	29	K1FO	527	49	75	K1OR	31	13	8	OH2DG	56	—	—
W7FN	14	4	4	AL7FS	119	49	11	SM4IVE	510	31	47	WA8WZG	30	13	11	K3HZO	54	—	—
OH2BC	13	5	5	WA7TDU	108	45	30	OE5JFL	502	—	—	OH5IY	30	9	13	W0RAP	53	16	17
W5FF	13	4	5	DL5DFTA	108	17	24	UR5LX	360	41	60	WB2VVV	24	—	—	WA4OFS	43	12	15
I5MXX	12	5	5	NOAKC	107	48	22	SM2CEW	352	—	62	WL7U	22	13	8	WA8WZG	38	10	24
W7GJ	7	2	3	W7EME	107	37	41	G3LTF	334	47	55	OK1DFC	21	11	11	KB3PD	32	15	8
WA6PEV	2	1	2	K6AAW	106	47	23	OK1KIR	328	43	62	W7KK	23	11	9	W7EME	13	5	6
K0FF	2	1	2	K0FF	103	27	26	KD4LT	317	37	47	KF0M	20	10	6	K0RZ	3	2	1
GD0TEP	2	—	2	K2LME	95	42	27	SM3AKW	310	35	50	N2HLT	18	8	7	JA9BOH	2	—	1
W7EME	1	1	1	N7EIJ	93	25	21	JA9BOH	292	42	47	W7EME	12	4	4	WL7U	1	—	1
				W5UWB	87	36	26	W1ZX	289	47	41	N7LQ	10	7	5				
				KJ7F	85	26	22	W7FN	287	50	58	K2DH	7	5	3				
				VE3AX	83	22	24	G3SEK	275	42	54	K7XC	7	3	5				
				K2UYH	72	16	—	N2IQU	267	—	—	SV9/SV1BTR	1	—	1				
				KB3PD	66	27	18	K0RZ	263	37	44					13 cm (2300 to 2310, 2390 to 2450 MHz)			
				KA2KQM	63	19	15	I2COR	251	—	40					OE9XXI	51	11	19
				W1JR	62	25	20	JA4BLC	248	—	—	W5LUA	44	8	19	OE9ERC	44	8	19
				NT0V	59	18	17	VE4MA	221	48	44	W0RAP	6	5	2	W5LUA	41	9	19
				PE1OGF	58	13	17	W0RAP	211	44	48	WA8WZG	5	5	5	W4HHK	38	12	15
				W5LUA	50	26	17	W0KJY	202	42	42	VE4MA	4	3	1	VE4MA	32	10	16
				K7XC	44	17	16	W5LUA	201	46	33	OK1KIR	31	8	16	OK1KIR	31	8	16
				KC7YVZ	42	15	14	W7HAA	192	46	40	ZS6AXT	26	—	16	ZS6AXT	26	—	16
				KB8JVH	42	—	13	OZ4MM	177	—	39	JA4BLC	19	3	12	JA4BLC	19	3	12
				WA1OUB	27	12	10	OH2DG	162	—	—	G3LTF	14	2	12	G3LTF	14	2	12
				K1UHF	26	13	9	LA8LF	160	32	32	OE9XXI	235	33	43	WA8WZG	13	4	10
				N6ZE	26	12	8	VE1ALQ	140	28	28	OE9ERC	200	28	35	K2DH	12	3	8
				K7XQ	23	—	6	EA6ADW	140	18	22	JA7BMB	11	3	8	JA7BMB	11	3	8
				W6/SM0PYP	20	7	7	ZS6AXT	140	—	34	SM3AKW	11	2	8	SM3AKW	11	2	8
				VE3FKX	19	10	7	UA9FAD	131	—	—	W5LUA	164	28	36	LA8LF	9	2	7
				K5AM	17	3	7	G4ERG	128	22	29	K2UYH	161	34	28	EA6ADW	9	1	8
				K6QXY	15	7	6	OE9ERC	126	22	27	WD5AGO	151	28	35				
				SV9/SV1BTR	9	5	5	KB3PD	120	44	27	OZ4MM	146	14	28	9 cm (3300 to 3500 MHz)			
				W3SZ	7	2	5	WA4OFS	115	32	27	G3LTF	142	20	31	W5LUA	4	1	4
				W8TN	6	2	4	EA2LU	119	18	32	EA6ADW	140	18	22	VE4MA	2	1	2
				BY1QH	6	2	3	K1CA	108	30	27	ZS6AXT	140	—	31	K2DH	1	1	1
				W7KK	5	2	3	F5PAL	106	—	38	OK1KIR	135	22	33				
				N2HLT	4	3	1	DK3FB	106	—	—	LA8LF	124	29	27	5 cm (5650 to 5925 MHz)			
				WB4JEM	3	2	1	W3XS	105	30	25	SM3AKW	121	18	29	OE9YTV	17	3	13
				W9JN	3	2	1	WD5AGO	101	25	23	N6BQ	119	25	29	OE9PMJ	16	3	12
				W3ZZ	3	1	2	KA0RYT	94	—	23	HB9BBD	119	17	33	OE9ERC	16	2	12
				KB9MLA	2	2	1	WA4MVI	79	38	12	N2IQU	119	—	—	W5LUA	15	2	12
				N7YAG	2	2	1	W8TN	74	28	16	VE4MA	110	25	30	OK1KIR	7	1	6
				WL7U	2	2	1	W8MQW	71	12	12	VE1ALQ	109	20	25	VE4MA	7	1	5
				NOUK	2	1	2	IK5WJD	63	13	23	K2DH	105	22	31	JA7BMB	4	1	3
				K0RZ	1	1	1	VE6TA	68	18	18	SM2CEW	103	—	—	K2DH	1	1	1
								OX6OL	60	—	—	DJ6YW	102	—	—				
								OK1CA	57	22	25	OE5JFL	92	—	—	3 cm (10 to 10.5 GHz)			
								SV1BTR	56	15	23	HA5SHF	89	6	20	W5LUA	23	6	13
								KB8RQ	52	—	—	W57DCD	80	—	—	AA5C	18	—	—
								DL3EAG	45	—	—	KD4LT	74	14	27	OE9ERC	11	3	7
								S52CW	44	9	17	JA4BLC	73	—	—	I4CHY	10	3	8
								K7XD	43	18	13	OK1DFC	70	13	25	OK1KIR	10	2	9
								IK5OQL	43	—	—	W0KJY	68	25	20	N4MW	1	1	1
								JH1EFA	42	5	8	I2COR	63	10	26	K2UYH	1	1	—
								KN6M/5	40	18	8	W4OP	61	13	22				

(EM17), completed with VE5UF (DO61) on December 14 at 0448. Jon reports that radio counts from an observatory in Nova Scotia suggest the peak occurred between 0300-0400. Germain Bisson, VE2PEP (FN46), had a difficult time with K8TQK (EM89) before completing around 1224 on December 13, but had a much easier contact with K9MRI (EN70) the next day at 1133.

VHF/UHF/MICROWAVE NEWS

120 GHz Record

Will Jensby, W0EOM, has claimed a new 120-GHz distance record of 5.3 km with Bob Johnson, KF6KVG. The CW contact was completed on November 16 in Redwood City, California. The pair have been working on 120 and 144 GHz rigs based on Hughes harmonic mixers and 9-inch Cassegrain fed dishes. They plan further work in the upper microwave bands.

Southeastern VHF Society Conference

The 1999 SVHFS Conference will be held April 9 and 10 at the Marriott Hotel at Windy Hill in Marietta, Georgia. The usual technical presentations are planned, preamp-noise-figure and antenna-gain measurements, exhibits, flea market and auction. Make hotel reservations directly by calling 800-228-9290. More information can be found at <http://www.svhfs.org/SVHFS.ORG/svhfs/>.

EME Data

Derwin King, W5LUU, has again kindly provided data on EME conditions for every weekend in 1999. Weekends that are rated *good*, *very good* and *excellent* are listed in the "This Month" box on the first page of each column. A *good* rating means that there is no more than a 2.5 dB path loss degradation on 144 MHz or 1.7 dB on 432 MHz. Two weekends rated as *excellent* appear at the end of the year, and Derwin

has discovered many weekends during 2000 to 2002 with excellent conditions.

FEEDBACK

Steve Carson, KB3BXI, noted that the comparison of relative SSB to FM signal-to-noise ratios (SNR) in the January column was a bit simplified. While it is true that SSB has a distinct advantage when signals are weak, that advantage does not continue indefinitely, because bandwidth is not the only factor in determining the SNR for FM. The calculations that demonstrate this effect are complicated, but they show that when the signals are 12 dB (about two S units) above the noise level, the SNR advantage begins to favor optimal FM equipment. Other correspondents reporting actual on-the-air experiences seem to confirm this effect. When SSB signals were a few S units strong, switching over to FM often resulted in a much quieter signal for the same power output.

Getting on the Bus with APRS

Are you on the APRS bus yet? You had better hop on soon, because you don't want to be left in the dust as the bus speeds away!

The popularity of APRS is snowballing. It is the fastest growing area in our hobby with new applications appearing all the time. Today, there are flavors of APRS to satisfy nearly everyone's taste in computers.

The original *APRSdos*, *MacAPRS* and *WinAPRS* are flourishing. Bob Bruninga, WB4APR, keeps cranking out new versions of the IBM/MS-DOS version, while the Sproul Brothers (Keith, WU2Z, and Mark, KB2ICI) keep adding features to the Macintosh and *Windows 95/98/NT* versions. As if they are not busy enough, the Sprouls are also working on UNIX and *WinCE* versions that should be available real soon now!

Brent Hildebrand, KH2Z, is the author of *APRS+SA*. His mature software mates APRS with the detailed maps of DeLorme's *Street Atlas*. Alan Crosswell, N2YGK, is the man responsible for two Linux APRS applications. His *aprsdigi* functions as an APRS digipeater and his *aprsmon* relays local APRS activity to Internet APRS servers.

Internet APRS servers exist thanks to the handiwork of Steve Dimse, K4HG. His *JavAPRS* permits an Internet server to display local APRS activity on the "net," while his *APRServe* collects local APRS activity from servers and TNCs interfaced to the Internet to present a big picture of all APRS activity to the "net."

On a smaller scale, Mike Musick, NOQBF, is working on *PocketAPRS*, which is APRS for the Palm III handheld computers. He released a beta version in late 1998 and plans to have a finished release ready in early 1999. Meanwhile, Kenwood has placed a complete APRS station (TNC and all) in your palm with their TH-7DA handheld 144/440 MHz transceiver. (That APRS bus I mentioned earlier is probably full of hams with Palm IIIs and TH-7DAs!)

It is becoming an APRS world as activity is blooming in Australia, Japan, and the United Kingdom.

Getting on the List with APRS

Tucson Amateur Packet Radio (TAPR) sponsors four APRS mailing lists to keep

track of this booming APRS activity. TAPR's APRS special interest groups (SIGs) exchange information and discuss issues regarding APRS in general (APRSSIG), issues regarding AMSAT-OSCAR 16 (AO16APRS), APRS issues in Florida (APRS-FL) and issues regarding the Kenwood TH-7DA APRS transceiver (HTAPRS). TAPR also sponsors APRSNEWS for announcing APRS software releases, hardware, events, etc.

To subscribe to a list, send e-mail to listserv@tapr.org with the following text in the body of the message:

subscribe <SIGname> <first name> <last name>

For example:

subscribe aprsnews cosmo kramer

Warning! Like APRS, some of the lists are very popular, so expect your mailer's in box to overflow regularly.

Wireless WWW Site Of The Month: WWW.QSL.NET

After mentioning <http://www.qsl.net> in January, I received the following e-mail

from its founder, Al Waller, K3TKJ.

"I would like to thank you for the kind words about QSL.NET in your recent column. It is a labor of love for me. I owe everything I have and most of my life decisions to the hobby. QSL.NET is my way of giving back some of what was given to me.

"QSL.NET started two years ago as an experiment of what it was like to administer a network server. I wanted to be an ISP for one customer (me). I built a server, installed Linux on it, and found a Web host site that would allow me to co-exist with them. I made my own home page, set up my own dial-in, and had a good time learning how the Internet worked on the inside.

"A friend asked if he could have a page. I offered pages to the members of my club. Someone posted to the ham Internet news groups that I would host a Web page if asked. Well, the e-mails came in at about 50 per hour, and QSL.NET was born.

"Today, there are not quite 10,000 Web pages at QSL.NET and the site receives 1 million hits per week. In addition to Web pages, we offer e-mail using your call sign or club acronym as the address, anonymous FTP for file exchange, page counters, guest books, Web page statistics, a search engine for the site and best of all, *no advertising!*

"Early last year, <http://www.qth.net> was born. This site is for ham mailing lists (reflectors) and there are 606 as of today. There is a list for every ham topic you can imagine including lists for each state for local use. Today, there are 66,000 users of QTH.NET, and it sends 500,000 e-mails daily.

"There is no way I did this by myself. I had help from volunteers every step of the way. K7ON and WB9LPJ were the leaders on the volunteer end, giving hundreds of hours to the system, as well as writing thousands of messages as we tried to teach HTML via e-mail.

"This year, <http://www.swl.net> is alive. I am going to clone QSL.NET for SWLs and others interested in related hobbies. This won't be as easy, but I think it is a natural pipeline for new members to the ham ranks. I have already graduated one SWL user to QSL and I'm not sure who was prouder, him or me!


"So thanks for the kind words. I have received mail from around the world mentioning your column and the article mentioning us on [page 79 of January QST](#). This will just make me work harder!" 



Fig 1—Wireless Web page of the month <http://www.qsl.net>.

*One Glen Ave
Wolcott, CT 06716-1442
stanzepa@ct2.nai.net
<http://www.tapr.org/~wa1lou>

Gearing Up For WRC-2000

One of the actions of last October's ITU Plenipotentiary Conference held in Minneapolis was to schedule the next World Radiocommunication Conference for May 8 to June 2, 2000, in Istanbul. The Plenipotentiary Conference also confirmed the agenda for WRC-2000 that was adopted by the ITU Council last May.

While the conference is 14 months away, preparations already are well along. In fact, a climax of sorts will be reached in November of this year when the Conference Preparatory Meeting (CPM) is held in Geneva to prepare the technical report for the WRC. Leading up to the CPM are meetings of various Working Parties and Study Groups of the ITU Radiocommunication Sector (ITU-R). If the representatives of Amateur Radio waited until Istanbul to get involved in the process, there would be little if any chance of influencing the outcome.

The ITU-R Study Groups are organized primarily by radio service, although one (SG 1) is devoted to the topic of Spectrum Management and another (SG 3) to Radio-wave Propagation. SG 8 is home to the amateur and amateur-satellite services, among others, but we must also take an interest in the work of Study Groups 7 (Science Services), 9 (Fixed Service), and 10 (Broadcasting Service-Sound). Working Parties are subsets of the Study Groups. Both the Study Groups and Working Parties are permanent parts of the ITU structure; Task Groups and other groups may also be formed and given specific, temporary assignments. At meetings of these groups, experts from various telecommunications administrations, corporations, and organizations present technical arguments on behalf of their interests and search for common ground with regard to technical issues, including but not limited to the topics on the upcoming WRC agenda.

Representation of the amateur and amateur-satellite services at these meetings is coordinated by the International Amateur Radio Union. If a meeting is to consider an issue of concern to us, an IARU representative—nearly always a volunteer with some experience or professional expertise in the field under discussion—will take part. Often, national delegations to such a meeting will include representatives of IARU member-societies. For example, ARRL Technical Relations Manager Paul Rinaldo, W4RI, often attends as a member of the United States delegation. The Japan Amateur Radio League, Deutscher Amateur Radio Club, Radio Society of Great Britain, and other sister societies make similar arrangements with their own na-

tional delegations. An even longer list of sister societies is represented on the national delegations to WRCs.

The principal technical groups dealing with WRC-2000 issues of concern to us include the following:

Task Group 1/5 is responsible for "Unwanted emissions and the modification of Recommendation ITU-R SM.328-8 concerning out-of-band emissions." When it comes to avoiding unnecessary interference, everyone is in favor of minimizing spurious and out-of-band emissions. (In this case, "out-of-band" refers to products caused by modulation that are outside the necessary bandwidth but within 250% of the necessary bandwidth.) However, in the case of the narrowband emissions frequently used by amateurs, how the limits on out-of-band emissions are specified could make it very expensive, or even impossible, to meet them. A similar problem exists with regard to amateur satellites. Thanks to the good work of several amateurs, notably Peter Chadwick, G3RZP, a solution appears to have been found for amateur stations and amateur earth stations in the amateur-satellite service and was more or less finalized at a meeting in January in Phoenix. Work on how to specify limits for space stations operating in the amateur-satellite service is continuing. The next meeting of Task Group 1/5 will be held in August in The Netherlands.

Working Party 7C is continuing to work on a study of a possible allocation of up to 6 MHz in the band 420-470 MHz for the earth exploration-satellite service (active), despite the fact that the issue was dropped from the WRC-2000 agenda and cannot come up before the next conference after that, which is not yet scheduled but is being referred to by the ITU as WRC-[2003]. Technical studies show that such satellites would be incompatible with co-channel amateur operations within line of sight, and so the issue is of great concern to us.

Working Party 7D is examining the allocations above 71 GHz with the objective of proposing a rearrangement of allocations to benefit radio astronomy. At its meeting in Venezuela last October, the IARU Administrative Council adopted the following principles to guide IARU representatives in addressing proposals to rearrange the amateur allocations between 71 and 275 GHz:

- Avoid moving amateur allocations that are presently located in atmospheric windows (where atmospheric attenuation is relatively low) to frequencies where atmospheric attenuation is high.

- Maintain the same amount of spectrum

in each band while agreeing to minor shifts.

- Maintain or improve the ratio between primary and secondary allocations.

- Avoid adding additional co-primary services in bands allocated to the Amateur Services.

There are meetings of Working Parties 7C and 7D this month in Geneva; the IARU is scheduled to be represented by Ken Pulfer, VE3PU. ARRL Technical Relations Specialist Walt Ireland, WB7CSL, who is a full-time member of the ARRL staff in Washington, is slated to be on the US delegation.

Working Party 8D is responsible for, among other things, little LEOs—that is, non-geostationary mobile satellites operating below 1 GHz—and the radionavigation-satellite service. The interest that some of the little LEO proponents have in additional spectrum, including ours, is well-known. Expanded use of the 1240-1260 MHz band by radionavigation satellites is being considered, which could affect amateur access to that portion of the 1240-1300 MHz band. A meeting of WP 8D is scheduled for Geneva in April, with the IARU to be represented by Wojciech Nietyksza, SP5FM.

A group with the unusual name *Joint Rapporteurs Group 8A/9B on wireless access* is examining frequencies between 27 MHz and 66 GHz to identify potentially suitable spectrum for fixed wireless access (FWA). FWA is not a new service, but is an application of technology to such things as bridging the "last mile" between the wired (or fiber optic) network and individual subscribers. A meeting of JRG 8A/9B was held in mid-February, after the press date for this issue; the IARU was scheduled to be represented by IARU Secretary Larry Price, W4RA, with Paul Rinaldo on the US delegation.

As extensive as this meeting schedule may appear to be, it is just the tip of the iceberg. The IARU and ARRL are already covering meetings of other groups looking toward likely agenda items for WRC-[2003], including the harmonization of the 7 MHz band and a growing concern that broadcasters will want to expand their regional toehold below 4 MHz, to the detriment of the 75-meter amateur allocation in Region 2. In addition, there are domestic preparatory meetings in Washington and meetings of CITEL—the hemispheric telecommunications organization—where administrations from North and South America try to develop common proposals for WRC-2000. □□□

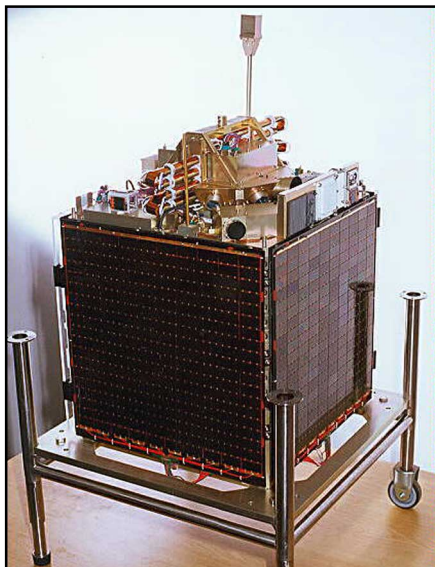
Amateur Satellites

Edited by **Steve Ford, WB8IMY** • Managing Editor

Meet the Multifaceted SUNSAT!

As this issue was about to go to press, SUNSAT was sitting atop a Boeing Delta II rocket awaiting launch from Vandenberg Air Force Base. SUNSAT is the brainchild of post-graduate students at the University of Stellenbosch, South Africa. This innovative microsat carries an Amateur Radio communication system supporting VHF, UHF and S/L-band links, a high-resolution imager, and some interesting communication packages and experiments including:

- A simplex 2-meter FM repeater that will relay approximately 8 seconds of speech
- 24-cm/13-cm linear transponder
- A packet BBS.
- A 2-meter 1200-baud AFSK-FM packet transponder compatible with terrestrial VHF-FM packet radio stations. (You won't need a special TNC to use SUNSAT!)



SUNSAT in its handling cart prior to launch.

- A 2-meter/70-cm 9600-baud FSK digital store-and-forward transponder
 - A CCD star camera for accurately determining the satellite's attitude relative to the stars
 - A triband (color) CCD imager with a resolution of 15-meters per pixel
- Sunsat promises to be a fun and fascinating satellite for everyone. You'll find more information on the Web at <http://sunsat.ee.sun.ac.za/>. We're keeping our fingers crossed for good launch weather in California.

VOXSAT—Another New Satellite for 1999?

AMSAT Argentina recently finished work on a bird that should cause some excitement this year, particularly among new satel-

lite operators. VOXSAT-1 is scheduled to ride piggyback, so to speak, aboard a Russian satellite later this year. It's a situation similar to the current RS-13 satellite where you have an Amateur Radio module within the spaceframe of another satellite.

If everything comes together as planned VOXSAT will feature a crossband (VHF/UHF) FM repeater similar to OSCAR 27 along with beacons using voice, fax and even SSTV. The repeater output will be about 2 W, which should make it easy to hear with H-Ts. The beacon transmitter will be 3 dB stronger at 4 W output.

AMSAT-LU is asking for donations to support the project. Anyone who donates at least \$10 will receive a certificate. Donate more than \$100 and your call sign will be engraved on the VOXSAT module.

You can send your donations to:

Gustavo Carpignano, LW2DTZ,
AMSAT-LU Vice President
M. Rosas 2044
1828 Banfield
Argentina

Check out the VOXSAT site on the Web at http://member.xoom.com/Amsat_LU/voxsat.htm.

PANSAT

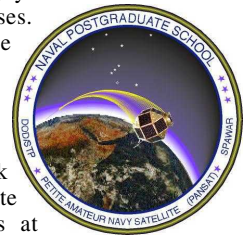
The space shuttle flight that returned

John Glenn to orbit last November also deployed the Petite Amateur Navy Satellite, better known as PANSAT. The satellite was designed and built by engineers at the Naval Postgraduate School and serves as a platform for a number of experiments. When the Navy is finished with its work, PANSAT will be open for ham use. If the turnover hasn't occurred already, it will within a few months.

PANSAT is the first Amateur Radio satellite to use spread spectrum communication. According to press reports, the Postgraduate School will release information soon that will allow hams to create receivers and transmitters that will be PANSAT compatible.

PANSAT may offer the first chance that many amateurs will have to use spread spectrum technology. The only fly in the ointment is PANSAT's equatorial orbit. If you live in the southern US or southwest, you should enjoy excellent PANSAT passes.

Many of us in the north, however, have to contend with passes that only rise about 14° above our local horizons. Check the PANSAT Web site for the latest news at <http://www.sp.nps.navy.mil/pansat>.



Active Amateur Satellites: Frequencies and Modes

Satellite	Uplink (MHz)	Downlink (MHz)
SSB/CW		
AMSAT-OSCAR 10*	435.030—435.180	145.825—145.975
Fuji-OSCAR 20	145.900—146.000	435.800—435.900
Fuji-OSCAR 29	145.900—146.000	435.800—435.900
RS-13	21.260—21.300	29.460—29.500
	145.96—146.00	
RS-15	145.858—145.898	29.354—29.394
Packet—1200 bit/s		
(FM FSK uplink, PSK downlink except as noted)		
AMSAT-OSCAR 16	145.90, .92, .94, .96	437.0513
LUSAT-OSCAR 19	145.84, .86, .88, .90	437.125
Mir Space Station	145.985	145.985
FM uplink and downlink		
Packet—9600 bit/s		
(FM FSK uplink and downlink.)		
UoSAT-OSCAR 22	145.900, .975	435.120
KITSAT-OSCAR 23	145.90	435.175
KITSAT-OSCAR 25	145.98	436.50
TMSAT-OSCAR 31	To be announced	436.923
TechSat-OSCAR 32	To be announced	435.325/435.225
FM Voice		
AMRAD-OSCAR 27	145.850	436.790
Repeater. Daylight passes only.		
Mir Space Station—Repeater	435.750	437.950
(CTCSS 141.3 Hz)		

*intermittent operation

QST

What Does the Foundation General Fund Do?

When you make a tax-deductible donation to our Foundation, you know we'll eventually *give it away*. Yes, we're here to help your generous gifts make their way to projects that perpetuate and enhance our hobby. That's our main mission and one thousands of hams and interested others have supported. Many times you know exactly what effort you want to support and you designate your contribution accordingly. Other times, your contribution is suggested for "the good of hobby" or "something to benefit Amateur Radio

youth." Memorial contributions come from friends and families of Silent Keys and often do not specifically name a fund to support. All undesignated funds we receive are welcome and placed in what we call our General Fund. It's a fund with a very special purpose, indeed.

The General Fund supports community projects such as museum displays, public service exhibits, emergency communications efforts, satellite and digital experimentation, and efforts to reward clubs and individuals for special technical innovations that benefit

our hobby. Preservation of our rich history is also part of the General Fund's mandate and we've funded several high-visibility efforts over the years. Helping disabled hams through grant to Courage HandiHam System is another important effort the General Fund supports. As you can see, we cover a lot of ground with your generous gifts. Let Spring fever imbue you with a desire to help us do more. Send your contribution to: The ARRL Foundation, Inc. General Fund, 225 Main Street, Newington, CT 06111.

Contributor's Corner

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As received and acknowledged during the months of September, October, November and December.



Coming Conventions

Edited by **Gail Iannone** • Convention Program Manager

ROANOKE DIVISION CONVENTION

March 13-14, 1999, Charlotte, NC

The Roanoke Division Convention, sponsored by the Mecklenburg ARS, will be held at the Merchandise Mart, 2500 E Independence Blvd; S on I-77 to Exit 11, E on Brookshire Freeway to Exit 28, S on Independence Blvd. Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 2 PM. Features include flea market, dealer booths, forums, VE sessions. Talk-in on 145.29. Admission is \$6 in advance, \$8 at the door (\$6 on Sunday). Tables are \$20 (8-ft, good both days). Contact Tim Slay, WO4G, 203 Aurora Ln, Huntersville, NC 28078, 704-948-6283 or 704-382-3234, wo4g@w4bfb.org; <http://www.w4bfb.org/hamfest.html>.

MAINE STATE CONVENTION

March 19-20, 1999, Lewiston

The Maine State Convention, sponsored by the Androscoggin ARC, will be held at the Ramada Conference Center, 490 Pleasant St; take Exit 13 off Maine Tnpk, go left at stop sign, pass 1 traffic light, Ramada on left. Doors are open Friday 7-9 PM, Saturday 8 AM to 2 PM. Features include forums, flea market, VE sessions (Saturday, exams at noon). Talk-in on 146.61. Admission is \$5. Tables are \$10 (includes 1 admission), additional tables are \$6 each. Contact Ivan Lazure, N10XA, 115 Old Lisbon Rd, Lewiston, ME 04240, 207-784-0350; ilazure@ghi.net.

OKLAHOMA STATE CONVENTION

March 19-20, 1999, Tulsa

The Oklahoma State Convention, sponsored by the Green Country Hamfest Association, will be held at the Maxwell Convention Center, 700 S Houston Ave; I-244 W to 7th St Exit, W on 7th St to Houston Ave. Doors are open Friday 5-10 PM, Saturday 8 AM to 5 PM. Features include dealer booths (from \$45), VE sessions. Talk-in on 145.11, 443.85. Admission is \$8 in advance, \$10 at the door. Tables are \$6 in advance, \$8 at the door. Contact Merlin Griffin, WB5OSM, Box 470132, Tulsa, OK 74147-0132, 918-622-2277, info@GreenCountryHamfest.org; <http://www.GreenCountryHamfest.org>.

1998

February 27

Vermont State, Milton*

February 27-28

Great Lakes Division, Cincinnati, OH*

March 5-7

Nebraska State, Norfolk*

April 23-24

Arkansas State, Little Rock

April 25

Delaware State, New Castle

May 1-2

West Texas Section, Abilene, TX

*See February *QST* for details.

MARYLAND STATE CONVENTION

March 27-28, 1999, Timonium

The Maryland State Convention, sponsored by the Baltimore ARC, will be held at the Maryland State Fairgrounds, I-83 to Exit 17 (Padonia Rd), follow signs to Fairgrounds. Doors are open Saturday 8 AM to 5 PM, Sunday 8 AM to 4 PM. Features include forums, ARES/RACES meetings, VE sessions. Talk-in on 146.67. Admission is \$5 per day, \$8 for the weekend. Contact Sharon Dobson, N3QQC, Box 95, Timonium, MD 21094, 410-HAM-FEST or 800-HAM-FEST (both mailbox 3772); n3qqc@amsat.org; <http://www.gbhc.org>.

SOUTHEASTERN VHF CONFERENCE

April 9-10, 1999, Atlanta, GA

The Southeastern VHF Conference, sponsored by the Southeastern VHF Society, will be held at the Marriott NW, I-75 and Windy Hill Rd. Features include specialized VHF/UHF topics, banquet (Saturday), antenna gain competition, noise figure com-

petition. Admission is \$35. Contact Dick Hanson, K5AND, 7540 Williamsburg Dr, Cumming, GA 30131, 770-844-7002, k5and@prestige.net; <http://www.svhfs.org/svhfs>.

INTERNATIONAL DX CONVENTION

April 9-11, 1999, Fresno, CA

The International DX Convention, sponsored by the Northern California DX Club, will be held at the Centre Plaza Holiday Inn, 2233 Ventura St, easy access from CA Hwys 41 and 99. Features include QSL card checking, DX-oriented talks and programs, forums (ARRL, DX, contest). Admission is \$60 in advance (postmarked by Mar 15), \$65 (after Mar 15). Contact Gordon Girton, W6NW, c/o NCDXC, Box 60307, Sunnyvale, CA 94088, 408-253-4455, w6nw@amateur-radio.org; <http://www.amateur-radio.org/ncdxc.org>.

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. **Q5T**

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 **March 1** to be listed in the **May** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo. (Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

Arizona (Scottsdale)—Mar 13. Roger Cahoon, KB7ZWI, 602-948-1824.

†**Arkansas (Fort Smith)—Mar 13,** 8 AM to 4 PM. *Spr:* Fort Smith Area ARC, Fort Smith Civic Center,

†ARRL Hamfest

55 S 7th St in downtown Fort Smith. VE sessions, QRP forum, homebrew contest, refreshments. *TI:* 146.94. *Adm:* \$5, children free. Tables: \$15 (includes 1 admission). Win Dooley, WB5KOM, Box 1604, Ft Smith, AR 72902; 501-785-5313.

Arkansas (Jonesboro)—Mar 20. Mike Conley, KC5ISI, 870-931-9957.

California (Fresno)—Apr 9-11. International DX Convention. See "Coming Conventions."

California (Linda)—Mar 13. Ron Murdock, W6KJ, 530-674-8533.

Connecticut (Pomfret)—Mar 27. Paul Rollinson, KB1CNW, 860-928-2456.

†**Connecticut (Southington)—Mar 21;** set up 6:30 AM; public 9 AM to 1 PM (Early Bird Special: doors open at 8:30 AM and admission is \$10 until 9 AM). *Spr:* Southington ARA, Southington High School, Pleasant St; take Exit 32 off I-84 to Rte 10, go

S for 1 mile, take left on Flanders St, HS is 1/2 mile on right. Flea market, vendors, annual spring ARES meeting, VE sessions (all classes given on a pre-registration basis only, 10 AM, send SASE for information and registration), refreshments. *TI:* 145.49, 147.345, 224.8, 444.25 (77 Hz). *Adm:* \$4. Tables: 6-ft advance \$12, door \$15. Make checks payable to S.A.R.A. and send SASE to Chet Bacon, KA1ILH, Box 873, Southington, CT 06489, 860-628-9346; hcbacon@connix.com; <http://www.connix.com/~hcbacon/sara.html>.

†**Connecticut (Waterford)—Mar 27;** set up 9 AM; public 10 AM. *Spr:* Radio Amateur Society of Norwich (RASON), Waterford Senior Center, on Rte 85; from Hartford take Rte 2 S to Rte 11 to Rte 85 S; from the shoreline take Rte 95 to Rte 85 N. Ham Radio Auction (bring your gear to sell; 10% commission to RASON), free parking. *TI:* 146.73. *Adm:* Free. Tony Griggs, AA1JN, 860-859-0162; or Mark Venable, N1RSK, Box 429, Ledyard, CT

06339, 860-572-9380 eves or 860-444-5448 days; mvnable@99main.com; <http://www.ims.uconn.edu/~rason>.

†**Florida (Englewood)**—Mar 13; set up 6 AM; public 8 AM to 2 PM. *Spr*: Englewood ARS, Tringali Community Center, Rte 776, East Englewood, near the intersection of Spinnaker Rd. Computer hardware and software, tailgating (\$5 per space, first-come, first-served basis), VE sessions (11 AM, on site; Ken Anderson, W4JQT, 941-475-3172; kba@ewol.com). *TI*: 146.7. *Adm*: advance \$3, door \$4. *Tables*: advance, table and ticket \$10 (additional tables \$7 each), door, table only \$10 (make checks payable to EARS and send to George Shreve, KA4JKY, 13591 Martha Ave, Port Charlotte, FL 33981, 941-697-3445; gshreve@ewol.com). J. R. House, K9HUY, 6249 Alloway St, Englewood, FL 34224, 941-475-3005; <http://www.flnet.com/~crosby/ears/index.html>.

†**Florida (Fort Walton Beach)**—Mar 19-20; Friday 5-8 PM, Saturday 8 AM to 4 PM. *Spr*: Playground ARC, Fort Walton Beach Fairgrounds, 1970 Lewis Turner Blvd; from US Hwy 98, take SR 189, 5 miles N; from SR 85 take SR 189, 2 miles W. Forums (ARRL, ARES, Nets, APRS, DX), RV parking (with full hookups), tailgating. *TI*: 146.79. *Adm*: advance \$4, door \$5. *Tables*: \$17. Clyde Gowdy, KE4FLC, 250 Annabelle Dr, Mary Esther, FL 32569, 850-244-0624; parcfest@aol.com.

Florida (Leesburg)—Mar 28. Paul Branch, K3NON, 352-343-8729.

†**Florida (Sebring)**—Mar 13, 8 AM to 3 PM. *Spr*: Highlands County ARC, Sebring Civic Center, 143 Lakeview Dr; US 27 to Lakeview Dr. Tailgating, refreshments. *TI*: 147.045. *Adm*: \$3. *Tables*: \$10. Phyllis Dibble, KD4CQG, 3053 Birch Rd, Lake Placid, FL 33852, 941-465-8176, dibble@strato.net; <http://www.strato.net/~hamradio>.

†**Florida (Stuart)**—Mar 20, 8 AM to 3 PM. *Spr*: Martin County ARA, Martin County Fairgrounds, 2016 S Dixie Hwy, follow signs. VE sessions. *TI*: 147.06. *Adm*: Free. David Millard, KE4AMW, 5 Indialucia Pkwy, Stuart, FL 34996; 561-288-7100.

†**Florida (Zephyrhills)**—Mar 7, 8 AM to 2 PM. *Spr*: Zephyrhills Area ARC, Zephyrhills Lions Den, 5827 Dean Dairy Rd; N of SR 54, between I-75 and US 301. "Phinney Fest" in honor of Ernest Phinney, WB4UMT, tailgating, VE sessions, refreshments. *TI*: 147.135. *Adm*: \$4. *Tables*: \$4. Ernie Vanselow, KD4VRV, 37536 Auric Terr, Zephyrhills, FL 33541, 813-783-8389; kd4vrv@gte.net.

Georgia (Atlanta)—Apr 9-10, Southeastern VHF Conference. See "Coming Conventions."

Georgia (Marietta)—Mar 20. Ben Dasher, KE4YZX, 404-869-6959.

Indiana (Columbus)—Mar 27. Marion Winterberg, WD9HTN, 812-342-4670.

Indiana (Indianapolis)—Mar 14. Dennis Bauernfiend, WB9ZLN, 317-996-3782.

Indiana (Michigan City)—Mar 27. Ron Stahoviak, N9TPC, 219-325-9089.

†**Kentucky (Cave City)**—Mar 13; set up 6 AM; public 8 AM to 4 PM. *Spr*: Mammoth Cave ARC, Cave City Convention Center, Hwy 70; Exit 53 off I-65, left onto Hwy 70, follow signs. Vendors, ARRL forum, meetings (3.960, MARS), VE sessions (all classes, walk-ins only), free coffee. *TI*: 146.94. *Adm*: \$5, under 12 free. *Tables*: \$7. Larry Brumett, KN4IV, 108 Withers Dr, Glasgow, KY 42141, 502-651-2363, lbrumett@glasgow-ky.com; <http://www.scrct.blue.net/mcsrc>.

†**Louisiana (Rayne)**—Mar 13-14; Saturday 8 AM to 4 PM, Sunday 8 AM to noon. *Spr*: Acadiana ARA, Rayne Civic Center, approximately 15 miles W of Lafayette on I-10; take Exit 87 (Hwy 35 S), go to first traffic light, turn right, go 2 blocks, take right and go to end of road. Forums (ARRL, AMSAT, LA Council of ARCs), camper hookups available on site, VE sessions. *TI*: 147.03, 146.82. *Adm*: advance \$2, door \$4. Nolen Griffith, K5ARH, 123 Normandy Rd, Lafayette, LA 70503, 318-989-9039; or Al Oubre, K5DPG, 318-367-3901, k5dpg@aisp.net; <http://www.acadian.net/w5ddll>.

Maine (Lewiston)—Mar 19-20, Maine State Convention. See "Coming Conventions."

Maryland (Timonium)—Mar 27-28, Maryland State Convention. See "Coming Conventions."

†**Massachusetts (Westfield)**—Mar 7; set up 7 AM; public 9 AM to 2 PM. *Spr*: Mount Tom Amateur Repeater Assn, Westfield Middle School, 30 West Silver St; take Exit 3 on Mass Turnpike to Rte 202/10 S, go to the green at city center, then Broad St to W Silver St. Amateur Radio and Electronics flea market, tailgating (\$5), vendors, VE sessions (10 AM, Jim Mullen, WA1ZUH, 413-245-3228), commercial exams (10 AM, Steve Rodowicz, N1SR, 413-593-6554), refreshments. *TI*: 146.94. *Adm*: \$4, under 12 free. *Tables*: \$15. James Allen, N1RUT, 56 Larchmont St, Chicopee, MA 01013, 413-536-5182, jim.allen@the-spa.com; <http://www.mtara.org>.

†**Michigan (Marshall)**—Mar 20; set up 6 AM; public 8 AM to 3 PM. *Spr*s: Southern Michigan ARS and Marshall High School Photo Electronics Club, Marshall High School, I-69 to I-94 then E to Exit 110; or I-94 to Exit 110 (old 27), then S and E to school, follow signs. Equipment, computers, free parking, refreshments. *TI*: 146.66, 146.52. *Adm*: advance \$4, door \$5. *Tables*: \$1 per foot (min 4 ft). Make checks payable and send SASE to SMARS, Box 934, Battle Creek, MI 49016; or Wes Chaney, N8BDM, 4405 S Minges Rd, Battle Creek, MI 49015, 616-979-3433; n8bdm@voyager.net.

†**Minnesota (Rochester)**—Apr 10, 8 AM to 1:30 PM. *Spr*: Rochester ARC, Graham Arena, Hwy 63S and 16th St SE. VE sessions (9:30 AM). *TI*: 146.82. *Adm*: advance \$5, door \$6. John Scott, N0HZN, 4552 5th St NW, Rochester, MN 55901, 507-285-6522, n0hzn@aol.com; <http://members.aol.com/rarchams>.

†**Mississippi (Pascagoula)**—Mar 5-6; set up Friday noon; public Friday 5-9 PM, Saturday 8 AM to 3 PM. *Spr*: Jackson County ARC, Jackson County Fairgrounds Civic Center; I-10, Exit 69, Hwy 63 S to Hwy 90, W to Singing River Hospital, turn N to Fairgrounds (behind hospital). Dealers, forums (ARRL, ARES/RACES), VE sessions (Saturday, 9 AM; test fee \$6.45, bring picture ID, original license and copy of license, no charge for Novice testing), RV parking available on site, refreshments. *TI*: 145.11, 146.88. *Adm*: \$2.50 (12 and over; \$10 max per family). *Tables*: 8-ft \$8 (first-come, first-served; must be paid in advance to assure reserved space). Charles "Kim" Kimmerly, N5XGI, 19000 Busby Rd, Vancleave, MS 39565; 228-826-5811.

†**Missouri (Kansas City)**—Mar 13, 8 AM to 2 PM. *Spr*: Ararat AR Shrine Club, Ararat Shrine Temple, 5100 Ararat Dr; I-435 E, exit Eastwood Trafficway. VE sessions. *TI*: 145.13. *Adm*: advance 3 for \$5, door \$3 each. Steve Dowdy, WJ0I, 12411 Olive St, Kansas City, MO 64146, 816-941-3392; sdowdy@qni.com.

Missouri (St Louis/Lemay)—Mar 5. Bill Schmidt, WA0JCO, 314-544-1515. (Auction)

New Hampshire (Henniker)—Mar 28. Jock Irvine, N1JL, 603-428-3476 (ext 256).

†**New Jersey (Parsippany)**—Mar 6; set up 6:30 AM; public 8 AM to 3 PM. *Spr*: Splitrock ARA, Parsippany PAL Building, Smith Field, Rte 46 and Baldwin Rd. Vendors, tailgating (\$13 each, includes 1 admission, WX permitting), VE sessions (registration 8:30 AM, exams 9 AM sharp), handicapped accessible, plenty of parking, refreshments. *TI*: 146.985, 146.52. *Adm*: \$5, nonham spouses and children free. *Tables*: \$16 (includes 1 admission). Mark Turner, KB2VKO, Box 610, Rockaway, NJ 07866, 973-347-3195 or 888-511-7272, fax 973-691-2063, mlturner@bellatlantic.net; <http://ham.hsix.com/sara>.

†**New Jersey (Trenton/Hamilton Twp)**—Mar 21; set up 6:30 AM; public 8 AM. *Spr*: Delaware Valley Radio Assn, Tall Cedars of Lebanon Picnic Grove, I-95 N to I-195 S, Exit 60A to I-195 E; Exit 2 to Yardville, S Broad St to end (3.7 miles), left at yield sign onto Old York Rd, next right onto Sawmill Rd; site is 1.1 miles on right. Tailgating (\$10 per space, includes 1 admission), ARRL table, free parking, refreshments. *TI*: 146.67. *Adm*: \$6, nonham spouses and children free. *Tables*: \$15 (includes covered table and 1 admission; some electricity, advance reservations available). Darryl Foytich, N2JVP, c/o DVRA, Box 7024, W Trenton, NJ 08628, 609-882-2240, n2jvp@amsat.org; <http://www.slac.com/w2zq>.

†**New Jersey (West Orange)**—Mar 13; set up 7 AM; public 8:30 AM to 1 PM. *Spr*: Irvington-Roseland AC, West Orange High School, 600 Pleasant Valley Way, Exit 7 off Interstate Rte 280. Commercial vendors, computers, electronics, VE sessions, free parking, refreshments. *TI*: 146.415 + 1.0 (85.4 Hz), 224.48, 447.875 (156.7 Hz), 146.52. *Adm*: \$5, nonham spouses and under 12 free. *Tables*: advance \$12 for first, \$9 each additional; door \$15 for first, \$12 each additional (limited number with electricity, \$2 additional; must reserve by Mar 1, after Mar 1 first-come, first-served). Jim Howe, N2TDI, 5 Iroquois Ave, Lake Hiawatha, NJ 07034, 973-402-6066, fax 973-335-2448; n2tdi@juno.com.

New York (Newark)—Mar 27. Jeff Jensen, N2MKT, n2mkt@aol.com.

†**New York (Yonkers)**—Mar 21, 8 AM to 2 PM. *Spr*: Westchester Emergency Communications Assn, Yonkers Raceway; I-87, Exit 2 from S or Exit 4 from N. Forums, vendors, VE sessions, new and used ham radio equipment, demonstrations, tech table. *TI*: 147.06 (114.8 Hz). *Adm*: \$7. Thomas Raffaeili, WB2NHC, 544 Manhattan Ave, Thornwood, NY 10594, 914-741-6606 or 914-769-1486; <http://www.weca.org>.

North Carolina (Charlotte)—Mar 13-14, Roanoke Division Convention. See "Coming Conventions."

North Carolina (Kinston)—Mar 21. Doug Burt, W4OFO, 252-524-5724.

†**North Carolina (Morganton)**—Apr 10, 8 AM to 5 PM. *Spr*s: Burke, Caldwell, Mitchell, and McDowell County Amateurs and the Morganton Recreation Department, Burke County Fairgrounds, Hwy 181-N; Exit 100 eastbound or Exit 105 westbound off I-40. Catawba Valley Hamfest and Computer Fair, flea market, dealers, tailgating (\$2 per vehicle), forums, VE sessions (8:30 AM sharp, fairgrounds site office; for a guaranteed space at the test session, send a check for \$6.35 payable to Thomas Taylor, KC4QPR, Box 8003, Morganton, NC 28680-8003; walk-ins welcomed), RV hookups (\$12 per night; self-contained RVs free), free parking. *TI*: 147.15. *Adm*: advance \$4, door \$5. *Tables*: \$10. Jim Rogers, N4EUX, 4657 Celia Creek Rd, Lenoir, NC 28645, 828-758-5320; bozo@abts.net.

North Dakota (West Fargo)—Mar 13, 8 AM to 3 PM. *Spr*: Red River Radio Amateurs, Red River Valley Fairgrounds, off Westman Ave, E of I-94. Flea market, commercial vendors (\$25), seminars, VE sessions. *TI*: 146.76. *Adm*: advance \$5, door \$6. *Tables*: 8-ft \$8. Mark Kerkvliet, KG0FR, 701-282-4716, mbkerk@worldnet.att.net; or Kent Olson, KA0LDG, 701-298-0956, kolson@means.net; <http://www.rrra.org/>.

†**Ohio (Conneaut)**—Mar 14; set up 6 AM; public 8 AM. *Spr*: Conneaut ARC, Conneaut Human Resource Center, 327 Mill St; I-90, Exit 241, Rte 7 N, 2 blocks N of Rte 20 junction. Hamfest/Computerfest, vendors, dealers, VE sessions, ample parking, refreshments. *TI*: 147.39. *Adm*: advance \$4, door \$5. *Tables*: 8-ft \$8. Jack Marttila, KA8TUU, 697 Broad St, Conneaut, OH 44030, 440-593-3353; or Clarence Baugher, W8FAS, 440-593-3038.

†**Ohio (Madison)**—Mar 28, 8 AM to 2 PM. *Spr*: Lake County ARA, Madison High School, 3100 Burns Rd; I-90 to Rte 528, go N to either Rte 84 or Rte 20, turn left to Burns Rd, follow signs to High School. Flea market; new and used Amateur Radio, computer, and assorted electronic equipment; forums; VE sessions (cafeteria); equipment test bench; paved parking. *TI*: 147.21. *Adm*: \$5. *Tables*: 6-ft \$8, 8-ft \$10. Roxanne, 440-256-0320.

†**Ohio (Maumee/Toledo)**—Mar 21; set up Saturday 3:30-7:30 PM, Sunday 5:30-8 AM; public 8 AM to 2 PM. *Spr*: Toledo Mobile Radio Assn, Lucas County Recreation Center, 2901 Key St; S of Heatherdowns and N of Anthony Wayne (Rte 24). Free parking, handicapped parking. *TI*: 147.27, 442.85. *Adm*: \$6. *Tables*: regular \$20, wall \$25 (to order tables send application form and SASE to TMRA Hamfest Tables, Box 273, Toledo, OH 43697-0273 by Mar 1). Paul Hanslik, N8XDB, 419-243-3836; <http://www.tmrhamradio.org>.

Oklahoma (Elk City)—Mar 6. Earl Bottom, N5NEB, 580-472-3442.

†**Oklahoma (Mooreland)**—Apr 2-3; Friday

5-10 PM, Saturday 8 AM to 4 PM. *Spr*: Tri State AR Group, Mooreland Fair Barn; from jet Hwy 412 and 50, go 6 blocks N across railroad tracks, then 2 blocks W. New equipment dealers, swap tables, SKYWARN, VE sessions. *TI*: 147.36 (88.5 Hz). *Adm*: \$4. Tables: Free (first-come, first-served basis). Duane Henderson, KC5NID, RR 1, Box 171, Mooreland, OK 73852, 580-994-2223; kc5nid@pdi.net.

Oklahoma (Tulsa)—**Mar 19-20**, Oklahoma State Convention. See "Coming Conventions."

†**Pennsylvania (Castle Shannon/Pittsburgh)**—**Feb 28**, 8 AM to 3 PM. *Spr*: Wireless Association of the South Hills. Castle Shannon VFD, 3600 Library Rd; Rte 51 S to Rte 88 to Grove Rd. *TI*: 146.955. *Adm*: \$4. Tables: with electricity \$15, without electricity \$10. Steven Lane, W3SRL, 133 Sleepy Hollow Rd, Pittsburgh, PA 15216-1727, 412-341-1043, slane@adelphia.net; <http://www.hky.com/~sanfordb/index.htm>.

†**Texas (Midland)**—**Mar 20-21**; Saturday 9 AM to 5 PM, Sunday 8 AM to 2:30 PM. *Spr*: Midland ARC. Midland County Exhibit Building, on Service Rd; 1/2 mile E of Fairgrounds and old Hwy 80 (also called Front St or Business 20); westbound on I-20, Exit 144; eastbound on I-20, Exit 143. Flea market, dealers, tailgating, T-hunts, forums (ARRL, satellite communications), VE sessions (Saturday, 1 PM), refreshments. *TI*: 146.76, 145.13 (88.5 Hz), 147.3, 147.28, 224.94, 444.2. *Adm*: advance \$7, door \$8. Tables: \$12 each (for the first 4), \$17 (for each additional table over 4). Beverley Harwood, KC5BNT, 6100 SCR 1169, Midland, TX 79706,

915-686-1841, shamrock@apex2000.net; <http://www.lx.net/edge/midswap.htm>.

†**Texas (Weatherford)**—**Mar 27**; set up Friday 4-9 PM, Saturday 62 AM; public 7 AM to 3 PM. *Spr*: ARC of Parker County. Texas National Guard Armory, 716 Charles St. Flea market, commercial vendors, tailgating, VE sessions, free parking, refreshments. *TI*: 147.04 (110.9 Hz). *Adm*: advance \$3, door \$4. Tables: \$10. Elizabeth Hunkele, N5ONE, ARPCP, Box 1795, Weatherford, TX 76086, 817-594-1700, eliz@mesh.net; or fax O. B. Wolf, WA4IXN, 817-599-6717.

†**Washington (Puyallup)**—**Mar 13**; set up Friday 2-8 PM, Saturday 5:30-8:30 AM; public 9 AM to 3 PM. *Spr*: Mike and Key ARC. Pavilion Exhibition Hall, Western Washington Fairgrounds. Electronics Show and Flea Market, commercial booths (\$100 each, includes 4 tables and 4 admissions), radio gear, computers, parts, club info, VE sessions (253-549-4062, k7nd@worldnet.att.net), free parking, overnight self-contained RVs, refreshments. *TI*: 146.82 (103.5 Hz), 146.58. *Adm*: \$6, under 16 free with adult. Tables: \$22 (plus admission; includes electricity). Michael Dinkelmann, N7WA, 22222 148th Ave SE, Kent, WA 98042, 425-867-4797 (days), 253-631-3756 (eves); mwdink@eskimo.com.

†**Washington (Spokane)**—**Apr 10**; set up Friday 5-8 PM, Saturday 6-9 AM; public 9 AM to 5 PM. *Spr*s: Lilac City ARC and Lilac City Chapter 10-10 Int. Spokane Community College, 1810 N Greene St; I-90 Exit 283B, go 1 1/2 miles N. Hamfest/Electronics Show, dealers, factory reps, seminars, VE sessions, DXCC field checking, self-contained

RV parking, refreshments. *TI*: 147.32, 146.52. *Adm*: advance \$5, door \$6, under 12 free. Tables: 8-ft \$12; commercial booths \$60 (includes 1 admission). Make checks payable to Lilac City ARC and send to Warren Kelsey, KJ7BB, 1405 S Crestline, Spokane, WA 99203-3648; 509-534-8443.

†**West Virginia (Charleston)**—**Mar 21**, 8:30 AM to 3 PM. *Spr*: Charleston Area Hamfest and Computer Show. Charleston Civic Center. ARRL forum, VE sessions. *TI*: 145.35, 146.52. *Adm*: \$5. Tables: advance \$9, door \$12. Jimmie Hewlett, WD8MKS, Box 916, St Albans, WV 25177-0916, 304-768-1143; fax 304-768-9788.

†**Wisconsin (Jefferson)**—**Mar 21**; set up 7 AM; public 8 AM to 2 PM. *Spr*: Tri-County ARC. Jefferson County Fairgrounds Activity Center, Hwy 18 W. Vendors, VE sessions, refreshments. *TI*: 145.49. *Adm*: \$4. Tables: \$5 (6-ft), \$6 (8-ft). Glenn Eisenbrandt, WA9VYL, 711 East St, Ft Atkinson, WI 53538, 920-563-6502; tricityarc@globaldialog.com.

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@arll.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				

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 9x12-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.

Silent Keys

By Kathy Capodicasa, N1GZO

It is with deep regret that we record the passing of these amateurs:

WB1ATX, Morton Levine, Delray Beach, FL
N1CGY, Maynard H. Rosenberg, Cape Elizabeth, ME
*K1CV, William M. Haigh, East Lyme, CT
WB1DGU, Sean Cogliano, Tewksbury, MA
W1DPL, C. E. Tweedie, Davidson, NC
*W1EED, Joseph F. Poges, Wakefield, MA
W1FSH, Llewellyn H. Melbert, Manchester, CT
W1IGU, George E. Deneke, San Antonio, TX
N1JEJ, Frederick McGarry, Saugus, MA
N1KEL, Frank O. Nicolay, Harwich, MA
W1ODY, Edward E. Miner, Mansfield Center, CT
W1PXX, Melvin J. Nadel, Delray Beach, FL
W1SMU, Frank P. Vivier, Pawtucket, RI
W1UCP, Salvatore F. Cogliano, Tewksbury, MA
*W1YJ, A. H. Adams, Salisbury, NC
*K2AU, Joseph Marshall, Northport, NY
W2CUQ, William C. Irwin, Staten Island, NY
W2FJH, Theodore J. Seiter, Sag Harbor, NY
W2GEZ, Donald E. Venberg, Eatontown, NJ
WB2IFC, Kenneth Birmingham, Chincoteague, VA
W2KRE, John F. Devane, Buford, GA
*K2PVH, Nunzio S. DeRobertis, North Bergen, NJ
K2RAG, Chris F. Bednarek, Hillsboro, OR
WA2UDZ, J. R. Hannisian, Mesa, AZ
W2VMD, Frank E. Hildick, Wake Forest, NC
WB3AZH, Robert G. White, Surfside Beach, SC
W3DLQ, Ernest Witkin, Philadelphia, PA
W3EVG, Paul D. Arnold, Bowie, MD
*W3GB, Soter Harbolis, Lady Lake, FL
W3HVB, Lester P. Sacks, Oreland, PA
K3IYA, Edward R. Sagan, Ridley Park, PA
K3LIC, Ronald F. Dudek, King Of Prussia, PA
K13N, Elmer J. Worth, Shillington, PA
K3QJS, Robert N. Sittler, Schwenksville, PA
W3RUK, Tony D. Summa, Uniontown, PA
W3USH, William F. Grayburn, Indiana, PA
NU3Y, Joseph I. Pearlstein, Philadelphia, PA
*WB4AJS, Gerald A. Wofford, Powder Springs, GA
*AA4BL, Newell D. Gentry, Prattville, AL
W4CKL, William J. Ziak, Decatur, AL
KD4DDS, Bob H. Williams, Lebanon, TN
WD4FCO, Howard Ullman, North Miami, FL
KD4F, Daniel R. Johnson, Middleburg, FL
W4HW, John H. Walthall, Sheffield, AL

75, 50 and 25 Years Ago

March 1924

◊ The cover art by Dickson, IANV, shows a ham wrestling with the problem of whether to call a station just *before* the end of "quiet hours," with the devil on his shoulder and a policeman keeping the ham's hand off the key. The lead editorial, "Our 'Business'," discusses the decline in the number of messages being relayed, noting that, "As an organization we fellows never have become quite accustomed to the idea of mere rag-chewing." A second topic, "The Short Waves," bemoans the fact "that present radio regulations do not provide some really short waves for the amateur. ... "Wouldn't it be fascinating to have an amateur band from 40 to 50 meters or even from 4 to 5 meters...? And 70 to 90 meters or 110 to 125 meters...!"

Stuart Ballantine discusses "Radio Frequency Amplification" (for receivers), which the technical editor describes as "very much out of the usual," and which explains r.f. amplifier design. John Reinartz, IQP, explains "How Antennaz Work," and describes experiments the ham can perform in his own station. "Cornering That Buzzing Interference," by Perry Briggs, IBSGF, tells how to locate power-line interference sources so the power company can fix the problem. The newness of the general call "CQ" is illustrated with a cartoon that

WB4IBO, Blain Ford, Barbourville, KY
KB4JHF, H. J. Kennedy, Charlotte, NC
W4PBK, John H. Schneider, Lynchburg, VA
K4QNA, Frederick E. Dutton, Griffin, GA
N4SEC, Rufus J. Reynolds, Marion, NC
W4SSM, Albert B. Booth, Weslaco, TX
KE4UYS, Bert Tannenbaum, Spring Hill, FL
N5AEW, Mike Earl, Albuquerque, NM
K5BBI, Jacob W. Fees, Pond Creek, OK
W5BLW, Charles M. Dibrell, Ardmore, OK
WD5BQH, Michael J. Blackwell, Pflugerville, TX
KA5FSZ, Donna D. Buck, Tulsa, OK
W5GGO, Benjamin K. Twyeffort, Las Cruces, NM
*N5HV, Roderick M. Fitz-Randolph, Jackson, TN
KB5JEO, Helene L. Haire, Roswell, NM
KB5JO, Ralph K. Graves, Huntington, TX
KA5KVX, Clarence W. Hill, Holly Grove, AR
W5LAF, Louis E. Kastelich, Jackson, MS
KA5LMB, Hyrum M. Paglia, Albuquerque, NM
W5MM, Bob E. Tripp, Denton, TX
*W5SP, Sidney H. Phillips, Orange, TX
WA5SZI, Emerson G. Thurber, Albuquerque, NM
W5VNV, Karl Lipscomb, Lamar, MO
W6CCK, Thomas W. Hee, Honolulu, HI
W6DSY, E. K. McMullin, Rancho Palos Vds, CA
W6DV, Frederick T. Smith, Woodland Hills, CA
K6DYF, Kenton D. Morgan, Fremont, CA
AH6DZ, Francis E. Jones, Tulsa, OK
W6EKM, Walter R. Joos, Los Angeles, CA
K6GGS, Brooks E. Rettig, Redlands, CA
N6HIW, Ruth A. Rich, Hemet, CA
K6IQR, Waldson Lodewyk, Lancaster, CA
KH6JFY, Douglas A. Embrey, Kaneohe, HI
*W6JTY, Harry E. Davidson, Los Altos, CA
*W6NEY, Charles E. Woodson, Berkeley, CA
WA6NOU, David M. Whisenant, Tulare, CA
K6NU, John D. Mc Lennan, La Jolla, CA
W6RFB, William P. Harriman, Live Oak, CA
W6RHA, Milan V. Terkla, Watsonville, CA
W6TGS, Le Roy F. Strong, Sacramento, CA
KA6UEZ, Edward J. Kimble, Susanville, CA
W6VNA, Kenneth A. Tallman, Canby, OR
W7BY, Robert E. Priebe, Redmond, WA
K7CMV, Lloyd A. Stewart, Grants Pass, OR
KA7ETZ, Garnard T. Peistrup, Stanwood, WA
*W7EU, Ervin N. Greene, West Valley City, UT
W7EXR, Alvin Svarz, Mercer Island, WA
KC7GAM, Donald L. Coleman, Reno, NV
*W7PHR, Paul H. Rossiter, Umpqua, OR
KB7SIU, Janette E. Reimers, Vancouver, WA
WA7SPE, Donald Heidner, Wolf Point, MT
W7SV, A. W. Moody, Redmond, WA
N7UCK, Carol J. Ivory, Vancouver, WA
KA8ABQ, Wilmer E. Tell, Macedonia, OH
N8CHN, Michael S. Stock, Fairlawn, OH
W8EMK, Richard O. De Long, Mansfield, OH
W8FGW, Ralph H. Becker, Beaver Creek, OH
WA8HSU, William C. Wells, Logansport, IN

shows sleepy father A.R.R.L. holding a squalling baby CQ, and the caption, "What'll we do with it?"

"The Onward March of Transoceanic Communication" reports that transatlantic ham communication is becoming almost commonplace, and the "Transatlantic Tests Report" lists the many stations that made it across. Miss Adaire Garmhausen, 3CBK, tells of her visit to "WWV At Home." A report on the progress of the polar-exploration schooner *Bowdoin* is given in the article "MacMillan Expedition Nears Arctic Daybreak," with details of the ham radio aspect of the expedition.

March 1949


◊ The cover photo shows two unidentified young hams sitting at a typical station of the era—J-38 key, HRO receiver, and surplus "command" receivers and transmitters. The editorial reports that "The amateurs of the United States are about to regain some of their operating rights in the 160-meter band!" This action follows "three and a half years of hard work and careful negotiation by your League...., the Federal Communications Commission, the Coast Guard, the Army, the Navy, and other Government agencies."

Immediately following the editorial is a short report on the "First Transcon TT [Teletype] QSOs Realized." After numerous attempts, W1AW and W6PSW made contact—on the 11-meter amateur band. Joe Gillson, W3GAU, describes his experiments with beams in "Parasitic-Array Patterns." "An Arizona Kilowatt" tells about a "cool-running tetraode rig for the C.W. man" built by John Girard, W7JYZ. David Mann, W3MBY, presents a filter-type single-sideband exciter in "An Inexpensive Sideband Filter." National Emergency Coordinator

WD8KBX, Fred Tinsley, Saginaw, MI
W8MQG, Ralph H. Lathouse, Columbus, OH
N8OWA, Lester E. Hilliard, Cincinnati, OH
W8QYW, Homer D. Cozad, Geneva, OH
W8SYZ, Charles R. Smith, Newcomerstown, OH
KB8VBG, Edgar A. Rohrbach, West Union, OH
W8VCJ, Cornell J. Etoll, Apache Junction, AZ
K8WJE, Clarence J. Buck, Conway, SC
K8ZRI, J. H. Sepull, Alpena, MI
N9ACE, Alfred Z. Storey, Indianapolis, IN
W9CPS, Joseph E. Hrycej, Chicago, IL
KA9GTQ, Donald E. DuKate, Indianapolis, IN
W9JES, Marvin C. Plonka, Westmont, IL
N9JIC, Ralph Applegate, South Bend, IN
KB9KDK, Leonard L. Porter, Indianapolis, IN
WA9LRG, Ray L. Roberts, Versailles, IN
KA9MPP, Lester W. Pardee, Kaukauna, WI
KB9OBS, Alice L. Lewis, Havana, IL
WB9QMG, James H. Morris, Terre Haute, IN
K9QXU, Ellen E. Johnston, Anderson, IN
W9SZP, Walter H. Sparf, Normal, IL
KA0EGE, Charles L. Chancey, Pittsburg, KS
WD0HND, Don Bowman, Coon Rapids, IA
W0000, Eugene M. De Lonais, Saint Paul, MN
WORWH, Donald Sinnock, La Plata, MO
KG0SC, Earl M. Frazier, Belton, MO
WB0S, James W. Boise, Sioux City, IA
WOYCR, C. W. Davies, Saint Paul, MN
KB0YNI, Arthur J. Chubick, Creston, IA
KB0YWI, Vincent J. Sciarra, Kansas City, MO
VE2TM, Leon Baldwin, St-jean-sur-richelieu, QC, Canada
*VE3CNS, James N. George, Minden, ON, Canada
G3VXZ, M. J. Frey, Berks, Great Britain
ON4CU, Leon Habay, Bertrix, Belgium

*Life Member, ARRL

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. 


Albert Hayes, W1HIN, proclaims "The ARRL Emergency Corps Is Ready!", giving the results of the October 1948 Simulated Emergency Test.

"Happenings of the Month" shows a photo of President Harry S. Truman receiving congratulatory messages that had been relayed via Amateur Radio on the occasion of his inauguration. Also in the photo were a number of hams—ARRL Field Organization officials and officers of the Washington Radio Club and the Potomac Valley Radio Club.

March 1974

◊ The riveting cover photo shows WA0CPX/mobile at the scene of the destruction caused by a killer tornado. The editorial discusses the problems of abuse of autopatches on 2-meter repeaters. A second topic explains how the ARRL provides monetary support to the IARU, showing that your membership in the ARRL supports Amateur Radio worldwide.

Ben Vester, K3BC, presents an article on "The Half Square Antenna." Wes Hayward, W7ZOI, gives good information in Part I of "A Competition-Grade CW Receiver." Lew McCoy, W1ICP, tells about "Improving Your Receiver Performance on 15 and 10 Meters." "The Constant-Impedance Trap Vertical" is described by Jerry Sevick, W2FMI. Steve Eichman, WA6IVN, tells about "A Simple Method of Raising Large Antennas." HQ's Assistant Circulation Manager John Nelson, W1GNC, relates the "Woes of Babysitting a Computer."

The "1973 ARRL Sweepstakes High-Claimed Scores" are published, with W7RM (K7VPF, opr) leading the single-op pack on both CW and phone, and with W1KID the top CW multi-op and W6ONV the top phone multi-op.—*Al Brogdon, W1AB* 

Contest Corral

Edited by **George Fremin III, K5TR***

Feedback

The call sign for **NB2T** was incorrectly listed as **KB2T** in the August 1998 **UHF Contest** results. The 222 and 432 MHz band winners for the Dakota Division were inverted: **WA2VOI** was the 222 winner and **KA0PQW** won the 432 band.

The **Northrup Grumman Radio Club K6HF Field Day** 1998 entry should show 2A from the LAX section with 2376 points total. The **Corona Police Department Communications Specialists Volunteers Field Day** call sign should be listed as **KN4KH**. The **North Georgia College ARC W4PYM Field Day** listing was omitted, running 2A in the Georgia section with 1746 points.

In the **January 1998 VHF Sweepstakes**, the category for **W7PW** should have been listed as **QRP/portable** instead of **single op**, making him the winner of that category for the Nevada section.

The power category for **7J1ABD** in the **1998 ARRL International DX CW Contest** should have been listed as **Low Power (B)** instead of **High Power (C)**. **KC5QPG** was listed inadvertently in the CW results instead of the phone portion of the contest from the Arkansas section.

KW7R was omitted from the results of the **1998 June VHF QSO Party** with 67 QSOs, 22 grids and a total score of 1474 in the WWA section. The call for **F/K6LMN** was incorrectly listed as **K6KMN**. **WB2QLP** should have been listed in the SFL section rather than NFL. This will make **NU4Y** the section winner as well as the 50 MHz leader.

W1AW Qualifying Runs are 10 PM EST Monday, March 8, and 7 PM EST Tuesday, March 23. The **West Coast Qualifying Run** will be at 9 PM PST on Wednesday, March 3. Check the W1AW schedule for details.

March 6-7

ARRL International DX Contest, phone, see the December 1998 *QST*, page 97.

13-14

QCWA QSO Party, sponsored by Quarter Century Wireless Assn, from 1900Z Mar 13 until 1900Z Mar 14 (the second QCWA QSO Party of the year takes place 1800Z Sep 18 until 1800Z Sep 19). CW, phone or mixed-mode. Work stations on each of 15 possible "bands": 160, 80, 40, 20, 15, 10 meters CW and phone; 6 meters; 2 meters; 1.25 meters; 70 cm and up. Work stations in your own QCWA chapter only once. No crossband or repeater QSOs. QCWA members exchange call signs, the last two digits of the year first licensed, chapter number ("AL" if not a member of a chapter). Nonmembers exchange call signs, the last two digits of the year first licensed, and the state, province or country. Scoring: 1 pt per phone QSO, 2 pts per CW QSO. Count one multiplier for each QCWA chapter, plus each non-member state/province/country. Contacts with HQ station W2MM count as three multipliers per "band." Awards. All logs must be received no later than one month after the contest. Send logs to: Art Monsees, W4BK, 420 Bay Ave, Apt 1521, Clearwater, FL 34616, or Don Bice, W4PCO, 5511 18th Ave North, St. Petersburg, FL 33710. See the QCWA Web site at <http://www.teleport.com/~qcwa/qsoparty.htm>.

Wisconsin QSO Party, sponsored by the West Allis RAC, 1800Z Mar 14 until 0100Z Mar 15. CW and

phone. Work stations once per band/mode, no repeater QSOs. Single op/multi-single/multi-multi, fixed/mobile/Novice/Tech. WI stations send county; others send state/province/DXCC country. CW—3.550 3.705 7.050 7.125 14.050 and 15/10/6/2 meters; phone—3.890 7.230 14.290 21.350 28.400 and 6/2 meters. Score 1 pt/phone, 2 pts/CW QSO. Final score is QSO pts WI counties (max 72); WI stations score QSO pts WI counties + states/provinces. WI mobiles/portables add 500 bonus pts for each county they make 12 or more QSOs from. Mobile operators may not sit on a county line to operate. Awards. Send logs by Mar 31 to West Allis RAC, POB 1072, Milwaukee, WI 53201; <http://www.execpc.com/WARAC/warac.html>.

Missouri QSO Party, sponsored by PHDARA, 1700Z Mar 13 to 2400Z Mar 14. CW and Phone bands 160-10 MHz. Novice and Technician, 25 kHz above sub-band edge. One pt/QSO phone, 2 pt/QSO CW/RTTY/digital. No multipliers. No repeater QSOs. 10 pt/QSO with PHDARA Club Station W. Certificates. Send logs by Mar 31 to Contest Chairman, PHDARA, POB 28954, Kansas City, MO 64188-8954.

World Wide Locator Contest, sponsored by the Czech Contest Club and the OK DX Club, 0000Z Mar 13 to 2400Z Mar 14. CW, Phone and Mixed mode, Single Op, High power and low power. Multi op; Single transmitter and two transmitter. Packet spotting not allowed for any single op. Exchange RST and WWL (Grid square). Points are based on computed distance between centers of locators (short path), every 500 km = 1 point; 3.5 MHz × 2, 1.8 MHz × 3. Multipliers are the first two characters of WWL field on each band regardless of mode. Total score is total points time total multiplier. Electronic logs only (any ASCII format) it is not necessary to have computer points, multipliers or final result. Awards. Send by May 15 to Karel Karmasin, OK2FD, Gen. Svobody 636, 674 01 Trebic, Czech Republic; ok2fd@contesting.com.

16-17

CLARA and Family HF Contest, phone and CW, sponsored by the Canadian Ladies ARA, from 1700Z Mar 16 until 1700Z Mar 17. 80 40 20 15 10 meters. Work stations once per band/mode. Cross-mode contacts count as phone for both stations. Single ops only. Exchange RS(T), state/province/DXCC country, and whether CLARA member or nonmember. Multipliers are Canadian provinces and DXCC countries. Score 5 pts for CLARA-member-to-CLARA-member, YL-nonmember-to-CLARA-member and OM-to-CLARA-member QSOs on phone; 2 pts per QSO with CLARA family members; 3 pts per QSO with non-CLARA YLs on phone; 1 pt per QSO w/OMs. Awards. Send logs by April 24 to Audrey Hughes, VE1PK, 28 Carriageway Court, PO Box 134, Wolfville, NS B0P 1X0, Canada.

20-22

Alaska QSO Party, sponsored by the South Central ARC, from 0000Z Mar 20 to 2400Z Mar 21. Work AK stations only (AK stations work everyone). Exchange RS(T) and state/province/DXCC country (AK stations send city). Score 1 pt/phone, 2 pts/CW, digital or SSTV QSO. 160, 80 and satellite QSOs count double. 1.835 3.700 3.785 7.035 7.135 7.235 14.035 14.245 21.135 21.335 28.135 28.335. Final score is QSO pts AK counties worked (AK stations use states/provinces/DXCC countries). Awards. Send logs by June 30 to South Central ARC, c/o Jim Wiley, KL7CC, 8023 E 11th Ct, Anchorage, AK 99504; <http://www.servcom.com/worcester/srcr.htm>.

Virginia QSO Party, sponsored by the Sterling Park ARC, 1800Z Mar 20 to 0200Z Mar 22. Single operator, mobile, club, single-multi and multi-

multi. Work stations once per band/mode, mobiles as they cross county lines. VA stations work everyone, others work VA stations only. Exchange serial number and state/province/DXCC country (VA stations send county). CW—1.805 and 50 kHz up; phone—1.845 3.860 7.260 14.260 21.360 28.360; Novice/Tech—10 kHz up and 28.360; VHF/UHF—50.125 147.48 223.50 446.00. No repeater or cross-mode QSOs. Score 1 pt/phone, 2 pts/CW, and 3 pts/VA mobile QSO. Final score is QSO pts VA counties (max 95); VA stations use VA counties/states/provinces/DXCC countries for multiplier. VA mobiles add 100 bonus pts for each VA county from which they make a QSO. Club competition. Awards. Send logs by Apr 17 to Virginia QSO Party, Call Box 599, Sterling, VA 20167.

Ohio Winter QSO Party, sponsored by the Cuyahoga Falls ARC, 0001Z Mar 20 to 2359Z Mar 21, 160 80 40 20 15 10 6 2 meters. Single op, Multiop, QRP, Low power (100 W or less) and high power. Stations outside of Ohio work only Ohio stations. Stations in Ohio work everyone. Exchange QSO number and state/province/country (OH stations send RST and county). Work stations once per band/mode. Count 2 pts for each phone QSO, 3 pts for each CW QSO. Multipliers are Ohio counties. Score is total QSO points times total multiplier. Send logs by May 1 to Ohio Winter QSO Party, c/o Cuyahoga Falls ARC, Inc., PO Box 614, Cuyahoga Falls, OH 44262; <http://www.cfarc.org/>.

Bermuda Contest, sponsored by the Radio Society of Bermuda, 0001Z Mar 20 to 2400Z Mar 21. Operate no more than 24 hours; off periods must be 2 hours or more. Single op only, 80 40 20 15 10 meters. Phone and CW, no crossband or crossmode QSOs. Exchange RS(T). Work stations once per band and mode. Score 5 pts/QSO. Multiply QSO points from all bands DXCC/WAE countries per band. Then multiply by number of VP9 contacts per band for final score. Awards. Logs must be received by 11 AM June 1 by Contest Committee, Radio Society of Bermuda, Box HM275, Hamilton, Bermuda HM AX. See the Radio Society of Bermuda Web site at http://www.bermuda-shorts.com/rsb/rules_1.htm.

28-29

CQ WW WPX Contest, phone, sponsored by CQ magazine, from 0000Z Mar 27 until 2400Z Mar 28 (CW is May 29-30). Single ops operate no more than 36 hours, off periods must be 60 min or more. Classes: single op single/all band, high, low (< 100 W), QRP (< 5 W) or assisted; multi-single (10-minute rule); multi-multi; rookie; tribander and single element; and band restricted. Send RS(T) and serial no. Score 3 pts/QSO w/different continents on 14-28 MHz and 6 pts/QSO w/different continents on 1.8-7 MHz; score 2 pts/QSO w/stations in North America on 14-28 MHz and 4 pts/QSO w/NA stations on 1.8-7 MHz. Stations in own country count one point. Multipliers are prefixes worked (ie, N8, KA1, HG73, JD1). Work stations once per band; prefixes count only once. Awards. Club competition. Send logs by May 10 (CW, Jul 10) to CQ magazine, 25 Newbridge Rd, Hicksville NY 11801, or e-mail them to n8bjq@erinet.com; <http://ourworld.compuserve.com/homepages/n8bjq/>.

Q5T-



*RR1, Box 322
Johnson City, TX 78636
k5tr@arrl.org

Special Events

Edited by George Fremin III, K5TR*

Daytona Beach, FL: American Archives Amateur Radio Club, W4D, 1200Z **Mar 1** to 1600Z **Mar 8**, operating from Bike Week at Daytona Beach, 7.270 14.270 21.370 28.370. Certificate. Dave Langston, KB8RAP, 1000 Town Center Suite 1200, Southfield, MI 48075.

Tucson, AZ: The Radio Society of Tucson, K7RST, 1600Z **Mar 13** to 2359Z **Mar 14**, operating from JFK's Air Force One, 7.235 14.250 21.350 147.140. Certificate. Steve Arens, K0DVH, 10056 E Place, Del Timbre, Tucson, AZ 85747.

Warner Robins, GA: Middle Georgia Radio Association, WR4MG, 1400 to 2100Z **Mar 13**, Tenth Annual Young Astronauts' Day at Robins Air Force Museum of Aviation, 7.250 14.250 147.300. Certificate. MGRA, PO Box 7872, Warner Robins, GA 31095.

Milford, OH: Milford Amateur Radio Club, WB8WSV, 1500 to 2100Z **Mar 13**, celebrating the 25th Anniversary of the Milford Amateur Radio Club, 7.245 14.245 28.320 147.345. Certificate. Gary Porter, KC8BTA, 6688 Earl Dr, Loveland, OH 45140-8710.

Savannah, GA: Coastal Amateur Radio Society, W4S, 1700Z **Mar 13** to 1700Z **Mar 20**, celebrating St. Patrick's Day week in Savannah, 14.265 21.315 28.415. QSL. Coastal Amateur Radio Society, PO Box 23972, Savannah, GA 31403.

*RR1, Box 322
Johnson City, TX 78636
k5tr@arrrl.org

Shepherdsville, KY: The Bullitt ARS, KY4KY, 1300Z **Mar 20** to 1900Z **Mar 20**, In celebration of antenna raising day at KF4BAR, 3.935 7.245 14.335 28.335. Certificate. KF4BAR Special Event, c/o KY4KY, 1229 Zoneton Rd, Shepherdsville, KY 40165.

Marietta, GA: Kennehooshee Amateur Radio Club, W4BTI, 1400 to 2100Z **Mar 20**, celebrating the 50th Anniversary of the Kennehooshee Amateur Radio Club, 7.210 14.240 28.390. Certificate. Kennehooshee ARC, PO Box 1245, Marietta, GA 30060.

Hinckley, OH: Brunswick Area Radio Club, KB8ONI, 1300 to 1900Z **Mar 21**, celebrating the return of the buzzards to Hinckley, Ohio, 7.260 14.280 28.400, SSTV. Certificate. Dennis Krieger, 1751 W. 130th, Hinckley, OH 44233.

Beebe, AR: Arkansas State Tech Institute Amateur Radio Club, W5ASU, 2000Z **Mar 26** to 2100Z **Mar 27**, new Distance Learning Center at the Arkansas State University Campus, 7.240 14.260. Certificate. Station W5ASU, Arkansas State University, PO Box H, Beebe, AR 72012.

Andover, NY: Allegheny Highlands Amateur Radio Club, A12W, 1500 to 1900Z **Mar 27**, celebrating the Annual Andover Maple Festival, 7.245 14.245 28.445 147.210. Certificate. Dave Grice, N2WDS, 3043 Davis Hill Rd., Andover, NY 14806.

Macon, GA: Macon ARC, W4BKM, 1500 to 2300Z **Mar 27**, Celebrating the 17th Annual Cherry Blossom Festival in Macon, GA, 7.235 14.035 14.250 21.335. Certificate. Macon ARC, PO Box 4862, Macon, GA 31208.

tact Sima Products, 140 Pennsylvania Ave, Oakmont, PA 15139; tel 412-828-3700, fax 412-828-3775; <http://www.simacorp.com>.

HIGH-PERFORMANCE RECEIVING LOOP FROM RSM COMMUNICATIONS

◇ The Model 108B receiving loop, intended for indoor use, covers 2.5 to 30 MHz, complementing RSM's mediumwave and longwave models. The loop can be used passively—minimizing the possibility of overload—or with the Model 301 switchable line amplifier. Designed for hams and SWLs who need an indoor receiving system that's on par with typical outdoor antennas, the 108B offers the benefits of "tuned loop" reception up to 30 MHz. The loop's output matches your receiver's 50-Ω input, allowing the use of standard low-impedance preamps. Other features include low ambient noise levels and steerable nulls.

Price: Model 108B HF receiving loop, \$240 plus \$15 s/h; Model 301 line amplifier, \$99 plus \$5 s/h. RSM loops have a lifetime guarantee. For more information, contact RSM Communications, PO Box 27, La Belle, FL 33975; tel 941-675-2923.


RADCOM 97 and CALLSEEKER 99 CD-ROMs FROM RSGB

◇ New from the Radio Society of Great Britain (RSGB), the League's sister society across the pond) are *CallSeeker 99* and *RadCom 97*, a pair of info CDs for hams in the UK and elsewhere.

CallSeeker 99 is a *Windows 95/98* CD-based call sign directory for the UK that includes lots of extra information, including awards, band plans,

Virginia Beach, VA: Virginia Beach Amateur Radio Club, W4UG and LA5M, 1700Z **Mar 27** to 1700Z **Mar 28**, celebrating the 108th Anniversary of Norwegian Lady—VBARC and MOSS ARC, 7.130 7.270 28.363 14.270. Certificate. VBARC, PO Box 62003, Virginia Beach, VA 23466.

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9×12 inch self-addressed, stamped envelope to address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.


Special Events Announcements: For items to be listed in this column, you must be an Amateur Radio club, and use the ARRL Special Events Listing Form. Copies of this form are available via Internet (info@arrrl.org) or for a SASE (send to Special Requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Requests Form" in the lower left-hand corner. You can also submit your special event information on-line at <http://www.arrrl.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 **May QST** would have to be received by **March 1**. Submissions may be mailed to George Fremin III, K5TR, at the address shown; faxed to ARRL HQ at 860-594-0259; or e-mailed to events@arrrl.org. 

prefix lists, repeater lists, and much more. The disk requires a 486-or-better PC running *Windows 95/98*, 16 Mbytes of RAM, a CD-ROM drive and 15 Mbytes of hard drive space.

RadCom 97 is a searchable CD-ROM compilation of the entire 12-issue 1997 run of *Radio Communication*, RSGB's monthly 100-page Amateur Radio magazine. With more than 1000 pages in Adobe *Acrobat* format, the CD-ROM can be read by users with PC, Mac and Unix computers running an appropriate version of *Acrobat* (the *Windows* version is supplied). The disk requires a 486-or-better PC running *Windows 3.1* or later, 8 Mbytes of RAM, a CD-ROM drive and 5 Mbytes of hard drive space.

RadCom 97 is available from the ARRL (order no. 7156) for \$30. See the ARRL Bookcase elsewhere in this issue. *CallSeeker 99* is £14.50 plus s/h from the RSGB at Lambda House, Cranborne Rd, Potters Bar, Herts EN6 3JE, England; tel 01707 659015; sales@rsgb.org.uk; <http://www.rsgb.org>.

HI-RES WX SAT SOFTWARE FOR WINDOWS

◇ New from Timestep is *HRPT for Windows*, software for resolving and displaying high-resolution digital images from NOAA 12, 14 and 15 weather satellites. The package, compatible with *Windows 95, 98* and NT, features automatic scheduling, automatic channel switching and unattended operation. Orbital data for the satellites are available through an automatic Internet update. For pricing and information on required receiver hardware, check out Timestep's Web site at <http://www.time-step.com>. 

Next New Product

New Products

NYE 330C STRAIGHT KEY FROM MORSE EXPRESS

◇ Nye's newest straight key—the first since the late 1970s—now is available from Morse Express. The 330C is a deluxe, serialized version of the company's classic Master Key. With its polished chrome base, nickel-plated hardware and Navy-style knob, each component is hand-selected and hand-assembled to ensure high quality and a flawless finish. Each 330C weighs a hefty 1.5 pounds.

Price: \$139.95; includes a standard two-year warranty. For more information, contact Morse Express, 3140 S Peoria St, Unit K-156, Aurora, CO 80014-3155; tel 303-752-3382; info@morsex.com.

12-V RECHARGEABLE POWERPAK FROM SIMA

◇ Designed to provide portable 12-V dc power for camping, picnics, ham radio and emergency use, Sima's Model SPK-80 *PowerPak* can provide up to 80 watt-hours of 12-V dc power to most portable devices. It can also help to start vehicles with dead batteries. The SPK-80 houses a sealed gel-cell battery that can be charged with ac or dc charge adapters (included). Also included are booster cables and an adjustable shoulder strap.

Price: \$99.95. For more information, con-

New Products

ADONIS DESK MIKE HAS EQ AND COMPRESSION

◇ The Adonis Model AM-7500E desk mike has a built-in four-band graphic equalizer, amplified audio and a three-stage speech compressor. Other features include a sensitive electret element, adjustable output level, momentary and locking PTT switches, up and down frequency controls, a VU meter, and more.



The AM-7500E is powered by four AA batteries or an optional dc adapter. A variety of cable sets are available for connecting the mike to your rig. This eliminates soldering and makes it easy to move the mike between radios.

Price: \$269.95. For more information, contact Adonis USA, PO Box 1124, Issaquah, WA 98027; tel 425-558-9592, fax 425-558-9704, info@rflimited.com; <http://www.rflimited.com>.

MICRO-SHEAR WIRE CUTTERS FROM XURON

◇ Xuron's new shear-action wire cutters produce clean, square cuts with minimal effort. Made from high-carbon steel, Micro-Shear Flush Cutters can handle millions of cuts in copper, steel and alloy wires up to 18 AWG. Optional static-control grips are available.

Prices start at \$13. For more information, contact Xuron Corporation, 60 Industrial Park Rd, Saco, ME 04072; tel 207-283-1401, fax 207-283-0594, xuron@snet.net.

6-METER DX VERTICAL FROM MFJ

◇ MFJ's Model 1756 6-meter vertical antenna is easy to erect and boasts a low angle of radiation for omnidirectional DXing. The antenna's isolated radial system provides a clean pattern and helps to reduce undesirable common-mode feed line currents. The dc-grounded '1756 is quiet on receive and can easily be tuned for your favorite part of the band. Other features include a large-diameter, high-strength aluminum radiator, a heavy-duty ceramic insulator, four 60-inch

radials and a single U-bolt mast mount.

Price: \$69.95. The Model 1756 6-meter vertical is backed by MFJ's "No Matter What" one-year limited warranty. For more information, see your local Amateur Radio products dealer or contact MFJ, PO Box 494, Mississippi State, MS 39762; tel 800-647-1800, fax 601-323-6551; <http://www.mfjenterprises.com>.

REMOTE CONTROL FOR KACHINA'S 505DSP TRANSCEIVER

◇ Kachina's 505DSP Computer Controlled Transceiver now sports a dial-up remote-control system, the Model 505RC. With the new unit, every transceiver function except QSK can be accessed via telephone. If your apartment or condo has impossible antenna restrictions, the 505RC can allow you to place your transceiver and antenna in an RF-friendlier location. It can also allow several users to share an off-site transceiver (clubs, etc).

The 505RC passes digitized audio and control signals through a standard V.34 external modem and will function at data rates as low as 14.4 kbps. At 33.6 kbps, remote operation is indistinguishable from local. Only one computer is required (at the control site).

Price: \$298. A package containing two 505RCs, two V.34 external modems and all necessary cables—everything necessary to remotely control one Kachina radio—sells for \$895. Special club prices are available. For more information, contact Kachina Sales Manager Aubrey Stewart, W6ODG, at 520-634-7828.

RADIO GLOVE FROM CUTTING EDGE

◇ Designed to keep today's expensive mini radios looking like new, Cutting Edge's Radio Glove wraps your radio in soft, glove-quality leather. Other features include speaker holes, a leather-covered belt clip, a secure velcro closure and an adjustable lanyard. Radio Gloves are available for the Yaesu VX-1R, ICOM IC-Q7, Standard C series and Alinco DJ-C series transceivers.

Price: \$20. For more information, see your local Amateur Radio products dealer or contact Cutting Edge, 1803 Mission St, Suite 546, Santa Cruz, CA 95060; tel 800-206-0115, fax 408-426-0115.

NiMH BATTERY PACKS FOR THE ICOM IC-T8A TRANSCEIVER

◇ New from Maha is a pair of high-capacity battery packs for ICOM's IC-T8A handheld transceiver. The Model MH-BP-199 provides 700 mAh at 6 V. The higher-powered Model MH-BP-200 provides 680 mAh at 9.6 V. Both battery packs feature an improved locking mechanism that exceeds the manufacturer's specifications.

Prices: MH-BP-199, \$38.20; MH-BP-200, \$41. For more information, contact Maha Communications, 2841-B Saturn St, Brea, CA 92821; tel 800-376-9992, [\[@maha-comm.com\]\(mailto:@maha-comm.com\); <http://www.maha-comm.com>.](mailto:sales</p></div><div data-bbox=)

US-MADE TRANSMITTING TUBES FROM TRITON SERVICES

◇ American-made 3-500Z and 4-400A/C amplifier tubes are available from Pennsylvania's Triton Services, which acquired EIMAC's Glass Tube Division in 1996. Matching Eimac's original specifications, the Triton tubes are manufactured by professionals with an average of 20 years of experience in producing industrial and military grade transmitting tubes. Triton tubes are available exclusively through D&C Electronics.

For pricing and additional information, contact D&C Electronics, 3089 Deltona Blvd, Spring Hill, FL 34606; tel 352-688-2374, fax 352-683-9595; <http://www.dandcelectronics.com>.

THE AOR AR7000B DSP WIDEBAND SCANNING RECEIVER

◇ AOR's compact AR7000B wideband scanning receiver covers 100 kHz to 2 GHz in WFM, NFM, AM, LSB, USB and CW modes (cellular frequencies are blocked in the USA version). The triple-conversion receiver boasts 1500 memory channels, DSP noise-reduction technology and an innovative color video display. Other features include computer control; infrared remote control; multiple clocks; on-off timer; NTSC or PAL video output; IF shift; adjustable AGC; graphical signal display; and much more.



For pricing and additional information, see your favorite Amateur Radio products dealer or contact AOR, 20655 S Western Ave, Suite 112, Torrance, CA 90501; tel 310-787-8615, fax 310-787-8619, <http://www.aorusa.com>.

LOW-PASS FILTERS FOR 144 and 440 MHz

◇ DCI's low-pass filters for 144 and 440 MHz can handle a kilowatt of RF while attenuating undesirable second harmonics by about 40 dB (0.1 dB insertion loss). Multi-station contest ops take note: Because of their power-handling capacity, DCI low-pass filters go between the linear amplifier and the antenna, reducing harmonics and amplifier-generated noise.

Price: 440-MHz, \$159; 144 MHz, \$239. For more information, contact DCI Communications, Box 293, White City, SK, Canada, S0G 5B0; tel 306-781-4451, fax 306-781-2008, dc@dc.ca; <http://www.dci.ca>. **QST**

The 1998 ARRL 10 GHz and Up Cumulative Contest Results

The 1998 ARRL 10 GHz and Up Cumulative Contest brought out the competitive spirit in this very talented group of hams. From the heights of Pikes Peak, Colorado, and Mt Wachusett, Massachusetts, to the heat of Baja California, experimentation and challenge still lives in the amateur community. Sixty-nine logs were received for this year's event, which was contested August 15-16 and September 19-20.

In the 10 GHz-only category, N0IVN scrambled to take the top slot in 1998 with a score of 42,050, edging out 1997 third-

place finisher WD4MUO/0 by less than 2,000 points. N0KE placed a very respectable third with a score of 36,032. WA6QYR easily outdistanced the competition to win the 10-GHz-and-up division with a score of 24,397. He finished ahead of fellow Californian K6GZA who nosed out WA6CGR for third place 12,858 to 12,609.

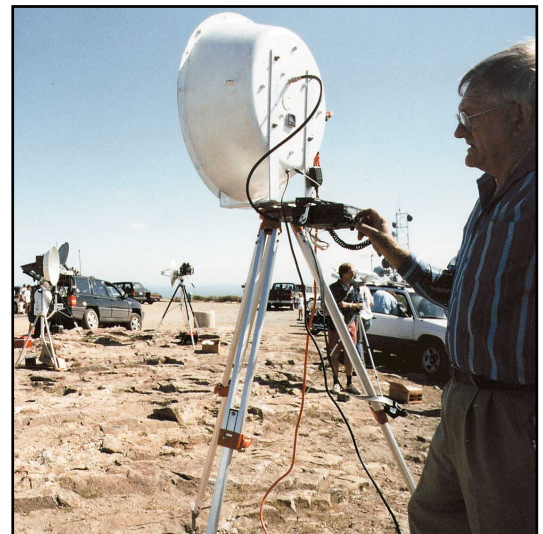
WD4MUO/0 recorded the most QSOs for the contest with 267 while W1AIM worked the most different call signs with 43. XE2/N6XQ and XE2/WA6CDR worked K6OW on 10 GHz to make the DX QSO at 889 km, a new contest distance record.

The 256-km contact between WA6CGR and W6BY on 24 GHz is a new contest distance mark above 10 GHz.

It was a bit disappointing to see participation down slightly from the past several years. Maybe a visit to N1BWT's excellent Web site at <http://www.tiac.net/users/wade/> will help inspire more participation for the 1999 contest. Visit <http://www.arrl.org/contests> for contest rules, forms and information. Start planning now and mark your calendars for August 21-22 and September 18-19 for an event that brings out the best in operating skills and technical challenge.



Is N0IVN keeping the water jugs ready in case he overheats the equipment on Pikes Peak?



KA1OTP adjusting an assortment of 10 GHz gear on Mt Wachusett.

Scores

Scores are listed by call areas. Within each call area, scores are listed in descending order. Score lines indicate call sign, score, QSOs, number of different call signs worked, and best DX in kilometers (J = 24 GHz; P = 300 GHz).

10 GHz Only																													
1	W1AIM	22,127	118	43	377	N1QVE	3,726	26	12	298	N2NQI	351	2	2	150	WD4MUO/0	40,074	267	11	249	N5QGH	741	10	6	68	1-J	1-P		
	AF1T	21,737	126	39	480	WB2BYP	3,355	20	14	204	6	KC6UQH	8,496	57	20	267	N0KE	36,032	214	15	250	6	WA6QYR	24,397	97	26	666	124-J	
	WB1FKF	19,641	122	36	377	W1JOT	722	5	5	79	K6LL	6,631	38	21	304	N0DOD	19,017	166	9	237	N6GZA	12,858	58	23	876	75-J			
	W1GHZ	19,618	114	38	377	2	N2LIV	14,911	63	32	366	W6ASL	6,510	49	14	275	W5VSI	5,280	38	4	193	WA6CGR	12,609	73	27	492	256-J		
	K1LPS	17,266	85	36	377	K2CBA	3,916	24	16	237	K6ENS	6,408	47	16	280	VE	VE3EZF	1,648	20	6	157	K6OW	11,078	39	21	889	29-J		
	KB1VC	15,713	90	27	377	NY2US	3,038	11	9	272	W6DXJ	5,328	32	22	302	DX	XE2/N6XQ	18,201	63	25	889	WA6EXV	8,921	52	19	702	121-J		
	W1VT	14,896	80	26	350	WB2GLW	1,665	8	7	259	WF6R	1,158	8	5	111	XE2/WA6CDR	17,623	65	25	889	W6OYJ	8,832	70	29	321	9-J			
	WA1HOG	12,509	97	32	269	3	W3RJW	2,621	9	8	388	KC6YVS	169	1	1	69	W6DNX	7,916	49	21	281	WB6JY	7,081	56	24	293	124-J		
	K1UHF	11,022	42	26	377	KB3XG	1,573	5	5	306	K6VLM	150	1	1	89	W6BY	4,557	23	12	275	256-J								
	K1MAP	9,854	82	28	241	4	W4DEX	4,331	19	6	281	K6BTO	102	1	1	2					9	WB9SNR	3,434	18	7	437	77-J		
	WA1MBA	9,313	69	29	227	W4EFD	3,924	22	6	282	8	WW8M	4,622	17	9	412	10 GHz and Up					K9PW	1,212	15	4	135	77-J		
	K1AE	8,697	63	25	205	WB5MMB	2,679	37	5	100	W8WZG	4,522	20	12	504	4	W4SW	4,526	59	9	100	79-J	VE	VE3SMA	3,130	27	14	271	18-J
	KE1AC	8,426	52	21	366	N4GN	2,081	11	5	283	W8RJF	1,486	6	5	237	4	K9RKH	3,780	50	8	100	8-J	VE3OIK	3,047	19	12	287	2-J	
	N1RWM	8,006	58	24	205	KB4DAT	634	5	4	100	NE8I	521	6	2	130	5	W5LUA	1,583	15	10	150	47-J							
	N1SAI	7,582	41	24	282	5	WW2R	351	2	2	150	0	N0IVN	42,050	255	16	250												
	KX1C	5,742	22	17	377																								
	K1TR	4,632	33	18	214																								
	N1LZK	4,469	31	15	241																								



1998 IARU HF World Championship Results

Summertime contests are...different. Absorption creates difficult propagation, sporadic E can occur at any time, and summer thunderstorms present a special challenge to operation on the lower frequency bands. Squeeze in vacation time and trips to the beaches in the Northern Hemisphere. Sprinkle in cold winter nights south of the equator, and you find a number of challenges to be conquered. Nevertheless, once again the IARU HF Championship proved to be one of the most popular worldwide contests, attracting over 1300 entries from most of the IARU zones across the globe.

Three different continents produced champions this year. The place to be during this year's running appears to have been Cyprus (5B). The top finishers in the CW and Multiop categories hailed from that Mediterranean island, as well as two more Top Ten Phone stations and another Top Ten Multi-op station. Congratulations to world winners in Mixed Mode DL6FBL; Phone Only 5X1T (ON6TT op); CW Only C4A (5B4ADA op); and Multiop H20A. Kudos to 5B4ADA operating C4A who set a new IARU HF World Championship CW Only record with 2,768,640 points, shattering the old record by over 715,000 points. A special acknowledgement goes to LT1F who also shattered the old mark but fell 240,000 points off the torrid pace set at C4A.

On the W/VE side, Top Ten stations appeared from several regions, with Canadian XJ3EJ (VE3EJ op) placing third worldwide in the Mixed Mode category as well as taking top W/VE honors in that category. John also set a new Mixed Mode W/VE record of 2,137,960 which shattered the mark he set last year by 369,000 points. K5TR (at W5KFT) paced the Phone Only scores for W/VE while establishing a new record for the category. K5ZD led the way for CW Only and became the first W/VE to break the 2 million point barrier for that category. In one of the tightest finishes in quite a while the gang operating WU4G edged out the crew at N3BB to take the top Multioperator W/VE championship, even though both surpassed the old W/VE record set in 1992. Top Ten finishes are seen from many areas of the US and Canada as the multiplier structure of the

Top World Scores

Mixed Mode

Call	Score
DL6FBL	2,277,587
EA8/OH2BYS	2,268,344
XJ3EJ	2,137,960
(VE3EJ,op)	
EA3KU	1,895,517
WP2Z	1,833,349
(AG8L,op)	
W3LPL	1,826,140
(KE3Q,op)	
YT1AD	1,771,308
K3ZO	1,766,336
KQ2M	1,711,300
UA3RAR	1,615,866

Phone Only

Call	Score
5X1T	2,583,504
(ON6TT,op)	
4X2F	2,450,553
(4Z5JK,op)	
C40M	2,415,276
(5B4AFM,op)	
P3P	1,815,220
(5B4LP,op)	
IR6F	1,538,604
(IK6BOB,op)	
S50A	1,530,675
H22H	1,456,218
(5B4MF,op)	
UT7DX	1,418,178
UX0MM	1,374,478
K5TR	1,314,423
(at W5KFT)	

CW Only

Call	Score
C4A	2,768,640
(5B4ADA,op)	
LT1F	2,528,524
K5ZD	2,067,062
W4AN	1,846,678
8P0V	1,832,272
6Y6A	1,539,825
K1TO	1,509,567
9A7A	1,497,890
IR2W	1,448,160
(I2VXJ,op)	
9A9A	1,387,800

Multioperator

Call	Score
H20A	5,481,752
P3A	5,451,576
HG6N	3,560,270
HG1S	2,938,880
RZ9AZA	2,553,657
IR4T	2,550,000
EW5O	2,495,080
HC8A	2,417,415
RK3AWL	2,266,250
RZ3Q	2,184,744

Top W/VE Scores

Mixed Mode

Call	Score
XJ3EJ	2,137,960
(VE3EJ,op)	
W3LPL	1,826,140
(KE3Q,op)	
K3ZO	1,766,336
KQ2M	1,711,300
XK7SZ	1,329,482
(VE7NTT,op)	
N9AG	1,271,160
(at N8NR)	
W3GH	1,001,472
(KB3AFT,op)	
N5JR	876,288
N6ED	822,950
W0TM	816,156

Phone Only

Call	Score
K5TR	1,314,423
(at W5KFT)	
WB9Z	1,069,328
N2QT	807,048
W7NN	762,246
VE1JX	659,664
(K6HNZ,op)	
N4UH	645,507
N2TX	604,044
WS1A	576,600
N6WLX	521,572
KQ3V	518,140

CW Only

Call	Score
K5ZD	2,067,062
W4AN	1,846,678
K1TO	1,509,567
N2IC	1,246,138
VO1MP	1,149,480
AA3B	1,060,514
KT3Y	958,433
WC4E	933,282
K9IG	921,225
K7SV	874,412

Multioperator

Call	Score
WU4G	1,796,005
N3BB	1,792,036
K5MR	1,599,442
N1BB	1,442,721
K8AZ	1,420,212
K8CC	1,398,600
W4PA	1,344,525
K2LE	1,173,879
K3EST	969,246
K5NZ	950,544

contest tends to level the playing field for entrants from all across North America.

For the Headquarters stations, there was DA0HQ, and then there was the rest of the



The UX3M team: (clockwise from back left) included UR5MTA, UR3MC, UR5MAW, UR5MTJ, UR7MR, UR5MNL and UR3MP.

pack. While their 11,110,944 points did not set a new HQ station record, it was good enough to distance themselves from the two runner-up stations; 12,568 QSOs and 377 multipliers under *any* condition is outstanding. OL8HQ took second place among the 34 HQ stations and IARU officials on the air for the event.

As in most competitive endeavors, that which is not prohibited under the rules is permitted. Rules for this contest are different from most others. There is no 500-meter circle rule for multiops, something that HQ stations and certain other multiops have used to their advantage. While there is a band change limitation for multiops, there has not been a mode change rule. This has allowed multiops in some jurisdictions to alternate CW and phone contacts on a single band—a great advantage over those who operated under the traditional rules. However, look for a rule change in 1999 requiring band and/or mode changes to be made under the 10-minute rule. It's hard to imagine how simultaneous transmissions, which aren't permitted under the rules except for HQ stations, are prevented with a combination of split site and same band different mode operation.

IARU Headquarters Stations

DA0HQ (DF8XC, DJ7AA, DK3WW, DK4WA, DK7YY, DK8YY, DL1AOB, DL1AQO, DL1ASA, DL1AWI, DL1AWD, DL1AUZ, DL1DTL, DL1VDL, DL2KUW, DL2OBF, DL2OE, DL2SAX, DL3ABL, DL3ALI, DL3APO, DL3DXX, DL3OI, DL3TD, DL4ALB, DL5MX, DL5XU, DL5YY, DL6MHW, DL6MYL, DL7AU, DL7BY, DL7IO, DL7IQ, DL7VOA, DL7VRO, DL7UBA, DL7URH, DL7UTM, DL8AKA, DL8ALU, DL9AUA, DL8WAA, DL9AWI, YB1AQS, ops)	11,110,944	12568	377
OL8HQ (OK1ADM, OK1AEZ, OK1AU, OK1AXB, OK1CF, OK1CM, OK1CW, OK1DIG, OK1DNR, OK1FAU, OK1F, OK1FLM, OK1FUA, OK1GW, OK1HSK, OK1MD, OK1MD, OK1MR, OK1RI, OK1RR, OK1TA, OK1TC, OK1TN, OK2FD, OK2PAY, OK1RZ, OK1RZ, OK1ZU, ops)	10,059,626	10658	361
OM8HQ (OM8AA, OM8AU, OM2TW, OM3EI, OM5RW, OM5ZW, OM5RM, OM5DP, OM5MZ, OM3BH, OM6NM, OM1KM, OM3RG, OM3NA, OM5DX, OM2RA, OM3RM, OM3LU, OM3EA, OM8AM, OM8AW, OM3DX, OM3CD, OM5MB, OM5NA, OM3JW, OM5FM, OM5MF, ops)	9,490,357	9199	349
NU1AW (+K1CC, K1KI, K1RO, K1ZZ, N1RL, W1WEF, KM1P, K2KQ, K5FUV, N6BV, ops)	8,800,871	7871	317
R3HQ/6 (UA3AGW, RA4AJF/6, UA6AF, UA6AN, UA6AA, UA6AHF, UA6LO, UA6LU, UA6LV, UA6LFQ, UT6IZ, RA6AX, RA6CM, RA6CO, RA6YY, RA6YDX, RN6BN, RN6LG, RU6AB, RU6LG, RV6ASU, RV6LNA, RV6YY, RV6YZ, RW6YY, RX6BA, RZ6AZ, ops)	8,509,481	7736	347
HG5NHQ	8,065,008	7960	336
P40HQ (P43E, P43P, P43T, P43W, P49V, ops)	7,559,682	6340	247
YU0HQ (YU7AU, YU7AV, YU7AX, YU7BCL, YU7BJ, YU7BW, YU7CB, YU7CM, YU7FN, YU7JX, YU7KW, YU7GO, YU7GW, YU7NU, YU7NWW, YU7OA, YU7WA, YU7YG, YT7KF, YT7TY, YZ7AA, YZ7UN, 4N7EA, 4N7CA, 4N7DW, 4N7TW, 4N7ZZ, ops)	7,421,865	7872	341
YP0A	6,798,208	8434	346
PA6HQ (PA3REC, PA3EPD, PA3ELV, PA3BSQ, PA3FVW, PA3ALK, PA3BAG, PA3CMG, PA3GZX, PE1LAU, PB0ALB, PE1ALV, PA0LFE, PA0VHA, PA3FWG, PA4DF8MQ, PA4HA1AG, PA3BBP, PA3BTH, PA3CAL, PA3DMH, PA3ELD, PA3EWP, PA3FDO, PA3FQA, PA3GBQ, PB0AIC, PE1PZS, ops)	6,663,457	7187	313
LY60RMD (LY1BA, LY1BW, LY1DL, LY1DT, LY1DQ, LY1FF, LY2BIL, LY2BKF, LY2BTF, LY2HM, LY2JJ, LY2KW, LY2PAJ, LY2PX, LY3JY, LY3MM, LY3NFW, LY4CW, ops)	6,411,333	6107	321
EM5HQ	6,086,430	6028	315
ER7A (US0ZZ, US7ZM, ER5WU, ER5OK, ER5DX, UX3FW, UX0FF, ER3DX, ER3OO, ER1LW, ER5AA, ER5AL, ER1DA, UR5FD, ER1OO, ops)	5,798,355	5781	305
W1AW/0 (K2VV, K4MA, K4VX, K9PG, AG9A, W9WI, W9WW, N9JF, W9QA, K9BGL, W0AIH, N0SS, N0S0B, N0NX, KK0DX, K0BJ, K0IL, K0CA, ops)	4,905,719	6832	259
GB5HQ (GM3WOJ, GM4FDM, GM4YXI, GM0NAI, ops)	3,467,360	4053	260
OH3X (OH1KAG, OH3HEI, OH3LQK, OH3MEP, OH3MMF, OH3MMH, OH3MYD, OH3RB, OH3RM, OH3WW, ops)	2,904,552	3823	238
OZ7D (OZ1BOH, OZ1FTU, OZ1IVA, OZ1JSH, OZ1KRF, OZ1RH, OZ3W, OZ5ABD, OZ5LH, ops)	2,500,165	3129	235
ES9A (ES5MC, ES5MG, ES5QX, ES5RN, ES5RW, ES5RY, ES4TG, ops)	1,969,605	3142	207
L77E (LU4DXU, op)	1,043,152	1267	176
LU2AH	1,010,244	1300	174
SK0HQ/SK3HQ (SM0HQ, SM0JSM, SM0KCO, SM0TX, SM3CER, SM3DMP, ops)	908,222	2769	203
EA4URE (EA4BPJ, EA4BT, EA4ECF, EA4ET, EB4EPJ, ops)	711,604	1598	146
TF3IRA (TF3HP, TF3GB, TF3DX, N6HR/TF, ops)	499,849	1493	101
PA0LOU	398,780	750	157
SV1SV	229,174	747	121
8J3JHQ (JA3MAU, JH3ERW, JH3JWR, JI3ERI, JJ3WPF, JK3RXY, JL3MHD, JL3NEY, JE2PMC, JG2ONT, ops)	120,963	1203	61
W4RA	87,912	258	99
BV2Y (BV2TA, BV3FG, BV4ME, ops)	74,574	412	54
HC2EE	56,745	191	65
4Z1GY	54,355	334	35
OE1XHQ (OE1JNB, OE1TKW, ops)	41,108	168	86
VU2UR	29,810	144	55
VK3ADW	1,560	24	20
W1RU	1,356	25	12



The smiling faces of the second place W/VE multioperator group at N3BB included (clockwise from back left) N3BB, K5NA, WD5N, N5ZC and AB5EB.

With help from N6AA, N6TR and N6TW, log checking is much improved this year. Most competitors will find their scores reduced from their submitted claimed scores. The more extensive log-checking was able to identify numerous busted calls and exchanges, and also pinned down many of the dreaded “not in logs.” Many thanks to the volunteers who assisted with developing the more sophisticated log checking software. Their efforts have helped level the playing field even more, making the contest more competitive and fair for all participants.

One additional rule change will affect the 1999 IARU HF World Championship, which is scheduled to be contested July 10–11. Beginning in 1999, **all logs that are contenders for certificates or Top Ten rankings must be submitted in digital format conforming to ARRL specifications.** E-mail submissions to iaruhf@arrl.org are preferred. Also starting in 1999 any paper entry which was logged on a computer must include a copy of the log files or it will become a check log. Submissions on 3.5-inch floppy disk are also acceptable. You need to include the required summary sheet file and the log files generated by your logging program. Participants outside the US should use air mail for their entries, as many entries postmarked in time actually arrived in December, after a considerable amount of log processing was already completed. Entries must be post-marked or e-mailed no later than 30 days after the end of the contest.

Remember it is the responsibility of the participants to keep up-to-date on rule changes and log requirements. The rules are published in *QST* before the contest as well as at the ARRL Contest Branch homepage on the Web. By visiting <http://www.arrl.org/contests> you can access all of the forms, rules, and log sheets required for any ARRL contest. Make sure

you read the “General Rules for all ARRL Contests” as these contain the specific requirements for log submissions. If you have specific contest rules or inquiries, you can e-mail me at n1nd@arrl.org, or call or write to the [phone and address in the front of each issue of QST](#). Good luck and see you in the IARU HF World Championships July 10-11!



JH3PJP putting Zone 45 on the air in the Phone Only category.



YT1AD with this station finished 7th worldwide in the Mixed-Mode category.

Scores

Scores are listed by ITU Zone and then by country, ARRL Section or Canadian Province within the zone. Line scores indicate call sign, final score, QSOs, multipliers, and entry class (A = single operator, B = single operator phone only, C = single operator CW only, D = multiplieroperator, single transmitter).

Table of scores organized by ITU Zone (1-12) and country/province. Each entry includes call sign, score, QSOs, multipliers, and entry class. Includes sub-sections for Eastern Washington, Idaho, Montana, Nevada, Utah, Western Washington, Connecticut, Eastern Massachusetts, Maine, New Hampshire, Rhode Island, Vermont, Western Massachusetts, NYC-Long Island, Northern New Jersey, Southern New Jersey, Western New York, Michigan, and various other regional and international entries.

Macedonia			
Z31GX	147,828	507	97 B
Zone 29			
Armenia			
EK6CC	559,435	1089	127 B
Moldova			
ER1IM	139,650	391	98 B
ER1OA	226,920	518	122 C
Estonia			
ES2RH	153,573	525	103 A
ES2TD	127,800	300	139 A
ES1RA	16,560	97	80 A
ES1CH	15,540	132	42 A
ES4LB	5,538	72	39 B
ES1XT	114,948	344	103 C

Belarus			
EW5R (EU1FC,op)			
EW6TU	835,212	1455	183 A
EU1MM	302,932	902	124 A
EU1DX	1,122,552	1511	225 C
EUDXK	492,128	796	169 C
EUGAA	123,370	334	130 C
EUA1BA	21,232	259	82 C
EW5O (EW8DX,EW8MM,EW8OB,EW8OS,EU8DX,EU8RZ,ops)	2,495,080	3283	280 D

Lithuania			
LY2VAD (LY1DS,op)			
LY1DR	50,680	248	70 A
LY3BH	7,975	74	25 A
LY2ME	880,230	1205	195 B
LY3BA	65,416	265	74 B
LY3BY	45,018	383	86 B
LY2BTA	12,062	107	36 B
LY4AA	1,001,948	1460	214 C
LY4AM	961,515	1415	207 C
LY4BM	789,370	1330	193 C
LY6M (LY1DS,op)			
LY2VG	399,000	767	152 C
LY2MM	351,090	806	141 C
LY2KM	234,252	518	134 C
LY1DD	129,876	343	125 C
LY1DC	55,286	244	77 C
LY1YD	25,830	124	70 C

Ukraine			
UA3RAR	1,615,866	1784	237 A
RA3AAU	1,259,368	1508	242 A
R33DCX	670,440	1187	185 A
UX1UA	634,600	1012	190 A
UE6MAA (RA6LV,op)			
RZ6LQ	594,972	1186	189 A
RV6LE	323,628	582	181 A
RZ1Z/3	323,582	759	133 A
RU3BK	315,904	830	128 A
UA4AO	91,134	505	61 A
UA4AA	51,051	561	91 A
RW3ZA	48,620	322	44 A
UA1ANA	31,707	269	39 A
UA3XBB	26,730	144	55 A
UA0ZDA/6	29,224	222	52 A
RU3HD	409,945	775	165 B
UA3B	358,344	735	158 B
UA3QNL	205,859	427	139 B
RU3RV	161,325	409	135 B
UT1WA	138,852	328	133 B
UA4NC	105,525	330	105 B
UA3LHL	95,370	290	102 B
UA3QOG	80,224	294	92 B
RZ3EC	80,193	271	92 B
UA1OMS	72,540	252	90 B
RU3WT	62,589	228	93 B
RV3LZ	47,736	204	78 B
UA4HAK	29,925	169	63 B
UA4AES	18,700	184	34 B
UA4LDP	14,487	157	33 B
UA4AVN	12,420	94	30 B
RV4SEK	10,144	95	32 B
RT3A (RU3AA,op)			
RA1ACJ	614,347	1165	163 C
RW3FO	406,263	904	143 C
RU4WE	338,688	815	147 C
RW1AI	303,972	718	146 C
UA4SS	239,148	528	146 C
RV6YB	186,711	593	119 C
RU3AQY	167,140	438	122 C
RK3UWZ	166,007	489	109 C
UA3LFP	130,383	407	99 C
RX3AP1	91,549	348	83 C
RA4FW	83,664	322	84 C
RA4XO	70,125	393	55 C
RA3XO	69,615	207	105 C
UA4AHT	57,035	295	55 C
RW6AEP	19,344	134	52 C
RW3WM	16,095	113	37 C
UA6ATG	9,636	84	33 C
RK3AWL (+UA3DVF,UA3QDX,RK3AW,RA3QFB,UA3ATP,RV3FF,RA3ATX,RK3AD,RV3BA)			
RZ3Q (RW3QC,RW3QNZ,RN3QO,UA3QQ,ops)	2,266,250	2717	250 D
RZ6HWA (RA6FV,RW6HA,RZ6FA,ops)	2,184,744	2839	258 D
RK3AWE	1,406,916	1553	252 D
RK3SWX (RA35-367,UA3SEC,RA35-797,RA35-952,ops)	725,654	1344	157 D
RK1QXX (RA1QGG,RA1QFX,ops)	608,906	1017	191 D
RK3NWO (RA3NN,UA3NEA,UA3NFG,UA3NAM,ops)	234,438	663	123 D
RK3UWA (UA3UAW,UA3-123-009,UA3-123-444,ops)	105,768	352	104 D
RK3EUV (RA3EO,UA3EJN,RN3E-9,R3E-19,ops)	56,082	269	78 D
RK3EWW (+ops)	53,557	262	87 D
RW6AWM (RV6BV,RV6AS,ops)	725,654	1344	157 D
UA4600	44,600	294	50 D

Latvia			
LY2PN	160,552	616	94 A
LY2PN	11,410	145	35 A
YL3DW	759,225	1245	191 C
YL2GN	457,585	935	173 C
YL2UZ	150,880	556	82 C
YL2PP	43,240	178	94 A
YL3RW	11,872	111	32 C
YL1ZF	5,994	133	18 C

Turkmenistan			
EZ8CW			
14,250 101 38 B			
European Russia			
UA4LL	1,045,856	1556	196 A
UA4HTT	958,000	1390	200 A
UA4PFO	77,280	438	56 C
RU4HH	56,259	291	57 C
RK4WVA (UA4WA,RW4WA,UA4WAN,ops)	875,735	1427	191 D

Asiatic Russia			
RK9CWA (RW9CF,op)			
RA9AA	535,068	1215	167 A
UA9SG	157,300	533	65 A
RA9BT	121,374	295	99 A
RX9WN	93,800	258	110 A
RW9AY	84,621	308	67 A
RW9QA	50,556	267	44 A
RA9AUH	21,497	125	37 A
RX9CAP	18,202	115	38 A
RZ9WZ	16,072	90	49 A
RW9AB	345,700	709	113 B
RA9ACJ	300,424	528	136 B
RZ9SR	162,504	352	122 B
RA9MBC	93,840	252	102 B
RW9SW	32,928	170	49 B
RA9SO	651,040	927	160 C
UA9BS	315,225	557	135 C
RA9AUN	161,882	583	62 C
UA9AJD	126,655	412	73 C
UA9AJD	100,607	357	109 C
RU9CZ	96,800	287	70 C
UA9AB	87,495	324	95 C
RA9DL	82,173	431	39 C
RZ9AZA (UA9BA,UN4L,UN7LEB,RA9AB,RA9AQ,RU9AN,RZ9AR,RZ9AZ,ops)	2,553,657	2593	213 D
RK9CWW (RZ9CQ,RA9CMO,UA9CDD,RA9CQ,RW4WR,ops)	2,062,104	2106	214 D
RK9AWN (RZ9AW,RA9AX,ops)	795,945	1310	141 D

Kazakhstan			
UN6P	625,488	972	157 A
UP6F	38,016	194	48 A
UN9PQ	5,746	45	26 B
UN8RA	326,888	656	116 C
UP0L (UN9LW,UN7LAN,UN7LZ,ops)			
1,831,748 2164 194 D			

Zone 31			
Asiatic Russia			
RZ9OU	282,112	504	128 A
RX9UKF	12,307	99	31 B
Kazakhstan			
UP6F (UN7FZ,op)	342,990	699	111 C

Zone 32			
Asiatic Russia			
UA0ACQ	128,044	450	68 A
UA0YAV	59,752	187	88 A
UA0APP	8,181	67	27 B
RW0A (RA0AM,RA0ALM,RU0AB,UA0AM,RU0AV,RV0AM,RV0AE,RV0AR,RV0AU,RW0AR,UA0AGI,UA0ANW,ops)	1,493,471	2021	203 D

Zone 33			
Asiatic Russia			
UA0ZBK/0	415,400	873	124 B
RA0JX	154,140	413	105 C
UA0UAG	20,194	120	46 C

Zone 34			
Asiatic Russia			
UA0FDX	281,466	661	114 A
RA0AT	110,088	317	88 B
RU0LL	156,950	541	86 C
Zone 36			
Madeira Islands			
CT3HF	172,782	432	87 B
Canary Islands			
EA8/OH2BYS	2,268,344	2170	221 A
EA8BXQ	57,525	311	39 B
EA8AD	45,480	239	40 B
EA8ASJ	306,081	1047	71 C
EA8ABF	13,200	118	24 C

Zone 37			
Spain			
EA3KU	1,895,517	2461	221 A
EA3ALV	208,875	513	125 A
EA3GTF	151,018	901	49 A
EC5AEB	104,130	700	45 A
EA1FBU	102,030	450	57 A
EA1MK	69,722	305	71 A
EA7CWW	22,820	106	60 A
EA4HAD	21,514	245	31 A
EC07DS	7,125	87	25 A
EA3BOX	488,345	953	143 B
EA1EB	164,630	466	103 B
EA3OP	137,862	559	74 B
EA1BLX	95,052	320	89 B
EA7ALO	70,224	254	77 B
ED5JQE (EA5EI,op)	60,261	333	53 B
EA1FDG	44,070	300	39 B
EA7BJV	28,575	196	45 B
EA1CJH	25,477	123	73 B
EA1BLI	18,262	136	46 B
EA1BLT	10,556	101	28 B
EA2SN	6,864	76	26 B
EA3AM/5	4,161	55	29 B
EC3ALV	4,480	71	20 B
EA1AAW	3,219	41	29 B
EA5DIT	3,100	36	31 B
EA5FV	638,182	1592	122 C
EA3AR	175,028	448	98 C
EA7CA	67,436	252	87 C
EA1FBJ	32,025	179	61 C
EA1VM	4,704	45	32 C
EA5URP (EA5DFV,EC5GC,ops)	863,298	1618	146 D
ED5URN (EA5ANY,EA5CKP,EA5EOC,EA5GPP,EC5ALM,ops)	427,579	1111	107 D
EA5BY (EA5ABE,EA5BY,EA5FDJ,EA5GRV,EA5KW,ops)	243,522	964	83 D

Balearic Islands			
EA266	226,320	586	123 B
EA6ACF	66,263	311	67 B
EC6PG (EA6GP,EC6PG,ops)	30,712	249	44 D

Zone 39			
Israel			
4X1VF	338,352	676	106 A
4Z5FW	161,880	300	95 A
4X4KYT	92,530	260	95 A
4X2F (4Z5JK,op)			
2,450,553 2850 183 B			
4X0F (4Z5FL,op)	247,940	514	110 B
4Z5FI	203,915	535	85 B
4Z5FU	146,625	1725	85 B

Cyprus			
C40M (5B4AFM,op)			
P3P (5B4LP,op)	2,415,276	2792	207 B
H22H (5B4MF,op)	1,815,220	2182	185 B
C4A (5B4ADA,op)	1,456,218	1577	202 B
H20A	2,768,640	2705	224 C
(YL2LK,YL3CW,YL2UB,RZ3BW,RZ3BY,RA3CQ,RA3CW,RX3APM,RZ4HF,UA4HT,ops)	5,481,752	4301	289 D
P3A (RA9JX,RZ3TX,RZ9UA,UA3DPX,UA9ND,UA9NN,ops)	5,451,576	4032	312 D

Kuwait			
9K2HN	585,120	1054	120 B
Jordan			
JY9QJ	959,680	1288	160 A
Turkey			
TA2ZW (OK2ZW,op)			
TA3J	371,184	914	88 A
Zone 41			
Pakistan			
AP2JT	96,531	323	69 B
India			
VU2ABE	45,720	238	60 B
VU3DJQ	13,596	114	33 B

Zone 42			
Nepal			
9N1UD	65,820	309	60 A

Zone 44			
Taiwan			
BP0RIW (JP1RIW,op)	98,840	550	56 B

China			
BD4DWB	84,632	344	71 A
BA4TB	11,916	331	36 C
South Korea			
HL1SQO	2,760	43	20 B
D54CNB	146,316	458	89 C
HL0K (+ops)	62,928	262	89 D

Hong Kong			
VR98BG	484,092	1038	113 C

Zone 45			
Japan			
JH7PKU	768,672	1210	157 A
JA6ZLI (JU6WYS,op)	623,760	1063	138 A

Zone 46			
Nigeria			
JH7XGN	606,208	962	148 A
JF1SOC	586,000	1043	125 A
JR4GPA	357,552	788	104 A
JA1ZLO	329,239	692	117 A
JA6UBK	328,596	580	139 A
JL4IOU	184,230	411	115 A
JI7VJN	127,306	287	106 A
JR9NVB	101,728	344	68 A
JH5OXF	95,186	281	91 A
JQ6NAB	74,976	262	71 A
JA1BSU	65,919	216	73 A
JH2MIH	61,985	292	74 A
JQ1NGT	51,100	270	50 A
JA7YFB			

1998 ARRL September VHF QSO Party Results

The best laid plans of mice and men..." We know the rest of this quote though few of us can remember the source. And this year, it seems to be exactly what occurred during the 1998 September VHF QSO Party. From ardent multi-op stations to the casual participant, summary sheets were replete with tales of preparation and planning designed to maximize effort in this year's event. Rovers planned their routes. New antennas were mounted. Recruits for multi-op stations were trained. But it seems someone was not invited to party: Propagation.

The real star of this year's event may have been what one entry called "dismal" band conditions. When compared to the successful June VHF QSO Party (see results December 1998 *QST*), participation, entries received, QSO totals, and multipliers worked all were down. Scoring was also lower than in June. The hard-core VHF community was visible, but more than one log bemoaned the lack of the "casual" contest.

Making the best of band conditions is a hallmark trait of outstanding operators. Two stations set new overall September scoring records for their entry categories. "The Man" was at it again as WA8WZG, who swept all 4 major ARRL VHF/UHF contests in 1997, upped his Single Op September record to 465,915, bettering the 394,744 mark he set last year.

New Single-Op Division scoring records

were set by WA8WZG (Delta), K1TEO (New England), KE7SW (Northwestern), N6KBX (Pacific) and K5IUA (West Gulf) while new Division Rover marks were set by N1MJD (New England), K7XC (Pacific), N6TEB (Southwestern), and VE3OIL in

Top Ten

Single Operator

WA8WZG	465,915
K1TEO	345,685
K1RZ	241,230
WA2FGK	194,677
(K2LNS,op)	
KA1ZE	178,672
KE8FD	164,925
K1UHF	153,605
K3DNE	145,782
W3OR	145,782
K2YAZ	122,364

QRP Portable

K9PW	155,056
W8TL/3	58,145
ND3F	19,380
AF4HX	15,987
N8A (N8XA,op)	9,275
KK7AT	1,248
KO6TI	1,134
WB2AMU	987
KO6UQ	726
KC7YLP	464

Multioperator

W2SZ/1	1,620,042
K8GP	1,327,590
K3MQH	627,997
K2TXB	428,420
K1WHS	209,605
W0UC	192,148
N5WS	92,820
W2EA	80,769
W6TOI	71,496
KF6JSO	57,475

Limited Multioperator

K3YTL	383,783
NC1I	332,454
W4IY	314,748
WB1GQR	208,532
N2HLT	198,152
AA4ZZ	170,154
WB2ODH/6	169,344
N0UK	133,272
W9ICE	131,430
W1QK	94,501

Rover

AB4CR	175,050
W3EKT	112,254
N4STK	107,520
K7XC	90,816
N1MJD	76,167
W9FZ	50,350
WB9SNR	44,910
AB5SS	43,148
VE3OIL	42,840
K3QII	39,520

Canada. Only W8TL/3 (Atlantic) was able to establish a new Division standard in the QRP Portable category. In the Multi-Op category the K8GP operation set a new Roanoke Division mark while the N5WS group raised the bar in the West Gulf Division. Rounding out the record setters from the Limited Multi-Op Division category were groups manning the stations of K2BAR (Hudson), NC1I (New England), W6MMM (Pacific), and W4CMA (Southeastern). Well done to these outstanding achievers.

A particularly disturbing remark appeared in a number of Soapbox comments: "The 'pop-gun' contesters doesn't really matter." Let's put this sentiment to rest: *Every entry matters.* Whether you score 300K and you are a perpetual Division leader, or you casually make 20 QSOs in two grid squares, it takes every entrant to make any contest a success. It was encouraging to hear comments about the return of old call signs to the scene, as well as some larger stations encouraging others to listen out for local "little guys." Still, it was disheartening to hear so many comments about participation being down.

When you participate in any of our contests, remember to submit your log, including your items for the Soapbox section. Don't worry if it isn't a world beater or record setter. You might be surprised how well you did compared to others in your



AB4CR really had a hard time explaining to his wife that the halo was standard equipment for the new car, even before the license plate was added.



Matt Bennett, KF6RTB, visits the station of John Kountz, KE6GFF, and learns about contesting.

SHEILA SCHWARTZ, KE6GFI

Multiplier Leaders By Band

Single Operator/QRP Portable		Multioperator	
50 MHz			
K5TR	115	K8GP	118
(at W5KFT)		N5WS	112
KB0VUK	109	N0UK -L	107
N0LL	89	AA4ZZ -L	97
K5IUA	88	K2TXB	94
W8CM	75		
144 MHz			
K0MQS	70	K8GP	103
KE8FD	63	W4IY -L	81
K2YAZ	56	K2TXB	70
K8TQK	55	K3MQH	69
K3VGX	53	W2SZ/1	66
K1TEO	53		
222 MHz			
WA8WZG	36	K8GP	70
KE8FD	36	K3MQH	46
K1TEO	33	W2SZ/1	44
KA1ZE	30	K3YTL -L	42
K1RZ	30	W4IY -L	42
432 MHz			
KE8FD	49	K8GP	85
K8TQK	43	W4IY -L	56
WA8WZG	42	W2SZ/1	53
K1TEO	40	K3MQH	52
K2DRH	38	W9ICE -L	49
KA1ZE	38		
902 MHz			
WA8WZG	21	K8GP	31
K1TEO	20	W2SZ/1	29
K1RZ	18	K2TXB	21
K2YAZ	18	K3MQH	15
K9PW -Q	16	K1WHS	12
W3OR	16		
WA2FGK	16		
(K2LNS,op)			
1296 MHz			
WA8WZG	32	K8GP	39
K4QI	22	W2SZ/1	29
K2YAZ	21	K2TXB	27
K1TEO	20	K3MQH	22
K1RZ	19	W0UC	15
WF9X	19		

section working under similar conditions. Some sections only have a few logs submitted. It has never been easier to enter any of our contests. With the ability to electronically submit entries to the Contest Branch, you don't have to worry about unreliable delivery times of the postal service. Visit the Contest Branch homepage at <http://www.arrl.org/contest> for details, entry forms, logs sheets, general information, schedules, rules and results.

We look at every log and read every soapbox comment. This is how we get a feel for what the contest weekend was like

in your area. Sitting in Headquarters, we can't determine if there were better conditions in California or if there was some good sporadic E in Minnesota unless you tell us. Your photographs also give us a sense of what participants are doing in terms of creativity and experimentation. We can only print a few of the photographs and comments we receive, but believe me, they are valuable tools as we put together each article. One note about photographs: Please attach labels, including names and call signs of those in the photo, to the back of the snapshot. When you write on the photograph proper, it sometimes makes it unusable for us to print.

Get yourselves ready for the 1999 June VHF QSO Party, set for June 14-15. Besides the sunscreen and the cool clothes, be sure to check out your feed lines, good tires for your roving vehicle, and stock in goodies for the cooler. Oh, and someone please remember to invite Mr. Propagation this time. The pleasure of his company is always welcomed. We all hope he RSVP's in the affirmative!

Soapbox

Not as much activity as in June, but all in all it was a lot of fun (AA6W)... At times, tropospheric conditions were unusually good up to 1296 (K7IVW)... Conditions were completely flat. I need to finish building a real antenna for 6m (VE2ZP)... My first contest. All I had hoped to do was qualify for the Participation Pin (KF6RCI)... Super weather, good operating locations, fair propagation except for 50 MHz (WB7DHC/R)... Highlights must be the TE contacts to South America Sunday afternoon (W5UWB)... Sunday morning was so slow I went to a hamfest, but am looking forward to January already (KB8UUZ)... Perhaps poor conditions, producing weak signals, made CW a good mode for making contacts (K4ME)... My last entry in a VHF contest was from NNJ circa 1958. Grids were not known at that time. We worked sections around the country. Of course, then the only modes were AM and CW (K2IUK)... It was a good learning experience and lots of fun (KB6YAD)... If not for about three hours of sporadic on 6 meters, the contest would have been pretty dismal. Conditions for tropo were really poor and this did not provide the usual 432 MHz contacts (WOPHD)... Mix a VHF contest with helping in a public service overnight bike ride and you have a LONG weekend and LOTS of fun (AD4F)... Who said you have to be high on a hill to

QSO Leaders By Band

Single Operator/QRP Portable		Multioperator	
50 MHz			
K5TR	287	W2SZ/1	562
(at W5KFT)		K8GP	508
N1MIA	231	K3YTL -L	486
K1TEO	227	NC11 -L	464
WA8WZG	226	K3MQH	443
K5IUA	220		
144 MHz			
K3VGX	371	K8GP	671
K1TEO	360	W2SZ/1	664
K1UHF	309	K3MQH	639
KB2IT	283	K3YTL -L	503
K1RZ	274	NC11 -L	472
222 MHz			
WA8WZG	126	W2SZ/1	219
K1TEO	101	K8GP	165
K5MA	81	K3YTL -L	150
K1UHF	76	NC11 -L	142
K1RZ	72	K3MQH	131
WA2FGK	72		
(K2LNS,op)			
432 MHz			
WA8WZG	208	W2SZ/1	375
K1TEO	150	K3MQH	266
KE6GFF	143	K8GP	253
K5MA	111	NC11 -L	217
K1RZ	106	K3YTL -L	216
K1UHF	106		
902 MHz			
WA8WZG	49	W2SZ/1	99
K1TEO	43	K8GP	49
K1RZ	37	K3MQH	28
WA2FGK	30	K2TXB	26
(K2LNS,op)		K1WHS	19
KA1ZE	28		
1296 MHz			
WA8WZG	79	-Q denotes QRP	
K1TEO	59	Portable	
WA4VHF	52	-L denotes Limited	
K1RZ	48	Multioperator	
K9PW -Q	39		
K3DNE	38		

work the VHF Contests? With less than 1000 feet elevation our contest site for W9ICE came together. We found that with good planning, equipment and dedicated operators you can be competitive from any location (WB9YCY)... I took a lightning strike a week before the contest, so I had to borrow a few radios (VE3TMG)... My harmonic-op-in-training Susan and I had a great time roving and mountain topping. Thanks to K6NHK/R who put up with our invading his spot on Keller Peak (N6DN)... Thanks to the local "big guns" who made sure that the 'good ones' knew to turn this way and work us little guys too (KC8AQH)... The weather was great at 8013 feet: sunny days and 78° and clear nights at 38°. The entire group appreciated the absences of Murphy this September (WB2ODH/6)... The biggest thrill was watching my two 13 year old grandsons' eyes light up with

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	345,685	S	N8UM	48,096	S	WA8WZG	465,915	S	WQ0P	85,794	S	N6KBX	36,608	S
K1RZ	241,230	S	KN4SM	33,640	S	KE8FD	164,925	S	K5IUA	82,984	S	N6AJ	30,912	S
WA2FGK	194,677	S	K4QI	32,832	S	K2YAZ	122,364	S	W8CM	81,367	S	W3SE	27,295	S
(K2LNS,op)														
W8TL/3	58,145	Q	AF4HX	15,987	Q	K9PW	155,056	Q	KC7OLP	464	Q	KK7AT	1,248	Q
ND3F	19,380	Q	WA4AIW	182	Q	N8A (N8XA,op)	9,275	Q				KQ6TI	1,134	Q
WB2AMU	987	Q	KF4YWT	32	Q	W9SZ	330	Q				KQ6UQ	726	Q
W2SZ/1	1,620,042	M	K8GP	1,327,590	M	W0UC	192,148	M	N5WS	92,820	M	W6TOI	71,496	M
K3MQH	627,997	M	K4SZ	24,346	M	KC8DAZ	7,812	M	WW2R	13,325	M	KF6JSO	57,475	M
K2TXB	428,420	M	W8MOP	4,176	M	WD9DSN	6,426	M	N0FJ	5,460	M	K6MI	25,056	M
K3YTL	383,783	L	W4IY	314,748	L	W9ICE	131,430	L	N0UK	133,272	L	WB2ODH/6	169,344	L
NC11	332,454	L	AA4ZZ	170,154	L	W9FX	61,320	L	KK5IH	25,288	L	W6MMM	52,200	L
WB1GQR	208,532	L	W4NH	80,613	L	VE3TMG	17,748	L	K5XU	21,728	L	W7QH	4,640	L
W3EKT	112,254	R	AB4CR	175,050	R	W9FZ	50,350	R	AB5SS	43,148	R	K7XC	90,816	R
N1MJD	76,167	R	N4STK	107,520	R	WB9SNR	44,910	R	WA5VKS	10,032	R	N6IFW	36,040	R
K3QII	39,520	R	KB4NVD	21,730	R	N8KWX	6,432	R	KF0UK	4,032	R	KA7YOU	31,213	R

L = Limited multioperator; M=Multioperator; Q=QRP; R=Rover; S=Single operator

each new grid square. It won't be long before I have competition from them (WA9LZM)... This time it was no place for a "blue collar" station (W1FEZ)... More CW activity would yield more QSOs. Break out those keys, bugs and paddles for January (W9KHH)... It had not rained all summer. Guess what? (WD5AGU)... My QTH, while pleasantly

overlooking the Pacific Ocean, is ringed to the north and east by mountains. I now need a couple thousand more feet up or a few less mountains (KE6GFF)... My friend Aki (7M3CJQ) and I come from Japan to participate in this contest. OM Dave WBOGAZ prepared a fine VHF/UHF multi-band system for us (JO2AJT/WH2O)... it was good to

hear some calls that have been absent for a while - plus it takes a while to get used to the new variety calls the hardened VHF contesters have changed to (N8PVT)... I drove 3 1/2 hours then an additional two hours of backpacking 50 pounds over 2 miles of trails climbing 1300 feet of elevation to operate QRP portable DM43 (WA9TKK)...

Scores

Each line score lists call sign, score, stations worked, multipliers, number of grids activated (if Rover), and bands (A= 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, E = 902 MHz, F = 1296 MHz, G = 2304 MHz, H = 3456 MHz, I = 5760 MHz, J = 10 GHz, K = 24 GHz, L = 47 GHz, M = 75 GHz, N = 119 GHz, O = 142 GHz, P = 300+ GHz). Call signs of Division leaders and band indicators are listed in **boldface** type.

1					
Connecticut					
K1TEO	345,685	959	235	S	ABCD9EFG
K1UHF	153,605	674	155	S	ABCD9EFI
N1WQD	14,396	168	61	S	ABCD9E
K1WVX	3,404	69	27	S	ABCEDE
W1QJL	2,028	57	26	S	ABCEDE
WSJJ	1,770	59	30	S	AB
W1VHL	1,748	76	23	S	A
K1QNF	900	50	18	S	AB
W1QK (+W1QJ,N1TIV,N1TMG,AA1MY,N1ABY)	94,501	664	121	L	ABCD
Eastern Massachusetts					
K5MA	92,690	521	130	S	ABCD
W1GHZ	46,276	343	99	S	ABCD9EI
WG1Z	24,131	290	59	S	ABCEDE
N1GT	23,736	223	69	S	ABCD9EF
W1PM	17,574	201	58	S	ABCEDE
K1UR	6,727	166	31	S	ABCD
N1JOY	5,967	106	39	S	ABDE
WA1OFR	1,950	60	26	S	ABD
N1VQR	741	57	13	S	AB
N1EKV	450	26	15	S	ABC
AD1B	396	33	12	S	AB
W1DYJ	396	36	11	S	A
N1TMF	210	30	7	Q	A
KA1EKR (+N1A)	8,241	131	41	M	BCDE
N1FDX (N1FYZ,ops)	2,376	108	22	M	AB

Maine					
W1XX	39,248	316	88	S	ABCD9E
N1DGF	7,612	118	44	S	BCD
N1RWY	4,961	98	41	S	ABCD
K1VHS (+K1CA,N2CEI,W1MRQ,K1ART,N1LBI,K1DY,W1AIM)	209,605	749	185	M	ABCD9EFGHI
W1NPP (AA1TO,N1KAT,OXAMBZ,WBJ,KB1CNJ,ops)	5,117	95	43	L	ABCD
New Hampshire					
AFTT	38,456	258	92	S	ABCD9EFGHI
WA1OUB	15,300	246	51	S	BE
AC1J	6,880	120	43	S	ABCD
KU2A	6,678	103	42	S	ABCD9E
N1HJ	1,950	64	25	S	ABD
WB1FLD (+N1NUM)	16,380	226	63	L	ABD
Rhode Island					
KM1X	24,494	273	74	S	ABD
K1ZE	3,630	72	33	S	BCD
K8BGZ	782	46	17	S	AB
N1XFL	735	49	15	S	B
W1VHF (W1JIM,K1RWK,N1VDM,ops)	10,384	215	44	M	ABDE
Vermont					
K1LPS	2,890	68	34	S	ABD
WB1GQR (W1SJ,N1SRC,N2YHK,W1NT,ops)	208,532	1100	148	L	ABCD
Western Massachusetts					
WA1MBA	35,856	223	83	S	BD9EFGHI
N1MHM	9,540	166	45	S	ABCD
N1MIA	7,392	231	32	S	A
N1FUS	6,552	146	36	S	ABD
WA1UOL	5,733	106	39	S	ABCD
WA1NYV	1,500	100	15	S	B
N1RSY	200	25	8	S	B
W2SZ1 (K1DH,K1EP,K2AD,K2FR,KB0WJO,KE2TP,KE4IBF,N2BNI,N2HPA,N2XRE,N2YCA,N2YZO,W1SZ,W1VE,WA1ZMS,WA2AAU,WA2SPL,WA8USA,W5ZB,ops)	1,620,042	2323	386	M	ABCD9EFGHIJK
NC11 (+NC1B,N1DFM,N1MUW,K1TOL,W1QA,WZ1V)	332,454	1295	201	L	ABCD

2					
Eastern New York					
W2FCA	40,810	266	106	S	ABCDE
W3HHN	23,616	238	72	S	ABCD9E
K2ZZ	11,426	163	58	S	ABDE
WM2Y	6,018	136	34	S	ABCEDE
W2JHO	3,564	145	18	S	ABCD
N2TMT	3,075	123	25	S	A
W2CCP	2,160	90	27	S	B
N2MS	1,375	36	25	S	ABCD9E
WA2BAH	1,162	67	14	S	ABCD9E
K2M2CU	754	47	13	S	ABCD9E
KB2SLE	704	44	16	S	AB
WZ2X	504	42	9	S	BCD
KB2TSA	450	39	10	S	ABD
K2RI	360	31	8	S	BCD
KG2GX	322	32	7	S	BCD
W2FW	296	31	8	S	ABD
WB2BEJ	280	25	8	S	ABCD
AA2CW	196	22	7	S	BCD
N2PEQ	176	44	4	S	B
KB2ZTQ	168	24	7	S	AB
WB2VVQ	154	21	7	S	ABD

K2QNU	138	46	3	S	B
N2JJE	126	18	7	S	AB
KF2XY	54	9	6	S	AB
KN2C	2	2	1	S	B
NYC-Long Island					
NB2T	6,380	150	29	S	BCD
WB2CMI	3,293	70	37	S	ABCD
KF2XF	1,980	90	22	S	B
KB2VWG	1,197	54	21	S	ABD
WB2AMU	987	47	21	Q	AB
Northern New Jersey					
WB2VVV	96,472	493	124	S	ABCD9EFGI
K2KB	21,409	184	79	S	ABCEDE
K2SIX	18,292	236	68	S	ABD
KB2IT	12,452	283	44	S	B
K1NK	11,132	226	46	S	ABD
WB2CUT	3,900	156	25	S	B
KE3PL	1,475	59	25	S	A
KD2Q	1,056	45	22	S	ABD
KF2OK	833	44	17	S	ABCD
W2JEK	384	30	12	S	ABD
WB2IDV	319	29	11	S	B
K2BAR					
(K2AMI,K2PJM,K2YLH,K2ZB,KB2YJ,KF2OK,KO2OK,N2PBY,N2PPS,NN2T,NO2T,W1GI,W2MSK,WA2LXE,WA2GHL,WI2W,WU2C,ops)	85,020	604	109	L	ABCD
NX2Q (+W2OZU)	6,042	159	38	L	B

Northern New York					
WA2AEY	29,481	261	93	S	ABD
KB2ZVP	5,754	137	42	S	A
NT2W	1,890	64	27	S	ABD
Southern New Jersey					
WB3JYO	68,123	339	121	S	ABCD9EFG
W2SJ	50,112	245	116	S	ABCD9EFG
K2WKA	8,976	174	48	S	ABD
W2PAU	4,988	99	43	S	ABD
N2MPU	765	45	17	S	AB
W2BE	70	10	7	S	B
Western New York					
N2L	88,740	411	145	S	ABCD9EF
K2AN	50,840	263	124	S	ABCD9E
N2JMH	42,895	273	115	S	ABCD
W2WGL	5,175	88	45	S	BD
KV2X	5,085	100	45	S	ABC
WB2WPM	5,074	118	43	S	AB
WA2ZNC	3,441	69	37	S	ABCD
N2PSH	1,134	42	27	S	AB
W0VU2	800	40	20	S	B
KC2ATB	325	24	13	S	ABD
N2SPB	48	8	6	S	A
KG2LV	243	22	9	Q	BD
K2TXB (+W2DFZ,N2ODU,N2XTX,K2SMN)	428,420	1913	310	M	ABCD9EFGHI
K2IWR(N2MRE,KC2ARE,KC2CCC,KC2DTE,N2MRE,ops)	1,953	47	31	M	ABCEDE
N2HLT (KB2DMK,NS9E,N2JDQ,N2QLB,ops)	198,152	800	188	L	ABCD
KB2SGX (AA2PV,KG2NF,KB2SCK,AB2DY,KC2DYR,KG2BN,ops)	4,961	104	41	L	ABD

3					
Delaware					
W3OR	145,782	509	182	S	ABCD9EFG
WA3BTZ	3,720	124	30	S	B
WA3WUL	3,034	74	41	S	A
Eastern Pennsylvania					
W2AFGK (K2LNS,op)	194,677	607	203	S	ABCD9EFG
A3AGN	39,494	250	98	S	ABCD9E
K3GC	30,840	229	88	S	ABCEDE
K3VQ	19,863	371	58	S	AB
N3ADC	15,105	158	57	S	ABCD9E
W3KM	14,732	156	58	S	ABCD9E
W3SZ	13,872	167	51	S	BDEF
W5SC	8,120	114	58	S	ABD
W3RT	8,060	102	52	S	ABCEDE
WA4GPM	6,076	74	49	S	ABCEDE
N3XJK	4,324	92	47	S	AB
N3OGF	2,204	56	38	S	ABC
K3KEL	2,100	75	28	S	B
WA3CSP	1,920	64	30	S	A
W3PQB	1,800	60	30	S	AB
K3KX	1,575	57	21	S	BDE
N3JNX	1,534	50	26	S	ABD
W3HOA	1,311	57	23	S	B
N3KVF	1,144	44	26	S	AB
N3OWM	768	41	16	S	ABD
NE3I	672	46	14	S	ABE
WA3H	532	28	19	S	AB
KE3TC	528	33	12	S	BCD
W3JS	420	30	14	S	B
W3ZGD (N3VQI,op)	390	30	13	S	B

K3MQH (+K3MM,K3RA,N3KTV,N3EY,W2GG,AI3M,K3JFL,W3SST)	627,997	1572	289	M	ABCD9EIJ
W2EA (K2WB,N2FY,KD2KS,KF4YX,N2SCJ,N2XYZ,ops)	80,769	609	109	M	ABCD
K3YTL (K3MKZ,KA3ZHT,KB3QI,N3EMF,N3FA,N3RN,N3PBH,W3DZH,WA1HHN,WB3FKQ,ops)	383,783	1355	223	L	ABCD
Maryland-DC					
K1RZ	241,230	738	215	S	ABCD9EF
K3DNE	145,782	529	178	S	ABCD9E
WA4VHF	5,616	67	26	S	EF
N3BWJ	4,032	81	42	S	ABD
KA3TCC	3,296	81	32	S	ABD
WA3EQO	2,856	64	34	S	BD
W3TUM	1,090	30	18	S	BDEF
KB1YZ	435	26	15	S	ABD
N3SOK	360	29	12	S	ABD
N2TDT	256	32	8	S	AB
N3VOP	155	26	5	S	BD
W3GN	88	11	8	S	AB
W8TL3	58,145	266	145	Q	ABCD9E
ND3F	19,380	120	68	Q	ABCD9EFGHIJ
N3UMA (+N3QFZ)	5,292	105	42	L	ABCD

Western Pennsylvania					
KA1ZE	178,672	549	208	S	ABCD9EFG
NO3I	19,656	164	78	S	ABCEDE
AA3GM	4,472	73	43	S	ABCD9E
WG3E	425	24	17	S	ABD
W3YOZ (+W3VU,WR3Z,KC3EK,KD3SA)	67,541	424	137	L	ABD
K3MJW (KA3JWJ,N3NOS,N3OEX,N3WCR,ops)	28,119	253	91	L	ABD
K3MD (+N3PUR)	12,876	146	74	L	ABD
4					
Alabama					
N4ION	7,552	103	64	S	ABD
W4ZRZ	7,488	113	52	S	BDE
KS4YT	3,040	66	40	S	ABD
AD4DY	1,029	49	21	S	AB
WA4VQH	690	30	23	S	AB
KD4RHK	231	21	11	S	B
KF4YWT	32	8	4	Q	B
N4IDX (K4EKW,WA4III,K4WXX,ops)	10,430	128	70	L	ABCD
Georgia					
KD4K	6,612	99	58	S	ABCD
K4KAZ	476	28	17	S	AB
K4SZ (KC4GCK,KJ4P,KT4XE,K4SZ,ops)	24,346	210	94	M	ABCEDE
W4CMA (K4AEK,KD4HLG,KA5WZY,ops)	43,731	327	113	L	ABCD
KO4MZ (+ops)	15,280	160	80	L	ABCD
Kentucky					
WA4FVQ	9,027	103	59	S	ABCD9E
KT4JN	2,479	54	37	S	ABD
KE4WDZ	600	30	20	S	A
North Carolina					
K4QI	32,832	198	108	S	ABDE
NG4C	29,344	211	112	S	ABCD
W4VNH	12,529	113	67	S	BDEF
W4F50	11,130	110	70	S	ABCEDE
N4UJF	6,615	100	63	S	ABD
W4TNV	2,065	41	35	S	ABCEDE
N4AJF	1,870	51	34	S	ABD
KF4LVF	120	12	10	S	A
KU4HM	77	11	7	S	A
K2IUK	72	9	8	S	AB
AF4HX	15,987	176	73	Q	ABCD
WA4AIW	182	25	7	Q	ABD
AA4ZZ (+K4MQG,K2SD,W4MW,W4VHF,WA4UNZ)	170,154	684	207	L	ABCD
W4NH (K4BI,K4EA,KF4					

Los Angeles

Table with columns: City, Count, and other details. Includes entries like W3SE, KQ6GQ, K6BFT, etc.

Orange

Table with columns: City, Count, and other details. Includes entries like K6TSC, W6BFC5, KF6HAM, etc.

Santa Barbara

Table with columns: City, Count, and other details. Includes entries like W6FM, KE6RCI, etc.

Santa Clara Valley

Table with columns: City, Count, and other details. Includes entries like W6I, W6MT, W6GYD, etc.

San Diego

Table with columns: City, Count, and other details. Includes entries like KF6JBB, KE6NRO, KE6SQG, etc.

San Francisco

Table with columns: City, Count, and other details. Includes entries like W6W, W6MMM, etc.

San Joaquin Valley

Table with columns: City, Count, and other details. Includes entries like N6AJ, KF6CJV, KD6IVL, etc.

Sacramento Valley

Table with columns: City, Count, and other details. Includes entries like N6KXW, KE6BZT, KB6YAD, etc.

7

Arizona

Table with columns: City, Count, and other details. Includes entries like KE7FC, KE7NR, K7KGB, etc.

Eastern Washington

Table with columns: City, Count, and other details. Includes entries like N7AU, K7XW, N3CEV, etc.

Idaho

Table with columns: City, Count, and other details. Includes entries like KJ7TH, WB9DRB, KA7GLX, etc.

Nevada

Table with columns: City, Count, and other details. Includes entries like K7ICW, KO6CX, etc.

Oregon

Table with columns: City, Count, and other details. Includes entries like W7DSA, N7DB, W7ZOI, etc.

N7CNH (+KC7QAG)

Table with columns: City, Count, and other details. Includes entry N7CNH.

Utah

Table with columns: City, Count, and other details. Includes entries like N7JA, KC7KZD, KC7ZLP, etc.

Western Washington

Table with columns: City, Count, and other details. Includes entries like KE7SW, K7JX, AA7VT, etc.

Wyoming

Table with columns: City, Count, and other details. Includes entry W7DMD.

8

Michigan

Table with columns: City, Count, and other details. Includes entries like K2YAZ, K8MD, KC8AQH, etc.

Ohio

Table with columns: City, Count, and other details. Includes entries like WA8WZG, KE8FD, K8TKQ, etc.

West Virginia

Table with columns: City, Count, and other details. Includes entries like KB8FJ, K8GP, etc.

9

Illinois

Table with columns: City, Count, and other details. Includes entries like K2DRH, W9IIX, K9ZZE, etc.

Indiana

Table with columns: City, Count, and other details. Includes entries like WA1MKE, KB9NKM, W9ESU, etc.

K9QHO (+W9D9SP)

Table with columns: City, Count, and other details. Includes entry K9QHO.

Wisconsin

Table with columns: City, Count, and other details. Includes entries like WF9X, W9JN, N9JLL, etc.

WVOC (+ops)

Table with columns: City, Count, and other details. Includes entry KB9LYL.

0

Colorado

Table with columns: City, Count, and other details. Includes entries like W0AL, N0VSB, N0KE, etc.

Iowa

Table with columns: City, Count, and other details. Includes entries like K0DAS, K0MOS, N0SPP, etc.

Kansas

Table with columns: City, Count, and other details. Includes entries like W0Q0, N0LL, N0KQY, etc.

Minnesota

Table with columns: City, Count, and other details. Includes entries like KB0VUK, W0BWE, K0WLU, etc.

Missouri

Table with columns: City, Count, and other details. Includes entries like K0WFR, K0ETC, etc.

North Dakota

Table with columns: City, Count, and other details. Includes entries like N7OV, W0OAJ, etc.

Nebraska

Table with columns: City, Count, and other details. Includes entries like W0RVS, AEOG, etc.

South Dakota

Table with columns: City, Count, and other details. Includes entries like W0BLUX, W0HHM, etc.

Canada

Table with columns: City, Count, and other details. Includes entries like VE1Z, VE1MR, etc.

Quebec

Table with columns: City, Count, and other details. Includes entries like VE2GOG, VE2PJ, etc.

Ontario

Table with columns: City, Count, and other details. Includes entries like VE3RM, VE3BFM, etc.

VE3AV, VE3ROM, VE3TMG

Table with columns: City, Count, and other details. Includes entries VE3AV, VE3ROM, VE3TMG.

Manitoba

Table with columns: City, Count, and other details. Includes entries VE4KQ, VE4AS, etc.

Alberta

Table with columns: City, Count, and other details. Includes entry VE6EKP.

British Columbia

Table with columns: City, Count, and other details. Includes entries VE7AGG, VE7SKA, etc.

Rovers Atlantic

Table with columns: City, Count, and other details. Includes entries W3EKT, K3QII, etc.

Central

Table with columns: City, Count, and other details. Includes entries W9ZF, WB9SNR, etc.

Dakota

Table with columns: City, Count, and other details. Includes entries KF0UK, KB0EET, etc.

Great Lakes

Table with columns: City, Count, and other details. Includes entries AB4CR, N4STK, etc.

Hudson

Table with columns: City, Count, and other details. Includes entries N2MH, WA2IID, etc.

New England

Table with columns: City, Count, and other details. Includes entries N1MJD, N1XHS, etc.

Northwestern

Table with columns: City, Count, and other details. Includes entries KA7YOU, KB7UEP, etc.

Pacific

Table with columns: City, Count, and other details. Includes entries K7XC, N6IFW, etc.

Roanoke

Table with columns: City, Count, and other details. Includes entries KB4NV, WB3AKD, etc.

Rocky Mountain

Table with columns: City, Count, and other details. Includes entries N3EUA, N7TFT, etc.

Southeastern

Table with columns: City, Count, and other details. Includes entries WB0QGH, N6TEB, etc.

Southwestern

Table with columns: City, Count, and other details. Includes entries N6DN, KB6NHK, etc.

West Gulf

Table with columns: City, Count, and other details. Includes entries AB5SS, WA5VKF, etc.

Canada

Table with columns: City, Count, and other details. Includes entries VE3OL, VE3FHK, etc.

Checklogs

Table with columns: City, Count, and other details. Includes entry K3IXD.



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
OOO	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

SM W3TI presented them with a certificate of commendation for their 10 years of continuous activity and League affiliation. KB3CFV has taken 4 club scouts under his wing and teaching them code and theory. The Technical Committee, W3ROQ, W3JRY, N3LKK, N3ZXE, and ND300 run regular scheduled repeater maintenance for the South Mountain Repeater Association. "One K Club" certificates of commendation were awarded to the following for an annual traffic total of over 1000 for the year: W3KOD 7453, N3DRM 6062, W3IVS 3410, N3EFW 2198. Those with a count of over 500 received the "Half K Club" award: W3IPX 713, NR9K 704, N3YSI 610 and WA3EHD 507. Tfc: W3KOD 955, N3DRM 828, W3IVS 374, N3EFW 314, W3HK 186, NR9K 150, N3YSI 105, W3IPX 92, N3HR 82, W3JKX 53, WA3EHD 40, KA3ARR 30, N3AT 22, W3DP, N3IRN 14, AD3X 13, N3DCG 12, W3NNL 12, W3BNN 11, W3TI 11, N3KYZ 10, N3AO 9, KA3LVP 8, K3TX 6, WB3JOE 6, N3AS 5, WA3CKA 5, W3TWW 5, W3ZQN 4, W3SD 2, N3NNH 1. Nets: EPA 363, EPAEP & TN 212, PFN 149, PTTN 132, SEPTN 15, D6ARES 12, MARCTN 11, LCARES 6, SCESN 4, D8ARES 3, EPAS 2, 73, W3KOD, STM.

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 (ajyvq@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, WB4APP, 410-553-6021 (bruninga@greatlakes.nadn.navy.mil). MDC Section Web homepage www.erols.com/wb3v/mdc. Please visit the MDC home page for all the latest links, information and more nets! ANAR EC N3QXW reports 34 members, 5 nets on 147.805 with liaison to EPA, WVA, MEPN, MDD, BTN, and NCAC, 1 training session and 1 drill. OES reports received from N3QXW NU3D W3CA W3VNV K04A W4ATN. Several members participated in the "First Night Annapolis" event, and EC N3QXW also participated in a winter storm exercise at the ANAR EOC. CARR EC N3JIA reports 20 members, 4 net sessions on 145.41 with liaison to MEPN, MDD, and MSN by KE3FL and liaison to MEPN, BTN, DTN, WVA, Central Region and Western Region nets by KG6TU. OES reports received from KE3FL WX3F N3JIA N3TOT N3SOK KG6TU. Plans are underway to select training topics for the wintertime nets. Possible topics include use of 450 MHz to demonstrate benefits of using this band over 144 MHz in a hospital or in-building environment. Also under consideration is the creation of an AEC for Community Service Event Coordination. ALLE EC K04UW reports 13 members, 5 nets on 146.88. OES report received from: KB3CKH. During the last week in December, Hugh Turnbull, ARRL Vice President was taken ill. He has been recovering in Bethesda Naval Hospital. Hopefully by the time you read this he is fully recovered. Our best wishes for Hugh's speedy recovery, and thanks to all those who have sent cards/wishing him well. 73-Bill. With the nets: NET/NET MGR/QND/QTC/QNI: MSN/KC3Y/31/58/298, MEPN/KE3OX/31/74/690, MDD/WJ3K/62/233/662, MDD Top Brass KJ3E 246, K3JL 146, AA3GV 117, N3XPK 117, BTN/AA3LN/30/58/328, SMN/KE3OX/2/0/5. Tfc: KK3F 441, KJ3E 189, AA3GV 177, KB3AMO 133, W3YVQ 130, N3WKE 118, KC3Y 71, N3WKK 70, N3XPK 63, KE3OX 48, WJ3K 28, N3ZKP 25, WA1QAA 23, KG6TU 18, N3EGF 16, WA3PWR 4, KE3FL 3. PSHR: AA3GV 153, W3YVQ 141, N3XPK 133, KG6TU 131, N3WKK 131, KJ3E 130, KK3F 124, N3WKE 111, KB3AMO 107, KE3OX 103, N3ZKP 87, KC3Y 87, WA1QAA 87, WJ3K 77, KE3FL 73.

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. Website: <<http://www.northern.org/nyham>>. The ARRL CVARC Hamfest (Plattsburgh) will be Aug. 7 this year. New club call for JCRAC, KC2ELX; plans for a permanent club station. Hope it gets lots of use, especially Field Day. Hams involved in the recent Clinton Co EOC move to the Air Base. Should have good HF antenna space now! Dec. BBS Reports, B/P/T: KA2JXI 2231/450/39, KD2AJ 1988/525/72. Net Reports, QNI/QTC/QND: BFSN 201/0/22, BILL'S GERITOL 250/22/22, CARRIER 618/48/27, CVARCCPN 11/0/2, CVARCSN 36/1/4, CVARES 36/3/5, MVARC 33/0/4, NDN 238/8/31, NNYARES 223/5/30, SIRR 803/37/31, W2UXC SWAP 30/0/3. Watch for new Net Director soon. 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: WB2JVB. ACC: KB2ADL. TC: W2EKB, SGL: KB2WKY. OOC: K2PSC. PIC: N2YAJ. TS: W2PAU, W2BE, AB2Y, K2JF, WB2MNF, KD4HZW, WA2NBL. It's time to "THINK PUBLIC SERVICE" and "DO PUBLIC SERVICE". Check with county and your EC for a full lineup. Clubs often have activities. I encourage anyone with a story or experience to write it up and submit it to your club's editor. To hamfest chairmen, get your applications in ASAP. To all secretaries, if possible, send in your

club's Annual Report on-line. It's easier for you and workers at ARRL. Old Barney is celebrating their 25th year in 1999. Celebrate with a visit to the homepage: <http://www.llovelBI.com/obarc> and [freddie@cybercomm.net](http://www.cybercomm.net) will deliver a nice message. Tfc (Dec '98): WB2UVB 757, WA2CUW 423, KB2VSR 277, K2UL 94, K2UL-4 186, AA259 142, KJ4N 114, KA2CQX 65, N2WFN 58, KC2ATQ 51, N2VQA 49, KB2RTZ 40, KA2YKN 37, KB2YMB 19, N2FHJ 10, KB2CDB 8, NN2Y 6 N2HF4, K2BHJ 3, N2SOE 2. A newly formed Y2K Emergency Preparedness Net will meet every Tuesday at 21:00 on 147.345. A meeting will be held on the 2nd and 4th Friday at the Pennsauken Library 7 PM.

WESTERN NEW YORK: SM, William Thompson, W2MTA—see WNY Web site: www.dreamscape.com/phaedrus/WNY. CLUB NEWS: Fort Herkimer Ham of Year: N2LXA; '99 Officers: ARATS N2WUV KB2AIV N2TTF; KLARA KB2WVX KE2GEH K2VEB; NCARC KG2EI N2LRG WB2SNH N2LVX WB2LOE N2PCP N2RGT KE2PW; RAGS N2TRR KB2UQ W2IYK WA2URK WA2PUU; Rome KB2ESU WA2BNY WA2HNQ N2DJG WA2GBEL SCDXA KE2WY K2SY KB2DM WB2KCI KB2G; JARC AA2CUWA2TVE NA2A N2MTT; WNYDXA WB2RAJ N2LTC WB2YQH. CONGRATS: K2DH and RVHF set UHF test multiop record for Atlantic Division with 649,740 on 10 bands, and W2FU had 174,903 on 10 VHF bands as rover. MNI TNX: SM W2MTA reads 25 top notch club newsletters from RARA, WNYDXA, CVARA, Liverpool, NCARC, RVHF Group, TCARC, SCDXA, FHARC, RAGS, KALRA, MOARC, RAWNY, STARS, AHARC, ARATS, DRUMLINS, RRRR, RAPS, Rome, Lancaster, Orleans, GRAM, RDXA, and Skyline — other clubs are invited to send their newsletters too! Recent Silent Keys will be missed: W2AJ, W2WWP and WA2CYQ. In recognition of leadership of over 175 years total, Certificates of Merit were issued to AF2K K2KWK KA2GJV KA2ZNN KF1L N2DAY N2EH N2LTC W2BCH WA2AIV WA2PUU and WB2QIX. Appointment: (OES) KB4CMF:

Net	QNI	QSP	QND	Net	QNI	QSP	QND
Early Bird-FM	472	000	23				
NYS RACES-SSB	058	008	04	*STAR-FM	451	023	31
NYS RACES-CW	022	004	04	#WON-E-FM	536	126	31
#NYS/M-CW	232	137	31	#NYS/E-CW	360	177	31
CHN-SSB#3925	175	077	31	OARCN-FM	041	006	05
#WDM-M-FM	509	162	31	TIGARDS-FM	023	004	05
#NY PHONE-SSB	251	533	31	BRVSN-FM	162	006	24
#NYPON-SSB	381	263	31	STTHN-FM	061	011	09
ESS-CW 3590	303	096	31	#CNYN-FM	315	062	31
#NYSPTEN-SSB	367	050	031	#OCTENL-FM	620	277	31
#OCTEN-E-FM	1217	370	031	#WONL-FM	516	135	31
WDN THIN-FM	013	000	001	#NYS/L-CW	256	253	31

ARES report: OMEN 020-001-002^{TS} Designates Public Service Honor Roll. Tfc (Dec): N2LTC *1634, KA2ZNN* 695, KF1L* 578, KA2GJY* 516, WB2IJH* 501, K2BCL* 420, W2MTA* 372, NN2H* 294, N2OU* 253, W2FFR* 252, NY2V* 234, WB2QIX* 221, KB2VVD* 181, KB2WVW* 156, KG2D* 122, W2PIL* 104, AF2K* 92, N2CCN* 71, KG2OY* 70, KB2UQZ* 68, AA2ED* 67, N2WDX* 67, KA2IWK* 65, KB2ETO* 51, N2JRS* 44, WA2GUP* 38, W4BNY* 34, N2VDK* 27, KDN* 22, KB2TIY 21, W2RH 14, WA2UKX* 12, KA2QIK 6. Datalink RX/TX: K2DN 4/0, KA2GJV 4/10, N2LTC 214/160, NY2V 1/10. BPL: KF1L, KA2GJV, KA2ZNN, N2LTC, WB2IJH.

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: N3QCQ. DEC-N2: N3NIA. DEC-S1: KA3HUK. DEC-S2: KB3AQA. ARRL Affiliated Club presidents should make certain that their club information with the ARRL is updated each year. Special Service Clubs also need to send in a renewal for their Special Service club status once every two years. If your club is not an ARRL affiliated club or your club would like to explore the benefits of becoming a Special Service Club, please get in touch with the WPA Affiliated Club Coordinator, Twila Kerr, N3SJR, 120 Coolsprings Road, Indiana, PA 15701. I still have some open dates and topic ideas for club meetings. Please feel free to contact me for available dates. If your club needs some ideas or assistance with licensing classes get in touch with Robb Weiss, WPA Assistant Section Mgr — Youth and Education, 193 Shenandoah Dr, Pittsburgh, PA 15235. The ARRL has some great material available for new hams and new ham licensing courses. And while you're at it, don't forget to check out the ARRL's Registered Instructor program. December station traffic reports: N3ON 166, W3OKN 238, WA3UNU 189, W3NGO 179, AA3ML 8, AD4XV 10, WB8KPE 69, W3GJ 35, N3KB 354, N3WAV 75, N3IBT 22, WA3QNT 46, KC3NY 32, N3PBD 10, K3JHT 3, N3RDV 6, WA3QNT 46, N3HBB 48.

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WB0JXX—e-mail: WB0JXX@arrl.org—One of the nice things about Amateur Radio is that it is not just one single pursuit. There is a wide mix of activities and interests that one can explore. For some it is building, for others it's experimenting with new antennas or putting a new radio through its paces. Others enjoy operating activities such as DXing and contesting. If your club is looking for an activity to participate in together, consider entering in one of the many ARRL sponsored annual contests that allow submission of a club aggregate score. Each contest has its own rules, so just watch the contest column in QST for details and rules for the contest you're interested in. You can have the fun of competing against each other, while working for the total club score. This is an excellent way for new contesters to get involved as well. Traffic (Dec) DTN: QNI 160 QTC 16 in 23 sess. DEPN: QNI 25 QTC 0 in 4 sess. K3JL 39. 73 Randall.

EASTERN PENNSYLVANIA: SM, Allen R. Breiner, W3TI—EC: Eric Olena, WB3FPL. STM: Harry Thomas, W3KOD. OOC: Alan Maslin, W3DZL. SGL: Max Peters, K16NJ. TC: Cully Phillips, N3HTZ. ASM: Dave Heller, K3TX, Bill Dale, WY3K, J. Yogi Bear, WB3FQY, George Law, N3KYZ. New officers elect for 1999: Tri State ARA: K2KIP pres; N2YNZ vp, N2CNY secy/treas. Southern Pennsylvania ARC, pres WB3FQY, vp N3LOM, secy W3PWH, treas N3XPD, trustee WF3R, Mobile Sixer's Radio Club pres N3AMP, vp W3JG, secy KA3VTO, treas N3HT, dir W3DZL, W13S, WA3KFT. We welcome the CHESCO ARA that is now an ARRL Affiliated Club. Officers for 1999 are: WA3GHU, pres; WA3AFI, vp; W3WCG, secretary, N3VTE received the appointment as an OES for Northumberland Co. The following members of the Del-Lehi ARC activated the 2-day special event station. WX3MAS: KF3BD, W3BUD, KB3CSS, KE3AW, KB3DEC, N3YET, W3FYK, WO4H, W3HJ, AA3IX, KA3JWE, KA3MOU, K3MP, N3NGL, N3NVA, N3QZR, N3TFG, N3QZT, N3SQF, N3ULV, N3ZSR, N3WA, K3YIY, K3ZTJ, N5ZXJ. Those who took advantage of the vanity call system are: N3ZSJ who is now W3DAB, WB3U is K3IT, and KD3QZ is now W3JRY. Warminster ARRL Volunteer exam team give exams on the fourth Wednesday each month at the Warminster Recreational and Educational Center. The VE exam schedule for Tamaqua Wireless Assoc is 9 AM on the first Saturday of March, June, August and November in the Tamaqua Municipal Building. Class instruction sponsored by the Tri-State ARA are accredited for K3DRQ, KA3SNN, KA3VYV and KB3CFG upgrading to General. While attending their 1999 installation of officers,

Continued on page 116.

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- Freq: 10 kHz-1.3 GHz**
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- 1000 memories/file
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- (files limited by disk space)
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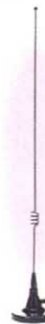
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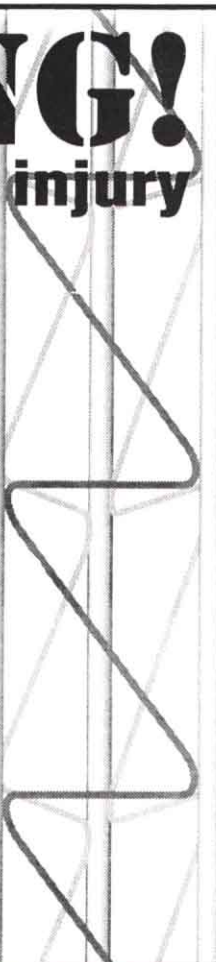
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CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBG. SGL: WA9AQN. ACC: N9KP. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. DEC-Central N9FNP. Due to new space limitations, the net listing will not be published each month in this column. It can be found on the Internet at www.qsl.net/kd9ul. Congratulations to Lonnie McVaigh, KB9LUN, on receiving the Sam Keene Memorial Award presented by the Disaster Preparedness-Emergency Response Association, International (DERA). McVaigh was recognized for saving lives during a 1996 tornado, which struck Decatur. As the tornado bore down on the city April 19, McVaigh moved from his storm spotter position to warn people to get off the street and take shelter. He was seriously injured as a result of his efforts to protect others. The award was given by DERA following an international review of disaster-related events. The Egyptian RC marks their 70th anniversary this year. The Kishwaukee ARC is in the process of setting up an emergency communications station at the new Red Cross building in DeKalb. KARC has a site on the Internet at www.tbncet.com/~jleondaw9c9j.htm. The new officers for the Metro ARC are pres W9MNF, vp N9BOR, sec W9LYA, trea W9FKC. Election results for the Schaumburg ARC are pres N9SQT, vp N9QGS, sec WD8BDP, trea KA9ZKR. The new officers for the York Road Club are pres WK9U, vp KB9RTP, sec KE9VC, trea K9BFU. 1999 officers for Peoria Area ARC are pres W9MI, vp N9MSG, sec N9PUW, trea KB9NW. 21 members of the PAARC provided communications for the annual Festival of Lights Parade. EC WA9TZL reports that during 1998 the St Clair ARES/RACES team responded to 11 tornado watch alerts, 5 tornado warnings, 11 severe thunderstorm watch alerts, and 7 severe thunderstorm warnings. Kane Co EC WB9PPK reports ARES membership has increased to 15, and amateurs are planning a net and storm monitoring on the repeater. It has been a busy year for all section volunteers. Your help and dedication is deeply appreciated. November traffic: ISN de WB9TVD QTC 100 in 30 sessions. ILN de K9CNP QTC 4 in 30 sessions. ITN de KF9ME QTC 17 in 23 sessions. NCPN de W9OUF QTC 37 in 25 sessions. No reports received from K9HEZ for IEN or KA9CYJ for IPN. K9CNP 147. December traffic: W9HLX 329, K9CNP 213, WB9TVD 37, N9DT 32, NC9T 32, W9FIF 6, WA9RUM 6, WB9TVD, ISN de WB9TVD QNI-275, QTC-177, Sessions-31. Ninth region C4 report de W9FC 302—sessions 61 reported—time 395 min—avg 4.93—rate .762—ILN K9CNP, KF9ME, NS9F. W9VEY Memorial Net via K9AXS 6 with 194 check-ins—1998 totals 79 with 2733 check-ins. D9RN de AF9FA Cycle One/Cycle Two Sessions-29/28, Traffic-172/189, Average-5.94/6.8, Rate-.306/388, Sec.Rep.-96%/97%, Checkins-27-15%/24-10%.

INDIANA: SM, Peggy Coulter, W9JUU—SEC: K9ZBM. ASEC, WA9ZCE. STM: A99HN. OOC: KA9RNY. SGL: WA9VQO. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Key: 12/23 Thomas King Sr., K9TKB, Evansville. He will be missed. The Bethlehem Special Event Station made 115 contacts in 31 states. That was good due to band conditions. The Mich City ARC each month help in testing the city's siren system. Helping last month were WD9BDW, N9RG, KA9PGA and K9ET. Are there other clubs that help test siren systems? Would like to hear from you. Congrats to the following having been awarded Amateur of the Year for their club for 1998. Bill, K9DBY, and Ron, W9YZ, from Indianapolis ARC. Randy, N9STQ, from Whitley Co ARC. Rick, N9TJG, from Michiana ARC and Charles, WA9SPT, from Grant Co ARC. Remember these amateurs and send into the IRCC in May for the Indiana Amateur of the Year award. As I write this, I am snowed in. This has been the worst winter snow storm since 1978, that I recall. I have mentioned this several times, but if you are a new ham and haven't seen this, try the Sloppy Code Net (it is called). This CW net's purpose is to build confidence and help increase code speed. The speed is generally 1-10 WPM. If you want to copy only, contact Henry, KA9ZNN, at 219-749-8968 for details. It is held every Sunday at 0200 UTC (9 PM) on 40 meters (7.1405 MHz). This is a chance to start building your code speed. 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	3029	549	1785	93
QIN	3656	1430/0000	228	115	702	52
ICN	3705	2315	116	42	464	30
IWN	3910	1310	2093	—	310	31
IWN VHF Bloomington			482	—	465	31
IWN VHF Kokomo			735	—	155	31
IWN VHF Northeast			943	—	620	31
Hoosier VHF nets (9 nets)			552	22	688	51

D9RN total QTC 361 in 57 sessions represented by K9GBR, WB9QPA, W9UEM, N9ZZD, N9XXI, KB9NPU and KA9UBY. 9RN total QTC 302 in 61 sessions represented by KO9D, N9PF, K9PUI, N9HZ, WA9QCF, WB9YU, AA9HN, and W9FC. Tfc: W9FC 353, K9GBR 205, W9ZY 144, KO9D 140, WB9QPA 101, W9UEM 82, K9PUI 80, WA9QCF 77, AB9AA 62, W9JUU 49, N9PF 48, KB9NPU 48, AA9HN 47, N9ZZD 44, K9RPZ 20, KA9QWC 18, W9BRW 16, K9DIY 15, N9WNH 14, N9JAI 11, W9RTH 8, W9EYH 7, W9CSJ 6, W9KT 5, K8LEN 4, WB9NCE 3, W9XD 3.

WISCONSIN: SM, Roy A. Pedersen, K9FHI—SEC: WB9RQR. STM: KA9KLZ. ACC: KF9ZU. SGL: W9RYA. OOC: W9RCW. PIC: K9ZZ. TC: K9GDF. ASM: W9CBE, K9UTQ. BM: WB9NRK. 9RCA report for November, Wisconsin stations N9KHD, W9CBE, N9CK, W9YCV and K9LGU. Thanks for all your work, it's really appreciated. Swapfest Cedarburg May 1, 1999. I regret to report the following Silent Keys, WD9JUY, WA9CCB. New officers Pinery Road ARC, pres KB9NEL, v pres.K9VSO. sec/trea, KF9ZU. N9UNR is the new EC for Ozaukee County. Green Fox ARC has a new call WB9RBC who was a member of that club, but is a Silent Key. KB9TPA upgraded to Tech Plus. Hamtrix. Mancorad Radio Club has been renewed as a Special Service Club. Madison area Repeater Assn Swapfest April 11. Ozaukee Swapfest May 1. Racine Megacycle Club Swapfest July 25. Lots of swapfests to go to. Hope to see a lot of you at these doings. WB9SMM retired

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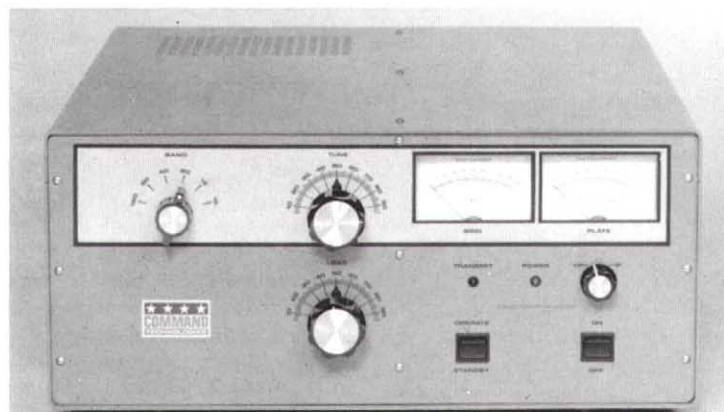
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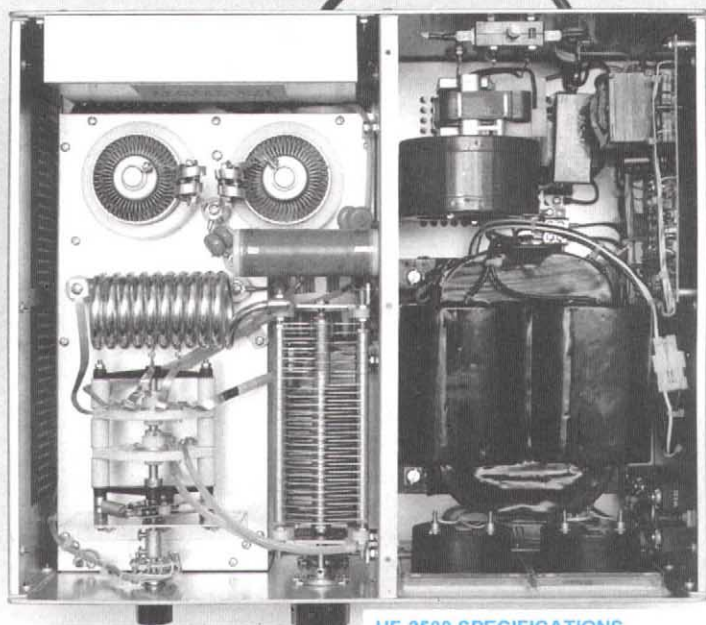
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as SEC effective January 1 1999. Thanks, John, for all your help. Effective May 1, 1999, K9LGU will be the new STM as Art, KA9KLZ, wants out. Thanks, Art, for all your help. I have decided to resign as SM effective July 1999. I was SCM for 11 years and now as SM for 3 years. I am not getting any younger, and I want time for myself and family. Just hope my successor will keep the ball rolling. I have enjoyed it very much, but it's time for younger blood. Please do help with news for this column. Thought for the day. Just for today: I will not find fault with a friend, relative or colleague. I will not try to change or improve anyone but myself. Tfc: K9JPS 833, K9RTB 789, W9IHW 521, WB9YPY 408, K9GU 401, W9CBE 373, N9KHD 171, W9YCV 106, N9CK 100, KA9KLZ 96, AG9G 81, N9BDL 78, KE9VU 58, W0UW 51, KA9FVX 43, KG9B 34, K9HDF 30, WB9ICH 30, K9FHI 30, KA9BHL 28, AF9FA 27, N9JY 18, WD9FLJ 13, K9UTQ 9, W9PVD 8.

DAKOTA DIVISION

MINNESOTA: SM, Randy "Max" Wendel, N0FKU—Each month I write this column with the goal of providing news and info of most interest to as many of you as possible. The value of this content will obviously vary each month as much as the items I have at my disposal to provide to you. As you should be aware, my efforts are to encourage as much Amateur Radio activity on a local basis as possible...thru the resources of the field organization of which I orchestrate. We strive to provide a service to our fellow hams as well as a resource to the public. The value of these efforts, in the long run are up to the individual... YOU. It is YOU who, bottom line, finds what value these activities are to the good of ham radio...especially how they apply on a more local basis. The ARRL is OUR "club," and how we make use of our club is really up to all of us. Since the ARRL is our national voice it is our responsibility to urge as many hams to consider joining the ARRL. Most of us probably generally assume that any ham will join if they would find a value in doing so. But, isn't it really our task to help provide the awareness of what those values are? How do you or your local radio clubs REALLY meet this objective? I think those values are obvious...if we'd just stop and take a hard look. I'd love nothing more than added space in QST to write about all our activities in our state. 73 de N0FKU.

Net	Freq	Time	QNI/QTC/Sess	Mgr
MSPN/E	3870	5:15 P	917/151/31	W0WVO
MSPN/N	3860	12 P	492/120/31	WA0TFC
MSSN	3710	6 P	N/A	Vacant
MSN/1	3605	6:30 P	285/184/31	W0HPD
MSN/2	3605	10 P	115/96/31	K0PIZ
PAW	3925	9A-5P	3285/116/113	KA0IZA

Tfc: W0WVNJ, W0LAW, K0B0AII, W0GRW, W0HPD, W0FA, WA0TFC, K0PIZ, W7HH, K0WPK, K0BAIJ, KN9J, W3AF, KA0IZA, W0WVO, K0OGI, K0OOHI, WD0GUF, N0JP.

NORTH DAKOTA: SM, Bill Kurtti, WC0M—Bismarck Hamfest Feb 27 location unavailable at this time. Fargo Hamfest March 14 at the Red Valley Fairgrounds in West Fargo. Both hamfests are planning meetings, vendors, flea market along with lunch and a lot of visiting with your ham friends. 36th Peace Garden Hamfest July 9-11 at the International Peace Gardens. Vendors, large flea market. Weekend of camping with your ham buddies. I'm sorry to report that W0IZA is a Silent Key. Mert was instrumental in changing the picnic over to a hamfest. At the Fargo Christmas party, W0ZQJ, was awarded the Ham of the Year award along with the Lifetime Achievement award. N0LX won the traveling tube award. Also, I was pleased to present a Certificate of Merit to the club for the work done by the RRRR during the 1997 great Red River flood in 1997. I also attended the CDARC Christmas Party. Tfc: N0RDJ. A. Net Sess/QNI/QTC: Goose River 4/69/0; DATA 24/556/14.

SOUTH DAKOTA: SM, R. L. Cory, W0YMB—Sioux Empire ARC at Sioux Falls has started a licensing course on Jan 14. Students who pass their exam are offered membership into their club for half price. Club members are encouraged to attend the classes and act as Elmers to the students. On Sept 30, the SD ham population was 1622 which was down 0.3 % from 1997. SD had 189 Extra, 299 Advanced, 346 General, 277, 376 Tech, Tech Plus, 139 Novices. LARK ARK at Watertown reports last June Field Day score up 50% over last year with 1562 points. Watertown club is working hard on the Dakota Division Convention next Aug 6-8. At Pierre, the 145.350 repeater has encode/decode tone of 146.2. The link repeater on 146.730 is up and operating. The ARRL Hamboree 21 will be held June 4-5 at the Marina Inn, South Sioux, NE.

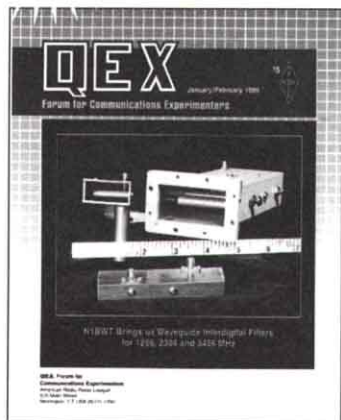
DELTA DIVISION

ARKANSAS: SM, Roger Gray, N5QS, e-mail n5qs@arrl.org—I would like to announce the appointment of Eldon Bryant, K7ZQR, as Arkansas Section Traffic Manager. I also want to thank Eldon for helping Joe Johnson, W5QFU, during his recent illness up to his passing. Over the past couple of weeks, I have had many reports of the work done around the state during the recent ice storms that took out power for many Arkansas residents. I want to take this opportunity to thank those involved and encourage everyone to contact your local EC and offer your services for the next disaster. A list of ECs can be found at <http://www.uarl.edu/~ham2/ec.htm> or you can call or write me for the information. Support your ARRL Traffic Nets. AR Phone Net (APN) M-S 6:00 A 3894.5; AR Mockingbird Net (AMBN) M-F 4:30 P 3928; AR Razorback Net Daily 6:30 P 3987.5; AR CW Net (OZK) Daily 7:00 P 3592. Tfc: K7ZQR 79, AB5SG 43, K5BOC 38, AB5AU 32, AB5ZU 30, K05E 10, W5HDN 10, K5UEW 6.

LOUISIANA: SM, Lionel A "Al" Oubre, K5DPG, e-mail k5dpg@arrl.org Web Page www.aisp.net/k5dpg. ASM: K5CXC, K5MCC. ACC: KA5IJU. BM: K5ARH. TC: K5E5F. SEC: N5MYH. OOC: WB5CXJ. PRC: K5SQVI. STM: KG5GE. NM LTN WB5ZED. NM LCW: W4DLZ. Up coming hamfests are: Lafayette March 13-14. Go out and support our area hamfest events. The AARA presented its 1st Annual Wouff Hong Award to KN5GRK. TCHC officers for 1999: pr W5LA, vp KB5ZVK, sec/tr KC5LFB. We are firmly in the grip of winter, and everyone should be taking preparations to deal with winter storms. We have already had one

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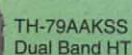
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ice storm and a tornado this winter. Can spring be far away? Louisiana Section Net Schedule: LTN 6:30 PM, local, 3910 kHz, nightly, WB5ZED, mgr; LCW 6:45 PM local 3673 kHz, nightly, W4DLZ, mgr. Reports for December 1998: LTN QNI 327 QTC 185 in 31 sessions. PSRR: NOKWA 39, WB5WBZ 66, KG5GE 98, K5MC 112, K5IQZ 122, W5CDX 131, K5DPG 141, WB5ZED 171. Tlc: WB5WBZ 7, NOKWA 8, W5CDX 14, KG5GE 27, K5DPG 32, K5MC 98, K5IQZ 180, WB5ZED 305.

MISSISSIPPI: SM, Malcolm Keown, W5XX—DEC: K5IMT, N5XGI. EC: KK5BY, W5DJW, KB5DZJ, KM5GT, WA5TEF, KC5TYL, N5XGI, KB5WJJ, N5XXX, KB5ZEA. Congratulations to KB5W for making BPL! Do you need to get in touch with a Mississippi Awards Manager to get your WAS or VUCC QSLs checked? For HF awards, contact W5OXA, N5QDE or KB5VLA; for VHF/UHF awards contact KG5MZ or N5QDE. Congratulations to the following new club officers: West Jackson County ARC: W5OXA pres, K7ZYV vp, KC5LCW secretary, and KC5RRG, treasurer. Hattiesburg: N5UE pres, KD5ELS vp, KC5FFT s/t, and KB5VCC FD chm. Jackson County ARC: N4KMH pres, WD5HAZ vp, KF4WNN secretary, and KB8CID treasurer. Net sess/QNI/QTC: MSPN: 31/2640/57, MTN: 31/157/112, MSN: 31/1197/16, PBRA: 31/857/0, Jackson Co ARES/RACES: 31/530/29, MSSN: 29/159/3, LARC: 5/65/0, MLEN: 4/70/0, MBHN: 4/24/0, Stone Co ARES 4/62/1, MCARAN 4/57/0. PSRR: KB5W 149, N5XGI 132, K5VU 122, W5XX 72. Tlc: KB5W 626, N5XGI 59, K5VV 51, W5XX 4.

TENNESSEE: SM, O. D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU. OOC: AD4LO. TC: KB4LJV. JCARA elected new officers as follows: Mike Wechsler, N4OFA, pres, Richard Randolph, KT4OR vp, Ed Ingraham, WX4S sec, C.V. Jayne, W4NHT treas. DARC's new officers are: Ben Troughton, KE4YU sec, Don Mills, K9DM treas, Regina Graham, KF4IGS dir of training, Tommy Thompson, KD4TJO dir of pub, Tom Richardson, K4TTA dir of programs, Eddie Trammel, KF4QFV dir of meetings & special events, Tim Morrow, AB4NH repeater trustee & Joan Thorne, KN4PM VE liaison. SRARC officers for 1999 are as follows: Roger Hughes, AC4UU pres, James Haralson, KE4DFC vp, Dave McDonald, KD4VWN sec, David Barlow, KR4VA treas, K4FUN was activated for the Nov sweeps SSB, participants were: NY4T, KF4GKN, KF4GFZ, KD4BAM & KF4GNV. RACK members participating in the Autumnfest Run were: KE4HSM, KE4RLJ, KF4VMK, KE4OTZ, N4RPR, KD4WYJ, KF4VMJ, KE4HID & KF4YWX. The Certificate of Merit has been awarded to the following appointees for outstanding service: Milo Ward, WB4DYJ, Assistant Section Manager; Wylodean England, WA4HKU, Section Traffic Manager; Jean Giesler, W4TYU, Public Information Coordinator; James Jarvis, WD4JJ, Section Emergency Coordinator; Floyd Rathbun, AD4LO, Official Observer Coordinator; James Butler, KB4LJV, Technical Coordinator & Milton Fanning, WA4GZZ, Tenn Phone Net Manager and NCS. Net sess/QTC/QNI: TEMPN 22/34/808, TEPN 25/111/2912, TSCWN 19/4/64, TMPN 31/49/2296, TCWN 23/66/239. Tlc: NZ4Q 355, WB4GIJ 195, N4PU 88, WA4FMR 63, W4SQE 63, WA4HKU 46, KA5KDB 44, WA4GZZ 32, WB4DYJ 25, WA4GLS 17, WD4JJ 14, K4UMW 7, K14V 6, W4PSN 4, W4HZD 4, W4IKK 2.

GREAT LAKES DIVISION

KENTUCKY: SM, Bill Uschan, KC4MIS—We have to make a decision. The amount of editorial articles in QST are being cut back. Overall the Section News articles have been cut 16%. The Kentucky Section News has been cut from 29 lines to 24 lines. So something has to go. What I am not sure of. I always try to include the section net info and traffic amounts for individuals. I haven't polled my staff as of yet, and a decision has to be made as to what is cut. Remember Feb. 27-28 is the Great Lakes Convention Hamfest in Cincinnati. March 13 is the Cave City Hamfest. May 1, 1999, is the Owensboro Hamfest and the Louisa Swapfest. Congratulations to the new officers of the ARTS club in Louisville, Butch Harley, W4MWH, president; Ken Brickel, AC4VV, vice-president; Rick Brown, KD4CLQ, treasurer; and Jennifer Dalton, KE4AYB, secretary. It is with deep regret that we mention that Pat Rule, K4MPR, became an SK on December 16, 1998. Pat was active in the KY traffic nets and will be missed. Net/QNI/QTC/Sess: KRN 933/23/23, MKPN 1327/52/31, KTN 1351/62/31, KYN 342/77/31, KEN 157/0/4, CARN 375/31/31, TSTMN 494/37/31. Tlc: K4AVX 77, W4ET 18, AE4VV 19, KO4O 41, KD4PWK 4, KU4UO 22, K4YK1 27, WB4ZDU 6.

MICHIGAN: SM, Dick Mondro, W8FQT w8fqt@arrl.org—ASM: Roger Edwards, WB8WJV wb8wvj@centuryinter.net. ASM: John Freeman, N8ZE n8ze@voyager.net. SEC: Deborah Kirkbride, KA8YKK ka8ykk@concentric.net. STM: James Wades, WB8SIW wb8siw@aol.com. ACC: Sandra Mondro, KG8HM smondro@mich.com. OOC: Donald Sefcik, N8NJE fdsmith@tir.com. PIC: David Colangelo, KB8RJI dcolangelo@ameritech.net. SGL: Ed Hude, WA8QJE edhude@juno.com. TC: Dave Smith DSmith@smithassoc.com. VHF/UHF Net Manager Ray Knuth, KB8ZY. Section Newsletter Editor: Dave Colangelo, KB8RJI dcolangelo@ameritech.net. QRV Bulletin Editor: Mike Pearsall, N8MP n8mp@concentric.net. I would like to thank Erv Bates, WB8ERV, who has served us so well as our PIC and for increasing the ranks of our PIOs and developing a training program for them based upon his experience in the broadcast media. Erv found it necessary to step down due to family and job commitments and continues to serve as president of EMARC and as a PIO. Thanks, Erv. I am proud to announce the appointment of Dave Colangelo taking on the PIC appointment. As you know, Dave has been serving as our Section Newsletter Editor and has given us a wonderful tool for communicating with others. He has made our quarterly newsletter one that continues to be updated with recent information and continues to be available on the Great Lakes Division Website. As I write this, we are finishing the digging out of a winter storm that caused in many areas, an accumulation of 8 to 14 inches of snow. With winds gusting to 40 or so, many roads became impassable due to the drifting snow. Our Section Traffic Manager, Jim Wades WB8SIW, activated Special HF Sec-

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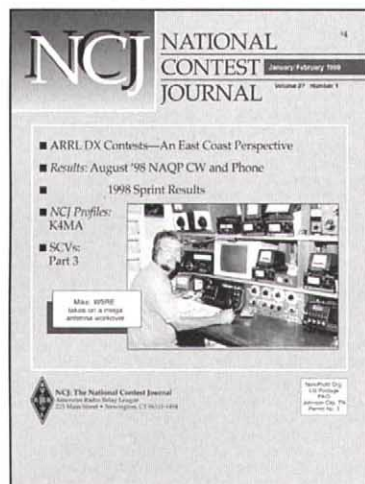
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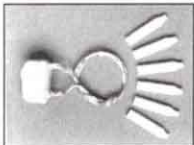


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tion Nets to gather Snowfall reports for the 5 NWS offices that serve us here in Michigan. Jim mentioned that 140 or so reports were taken during the 2-day special sessions on the phone and CW nets. Thanks to all who took time to go out and measure the snowfall and submit a report every 3 to 6 hrs. The NWS really appreciated this. If we have another major event, we plan to continue this worthwhile activity. As you read this, some may have already attended a severe weather SKYWARN Spotter Class. We all should be preparing for the spring and summer severe weather season. Be sure to try and attend your local spotter class or one in an adjoining county if you are unable to attend the local class. Be sure to check that your ready kit is packed for the spring-summer spotter season. Still time to register with SEC Debbie Kirkbride, KA8YKK (address above), for the Exercise Design Workshop at the State Police Training Academy Saturday March 6 at 10 AM. There is no cost including all materials. Thanks to Lt. Bob Ballard Michigan State Police EMD for making this one available to us. 73, Roger Edwards WB8WJV. Tfc: KB8ZY 270, N8FPN 210, K8LJG 189, WB8SIW 164, AA8PI 140, WX8Y 139, K8GA 87, N8TDE 84, KB8HGM 82, KC8GMT 80, K8GXV 66, WA8DHB 64, W8RNO 49, W8K 42, K8AI 33, K3UWO 33, AA8SN 31, W8RF 29, K8UPE 29, N8JGS 25, N8OSC 28, W8YIQ 23, K8ZJU 15, WB8WJV 12, KC8FX 8, W8YZ 4, WD8OEP 4, KA8LAR 4.

OHIO: SM: Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12)—In 1999 we continue to spotlight section appointments. This month it is the PIO—Public Information Officer—that person in your ham radio club who keeps you informed of club activities (via your newsletter) and tells your community (via news releases and speaking to community groups) what ham radio does in the areas of public service and public welfare. If this is your interest, contact Bev Priest, N8VZV <mapriest@erinet.com> Ohio's Public Information Coordinator for a PIO appointment. Also get your newsletter qualified for the 1999 Ohio Section Newsletter Competition... The 1999 Ohio Section Conference is Sept. 18 but the agenda is being prepared now. Interested in participating? Let me know... Ohio Section Congratulations to Don Camery, K8EC, Felicity, and Jim Linn, WB8RRR, Cincinnati, for selection as newest members of the Greater Cincinnati ARA Hall of Fame; to 1999 Newark ARA officers, Pres. N7CEU, Veep KB8GVW, Sec. N8HFI and Tres. KB8RJ; to Tony Fabro, N8RRB, Columbus, at COARES Net Manager of 1998; to Dick Daniels, W4PUJ, of AMSET, for visiting Maple Knoll amateur station W8MKV, Cincinnati; to Capital Cities Repeater Assn, Columbus, for becoming Ohio newest Special Service club; to Lori Damewood, N8BAN, Enon, for winning the KA8RIX (SK) Memorial Award for the Clark County ARA.... The STM tells me Ohio Traffic nets miss the dedication of Lloyd, W8PMJ, Newbury, well known for his outstanding work in handling 8th call area traffic...The OOC, K8CM, is getting regular monthly reports from most OOs reporting. A few still need reminding that these reports help ham radio justify its existence...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. And all of us should be receiving your newsletters and club activities. Contact me for addresses. It is to your advantage to spread the news around...Hamfests this month - Mar 14 at Conneaut ARC, and March 21, Toledo MRA, at Maumee...DE, K8QOE...Now for our December and end-of-1998 traffic reports.

Net	QNI	QTC	QTR	Sess	Time	Freq	Mgr.
BN (E)	184	30	406		1845	3.577	WB8KFN
BN (L)	225	120	401	31	2200	3.577	NV8V
BNR	136	74	892	28	1800	3.605	WB8LQD
OSN	141	42	526	31	1810	3.708	WB8KQJ
OSSBN	1995	739	2830	93	1030,1615,1845	3.9725	KF8DO
OH Section ARES Net				1700 Sun	3.875	WB8MPV	

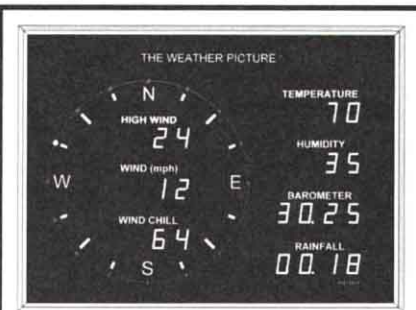
Tfc: K8DHD 334, KD8HB 286, W8PBX 262, NS8C 223, WD8KFN 216, N8FWA 191, W8STX 148, W8EYQ 143, KF8DO 132, WA8HD 121, N8TNV 113, KB8TAI 109, W8M8M 106, KA8VWE 107, KC9KSR 105, KB8YB 75, WA8SSI 102, W8RC 97, KA8FCC 90, W8LJW 76, K8OUA 75, K8WQO 75, N8CW 73, W8DD 69, KD9K 68, W8GSA 67, N8RRB 65, WB8HHZ 52, K8JA 51, K3RC 46, KB9GGV 46, KB8SBK 46, K8IG 42, WD8MIO 42, W8LDO 38, N8YXL 33, KC8KYP 32, NY8V 31, W8BO 30, W8BWO 30, KB8ROA 25, WB5ZJN 25, N8UEO 24, KC8HTP 23, KN8O 23, KC8FWU 23, N8GOB 21, WD8KBW 20, KB8SIA 19, KB8UEY 15, K8QIP 15, N8WLE 15, WB8KWD 14, W8GAC 14, KF8FE 11, KC8HFV 8, KC8JPP 8, W8LCT 7, N8RAK 7, AA8XS 7, N8SVA 6, N9PAI 4, WD8HIO 4, W2INO 4, K8WC 3, W8GDQ 1, KE8FK 1. (Nov) K8DHD 307, WB5ZJN 22, KA8OQF 2.

HUDSON DIVISION

EASTERN NEW YORK: SM, Rob Leiden, KR2L—STM: Pete Cecere, N2JZJ. SEC: Ken Akasofu, K17JQC. ACC: Shirley Dahlgren, N2SKP. SGL: Phil Bradway, KB2HO. PIC: John Farina, WA2QCY. 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 (December 1998) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 41/8 CDN 366/145 ESS 303/196 HVN 528/487 NYPHONE 251/1089 NYPON 381/529 NYS/E 360/371 NYS/M 232/382 NYS/L 256/509 SDN 336/253 Section News: Congrats to George, KB2SIY, on his appointment as DEC North. Check out the ENY Emerg Net 145.25 on the 1st Tues each month. Remember Spring can mean floods...are you ready? The ENY Convention is coming in late April...I'll see you there. 73 de Rob, KR2L. PSHR: N2YJZ, N2JBA 176, WB2ZCM 142, K2CSS 136, K2BTP 121, W2AKT 119, W2JHO 119, WB2IIV 112, KB2YUR 78, KC2DNO 77. Tfc: N2YJZ 633, WB2IV 213, K2CSS 100, N2JBA 93, W2JHO 90, KC2DNO 82, K2BTP 73, WB2ZCM 52, W2AKT 26, KC2DAA 23, KB2YUR 20, W2CJO 17, N2AWI 14, KL7JQC 3.

NEW YORK CITY/LONG ISLAND: SM, George Tranos, N2GA—ASM: KA2D, N1XL, K2YEW, KB2SCS, KD2YA. SGL: N2TX. SEC: KA2D. ACC: K2JEV. PIC: N2RBU. TC: K2LJH. BM: KG2M. OOC: N1XL. STM: WA2YOW. Thanks

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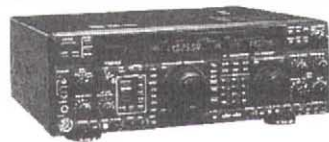
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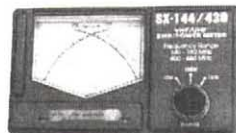
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8214 RG 8/U Type, 11 AWG Stranded Center Cond, 97% Braid, Atten 3.9 dB @ 400Mhz, Foam Polyethylene di-electric, Black PVC Jacket	\$0.43	\$0.42	\$0.38
9258 RG8/X Type, 16 AWG Stranded BC Center Cond, 95% Braid, Atten 2.3dB @ 50 MHz, Foam Polyethylene di-electric Black PVC Jacket	\$0.17	\$0.16	\$0.15
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to Mark, W2UFO, who steps down as SGL and congratulations and good luck to Mike Andersen, N2TX, who joins the staff as the new Section Government Liaison. The ARRL team again was successful in the tower variance of Anthony AB2CJ, in Smithtown in January. Testifying before the ZBA were K2YEW, K2RIW, W2QUV and N2FF. GSBARC Hamfest this month on March 7. Please send in your Annual Reports and notify me of new officers. Please contact me if you would like me or my staff to speak at your club meeting. 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 6th 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, AI Bender, W2QQ, 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, N2YBK, 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. Report all changes to N2GA before the 12th of the month. Tlc: N2AKZ 417, WB2GTG 416, KB2KHL 148, W2RUL 146, KC2ACL 126, N2XOJ 97, WA2YOW 32, KB2GEK 30, AA2NX 21, NB2D 8.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, NOJL @ KE0BX—ASM: N0LDD. SEC: NA0R. ACC: N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. TC: W0DIA. TSARC-N are still at the van. Changes all the time! Sounds like it is getting better. Note new officers at SARA are K0CAXK, K10KO, and N0EUM. Officers at EIDX are K0RX, KU0A, and K0VZR. At TSARC-N WA0AUU, KB8RPM, A1NIRAA: K8YWT, K10IH, K0QAKZ, KBOOCI. At FMARC: W00B, KBOERK, and K0AYP. CVARC notes mention of Linn County Amateur Radio in a FEMA manual. Congrats. Polk County ad comms for a cross country race. Sounds like they did well and had a good time. K0RX demonstrated some unusual and interesting contest techniques at the EIDX meeting. I enjoyed the equip reviews in the EIDX letter. Sorry to note the loss of W0UJQ, WK0I, and K0HFU. Newsletters note the passing of N0DX, WA0MXH, and K0ACOO. If any want to send their newsletters e-mail: n0jl@arrl.org. I am hearing of many clubs that want to take the newsletters to e-mail because of increasing postal costs, and I can help. Since the last column, I have received seven traffic reports from only four stations. They do total 694 pieces of traffic. In section net reports indicate 239 messages. I know that more people are out there than just the four. How about a report? 73. Tlc: W0SS 200, W0SS (Nov) 161, KA0ADF (Nov) 108, KAOADF 96, NR0E (Nov) 64, NR0E 41, NOJL 24.

KANSAS: SM, Orlan Q. Cook, W00YH—Hi gang, I am glad to see the Central Kansas AR Club has made a request to hold an ARRL convention at Salina, Aug 22. ARL Bulletin 001 states that the "Field Services and Educational Activities" are now one department. This will increase the efficiency and the move also was designed to reduce expenses because of a decline in both ARRL membership and Amateur Radio licensing in the past year. See the bulletin for the staff who wear the hats. I want to take this time to thank all of the KS section members for a job well done in '98. Tnx to Louie, W0YVWZ, and his NCS and members of the 2 KS WX nets. The same to Bill, N0KFS and the KS SSB and Phone nets NCS and members. Tnx to Jay, AB5PA, and the whole CSTN gang. Tnx to Tom and the QKS crew. Same to Ron, KB0DTI, and the Slow Speed CW net. TU Joseph, WD0DMV, and the whole ARES group. TU, K0BXF, for the many hats you wear. I especially want to recognize two EC: June, KB0WEQ, and pp 70-71 of Jan QST tells it all. Rick, KF4LM, also took part in this meeting and has built up a great ARES group. Nov Kansas Nets: sessions/QNI/QTC, KSBN 30/1229/108 KPN 22/ 289/19 KMWV 30/655/520, KWN 30/1025/593, CSTN 25/1663/113QKS 59/289/169 QKS-SS 7/16/0. Tlc: N0KJ 507 WBOZNY 234 W00YH 169 K0PY 95, KX0I 55, K0RY 23, KB0DTI 12, W0WWR 10, K0BJ 8, NBOZ 5.

MISSOURI: SM, Charles Boyd, KE0K—ACC: Keith, WE0G. ASM: Karen, N0TDW. ASM: Tom, K10JO. OOC: Mike, N0QBF. PIC: Dennis, AA0A. SGL: Ern, KD0UD. SEC: Fred, WA0US. STM: Tom, K10JO. TC: Mac, K4CHS. January brings two great hamfests: St Joseph on the 16th and St Charles on the 30th. Hope to have seen you there at one or both of these winterfests. I have no plans of making any changes in the staff at this time, so if you want to be replaced or might want an appointment, drop me a line. Traffic for December: K10JO 1178, KE0K 121, WA0YJX 56, KG0IV 34. PSHR: KE0K 115, K10JO 103, KG0IV 101. Net reports: WAARCI 4/100/0 KBOVZP: SWMO 4/100/5 NOUAM: MOTN 31/719/155 KOIPM: QCWA #35 4/71/0 KOYML. Audrain ARC 5/33/0 WBOSEN: CARL 5/30/0 KCOMV: Rolla Billboard 31/333/6 NA0V: Paul Revere 4/434/0 NOIWA Jackson Co ARES 4/27/0 KOULA: 1880 GOB Net 31/308/83/WL7YM: Mon 1 & 2 55/164/45 W0WFF; St Louis Repeater Club 4/11/17.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASMs: W0KVM, N0MT, W0BUHL, WY0F & WBOYWO. I am pleased to announce that Gene, W0UJL of Neligh has been appointed NM of Nebraska 40 Meter Net. The net meets daily at 1900Z on 7282. If you hear any intentional jamming of HF nets, don't egg the individual(s) on. Instead, call the FCC Amateur En-

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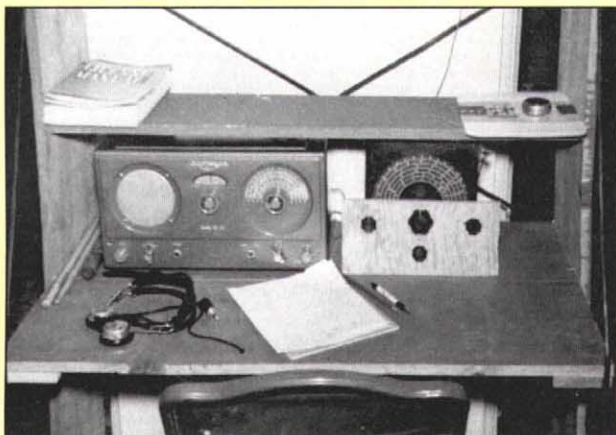
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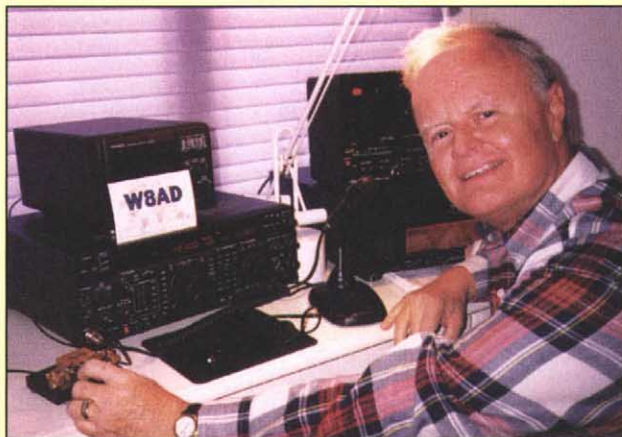
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Don, W9JTN, in 1951, with HQ129X,
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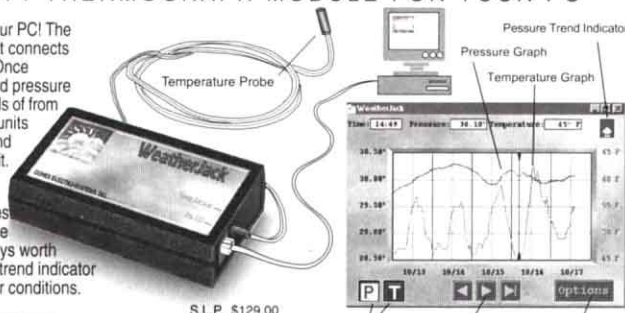


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forcement Hotline at 202-418-1184. There has been great success with the cleaning up of our frequencies. This has been long overdue. Let's just hope it continues. Saturday, Dec 12, the AK-SAR-BEN ARC hosted the North Pole Net enabling children in Omaha area hospitals to talk to Santa via 2 meters and see him via ATV. Members from the Lincoln ARC assisted with the annual downtown lighting ceremony on Dec 4. Although the weather kept many away, it was great seeing many of you at the Kearney Hamfest on Jan 9. The ARES forum included a talk by Pat Pope, WB0GWT, of the Nebraska Public Power District concerning Y2K and producers of electric power. Tfc: KOPTK 120, KE0XQ 36, WOAP 7, K00AL 4, WY0F 4, W0UJ 4, N0CQI 4, K0UWK 4, KORRL 2, KA0DOC 2, W0EXK 2, K0SW 2, W0C0 2.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsy Doane, K1E1C—Asst SMs: N1API, NK1J, K1STM, KZ1Z. BM: KD1YV. OOC: WA1TJT. PIC: W1FXQ. SGL: K1AH. STM: K1HEJ. TC: W1FAI. Many thanks to Michelle, N1PNT, for serving as affiliated club coordinator. Her busy schedule has forced her to resign this position—I will be looking for another ACC. Good luck Michelle! Rusty, NM1K was awarded a plaque with a CW key displayed by the Newington Amateur Radio League for his outstanding work as educational coordinator for NARL classes from 1988-1997. Congrats and thanks again for your FB work on behalf of Amateur Radio, Rusty! The Candlewood ARA is involved in an exciting project of writing and producing a few cable TV programs introducing Amateur Radio for Comcast and Charter Communications. Alex, N1TIV is heading up this project—he and his family have done similar programs for scouting! What a super idea—I'll keep you updated as this work progresses. The Southeastern CT Radio Amateur Mobile System (SCRAMS) is busy with lots of technical activities updating their repeater and packet equipment with the goal of linking to the 145.29 repeater. Clubs are urged to fill out the annual reporting form early and send it to HQ—accurate info results in better service to you—thanks! NTS ops watch for the date and place of this year's traffic handler's dinner. Do make an effort to attend, as it is one of the few times you will get to chat in person about traffic handling. Besides, the food is great! Net sess/QNI/QTC/NM: RTN E/L 2/412/170/WA4QXT; WESCON 31/316/129/KA1GWE; NVTN 31/239/97/K1STM; CPN 31/229/103/N1DIO; CN28/96/37/N1AEH; Bears of Manchester 27/388/406/NM1K. Tfc: NM1K 1893, KA1VEC 504, K1HEJ 327, KA1GWE 231, WA4QXT 229, K1STM 151, N1VXP 111, N1ZYD 10.

EASTERN MASSACHUSETTS: SM, Larry Ober, W1MW—ASMs: WA1IDA, KB1BCF, N1GTB, N1UGA, N1SGL. ACC: N1AKG. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SEC: W3EVE. K3HI. STM: WA1TBY. TC: W5VU. EMA ARRL: voice: 978-567-0942. Packet bulletins: ARRL@EMABBS. e-mail: w1mw@arri.org. e-mail list: ema-arri@netcom.com. Web: <http://www.qsl.net/ema-arri>. A reminder to club newsletter editors—please send newsletters to my home address as it appears in the front of QST. My Callbook address is a post office box maintained primarily for QSLing. It is only visited periodically. SEC, W3EVE held an Amateur Radio Communications Workshop in Marlborough on January 23. The Boston ARC continues to be active with VE sessions, their repeater and planning for the upcoming Boston Marathon. The Genesis ARS reports much activity with the South Shore Fox Hunters Association. SEC W3EVE was the January guest speaker at the Cape Ann ARA. The Quannapowitt RA held licensing classes starting January 26th in Reading. The Algonquin ARC will hold a flea market on February 13th. The Wellesley ARS continues to hold license upgrade coaching sessions and has receivers to loan for W1AW code practice. Perhaps, we have not yet recovered from the holiday season, but that's all the news to have reached my mailbox this month. Until next month, 73 de W1MW. Tfc: WA1TBY 651, N1LJK 316, W2EAG 287, NZ1D 259, N1TAT 193, K1SEC 115, WA1FNM 103, N1TDF 97, KB1EB 81, WA1LPM 64, K1BZD 59, N1SGL 51, KA1VAX 44, K8SH 43, N1OTC 40, N1LAH 33, N1IST 28, N1AJJ 25, N1TPU 20, NG1A 18, KD1DHG 16, N1XQC 2.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: NX1A. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: KA1WRC. PIC: KD1OW. SEC: N1KGS. Asst Dirs: W1KX, KA1TKS, K1NIT. Web Site: N1WFO. Last Nov the Oxford County ARES crew participated in the Chamber of Commerce Parade by providing excellent communications and a most excellent float of a scaled down 120' tower complete with strobe light and ARES banner. Great job! Tnx to N1GZB (EC), N1NYW, W1IF, N1VVJ, KA1KYY, N1YIR, N1RXJ, & N1XMU. Keeping Amateur Radio in the public eye is the best way to promote the hobby. The Amateur Radio community should be able to toast in the new year, because the Y2K bug will have been completely resolved. But just in case, maybe you can start thinking about how your service as an amateur could make a difference in the unlikely event the bug appears. With any kind of luck, the State Convention should be the biggest & best ever. See you all there on Mar 19-20 at the Ramada in Lewiston. Tfc: NX1A 219, W1KX 123, AF1L 89, W1LKC 76, W1JX 48, W1QU 44, W1JTH 32, K1UNF 31, KA2ZKM 26, KA1RFD 15, N1HYF 11, WA1YNZ 4.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK—ASMs: W1NH, N3CLZ, N1FL, N1K1M. TC: WA1HOG. STM: WA1JVV. PIC: KA1GOZ. OOC: W1GTA. SGL: K1KM. BM: KH6GR. ACC: NA1E. SEC: N3CLZ. www.nh.arri.org. Pleased to report that the Nashua Area Radio Club again has been officially renewed as an ARRL Special Services Club. NARC is recognized for its continued efforts on behalf of Amateur Radio and its community. New officers at NARC, Chair: Mike, K7CTW, Vice Chair: Ed, K2TE. Sec: Chris, K1SI, and Tres: Mark, N1ZYZ. Thanks to Frank Swain, N4FDL, of the GBRA for his years as editor of the club newsletter *Standing Wave*. I have decided to run again as Section Manager for the 2-year term beginning July 1999. I had received many inquiries in the past couple of months. If you are interested in running for the position of SM, contact Rick Palm at ARRL HQ in Newington for copies of the nomination papers. The harsh weather will soon be over and many will be out in force stringing antennas and doing

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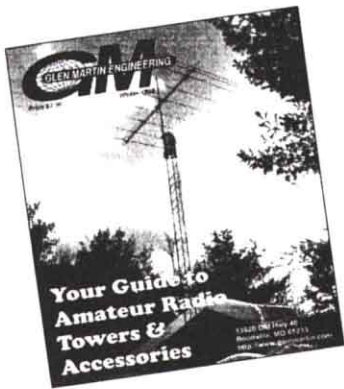
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public service events. Invite a non-ham along and see if you can get them interested. 73. Net sess/QNI/QTC: GSFM 30/229/61; GSPN 35/145/32; TSEN 4/52/3; VTNH 30/196/142. Tfc: W1PEX 1024, K1TOY 484, WA1JVV 160, N1NH 108, N1CPX 103, W1ALE 63, KA1OTN 53, AE1T 35, K1ZO 25, WB1GXM 24, KH6GR 17.

RHODE ISLAND: SM, Rick Fairweather, K1KY1, e-mail k1ky1@juno.com—Fidelity ARC has a full slate of meeting activities scheduled for the first quarter of '99. The club is doing General theory and code upgrade classes using the ARRL video training course at their meetings. FARC finished #1 in RI and #5 in New England in the 2A class during Field Day '98 with a score of 5730 points and 1788 Qs. Ocean State ARG had a good turnout at their annual holiday dinner held in West Warwick in February. A reminder to clubs: be sure to let ARRL HQ know of any changes in your club's leadership by going on line to <http://www.arrl.org/field/clubsearch.shtml> and locate your club's name, click on it, and bring up the detail page. At the bottom of the page is a link you can click on to update the data. Remember, ARRL no longer sends out paper renewal forms for club info updates. Once again, our section traffic handlers had 100% representation on FRN during Dec. Keep up the great work. STM KA1JXH is still looking for more people to participate in the traffic nets in RI. Get in touch with Bill and give him a hand. Tfc: KA1JXH 70, K1KY1 5. PSHR: KA1JXH 135.

VERMONT: SM, Bob DeVarney, WE1U—Greetings from Vermont. Busy month this month. First, let me thank and congratulate Mitch Stern, W1SJ, for volunteering to be TC. Also, a big congratulations to the RANV folks for their 3rd place Field Day finish. Also, congrats go out to N1MJD and N1JEZ for their new New England Division rover records in the June and August VHF and UHF contests. I hope to see everyone at the Vermont State ARRL Convention at the Milton Hamfest, February 27. Also, mark your calendars for the Snowflake Bentley W1B special event on February 6-7. Should be a great time!! 73 de WE1U. Sessions/ Checks/ Traffic: Vermont/New Hampshire Net (VTNH) 31/184/179. Vermont Phone Emergency Net (VPEN) 4/34/4. Green Mountain Net 27/856/22. Tri-State FM Emergency Net (Keene) 5/79/6. Rutland County ARES Net 4/36/0. Windham County ARES Net 4/3/0. PSHR: KT1Q 178, N1DHT 116. Tfc: KT1Q 686*; N1DHT 193, KA1YLN 8.*=BPL. Vermont had 92% representation on 1RN, Cycle 2.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, w1ud@juno.com—ASM: N1LZC. ASM (digital) KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1. Spring is just around the corner, and we should all be thinking of Field Day. A chairperson should be selected for a successful day. Remember that Field Day is not a contest. It is an opportunity to demonstrate your club's ability to set up a communications facility in the event of an emergency. Members of MARA enjoyed Bob Reif's, W1XP, presentation of "Working the Amateur Satellites." Each Sunday morning at 8:30 AM local, the Western Mass Emergency Net meets on 3937/3942 kHz. I encourage all in the section to participate in this net. Some mornings we have only one or two checkins from a county. I'm sure that there are more than two stations that are active in a county. Invite a newly licensed amateur to your shack and your club. Ham radio is a lonely place without an "Elmer." Traffic: KD1SM 29, W1ZPB 123, W1SJV 13, W1UD 208.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB—ASMs: KL7JBV, WL7BJ, KL5T. DECS: KL7JBV, WL7GK. OOC: KL7IKX. TC: AL7CE. TS: KL7CC. Snipers Net 3.920 daily at 1800 AST; Bush Net 7.093 daily at 2000 AST; Motley Group 3.933 at 2100 AST; and Alaska Pacific Net M-F 14.292 at 0830 AST (Alaska Standard Time). John Lynn, KLOCY, is the new Affiliated Club Coordinator for Alaska section. His phone number is 337-1091, e-mail johnlynn@gci.net. Richard O'Connor, WL7CPG, a junior at Diamond High, has been nominated for the "Hiram Percy Maxim Memorial Award". Iditarod Dog Race is still going on, so help out, pass a message or send a phone patch. PSHR: KL5T 130, KL7N 71.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—This year Reggie, W7ROL, of Four Lakes turns age 95 and has been licensed for 75 years! Sorry to report James Noud, WB7VZW, and Al Lafky, K7YV, both of Spokane became Silent Keys. Due to an 8% declining ARRL membership and waning advertising revenues the editor of QST has been forced to cut this report by 16%. The Amateur Radio Service is shrinking. The annual number of new licensees has dropped dramatically over the past two or three years and overall VEC exam activity is down about 25% from last year. A number of dealers have closed their doors and a number of manufacturers and publishers are no longer in business. Net Activity (for Dec.): WSN: QNI 873, Tfc 365; Noontime Net: QNI 8983, Tfc 497; WARTS: QNI 3528, Tfc 207. Tfc: W7GB 443, K7GXZ 258, KA7EKL 180, K7BFL 125, KK7T 35, KA7CSP 9. PSHR: W7GB 138, K7GXZ 128.

IDAHO: SM, M.P. Elliott, KF7ZQ — OOC: N7HGW. SEC: AA7VR. STM: W7GHT. A section the size of Idaho has a problem of communications. To help with this we are currently working on an Idaho Section Web page. The page will list section personnel, bulletins, and upcoming events. Our Bulletin Manager, Steve Nipper, N7DJX, is preparing the Web page. Don Clower, KA7T, serves as the Section's Governmental Affairs Officer and as such is monitoring the activities of the 1999 legislature. Another resource for those interested in newsletters or PR activities is our Public Information Officer, Steve Wade, KF7YC. Feel free to call on these people as you or your club requires help. 73 — Mike, KF7ZQ. Tfc: W7GHT 701, K87GZU 87, WB7VYH 78, and N7MPS 65. PSHR: W7GHT 123, WB7VYH 91, and N7MPS 84. Net (SESS/QNI/QTC/ Mgr.): FARM - 31/2240/27/N7OGR; NWTN - 31/1642/85/K7CRNT; IDACD 23/606/12/K7UBC; IMN 31/428/445/ N7MPS.

MONTANA: SM, Darrell Thomas, N7KOR—1998 was a pretty busy year for many amateurs across Montana. As usual the clubs and individual members contributed many hours to public and community service. The Hellgate Amateur Radio Club of Missoula closed out the year by providing communications during various points in the city through

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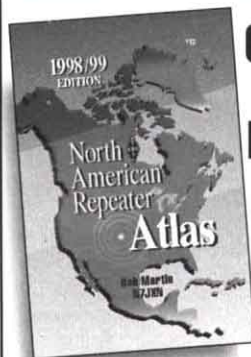
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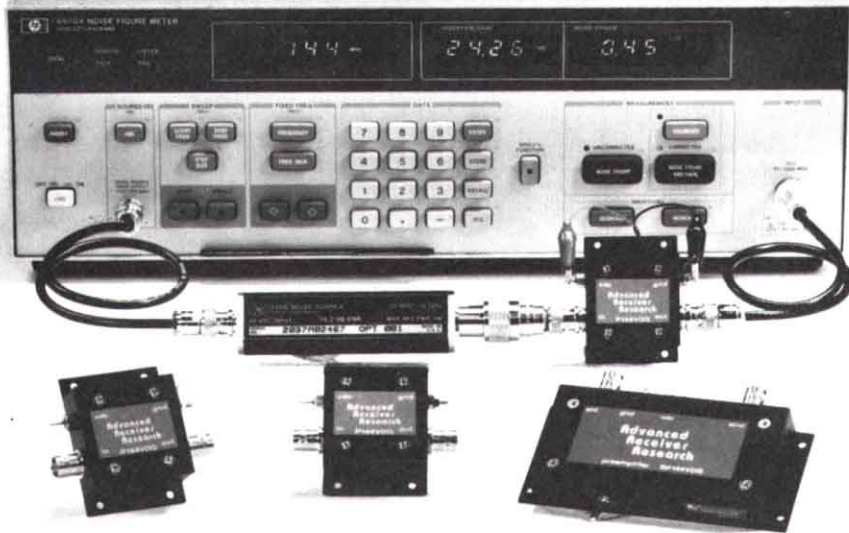
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P144VD	144-148	<1.5	15	0	DGFET	\$29.95
P144VDA	144-148	<1.0	15	0	DGFET	\$37.95
P144VDG	144-148	<0.5	24	+12	GaAsFET	\$79.95
P220VD	220-225	<1.8	15	0	DGFET	\$29.95
P220VDA	220-225	<1.2	15	0	DGFET	\$37.95
P220VDG	220-225	<0.5	20	+12	GaAsFET	\$79.95
P432VD	420-450	<1.8	15	-20	Bipolar	\$32.95
P432VDA	420-450	<1.1	17	-20	Bipolar	\$49.95
P432VDG	420-450	<0.5	16	+12	GaAsFET	\$79.95
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SP28VD	28-30	<1.2	15	0	DGFET	\$59.95
SP50VD	50-54	<1.4	15	0	DGFET	\$59.95
SP50VDG	50-54	<0.55	24	+12	GaAsFET	\$109.95
SP144VD	144-148	<1.6	15	0	DGFET	\$59.95
SP144VDA	144-148	<1.1	15	0	DGFET	\$67.95
SP144VDG	144-148	<0.55	24	+12	GaAsFET	\$109.95
SP220VD	220-225	<1.9	15	0	DGFET	\$59.95
SP220VDA	220-225	<1.3	15	0	DGFET	\$67.95
SP220VDG	220-225	<0.55	20	+12	GaAsFET	\$109.95
SP432VD	420-450	<1.9	15	-20	Bipolar	\$62.95
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New Years Eve activities. They were in position to assist in case of emergency as well as keeping the central command post apprised as activities progressed. As we launch into 1999 we should all take on a New Years Resolution to introduce a new ham to the hobby, assist them in preparing for the exams, help them up-grade, introduce them to your local club and strongly encourage them as well as all other hams to join ARRL or re-new their current membership as many new hams are failing to do so. Net/QNI/QTC/NM MSN 119/1 W7OW; MTN 2076/120 N7AIK; IMN 425/445 N7MPS. PSHR: N7AIK 126.

OREGON: SM, Bill Sawders, K7ZM—ASM: KF7KE. ASM: KG7OK. ASM: KK7CW. STM: WA7EES. SEC: WB7NML. PIO: KC7YN. SGL: KA7KSK. STC: AB7HB. OOC: NB7J. Congratulations to Jim Fenstermaker, K9JF, of Vancouver, WA. Jim was appointed Northwest Division Vice Director, by ARRL President Rod Stafford, W6ROD. Jim is well qualified, and becomes the division's first "K-9" Director! Also joining the "newly appointed" ranks, is Oregon's newest Assistant Section Manager, Marshall Johnson Sr., KK7CW, of Albany. Marshall is going to do an outstanding job, representing both me and the League. It's great to have active, experienced, and exceedingly knowledgeable hams as part of our Oregon section appointees. We are truly blessed. What's the greatest ham event, next to Field Day? The Oregon QSO Party! Many club members travel to far-away counties, within the state, to "activate" them. These "rare" counties are needed by thousands of hams across the United States, and around the world! All you have to do is give the station you work a "signal report" and tell them what "county" in Oregon you're operating from. That's it! You can even operate from your own home! This year's event takes place on Saturday, May 8! Look for the rules in all ham magazines, or for complete details, check out the Web at www.empnet.com/codxc. You'll make this an annual FUN event! Keep in touch! Bill, K7ZM. NTS traffic totals for December: N7DRP 350, WA7EES 278, K7NLM 157, KC7ZZB 140, W7VSE 98, K6AGD 72, W7ODG 51, W7WAT 48, K7NYR 39, KA7AID 29.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—Mark your calendar: March 13 is the date for the Puyallup Electronic Flea Market sponsored by the Mike and Key ARC. The joint RACES/ARES conference will be held November 20 at Camp Murray. Contact N7NVP for details. The Sea-Tac Repeater Group now has their 2nd Saturday of the month breakfast at Denny's 31100 48th Seattle at 8 AM. All are invited. VE exams follow breakfast. OOC Dee Dee Eck, AA7KE, reports 321 Official Observer monitoring hours and eight advisory cards sent in December. Welcome new Official Observer Justin Bousquet, AD7O, and new Technical Specialist Jim Kenny, K7LD. STM Pati, W7ZIW, reports that in December two traffic handlers made BPL. They are George Thomas, K7BDU, who is also the new manager of DRN7 Cy/2, and Jere Felton, W7TVA, Manager of the Noon Time Net. Kudos to both for their public service contributions. Let's look at the traffic totals: K7BDU 1510, W7TVA 538, N7AJ 52, K7CLL 11, W7LG 178, KD7ME 78, K7MQF 230, W7NWP 230, K7SUQ 18, KA7TTY 73, KC7UO 1, N7YSS 155, W7ZIW 380. Digital traffic gives K7BDU a total of 832. Note new call sign for DEC Monte Simpson is W7MLS, formerly K8TRID. Pierce Co. EC Alan Hughes, KB7SVU, reports 125 hours of flood watch during a particularly wet period just after Christmas. In Cowlytz Co, EC Randy Greeley, NU7D, assisted the 911 dispatchers open the alternate 911 site while they investigated a bomb threat at the main center. The Hams of Clark Co took part in the annual seasonal food drive providing dispatch and pick-up services. DEC Jim Pace, K7CEX, is recovering from a hospital stay that resulted from a collapsed lung. Keith Carlin, N7ACW of Auburn has been nominated for the Herb Brier Instructor of the Year award. Net/Traffic/QNI: CCAIN 163 mgr K7SUQ, NTN 8983 mgr W7TVA, NWSSB 744 mgr WA7LQV, WSN 873 mgr K7GXZ, PSTS 33 mgr KA7TTY, WARTS 3528 mgr W7GB 31.

PACIFIC DIVISION

EAST BAY: SM, Bob Vallio, W6RGG—ASMs: W6ZF, KF6RCO. SEC: N4OGL. DECS: WA6TGF/Alameda County, K06JR/Contra Costa County, WA7IND/Napa County, K6USW/Solano County, N6UOW/Training, KE6HCI/Administration, KE6NVU/Finance, W6CPO/Technical Services. STM: K6APW. OOC: W6NKF. TS: KF6NY. Check out the EB WWW page at <http://www.pdarrl.org/ebsec/>. Webmaster is KB6MP. SARS members who attended the Lake County VIP Dinner included WA7IND, KE6RYN, WA2TLS, ND4MR, KE6UAX, KD6KME, K6KLL and AC6LE. WA7IND was honored for his 15-plus years of service. The club welcomes new member NH6NJ. EBARC's 1999 officers are KF6HFA, pres; K6SRZ, 1st vp; K17FQ, 2nd vp. AA6XZ, 3rd vp; NU6W, treas; and KF6OGC, secty. Oakland ARES members are building standard power connectors for all fire station radios, as well as their personal radios. VVRC's newsletter, *The Repeater*, has N6WVF as its new editor. MDARC's 1999 officers are KE6VTA, pres; KE6JGA, vp; N6JOX, secty; KF6LGV, treas; KF6FGH, EC; KM6QX and K6SFD, Dir. December ttc: WB6UZX 18.

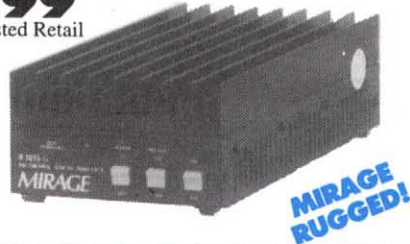
NEVADA: SM, Bob Davis, K7IY. ASM: Jan Welsh, NK7N. SEC: N7JEH. TC: NW7O. ACC: N7FFP. STM/SGL: N7CPN. PIC: WW7E. OOC: N7ELV. Hello to all in the Nevada Section. Quite a few club activities being planned in the near future, not the least of which are many entry-level license classes, beginning in Reno, Las Vegas, Elko, Carson Valley, and Minden. Reports from the fall classes are in, and it looks like we have a very high success rate with many new call signs joining local clubs. Please take the time to make the newcomers aware of the League and ask them to become members. Time for the Pony Express ReRide, Please contact Bruce, N7CPP, for information or to join in the fun, 775-882-2207. Congratulations to Kerry McDole, KC7OLG, on his recent upgrade to General, proving that he will not let even multiple sclerosis slow him down. A new Web page for Elko ARC: www.qsl.net/W7LKO. Sat 8:30 AM. HF Section ARES Net on 3965. Hi to Dean, KM6RE. Thanks & 73, Bob, K7IY.

PACIFIC: SM, Ron Phillips, AH6HN—SEC: Dennis Carvalho, KH7H. ASM: Harry Nishiyama, KH6FKG. ASM:

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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

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. 3 1/8 x 1 3/8 x 4 1/4 inches.

MIRAGE RUGGED!

MIRAGE Dual Band 144/440 MHz Amp

BD-35
\$159.95
Suggested Retail



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
- Full Duplex Operation
- FREE mobile bracket
- 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).

1 1/4 Meter Amps (223-225 MHz)

Choose from 10 models -- 20 to 220 watts out for 2 to 50 watts in, \$129 to \$655.

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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). 1 3/4 x 3 3/4 x 2 1/2 inches.

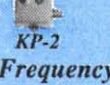
Repeater Amps

11 models -- continuous duty all mode FM/SSB/CW repeater amps for 6, 2, 1 1/4 Meters, 70cm, 450 MHz ATV.

Low noise GaAsFET preamps

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.

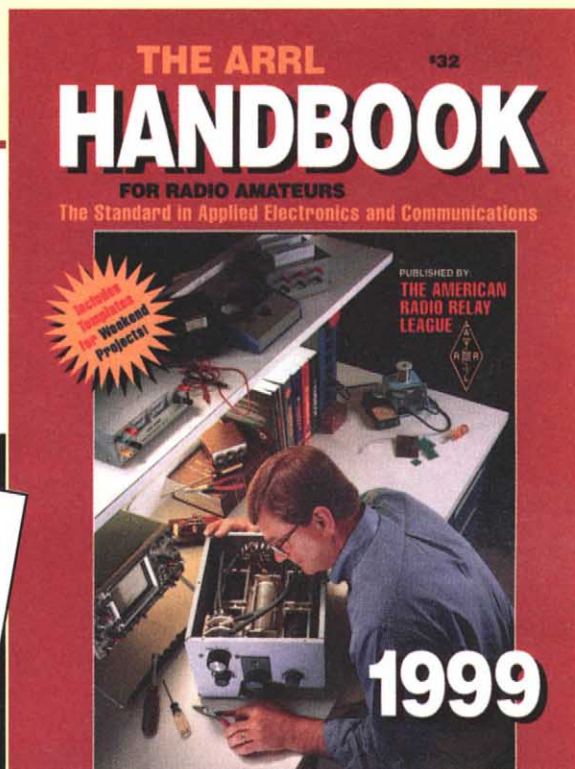
Frequency (MHz)	In Shack \$139	Mast Mount \$195
28-30	KP-1/10M	KP-2/10M
50-54	KP-1/6M	KP-2/6M
144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440



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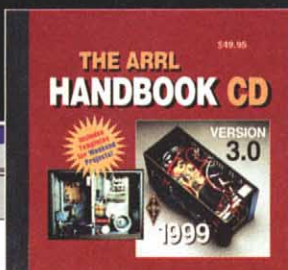


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• 100w • All-mode • Twin passband tuning
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PW-1 Amplifier

HF + 6M • 1KW PEP SSB and 1KW CW/RTTY output • Auto band change • Built-in auto antenna tuner • Wide ALC adjustable range • Full break-in CW operation • Built-in 110/220VAC • Auto input voltage selector • 14" w x 10 1/2" h x 14 1/2" d, 56 lbs **\$4999⁹⁵**



IC-207H Dual Band Mobile

2m/440MHz FM • 50w/35w • Wideband receive • 182 memory channels • 9600 baud capability - PC ready • 50 frequency en/decode • Backlit TTP mic **\$349⁹⁵**



IC-707 HF Transceiver

100w • All mode • General coverage receive • 32 memory channels • 100% duty cycle • Min. # controls • Front facing speaker • Large display... **Special \$699⁹⁵**

Super LOW



IC-2100H FM Transceiver

144MHz, 55w • FM switchable • PC ready • 14 channel DTMF • 113 memory channels • Selectable squelch delay • Optional HM-90A 5 1/2" w x 1 1/4" h x 7 1/2" d **Special \$199⁹⁵**

HANDHELDS



IC-T22A



IC-T2H



IC-T8A/HP



IC-Q7ABC



IC-W32A

IC-T22A Affordable Beginner's HT! 2 meters • 3w (5w @ 13.5V) • Small, easy to use • Alphanumeric display • Air band rx • 80 memories; 40 with alphanumeric display **\$239⁹⁵**

IC-T2H 2m 6w • Wide band receiver • 43 mem. • 8 program. keys • 8 AA batteries. **169⁹⁵**

IC-T7A/HP 2 meters/440MHz Dual band • Dual bander at a single bander size and price • Easy! Works one band at a time • 4w (2 meters) 3w (440MHz) @ 13.5V • No function key and "intuitive" help function • Built-in CTCSS encode/decode **Closeout 259⁹⁵**

IC-T8A/HP 6m/2m/440 MHz • 123 memories • 4.5w with supplied battery **© 329⁹⁵**

IC-Q7ABC 2m/440 • 300mw; rx: 30-1300MHz cell blkd • 200 mem • w/batts & cgr **199⁹⁵**

IC-W32A 2 meter/440MHz dual bander • 3w, 5w with BP-173 • Independent band controls • Simultaneous receive of both bands • 200 memories (100 per band) with name capability • PC/radio-to-radio cloning capability • Built-in encoder/decoder • Backlit keypad and LCD • Auto repeater function • Weather channel receive capability **© 289⁹⁵**



IC-775DSP HF Transceiver

200w-all modes • IF-DSP • Auto IF Notch DSP noise reduction • Noise Blanker PSN modulation • Auto peak filter • Dual watch • CW pitch control • Electronic & memory keyer • Power MOS FET final • Built-in power supply **\$3599⁹⁵**



R-8500 Receiver

0.1-2GHz (cell blocked) **Special \$1499⁹⁵**



RECEIVER FOR PC

PCR-1000 5-1300MHz PC-controlled • Power supply • AM/FM/SSB • Built-in speaker • Antenna • RS-232 cable and software • cell-blocked • **FREE Percon Spectrum from Icom thru 3/31/99** **Special \$399⁹⁵**

PCR-100-12 .01-1300MHz PC-controlled • AM/FM/WFM • CTCSS • Antenna **\$329⁹⁵**

WOW!



IC-706MKII HF/VHF Transceiver

6m (100w); 2m (20w) • Detach. control panel/display • 101 mem. • .03-200MHz broadband all mode receiver • Cross band split • Noise blanker • IF shift • Preamp/attenuator • CW keyer • Full break-in (QSK) • CW pitch • Speech processor • VOX/XFC • LCD display • Scroll menu system • Tone enc. • 9 1/2" w x 3 3/4" h x 9 1/4" d, 9.1 lbs • **FREE DSP** **© \$999⁹⁵**

HANDHELD COMM. RECEIVERS

R-10-05 (pictured) Wideband coverage: 0.5-1300MHz (cell blkd) • FM/WFM/AM/USB/LSB/ CW modes • 1000 memories • 8 chara. alphanumeric LCD • 7 scan modes w/priority • Cloning • **FREE CS-R10 software & OPC-478 cable from Icom thru 3/31/99** **Special \$359⁹⁵**

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Other ICOMs not Pictured

AH-4 80-6m/120w/auto anten tuner. **\$319⁹⁵**

A-22 5w Navicom Air HT **549⁹⁵**

IC-2GXAT/HP 7w 2M HT **Closeout 229⁹⁵**

IC-4008A Family radio service HT **109⁹⁵**

R-100-11 1MHz-1.8GHz Receiver **849⁹⁵**

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Fiberglass telescopic Mast

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Vertical Loop Ant. (10-40m)

Very effective DX-Antenna due to the small radiation angle which is achieved at relative low heights. Compared to wire antennas, this solution offers good signal levels on all bands. Includes a 1:4 balun to connect the 50 Ohm max cable. Erected in < 10 minutes. For use with Fiberglass Tel. Mast. **\$ 89**

W3DZZ Portable Antenna

A half wave dipole for 40-80m. With a tuner it can be used on 10-30m. Traps with teflon coated cable, max 150 W. Erects in < 5 minutes, as an inverted V with the Fiberglass Tel. Mast. **\$ 59**

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Duoband Vertical 2m +70cm

Light weight economical antenna. Excellent DX-antenna for the most above. At 33 ft height > Easily erected in 20 seconds! **\$ 49**

LOG. Periodic 2m +70cm

4 elements for 2m and 4 ele. for 70cm > on 70cm. Quick and easy to assemble. Folds for transport. **\$ 85**

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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. Adrian DiTucci, KH7GK, reports that EARC continues to have good check-ins on all nets. Thanks for the report, Adrian. It is with deep regret that Sam Kumukahi, KH6AFS, reports the passing of Leslie Nunes, KH6KB, whose many years as a ham will be greatly missed. Please continue to let me know how your QST's are arriving. We are still trying to get improvement. 73, Mahalo, Aloha, Ron Phillips, AH6HN.

SACRAMENTO VALLEY: SM Jettie Hill, W6RFF—Time to start planning Field Day '99. New EC for Butte county is Betty Bibeau, KF6BOI, contact her to help out in Butte Cty. Several clubs planning hamfests or swapmeets. Get info to me as soon as a date is set. Club membership and attendance, ARRL membership and new licensees are all down. Let's get out there and promote Amateur Radio and the ARRL. CDF Aids from Amador and El Dorado counties held a meeting in Jackson. The VIP program is very active throughout the SV section. El Dorado City ARC operated a special event station, AG6AU, for the 151st anniversary of gold discovery. Yolo ARC now holding meetings at Davis ExplorIT Science Center. SFARC members on the mend list are: KA6LNC, KA6WUW and KA6WUX—get well! The Yuba Sutter ARC now meets on 2nd Thursday/mo at King Avenue School. River City ARCS sponsors a YL net each Thursday at 7:30 PM on 145.250, PL 100 Hz. Mary Ann, K16TE, became a Silent Key. She was very active in public service, although confined to a wheelchair. New club members: Siskiyow Cty. ARA—N6MRX, KF6DFO, KF6KTA, KF6IRF, WA6GUT. North Hills RC—KE6BLL, AD6EF, K7MRK, KE6VQJ, N6OKB, WB6UHQ. Nevada Cty. ARC KF6BVV, KF6TIE. Sierra Foothills ARC—KF6TUC, N6JKW, KF6OGD, KD6AQN, KE6ILS, KF6ELI, KF6IDS. Yuba Sutter ARC—KF6UEV. Golden Empire ARS—KF6SHG, KF6LOO, KF6QB. CLUBS: Please send in your club affiliation renewals as soon as possible.

SAN FRANCISCO: SM, John Wallack, W6TLK—ASMs: N6KM, KE6EAQ. OOC: KD6VWD. PIC: N6BWS. SEC: WB6TMS. TC: N1AL. I'm sad to report that K6MUP and W6PM are Silent Keys. Thanks to the members of the Lambda ARC for an enjoyable visit. Welcome to the San Francisco Ham Radio Club as the newest club in the SF Section. Members of the Empire ARS are planning a trip to the Dayton Hamvention. KF6JQY is the new chief of Marin County RACES. Thanks to W6UDS for his generous donation of a 3/4-ton van to the Marin ARC for club activities. Thanks to WB6TMS, SEC, for helping me update the 1999 ARRL Net Directory for the SF Section. Congrats to N6MHG, KF6DHA and KF6DHB as Sonoma County RA 1998 Members of the Year. Thanks to KE6SPJ for composing such excellent Willits ARS newsletters for the past 3 years. KE6WHH, new president of the Del Norte ARC, reports that the club is reactivated for 1999. Welcome to all new radio club officers. Please support their efforts to make your radio club an active and responsive club in 1999. Tfc: W6JCG, ORS, 70.

SAN JOAQUIN VALLEY: SM, Don Costello, W7WN—ASM: Mike Siegel, K16PR. ASM: John Lee, K6KY. ASM: Pat Fennacy, W6YEP. SEC: Kent LeBarts, K6IN. OOC: Victor Magana, AA6AH. Congratulations to all of the new radio club officers elected to serve during 1999. It is hard to believe that the millennium is upon us next year and that Amateur Radio will move into the 21st century but, move it will, with some changes in license restructuring and possible additions of band expansions. Pausing to reflect for a moment on 1998, I want to thank all of the radio club officers who gave of their time and efforts to administrate the fine radio clubs that make up the San Joaquin Valley Section. During 1998, I appointed many talented amateur operators in the section to various posts who have been introduced to you in previous Section News reports and, of course, I was very fortunate to have many experienced and talented support staff persons already in place. What better time than the beginning of a new year to thank all of the section staff for your support and hard work. I wish all in the San Joaquin Valley Section, as I am writing this in January, a happy and prosperous New Year. Gud luck and gud DX.

ROANOKE DIVISION

NORTH CAROLINA: SM, W. Reed Whitten, AB4W—ASMs: AB4S, KE4ML, KC4ACE. SEC: K4AMP. ASECS: WA4MOK, N4UCO, KD4RYE. STM: K4IWW. ASTM: W4EAT. TC: K4ITL. SGL: K4IAN. OOC: W4ZRA. PIC: KN4AQ. ACC: W4CC. BM: KD4YTU. Section Web site <http://www.ncarrl.org>. Is it "The Amateur Radio Service" or just a hobby? A Fraternity, or just people with radios? Amateur Radio is an opportunity: An opportunity to help your neighbors and your community respond to emergencies and disasters; An opportunity to meet people who can share new interests and information; An opportunity to develop both communications and electronic skills; An opportunity to have an enjoyable time doing all of these things. It is up to you to take advantage of these opportunities. Get on the air and ask questions, go beyond QTH, rig, and WX. Attend your local club meeting and get involved in club activities. Participate in operating events, contests, and public service events. Attend the forums at hamfests to learn about new activities. Amateur Radio will enrich your life if you approach it as a Service and a Fraternity. Is it ARRL Membership, or a subscription to QST? Well, I think you know my answer to that question. 73. Down East Hamfest in Kinston, Mar 21; Morganton Hamfest, Apr 10; Raleigh Hamfest, Apr 11. Dec Tfc: W4EAT 557 (BPL), AB4E 513 (BPL), K4IWW 340, W4IRE 211, K4YV 178, K4AIF 136, KE4JHJ 132, AC4DV 99, W3HL 85, W4FMM 77, WB4TOP 61, KB4FWL 45, WA4SRD 43, AB4W 37, KF4PUX 35, KE4AHC 34, KF4OZF 23, WD4MRD 22, W4CC 21, KF4VDW 20, W4DYW 13, KB8VC 21, KE4YMA 11, N4JLE 7, N4YXU 7, NT4K 7, KF4YHG 6, KT4CD 5, KF4PAK 4, KR4ZJ 4, KB4USN 2.

SOUTH CAROLINA: SM, Les Shattuck, K4NK—Greetings,

spring is just around the corner, and hopefully the weather will improve. We hope your Santa brought you some goodies. Here, Joyce and I are the proud new owners of an ICOM 706MKII. We had a few good QSOs on 6 meters and it is small enough to take camping. I'd like to introduce our new Technical Coordinator, Al Holden, KM4TN, holds an Advanced ticket and works as a two-way radio tech. Also, welcome to Tyler, KT4XD, who is a new TS. I still need help. I would like each club to pick an ARRL member and have them apply to be their club's Public Information Officer. I also need a PIC (Public Info Coordinator). Please contact me. The Greenville Red Cross got a big boost for their new facility. The Blue Ridge ARS donated a Kenwood TS-820S HF rig and a new dual band VHF rig. Many members are involved with the chapter. Any news from your area? Please send it to me so I can make this column your information center. The new net manager for the Blue Ridge 2 M Net is K4SUG. Ray. Thanks to Mully, K4TOY, for many years of service. Tfc: W4DRF 95, WW45C 94, KT4SJ 82, KA4LRM 77, KA4UIV 73, KT4FP 42, WA4UGD 32, WD4BUH 25, W4COB 10, KF4HAV 6, WT4F 5.

VIRGINIA: SM, Lynn Gaghan, AF4CD—ASM: W4TLM. SEC: K4EC. SGL: KK4IY. TC: W3EED. OOC: KR4UQ. PIC: W2MG. Greetings all. I have been notified by the League that due to cutbacks our Section News space has been reduced. K4EC reports that during the holiday ice storms the VDES had us on stand-by but we were never activated. Also your SEC in planning another ARES/RACES training program session for Area "C" which includes districts 1 through 4. This program will be similar to the sessions that were held in Area A and B of last year. At the time of this writing we are still looking for a central location to hold the meeting. Anyone that could help out updating the information that is on the Virginia Section home page, please send the information to aresva@aresva.org. We are looking for updates from clubs, links, hamfests, VE sessions, repeater listings, and other info for all to share. I am pleased to announce the following appointments by our SEC. The following have been appointed Emergency Coordinators for their areas. Lenford Sutphin, C5EJR Pulaski Co; Pat Wilson, W4PW, New Kent Co; William Rand III, N4LSS, Roanoke Co; Coy Weaver, W4AGMX Roanoke City, Cecil Ennis, K4CBE Russell Co; and Lyle Palmer moves from the position in Craig Co to the City of Salem. Thanks gentlemen for volunteering your time to this important job. Although at this time we do not have a STM for the section, I am pleased to say the Net Managers and NCS are doing an outstanding job with the NTS Nets. Many are trying to recruit new participants. If you are interested in learning how to handle traffic and do not know who to contact, give me a call or e-mail and I'll point you in the right direction. WA4DOX, Net Manager for the VNE/VNLT/VTN reports that starting on February 16 at 7 PM on 3680 kHz. The VSN (Virginia Slow Net) will be back in service again. The VSN will operate as a weekly session of the VNE at 13 WPM to encourage slower speed operators to participate in the National Traffic System. These slower sessions will be held on Tuesdays. 73 de AF4CD. Tfc: K4DOR 1010, KR4MU 419, K4MTX 361, WD4MIS 300, N4ABM 266, WA4DOX 232, KE4PAP 157, KE4NY105, W3BBQ 99, K4YVX 98, WB4ZNB 66, WA4AC 65, KOIBS 44, WB4UHC 40, W4HDW 40, K4IX 32, WA8AV 31, AA4HT 30, KC8GUK 28, KF4HFT 27, KE4HF 25, AF4CD 23, WA4JFW 20, K4ISM 18, KB4CAU 16, W4TZC 13, W4YE 10, K4IM 10, WD4LES 8, W4JLS 6, W4IN 2, N4FNT 2, KF4HJW 2.

WEST VIRGINIA: SM, O.N. (Olie) Rinehart, WD8V—STM: W8IMX. SEC: W8XF. ASEC: KB8ZO. SGL: KB8S. TC: K8LG. OOC: N8OYY. ACC: WD8MKS. APRSC: W8XF. I would like to begin with another apology to the amateurs in WV for the total lack of any Section Manager's column in the last issue of this magazine. My family, my health, both mental and physical, the holiday rush, and the massive changes going on in Amateur Radio frankly had me so busy that I could not sit down and write an article. We now have W8IMX as our STM, W8XF as SEC, and N8OYY as manager of WVFN. The best news of this period is the much sought after and now available functioning of the FCC Compliance and Interference Bureaus (CIB). They are actively eliminating the headgear and blatant violations that have been increasing. Headquarters, as well as we in the field, are gravely concerned over the drop in membership. Please help us come up with ideas of how to create interest in Amateur Radio and save our hobby. Tfc: K8WNO 545 (BPL), WD8V 314, WD8DHC 281, K8MHR 110, K8QE 60, N8RNY 52, W8FZP 32, K8FTE 30. PSHR: WD8V 264, WD8DHC 138, K8WNO 118, K8QE 64, WVFN 1493/163/31, K8MIA/W8YS, WVMDN 724/56/31/WD8DHC, WVN E 189/89/31 N8RNY; WVMDN 149/33/31 N8RNY; ARES/RACES 1247/49/31 K8QE; DIGITAL 1/18/62 K8MHR.

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: Eric Dyce, W0ERJ. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. Pikes Peak Radio Amateur Assn. conducted a food drive over the air and collected over 240 food items for the local Care and Share. Congrats to them for finding a great way to use Amateur Radio for community service. Ham radio came to the rescue in early January. Dave, KB0LP, and Mike, W5VSI, heard someone trying to use the DRL .88 machine but there was no audio. DTMF tones and key-ups with no audio continued for 20 minutes. Dave and Mike continued to work the station. Finally, a call sign was heard very faintly. Tim, WB0TUB recognized the ham in trouble and asked where he was. Two minutes later, Tim found Al, N0AUS, pulled over and in great distress. 911 was called and an ambulance took Al to the hospital. Turns out Al's pacemaker had malfunctioned. He is back to work and doing fine. Thank goodness Al had a 2-M rig in the car, and Dave, Mike and Tim were there, and didn't ignore the key-ups which could have been mistaken for interference. All had

RF POWER AMPLIFIERS

High Power Amps
144mhz 400watts
220mhz 225watts
440mhz 185watts

Model (W)	Pin (W)	Pout (W)	Ic (A)	Gain/NF (dB)	Type	Price
50 MHz						
0503G	1-5	10-50	6	15/0.7	LPA	204
0508G	1	170	28	15/0.7	Standard	359
0510G	10	170	25	15/0.7	Standard	314
0550G	5-10	375	59	15/0.7	HPA	503
0552G	25-40	375	54	15/0.7	HPA	463
144 MHz						
1403G	1-5	10-50	6	15/0.7	LPA	160
1405G	1-2	100	14	15/0.7	Standard	291
1410G	5-10	160-200	28	15/0.7	Standard	323
1412G	25-45	160-200	22	15/0.7	Standard	283
1450G	5-10	350+	56	15/0.7	HPA	563
1452G	10-25	350+	50	15/0.7	HPA	516
220 MHz						
2203G	1-5	8-35	5	14/0.8	LPA	166
2210G	5-10	130	20	14/0.8	Standard	341
2212G	25-45	130	16	14/0.8	Standard	313
2250G	5-10	225	40	14/0.8	HPA	574
2252G	10-25	225	36	14/0.8	HPA	531
2254	75	225	32		HPA	489
440MHz						
4405G	1-5	15-50	9	12/1.2	LPA	305
4410G	10	100	19	12/1.2	Standard	362
4412G	15-30	100	19	12/1.2	Standard	352
4448G	1-5	75-100	25	12/1.2	HPA	423
4450G	5-10	185	35	12/1.2	HPA	579
4452G	25	185	30	12/1.2	HPA	539

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great presence of mind and are to be congratulated for their actions. Do you have items of interest for this column? Send me a message at n0wpa@qsl.net. 73. de NOWPA. NTS traffic: W5JCW 465, W0GOB 238, K0TER 213, N0UOD 29. CAWN: W0WPD 794, W0GGP 594, K0YFK 590, A0AZR 502, N0DKK 497, W0LVI 459, N0JUS 395, K0HBZ 303, N0FCR 268, W0BVT 247, K1OND 226, W07VTY 121.

NEW MEXICO: SM: Joe T. Knight, W5PDY—ASM: K5BIS & N5ART. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. New Mexico Roadrunner Net handled 189 msgs with 1149 checkins. New Mexico Breakfast Club handled 221 msgs with 742 checkins. Yucca 2-mtr Net handled 15 msgs with 712 checkins. Caravan Club 2-mtr Net handled 2 messages with 67 checkins. SCAT Net, handled 20 msgs with 850 checkins. Four Corners Net handled 38 msgs with 428 checkins. GARS Net handled 4 msgs with 24 checkins. Rusty's Net handled 81 msgs with 759 checkins. Valencia County Net handled 9 msgs with 20 checkins. Enjoyed a good Christmas Dinner for the ABO ARC, and there were many other Christmas parties that we missed around the state, but all reported that "a good time was had by all." The NM State Police ARES District 5 ran 5 SAR missions in Dec. Our thanks go to N5CFO and KB5WEV for their many hours as ARES base on our SAR missions. Our thanks also to WA5IHL, K5QQ, N5OBS and many others for the installation and operation of all the APRS digis around the state. We have had our share of SKs with the passing of WA4RCP, N5NSQ. Tlc: K5OWK 36. Vy best 73.

UTAH: SM, Jim Rudnicki, N2Z77—Greetings. As promised, the definition of JARS! The Juab Amateur Radio Society is a new organization with only a few members. They have developed a newsletter, a weekly net, and are hoping to expand their membership and activities in central Utah. We wish them the best. Also, news from Cedar City from the Rainbow Canyon ARC. Got a nice note from Russ Roberts, K7JUN, who tells me that RCARC has been very active with Fox Hunts, Field Day, license classes, public service in support of the Utah Summer Games, and weekly emergency communications nets. Sounds like things are alive and well! As invited, I hope to come down and visit as soon as my work schedule permits. Reporting on the Kaysville City antenna ordinance issue, we are still at impasse. We are still negotiating the ordinance language. More on this next month. If I have seemed invisible on the air the last two months, I apologize. I have been working weird overtime shifts, and have not been around much. Hope to catch up with everyone this spring. Due to budget concerns at ARRL, my space has been cut, so that's it for this month. 73 de N2Z77.

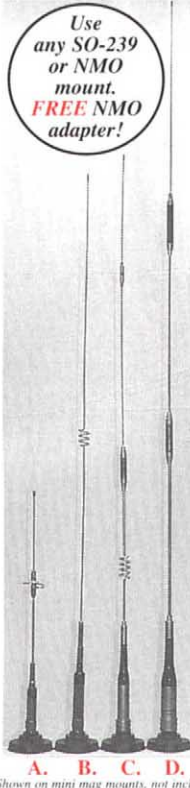
WYOMING: SM, Bob Williams, N7LKH—I must offer my sincere apologies to the Tri County Amateur Radio Club for neglecting to include their Field Day score in last month's reporting of WY Section Field Day results. The Tri County ARC was second in the WY Section with a score of 2970 points. Several people have brought the omission to my attention. Never again! Further, the Tri County ARC has agreed to take over arrangements for the annual Meadowlark Ham Picnic. The bankroll, attendance lists and Forest Service contact procedures are being given to them at their monthly club meeting on January 16. For information on the event one should contact the new club president, Rob Underwood, K7EMR. Duane Shillinger, NN7H, of the Carbon County ARC has achieved considerable prominence. For the month of December, he made PSHR with 213 points and BPL with 504 points. Not only that, but he enjoyed a 2-day cruise on the Trident submarine USS Wyoming with most of the time submerged. His son, Craig, is Senior Chief Sonarman.

SOUTHEASTERN DIVISION

ALABAMA: SM, Scott Johnston, N4YYQ—Hello to each and everyone. Here we are in March already, and maybe warmer temperatures are just around the corner. Hope your year is going to your liking and you're marking on your calendars all the hamfests you want to attend this year. I do believe the hamfests are getting better and better. It's such a great time to get to visit "eyeball" style with friends that we normally only visit with over the airwaves throughout the year. Sort of a ham reunion! Want to mention two Amateur Radio stations that made BPL in December 1998: Jack Bramlett, W4PIM, of Arlton, Alabama, and Eugene McGlaughn, WB4GM, of Gadsden, Alabama. Good work gentlemen! Also, I'd like to say a very hearty congratulations to our Ham of the Month for January 1999, Lester McGlaughn, W4DB, of Rainbow City, Alabama. Lester, congratulations my friend. You are an outstanding amateur! Always there to help anyone anytime. Congratulations, Les! Also, a big reminder...please keep your end of the month reports coming in, and be sure to get them to us by the 5th of the month. We need this time to get our reports ready to send in to Headquarters. Thanks! 73 Scott, N4YYQ, AI SM. Tlc: WB4GM 414, W4PIM 303, W4CK5 259, W4ZJY 215, WA4GQS 134, N4ZNO 133, AC4CS 57, KU4IJ 53, W4ZBA 33, KL7Q29, W4X129, KC4RNF 27, AE4WP 26, N4YYQ 21, W4DGH 21, W4BTVY 10.

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, WB4UVV. TC: Eddie Kosobucki, K4JNL. OOC: Monroe Gaines, KF4NXD. PIC: Chuck Calmbacher, AD4JU. If all Section News columns seem shorter, it is because declining resources at the League and QST require cutbacks in space for this and other SN columns. Albany ARC new officers: pres KD4OZR, vp KF4YED, sec KF4TZR, tres K4PHE. The club also gave Charlie Royal, WD4EIK, a lifetime membership for his years of dedicated service to the club. Old-timers remember Andy Clark, W4IYT, longtime EC of Dade County, FL, and publisher of Florida Skip who passed away New Year's Eve. March 20 is Kennehoopchee Hamfest at Jim Miller Park, Smyrna. April 9-10 brings the 3rd Southeastern VHF Conf at Marriott NW at I-75 and Windy Hill Rd. ARRL 1st VP Joel Harrison, W5ZN, is banquet speaker. See the Website <http://www.svhfs.org> for details and registration. 73, Sandy, W4RU. Tlc Nov: KE4NAY 172, W4AET 119*, K4BEH 105*, WB4GGS 103, WU4C 86*, KA4HE 76*, K1FP 67*, K4JNL 7, KT4ST 6, K4BAI 1. Tlc Dec: KE4NAY 173*, K4BEH 149*, WU4C 137*, WB4GGS 135, W4AET

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MFJ-345 Lip Mount is shown mounted vertically to a mini-van's angled hatchback lip. Note extra-wide mount with reinforcing tab at right -- safely secures heavy antennas. Swivel mount is adjusted so antenna is near vertical away from mini-van to clear luggage rack.



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add s/h

MFJ-340 Pipe Clamp Mount is shown clamped solidly to vertical mirror support rod on a pickup truck. Antenna is slightly swiveled to the left and positioned about 30 degrees from vertical to clear cab of the pickup truck.

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NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—ARRL Certificate of Merit was awarded to NR2F, retiring Net Manager of the NFAN, AD4BL, retiring Net Manager of NFAN, and DEC West Panhandle District, AC4PF, retiring DEC of East Central District. Each of these people will be missed as their dedication, untiring efforts, and expertise contributed to making the sections' operations exceptional. Congrats to their replacements, namely, K4VRT, NM for NFAN, KN4VL NM for NFAN, and NP2CB, DEC E Central District. ARRL is putting more information on the Web page, and consideration is being given to including the Section Activity Reports and not in QST. If you haven't checked with the Web page lately, do so, you may find lots of info of interest. *Balanced Modulator*, newsletter of North Florida ARS to go electronic beginning February 2000. More and more are going electronic and we will try and keep you posted on those. HR 3572 still needs your support to write your Congressman. This proposed bill is a straight forward piece of legislation that would provide "equivalent replacement spectrum" in the event the Commission might need to reallocate any Amateur Radio frequencies. FCC's Riley Hollingsworth, K4ZDH, is making a list of those that are naughty and not nice. He has talked with over 250 people on enforcement line 202-418-1184. The FCC is taking action, and he states "We are not going to stand for the Amateur Service to be further degraded or destroyed by them." The stations receiving notices etc, is quite long, and it is good to see FCC back in the enforcement picture. 73, Rudy. Tlc: WX4H 2634, KE4DNO 1169, NR2F 448, KE4OAV 426, NO2O 392, KF4NFP 333, KF4TQX 280, KE4PRB 259, WB8NER 206, AD4DO 183, KF4TM 178, KF4GUA 143, N4ORZ 119, W5MEN 109, AD4BL 90, KK4ND 88, W4KIX 72, AF4GF 60, KE4WBI 51, KS4FB 47, KF4VRS 46, KM4DW 37, KJ4HS 36, WB2IMO 24, N4JQA 21, WX4J 21, K54WV 19, AB4PG 18, WA4EYU 17, KB4DCR 13, N4GMU 13, KF4JYU 5, KU4LY 5, W8IM 5, KF4YHK 4, WB9GIU 4.

PUERTO RICO: SM, Raul Escobar, KP4ZZ—With the start of the new year, I want to task all veterans of Amateur Radio to take a few moments and help the newcomer's learn how to operate and use the equipment correctly. Congrats to the new directors of the FRA: president, WP4BAI; vp, KP4PK; secretary, WP4LCL; treasurer, KP4RZ; public relations, WP4LEL; QSL mgr, KP4BKB. Congrats! EUREKA! of PRARL and editor Victor, KP4PQ, for the excellent job during this 10 years. 73 de Raul.

SOUTHERN FLORIDA: SM, Kevin "KB" Bunin, K4PG, k4pg@arrl.org—ASM/STM: KA4FZI@AE4IG. ASM for Youth Activities: WB9SHT@KB4VOL. SEC: W4SS. ASST SECs: WB2WPA@WB2WPA. KD4GR@KD4GR. TC: K14T@KD4GR. BM: KE4WU. PIC: WA4ATF. OOC: WB4GHU@WD8IBY. ACC: W3BLW@W4DPH. SGL: KC4N@W1FJ. Pkt Mgr: KB4VOL@N4EXO. If this month's section news seems a little shorter, it is. All section news is shorter! I was cut back by 16 percent to 59 lines. This is the first news under the new guidelines. December and January were eventful months for some of our best. I am sad to report the following are Silent Keys: W4IYT, Andy Clark, founder of *Florida Skip* magazine, architect of emergency communications in Dade County, long time friend of hams in Florida and much more, Miami Springs; KA2YZM, Rich Bernstein, Net Manager FMTN, BCEPN, Regional and Area traffic handler, Elmer, and much more, Tamarac; and Janet Jones, WD4AWN, was active as a member and NCS on FPTN and QFNS. On the brighter side, after 4.5 years of service as Net Manager of the FAST net, Larry, KE4ESV, has handed the baton over to Laura, WA9VND, effective January 1, 1999. KD4JMV reports the Broward ARC officers for 1999 are President, N4YWN; Vice President, N5PIP; Treasurer, Len Weiss, AB4LV. New officers of the Highlands County ARC are: Dennis Koranda, AF4HR, president; Vice President, Phyllis Dibble, KD4CCG; Bill Dibble, KE4WU, secretary. The Highlands County ARC Ham of the Year Award was presented by W4WDK to Roy Loweke, AF4HV. Tampa ARC will operate W4G for 15 days again this year beginning on February 7, 1999, to commemorate the Gasparilla Festival. Offices for the Manatee ARC are President, Mike Strickland, WA2IVN; Vice President, Ed Boyett, KB4SYV; Secretary, Wes Church, N2LGL; Treasurer, Jerry Johnson, AE4XW (Great pictures of Sea Port and ARES in the Newsletter). Lakeland ARC Officers are President, John Halley, WD4DGC; Vice President, Joe Nappier, KT4PM; Secretary Phil Dentler, KE4BHE; Secretary, Warren Fletcher, KE4VBA. Florida Contesters (FCC/FCG) put in a score in the 10 meter contest over 18 million points! If you are having a problem in your area with interference, the FCC encourages calls to their Enforcement Hotline in Gettysburg, PA., (202) 418-1184. For the latest information, check into the ARRL Information Net (AIN), Saturday mornings, on 3.940 MHz, at 7:30 AM or right after FPTN. 8 AM the South Florida ARES Net meets on the same frequency. Jerry Eichhorn, W4WDK, has not missed an EC report all year! All ECs should send their EC report to David Smith, KE4UEI@gate.net. EC reports are used for news and to monitor activity in the Section. 73 de K4PG. Traffic: WA9VND 1230, K4FQU 973, AB4XK 723, W7AMM 722, KA4FZI 702, K4SCL 514, KE4WU 405, KB4WBY 304, KC4ZH 304, AA4BN 256, AA4HT, 198, K4PG 193, KD4HGU 192, WA4EIC 181, KD4GR 175, WB4PAM 119, KD4JMV 109, K4RBR 71, W4DL 70, KT4XK 47, WD4JNM 44, W4WYR 33, KE4UOF 30, W6VIF 25, WA4CSQ 21, AA4WJ 15, K9ALX 13, KF4UTH 8, K3KT 7, K4ENA 2.

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. 440 activity seems to be getting more popular with a machine on St Thomas on 447.450 and one on St Croix on 447.475. Frequencies going thru the formal coordination process but experimentally do not seem to bother each other. Folks getting geared up for the ARRL CW and phone contest season. NP2B expects to be active during the phone portion. NP2HL now sporting new call, KP2Z. We

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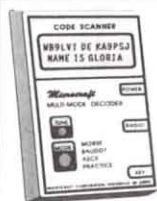
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suspected same last month but it wasn't "official" then. St Croix ARES meets at 1815 each Tuesday on 147.25 machine while St. Thomas / St. John continue to meet at 1830 on 146.81 repeater. 73 to all, John, NP2B.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—I have been told that my article will be limited in size starting with the March issue of QST. I was not aware that I wrote long articles, but I will condense my article and not get long winded. A sad comment on our HF performance came from one of my recent contacts. We talked for about 15 minutes on various subjects and one was the attitude of American Amateur Radio operators. His opinion of American Amateur Radio operators was not very high due to our language and rude behavior. Because we have lots of money to buy equipment (good quality HF sets and linear amplifiers), we feel that the bands belong to us and no one else. This person felt that since it is so easy for us to get a license, an Amateur Radio license is not appreciated. I told him that there are always a few people who act this way, but that 90% of Amateur Radio operators do appreciate the responsibility that comes with the privilege of having a license. While on the HF bands, please be courteous and use proper language. Remember that we are ambassadors for Amateur Radio. What we say and do, how we act, is a reflection on Amateur Radio as a whole. Phoenix has been experiencing repeater interference again. Please cooperate with Lance Halle, KW7LH, on all interference problems. He has done an excellent job in the past. We have a good working relationship with the FCC in this area and I hope it will continue. The 1999 DX Convention will be held at the City of Fresno (California) Holiday Inn downtown (telephone number 209-268-1000) during the time of April 9-11, 1999. 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 the Spring Hamfest at Scottsdale Community College on March 13 1999. Hope to see you all there. Not much else to report this time. Hope to hear from you on the bands. 73, Clifford Hauser, KD6XH.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF—The number one interest of our NEW club officers is scheduling speakers for 1999. Our LAX Web page www.qsl.net/arrlsw/lax has a listing of competent and available speakers in our area. The feedback has been very positive and our speakers should be congratulated for their free public service. Some clubs appreciate their efforts so much they even serve the speakers free food. If you have a presentation that you would like to list on our LAX Web site, please e-mail the information to me at w6bf@arrl.org. It has been reported that we have two outstanding amateurs who have been cited in our local newspapers for their on-the-air life saving efforts. These two gentlemen should be congratulated for their public service efforts: Julio Ortiz, AD6DK, and Brannister Bray, AH2CZ, both are from the South LA area. Jerry Verduft, ADOA, has an outstanding traffic report total of 202 for the month. Jerry is now a retired engineer and listed as a speaker on my Web site. www.qsl.net/arrlsw/lax Hank, W6SX, has reported a traffic total of 36. Our new "Eastside Reservoir Project" located in the Hemet area is due for completion in 1999, at an estimated cost of \$2 billion. This dam is 4.5 miles long, by 2 miles wide (160-260 feet deep) Reservoir that can almost double southern California's surface water storage capacity, in the event of an earthquake. Al, W6BBB, provides a progress report from the Hemet area every Sunday AM on the Section Managers Net. (75 meters & 440 MHz). This saddle dam, construction project started in 1995, and is, as of now, reported to be the largest earthfill dam in the USA. The construction of facilities for boating, sailing, fishing, camping and many other recreational opportunities, (maybe even, ham radio from the top of the dam) are in process. We depend and rely on Al's weekly "dam report," and we hope that Al's cox some day will reach above the look-out point. (tnx Al) 73 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/PC: Gwyn, KE6JOF, 909-685-7441. SEC: Ted, N6RPG, 909-947-1769. Words of Wisdom this month are from OCARES' Ray Grimes who urges RACES members "to remain focused and dedicated, remembering the reason all of us joined the team was to serve our communities by providing emergency radio communications." We have been limited to 39 lines for our Section News column, so please, no calls or comments if it seems too short! We begin by noting some new club officers for 1999. CNARC: Ed Lestina, KE6DQL, pres; Joe Magaditsch, KO6XB, vp; Gwyn Magaditsch, KE6JOF, sec; Karen Balsamo, WD6BWM, tr. ECARO: Fred Roberts, W6TKV, chair; Gary Boskovich, KD6QLT, v-chair; Jim Lowman, AD6CW, sec/tr. HBRACES: Gloria Morrison, KE6ATG, Em Serv Coord; Steven Graboff, W6GOS, RACES Officer, Robert Thompson, KE6RKG, Asst Radio Officer; Glenn Sasano, KE6OQO, Asst Radio Officer; Mel Goldberg, KO6TF, training officer. Lee DeForest Arc: Matt Bogle, N6WQH, pres; Glen Vaughn, KD6NZV, vp; Bob Williams, KA7VJD, sec; Mark Thompson, KE6KOE, tr. RCARA: Robert Randleman, N6CEU, pres; George Ashby, W6PRD, vp; Don Williams, KD6UVT, sec; Harold Ellis, KD6GMAN, tr. To each and every re-elected officer, thanks for running again, and to the newly elected, thanks for taking on the responsibility of keeping your club functioning. HBRACES received the Cyber Ham Award for content and design. As they state in their newsletter, they "are truly fortunate to have professionals like Mel Goldberg, KO6TF" in their group. Fullerton RC writes about HDSCS, "We haven't struck oil yet, but [HDSCS] keeps getting more experience in supporting the OC hospitals." STM, N6GIW, reports 12/98 traffic: KO6RZ 469, KC6SKK 108, KF6RDI 105, W6OZ 86, N6GIW 34, KD6EY1 25, N3IVO 19. Digital tlc: W6OZ NTS BBS 438. N6GIW mailbox 62. PSHR: W6OZ 145, KO6RZ 133, KC6SKK 103, KF6RDI 85. SCN/R NM, KO6RZ, reports 31 sess, QNI 241, QTC 172. Vy 73, KE6JOF for W6UBQ.

SAN DIEGO: SM, Tuck Miller, K6ZEC, 619-475-7333—Don't let your League membership expire! They, and we,

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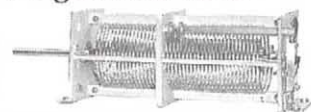
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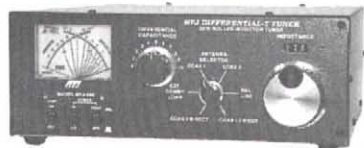
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MFJ-989C
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need your help. League membership over the past few years has been on a slow decline. Why is that? Your membership helps support various services that you have grown accustomed to over many years, and we would like to see them continue. If you are reading this, and are not a League member, I encourage you to take just a few minutes, fill out an application that can be found elsewhere in this QST magazine, and help support our great hobby and service. We need your help, so we can help you. My column has been reduced in size, so I will not be able to print the names and calls of all of our field volunteers every month. I will list them every so often, but be certain, that your work is very much appreciated, and without your help, our section would not be what it is today. A special thank you goes to Frank Littlebury, KE6WOE, for his great job on the Palomar Club Web-site. Also on the Web-site is the full edition of the club newsletter, the *Scope*. The Palomar club meets the 1st Wed of each month, 7:30 PM at the Carlsbad Safety Center. San Diego Section ARES meeting is held the 2nd Saturday of each month at the Normal Heights Methodist Church at 8 AM. Pancake breakfast at 7 AM. Check into the traffic net every night at 8 PM on 146.730. For traffic totals: KT6A 1109, KD6YJB 552, WA6ODQ 441, KO6BU 16, KD6IVF 12 BPL: (500 or more) KT6A 1109, KD6YJB 552, PSRR: (70 or more points) KT6A 142, WA6ODQ 129, KD6YJB 126.

SANTA BARBARA: SM, Rob Griffin, K6YR, 805-543-3346 & k6yr@arrl.org—Our NTS Section Net (SCN/SSB) looking for "a few good operators" to take on Net Control Station assignments. Interested? Contact Ken, KE6MIW, or your SM (see above). A major salute to the new ARES leaders recently appointed by Jack, KD6HHG, our SEC: DECS - SB:WA6BRW & SLO:KF6FKS; ECs Ven: KQ6NO; SB: KD6DYZ; SLO: KF6HHH & KC6WOY. Congrats to you all! The SEC recently released an updated Section Data Base. If you would like to have an electronic copy, contact Jack Hunter, KD6HHG, at his e-mail address: jhunter@thegrid.net. Excellent job, Jack. The California Central Coast DX Club, under leadership of its prexy, Bill, WA5VGI, has established an annual award to recognize the club's "DXer of the Year." Award criteria has been determined and the 1998 selection is in the works. TASMA has elected a new chair: our PIC, Jeff, AA6JR. Great! Check out the Santa Barbara Section Web site: qsl.net/arrl/sb/SCN/SSB P on 147.00+(131.8), 224.90-(131.8) & 448.875-(100). PSRR/Tfc: K6YR 221/444 W6ZRU-/40 KE6MIW 100/24 KF6OIF 101 & KM6RZ-/12.

WEST GULF DIVISION

NORTH TEXAS: SM, Don Thomas, KA1CWM—SEC: K5UPN. STM: KC5OZT. TC: W5CWO. BM: K6SYAM. SGL: N5GAR. OOC: W5B5DA. ASMs, K5RE, W5IWE, K5LP, W5FB, KX5K, K5QA, K5NA. <http://www.isic.net/net/texas.html>. We want to start by congratulating Jim Moore, K5MY, a member of the McKinney Amateur Radio Club for receiving the Club President's Award. Jim was very instrumental in restarting the club's ARRL VE program three years ago. His efforts have gone unseen or unrealized by many except for those who tested under him. It is great to know that he is being recognized by his peers for all of his efforts. Special recognition also goes to Skip Ely, N5TJB, of the National Weather Service in Fort Worth for his support of Amateur Radio and to Mike Heskett, WB5QLD, and Claude Whitley, WB5FLQ, and all of their ham volunteers that provide the communications between the National Weather Service and many of the County and City ARES and RACES organizations in the section. A recent visit to the Temple, Texas Special Service Club revealed that they have a very aggressive program for improving their meeting programs during the year in an effort to increase meeting attendance. They are also getting their ARES organization reestablished in Bell County. Assistant Section Manager Andy Ross K65VX, has had heart surgery and has asked to be replaced. We and all of his many friends wish him well during his recovery, and I'm sure he will shortly be back active again. We appreciate all that he has done for the section in the past. There are many new club presidents and officers that took office during the first quarter and we want to again offer the section's support and assistance if required. Be sure and submit your FSD-2 forms on all of the changes so the section and Headquarters can have updated names, telephone numbers and e-mail addresses. The e-mail distribution list for the section newsletter continues to grow with more requests every day. Amateurs can be added to the list by sending an e-mail to ntx-news@juno.com. If you have items that should be included in this QST article or the section's newsletter submit them to the section manager well in advance. This is the season for lots of public service activity, so be sure your club gets the credit it deserves by submitting information on your events by sending in Form FSD - 157. We have been receiving e-mail and letters from public service organizations inquiring about Amateur Radio support during the Y2K rollover. Be sure and read the article scheduled to be in the April QST on this subject. December traffic reports: KC5VLW 255, K5MXQ 226, K5AO 192, KB5TCH 108, KC5QGI 107, KC5OZT 91, KC5QZZ 77, N5JZ 74, WA5I 50, KC5EIV 48, KC5PNM 24, AC5Z 18, KB5YAM 8, KD5AHW 4, N8QVT 1.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, K5CPZ. SEC: W5ZTN. STM: AB5RV. ACC: KB5BOB. PIC: WA9AFM. OOC: K5WG. SGL: W5NZS. TC: KB5RV. Congratulations to Coy Day, N5OK, on his election to Vice-Director. It is a great privilege to accept his appointment to this position. I have worked with Coy over the past couple of years, and am honored that he selected me as his replacement. I will do my best to fill his shoes. I look forward to working with each of you and hope I can count on your support. OK Section Web page has moved to <http://www.busprod.com/k5ttt>. Ada ARC 1999 Officers are pres: Scott Renes, KD5AJL, vp: Charles Etier, KC5TGA, treas: Finnis Hallmark, KM5RZ, sec: Danny Coffey, KM5LB. The Stillwater Club has moved to the Red Cross building and is setting up what will be a nice club station. They provided the RC with valuable services passing H&W traffic during the TX floods. Elk City Hamfest will be March 6 and Green Country Hamfest in Tulsa will be March 19 & 20. Check the web page for details. CORA has added Enid ARC to its family and brings the total memberships to 15 clubs! 73 for now. Tfc:

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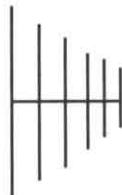
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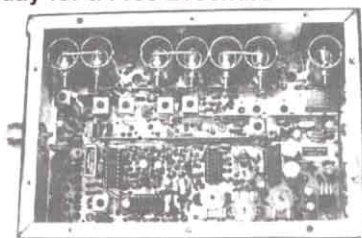
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N51KN 862, KF5A 838, WB5NKC 695, K5GBN 303, AB5RV 95, KE5JE 86, WB5NKC 139, WA5OUV 81, W5CU 72, KC5VOG 42, KK5GY 35, W5REC 32.

SOUTH TEXAS: [Editor's Note: In the January, 1999, South Texas Section News column (p. 138), New Braunfels was misspelled four times. The misspellings were introduced at Headquarters by using a spell checker, and then the editors failed to catch the mistakes. We regret the errors and apologize to our readers.] SM, E. Ray Taylor, N5NAV—ASMs: NR5ED, N5WSW, W5GKH, K5DG, N5LYG, WA5UZZ, KK5CA, WA5TUM, KB5AWM, WA5JYK, K5PFE, and K5SBU. STM: W5GKH. SEC: K5DG. ACC: N5WSW. PIC: KA5WSS. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: KM5HY. The March winds are upon us here in South Texas. I do hope all the antennas hold up. I don't think we could survive without the courageous help that has been shown by the ham community. We are still trying to rebuild here in South Texas after the Flood of 1998. My son lost everything, and I had severe damage to the foundation and roof. We were just discussing how fortunate we were because we can still rebuild, and I was able to continue to operate throughout the emergency. There are thousands who will never be able to repair or recover their losses. Our heart-felt sympathy goes out to those. There are still a lot of areas that have not been cleaned up as yet. As I make some speaking engagements in the next few months, I will try to get some pictures for the PIO group to put together an article for QST. If anyone has pictures of your area, please send them to me. It appears that the whole thing left everyone shocked and not too many pictures were taken. Three clubs have invited me to speak in the Houston area on the new licensing structure, the FCC enforcement, interference problems on 2 meters and HF, and emergency operations. I might suggest that we have a joint meeting of all the clubs in and around the Houston area in a place that will accommodate the group. Just a thought. This would be a time for all the clubs to get together with one common goal in mind because the subjects are of interest to all. This will be the fifth year for John Cross, AB5OX, to conduct the no-code license class for the Boy Scout Merit Badge at Sam Houston Area Council Winter Camp. The location will be at Camp Strake in Conroe, Texas. Assisting John will be Ron Carmer, K5CXH, and Alan Cross, WA5UZZ. John, I do wish you much success. Our future depends on our youth. Might I suggest to all those who have the opportunity to work with youth, digital communications is a great tool, but it does fail, especially during an emergency, and you take a test so you can talk on the air, not for two machines to talk. This just might encourage them to upgrade. Now, in regards to the misspelling of the city of New Braunfels, in the January issue of QST, I have had over a hundred contacts either by phone, e-mail, or on the air. I have asked the League not to run my articles through a spell check, since I do that before I send it in. Larry Eblen of the National Weather Station, was changed about a year ago. I hope he didn't read the article. However, I did find that a lot of hams are reading my articles. The League has apologized, and I accept. Have a wonderful March, and God Bless. Tlc: W5SEG 607, W5YQZ 570, NR5ED 452, W5KLV 369, KA5KLU 255, W5SHN 220, N5NAV 205, WA5FXQ 104, W5ZX 102, W4RRX 95, W5GKH 89, K5UCQ 75, N5OUJ 67, WA5AA 36, KD5GM 32, W5ZIN 26, KD5CRX 20, K5VY 12, N5JUJ 6, KG5CX 4.

WEST TEXAS: SM, Charlie Royall, WB5T, (see p 12 for address)—Section News reduced due to loss of advertising revenue caused by loss of hams. Nr of US ham licenses dropped by 2683 in '98. ARRL VEs tested 64.6% of all new licensees; 2nd place W5YI 27.6%. Death rates greater than replacement rates. SKs San Angelo: Capt (USNR, Ret) Dr Geo Moutos/KC5HVL, Arnold Weathersbee/W5JXA, Leo Knopp/KA5DLU. New Officers: Midland-pres Ray Schulze/N5SR, vp Steve Hopkins/K5RS; San Angelo-pres Gil Gilstrap/KK5YZ, vp, Nan Royall/KC5YTG; Odessa-pres Bob Jordan/N5RKN, vp Jerry Naylor/KB5THR. Former El Paso ARC mbr Dr Gerald Griffin/K6MD, USA, promoted to Brig Gen; also mbr of ARRL RF Safety Cmte. 15 new hams-Lubbock: Ken/KD5FRY, Garrett/KD5FRO, Ahsen/KD5FRM, Steven/KD5FRT, Roger/KD5FRZ, Issac/KD5FRQ, Scott/KD5FRP, Nick. KD5FRR, Mark/KD5FRU, Adam/KD5FRS, Kyle/ KD5FSA; Abilene-Amber/KD5FOP, Sherry/KD5FON; Horizon City: E.H. Ruble/KD5FMZ; Sweetwater-Gary/KD5FOO. In '98, Lubbock licensed as many new hams as all the rest of the section combined! '98 was a yr of continuous disasters for TX; hope '99 fares better.

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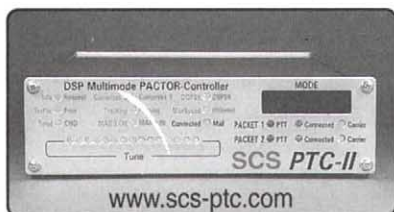
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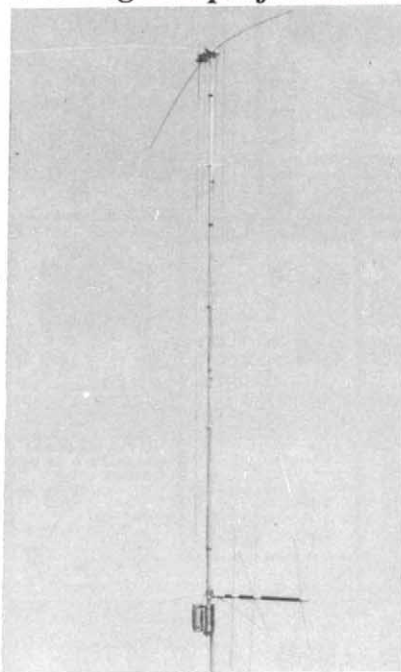
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MFJ-1792
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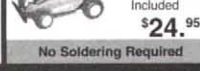
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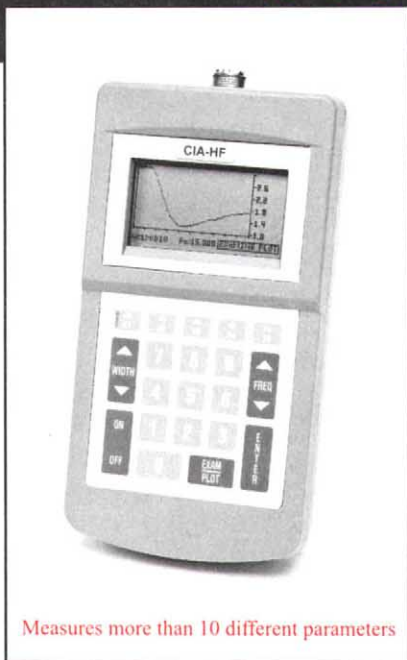
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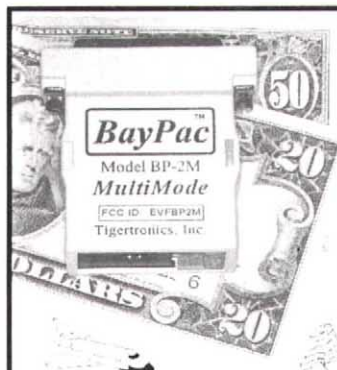
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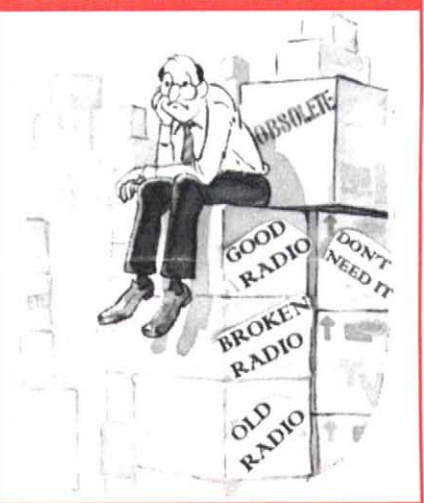
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5971CPS125. 125ft (cable same as above) w/Jones plug to socket assembly	\$39.95/ea		
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RG8/U strd BC foam 95% braid UV resistant JKT. 0.9dB 1350 watts @ 30MHz.	100ft \$44.95	6ft \$11.95	3ft \$9.95				
RG8 MINI(X) strd BC foam 95% braid UV resistant JKT. 2.0dB/875watts @ 30 MHz	100ft \$24.95	50ft \$15.95	6ft \$4.95	3ft \$3.95	(3ft & 6ft are China made)		
RG303/U Teflon® 95% silver braid 8.6dB 1100 watts. Crush resistant.	18ft \$24.95	6ft \$14.95					

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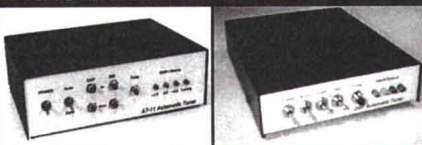
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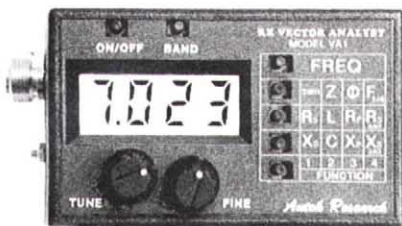
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much bigger than the battery pack in others. Uses a single 9 V battery. Micro-processor-based. Errors are compensated in computer tables. All values are DIGITAL. This yields a true INSTRUMENT, not just an SWR dipper. Illustrated instructions guide even a beginner through common measurements. So why use an older design? Get yours today!

Analyst details: Impedance: 0-1000 ohms (VA1), 0-2000 ohms (RF1), 0-600 ohms (RF5), 1 ohm resolution. Z accuracy to 3%. RF1/VA1: C: < 5 to 9999 pF, to 1 pF resolution. L: 0.4 to 300 uH. Autoranging. SWR 1.0 to 20.0 (VA1), 1.0 to 15.0 (RF1), 1.0 to 6.0 (RF5) 0.1 resolution, except 0.01 for VA1 below 4.0. VA1 reads R/X 0 to 999 ohms. All crystal-controlled 4 digit frequency readout and accuracy at all frequencies, e.g. 1.200 to 500.0 uP auto turnoff to save 9V battery (not included) Cycle between two modes (e.g. SWR/FREQ) on command. RF5 uses stripline techniques, HP diodes, and costly commercial shielded oscillators. All 5 x 2.5 x 1.5" ABS cabinet. All have standard UHF connector (SO-239). Exact specs. are subject to change w/o notice. 1 year limited parts & labor warranty on all products. MADE IN USA. See excellent reviews in QST: May 1995, and June 1998.

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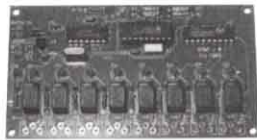


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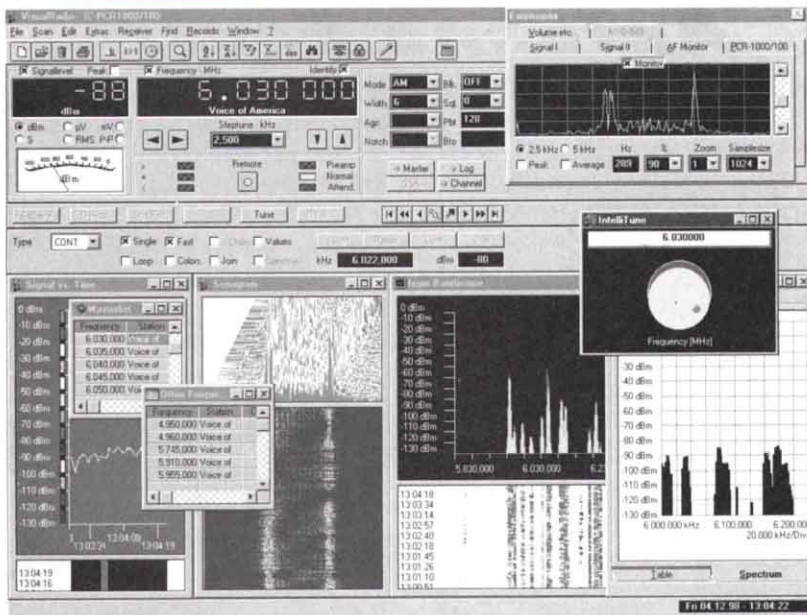
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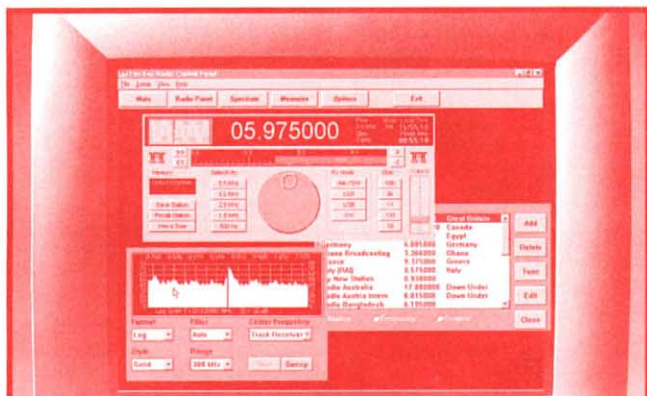
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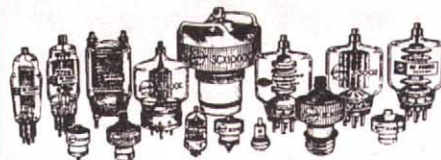
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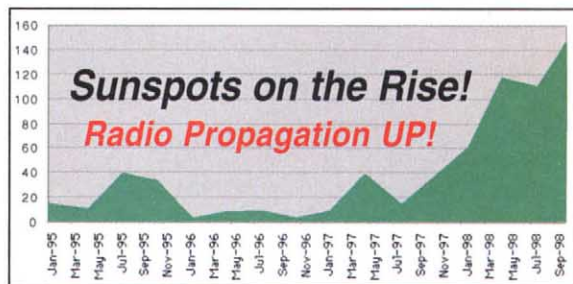
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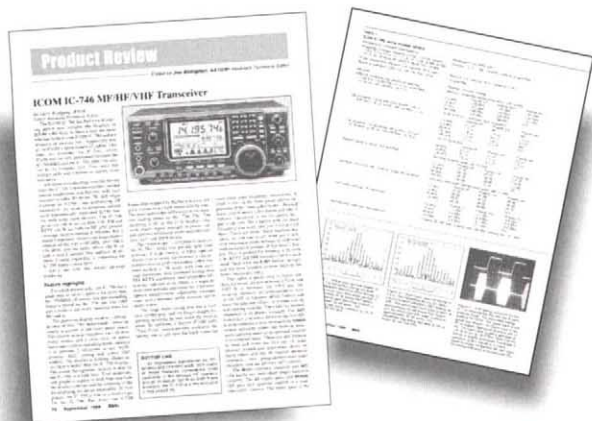
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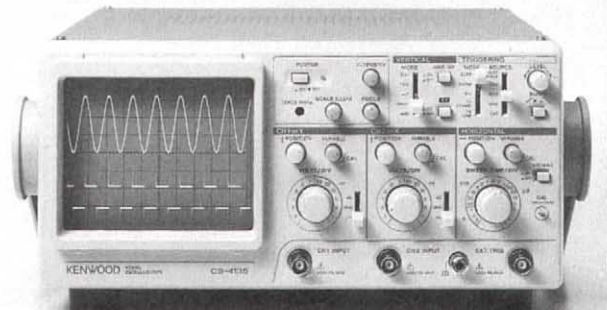
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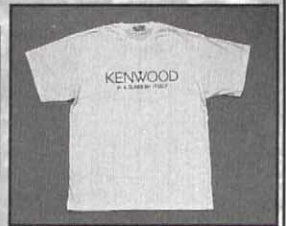
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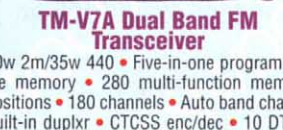


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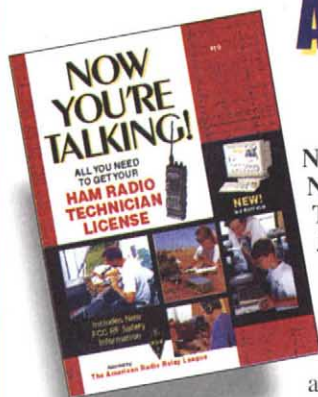
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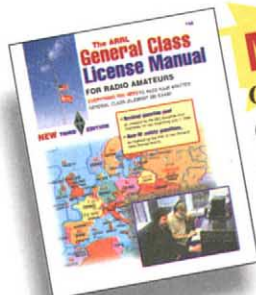
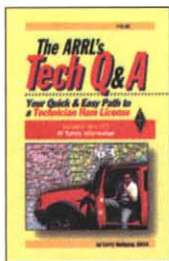


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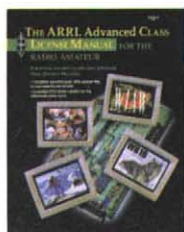
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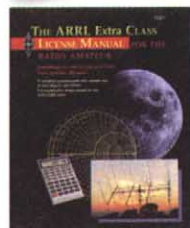
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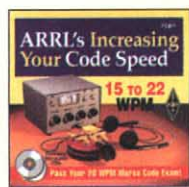
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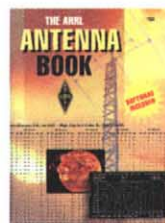
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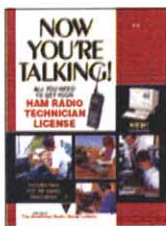
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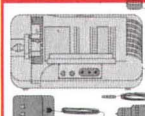


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50-54 MHz
 6M5/6M7 \$189/269
 6M2WLC/6M2.5WLC \$399/529
220-226 MHz
 222-7EZ/222-10EZ \$79/89
 222-5WL/222-7WL \$145/179
900-928 MHz
 902-18EZ/902-14WL \$119/179
1250-1300 MHz
 23CM22EZ/23CM35EZ \$85/139
More M2 models in stock-please call

MFJ ANTENNAS

259B Antenna Analyzer \$219
 1798, 80-2m Vertical \$239
 1796, 40/20/15/10/6/2m Vert. \$179
 1793, 80/40/20m Vertical \$159
 1792, 80/40m Vertical \$145
 1788, 40-15m Loop \$399
 1786, 30-10m Loop \$349
 1780, 14-30 MHz Loop \$229
 1768, 2m/70cm Beam \$65
 1762, 3 Element 6m Beam \$65
Big MFJ inventory-please call

LAKEVIEW HAMSTICKS

9106 6m 9115 ... 15m 9130 ... 30m
 9110 ... 10m 9117 ... 17m 9140 ... 40m
 9112 ... 12m 9120 ... 20m 9175 ... 75m
All handle 600W, 7' approximate length, 2:1 typical VSWR ... \$19.95

HUSTLER ANTENNAS

4BTV/5BTV/6BTV \$129/169/189
 G6-270R, 2m/70cm Vertical \$149
 G6-144B/G7-144B \$109/159
Hustler Resonators in stock-call

KLM ANTENNAS

10M4/M6 \$229/369
 15M4/M6 \$255/599
 20M4/M5/M6 \$475/735/1065
 40M2B/3/4 \$565/759/979
 KT34A/34XA \$539/749
 6M5/7LB/10 \$219/319/459
 2M16LBXM/2M20LBX \$210/259
 2M22C/435-18C \$210/219
 440-6X/10X/16X \$59/69/125
 432-20LBX/30/40 \$159/185/249
Please call for more KLM antennas

FORCE 12 ANTENNAS

C3/C31XR \$519/1119
 C3S/C3SS \$459/449
 C4/C4S \$660/569
 C4SXL/C4XL \$839/929
 EF240/EF240S \$539/469
 EF410/EF415 \$249/339
 EF417/EF420 \$379/499
 EF510/EF610 \$339/429
 WARC2-2/WARC7 \$379/759
 ZR3, Low Profile Triband \$429
Please call for more Force 12 items

GLEN MARTIN ENGINEERING

Hazer Elevators for 25G
 H2, Aluminum Hazer, 12 sq ft ... \$359
 H3, Aluminum Hazer, 8 sq ft \$269
 H4, HD Steel Hazer, 16 sq ft \$339
Aluminum Roof Towers
 RT424, 4 Foot, 6 sq ft \$159
 RT832, 8 Foot, 8 sq ft \$229
 RT936, 9 Foot, 18 sq ft \$389
 RT1832, 17 Foot, 12 sq ft \$499
Please call for Glen Martin info

COAX CABLE

RG-213/U, (#8267 Equiv.) \$36/ft
 RG-8X, Mini RG-8 Foam \$19/ft
 RG-213/U Jumpers Please Call
 RG-8X Jumpers Please Call
Please call for more coax/connectors

TIMES MICROWAVE LMR COAX

LMR-400 \$59/ft
 LMR-400 Ultraflex \$89/ft
 LMR-600 \$1.19/ft
 LMR600 Ultraflex \$1.95/ft

ANTENNA ROTATORS

M2 OR-2800P \$1095
 Yaesu G-450A \$239
 Yaesu G-800S/SDX \$319/399
 Yaesu G-1000SDX \$479
 Yaesu G-2800SDX \$1069
 Yaesu G-550/G-5500 \$289/499

ROTATOR CABLE

R51(#20)/R52 (#18) \$.22/.32/ft
 R61 (#20)/R62 (#18) \$.28/.32/ft
 R81/82/83/84 \$.25/.39/.52/.85/ft

US TOWER

MA40/MA550 \$659/1055
 MA770/MA850 \$2359/3649
 TMM433SS/HD \$1139/1379
 TMM541SS \$1499
 TX438/TX455 \$1069/1319
 TX472/TX489 \$2649/4599
 HDX538/HDX555 \$1379/1919
 HDX572 \$6329
Please call for help selecting a US Tower for your needs. Shipped factory direct to save you money!

ROHN TOWER

25G/45G/55G \$79/179/229
 AS25G/AS455G \$39/89
 GA25GD/45/55 \$68/89/115
 GAR30/GAS604 \$35/24
 SB25G/45/55 \$39/89/109
 TB3/TB4 \$85/99
 HBX32/HBX40 \$349/439
 HBX48/HBX56 \$589/699
 HDBX40/HDBX48 \$549/699
 BXB5/6/7/8 \$39/49/59/59
Please call for more Rohn prices

UNIVERSAL ALUMINUM TOWERS

4-40/50/60' \$519/739/1049
 7-50/60/70' \$939/1369/1789
 9-40/50/60' \$729/1049/1469
 12-30/40' \$559/869
 15-40/50' \$969/1399
 23-30/40' \$859/1289
 35-30/40' \$979/1509
Bold in part number shows wind-load capacity. Please call for more Universal models. All are shipped factory direct to save you money!

TOWER HARDWARE

3/8"EE / EJ Turnbuckle \$10/11
 1/2"x9"EE / EJ Turnbuckle \$15/16
 1/2"x12"EE / EJ Turnbuckle \$17/18
 3/16" / 1/4" Preformed Grips \$4/5
Please call for more hardware items

HIGH CARBON STEEL MASTS

5 FT x .12/18" \$35/59
 10 FT x .12/18/25" \$65/110/149
 15 FT x .12/18" \$95/160
 20 FT x .12/18/25" \$120/199/289

PHILLYSTRAN GUY CABLE

HPTG1200I \$39/ft
 HPTG2100I \$52/ft
 PLP2738 Big Grip (2100) \$5.50
 HPTG4000I \$79/ft
 PLP2739 Big Grip (4000) \$7.65
 HPTG6700I \$1.15/ft
 PLP2755 Big Grip (6700) \$10.95
 HPTG11200 \$1.55/ft
 PLP2558 Big Grip (11200) ... \$16.50
Please call for more info or help selecting the Phillystran size you need.

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- Super Compact 2m/70cm FM HT
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- Extended RX (76-999 MHz) Cellular Blocked
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Texas Towers has Yaesu specials galore! In addition to our every day low prices, Yaesu is offering additional savings coupons for several of the radios shown on this page. So be sure to give us a call - Texas Towers really does sell for less!



G-2800SDX:
Features 34 sq. ft. capacity, 450° rotation, preset control, and more!

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G-450XL (11 sq. ft.) Please Call!

G-5400B Az/Elevation* Please Call!

G-500 Elevation Rotor* .. Call for price!

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FT-840 Call For Yaesu Special!

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FT-3000 2M Mobile XCVR, 70W Call!

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FT-50RD Please Call!

- Compact 2m/70cm HT
- Built to Mil. Spec. MIL-STD 810
- 112 Memory Channels
- CTCSS Tone Encode
- CTCSS Tone Decode
- DTMF Paging
- DTMF Squelch
- Dual Watch
- Extended RX 76-200 MHz 300-540 MHz 590-999 MHz (Cellular Blocked)
- Optional ADMS-1D Software
- Supplied with NiCad Battery Pack, Wall Charger, Belt Clip, Rubber Duck Antenna, and More!

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FT-51RH Call!

- Tiny 2m and 70cm FM HT
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- Alpha Numeric Display
- AM Receive (110-138 MHz)
- Autodial Memory (10 Channels)
- CTCSS Tone Encode
- CTCSS Tone Decode
- CTCSS Scan (Finds Tone)
- DTMF Paging & Squelch
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- Direct Keypad Frequency Entry
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HF ENTHUSIASM

Yaesu, Choice of the World's top DX'ers



Over 40 years of experience in HF transceiver design has firmly established Yaesu as the choice of the world's top DX'ers. The knowledge that produced unequalled RF technology and design that is found in the State of the Art FT-1000MP can also be found in the miniature FT-100. The FT-100 while small in size 6.3" x 2.1" x 8.1" (160 W x 54 H x 205 D mm :w/o knob) is large in features and performance. This is accomplished by using the most advanced manufacturing techniques and component mounting technology. High Dynamic range RF front-end technology and Advanced Digital technology such as DSP sets a new standard of receiver performance for miniature HF transceivers. The single piece die cast frame, dual cooling fan system and revolutionary RF high power design technique keeps the FT-100 running cool and smooth in the most adverse operating environments. (TX Power output=100W HF, 50W VHF/20W UHF) The TX Equalizer offers crisp, clear and clean TX audio reproduction that until now was only found in top of the line HF base stations. The optional ATAS-100 (active tuning antenna system) ushers in a new age of mobile and field day operation (from HF to UHF frequencies). Add the optional ATBK-100 base kit (Good for limited space, simple setup.) and you've got a base station that ranks among the best in the world.

Features

- Frequency coverage:
RX : 100 kHz-76 MHz, 108-174 MHz, and 420-512 MHz
TX : 160-6 m/144-148 MHz/430-450 MHz
- Power output : 100W (160-6 m), 50W (144 MHz), 20W (430 MHz)
- DSP Bandpass Filter, Notch Filter, Noise Reduction, and Equalizer
- IF Noise Blanker
- IF Shift
- SSB, CW, AM, FM, AFSK, Packet (1200/9600 bps) operation
- Detachable Front Panel
- Two Antenna Jacks (HF/50 and 144/430)
- VOX
- Dual VFOs
- Available IF bandwidths of 6 kHz, 2.4 kHz, 500 Hz, and 300 Hz (6 kHz, 500 Hz, 300 Hz filters optional)
- Built-in Electronic Memory Keyer
- Speech Processor
- Built-in CTCSS and DCS for FM operation
- Automatic Repeater Shift and Auto-Range Transponder System
- Smart Search™ Automatic Memory Channel Loading System
- 300 memory Channels
- Quick Memory Bank (QMB)
- Bright LCD with multi-function display
- Optional FC-20 External Antenna Tuner
- Compatible with ATAS-100 Active-Tuning Antenna System. Add the optional ATBK-100 base kit

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FT-100

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Explore the new opportunities of APRS™ with a handheld transceiver built for the future.



TH-D7A DATA COMMUNICATOR 144/440MHz FM Dual Bander

Meet Kenwood's new TH-D7A, an FM dual-band (144MHz/440MHz) handheld transceiver equipped with a TNC and all the features needed for easy amateur radio data communications — and especially APRS.

The TH-D7A offers exciting new adventures in Ham radio with a wide range of data communications options — including simple packet operation using the AX.25 protocol and the Automatic Packet/Position Reporting System (APRS), which is rapidly gaining popularity worldwide. You can also send and receive SSTV images using Kenwood's VC-H1.

APRS (Automatic Packet/Position Reporting System)

- ▶ **Position/directional data**
Hook up to an NMEA-0183 compatible GPS receiver and you can transmit your exact position for automatic calculation of distance, current speed and heading. Manual input of latitude/longitude is also permitted.
- ▶ **Versatile messaging**
Transmit your own alpha messages (up to 45 characters), bulletins, comments (up to 20 characters), and fixed messages (8 patterns).
- ▶ **Station List**
Store received APRS data in up to 40 memory channels
- ▶ **Grid square locator**
- ▶ **TX interval** (0.5/1/2/3/5/10/20/30 min.)
- ▶ **Packet path selection for Digipeat**
- ▶ **Weather station & PHG data reception**

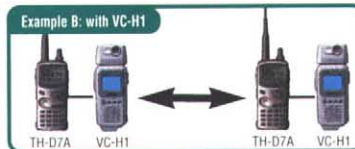
Visual Communicator Control

- ▶ **Text superimpose function**
Add your call sign, RSV reports, comments, etc.
- ▶ **VC-H1 shutter**
Command a connected VC-H1 to initiate transmission
- ▶ **Fast FM**
Send an image in just 14 secs (approx).
- ▶ **SSTV transmission mode selection (9 modes)**
- ▶ **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
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