Official Journal of
The American Radio
Relay League

QST

devoted entirely to
AMATEUR RADIO

February 1999

QST reviews:

- Japan Radio Company NRD-545 DSP communication receiver

The crash of SwissAir 111

A DX adventure to the Australs and Marquesas

New Ham Companion:
Practical information for all hams

Build this synthesized, computer-controllable 2-meter receiver!

$4.95 U.S. $5.95 Can.

02>

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ICOM IC-207H

50 Watts on 2 Meters and 35 Watts on 440 MHz Now Fits Anywhere

SHOCK MIL STD 810 C/D/E VIBRATION

ICOM Rugged
One piece, die cast aluminum chassis is a large heat sink.

ACTUAL SIZE

PC Ready!

ICOM options required for PC cloning:

CS-207 Cloning Software
OPC-646 Cloning Cable

A third party 6-pin serial cable is required for PC packet connection

Removable, Remotable Control Head. An optional feature of the '207H lets you separate the control head from the main unit. Only 4.3 inches wide, this little powerhouse is easy to fit on even the most crowded dashboards.

9600 BPS Packet Ready. Packet operation is growing in popularity. The '207H lets you get in on the fun.

Small Size, Big Value. ICOM's most affordable mobile dual bander features 50 watts of power, multiple power settings, 182 memory channels, PC programming, and much more.

One Touch Band Switching
Easy operation on the go. Work one band at a time.

9600 Packet Connection Point
A 6-pin connection point on the back panel is provided for up to 9600 packet operation.

Large LCD Display
Contains "soft keys" menu information, SWR meter, big-sized frequency identification, and more.

50 Watts
A full 50 watts of output power on 2 meters gives you a commanding on-air presence. 35 watts on 440 MHz.

DTMF Mic
Allows for easy control of most rig functions. Optional wireless mic available.

SPECIFICATIONS

Transmit: ..... 2 Meter, 440 MHz (70 CM)
Receive: ..... 118-174 MHz*, 440-450 MHz
Includes Air Band (*guaranteed 144-148 MHz)
Mode: ..... AM (Rx only), FM
Power: ..... 2 Meter: 50W/20W/10W/5W
440 MHz: 35W/20W/10W/5W
Power Supply Requirement: ... 13.8 V DC
Memory Channels: ..... 182 Total, 150 regular, 10 scan edges, 2 call, and 20 scratch pads
Size (approx): .. 5.5(W) x 1.6(H) x 7.3(D) in.
140(W) x 40(H) x 185.4(D) mm.
Weight (approx): ..... 2 lb, 6 oz /1.17 kg

FEATURES

- **Removable, Remoteable Control Head (optional operation)**
  - Super compact size
  - Big keys, big dials, big bright LCD
  - Optional separation cable required
- **Tone Squelch (CTCSS Encode) and Tone Scan (CTCSS Decode) Standard**
  - 50 independently programmable tone frequencies for repeater and tone squelch use, respectively
- **Built to Military Specifications (MIL STD) 810 C/D/E shock/vibration**
- **On-Screen Menu "Soft Keys"**
- **9600 BPS Packet**
- **Fast Scanning**
- **Attenuator**
- **Rugged ICOM Construction**
- **Auto Repeater Function**
- **Built-in Duplexer**
- **Wireless Mic Operation (optional)**

HEAR comes the Sun with ICOM UPGRADE 1998

There's still time to enter our IC-706MKII giveaway. Check our Website for details.

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ISO 9002 SGS

The '207H head fits on just about any boat, plane, motorcycle, or tractor dashboard. Heck, it'll even fit in a car or truck. Visit your ICOM dealer today or call our 24-hour free brochure line. **425-450-6088**

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The most versatile series of compact, multi-banded rigs ever made.

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– Kevin Olson, K3OX

"I enjoy everything about the IC-706MKII; size, ease of operation, power."
– Richard Lemme, K9FA

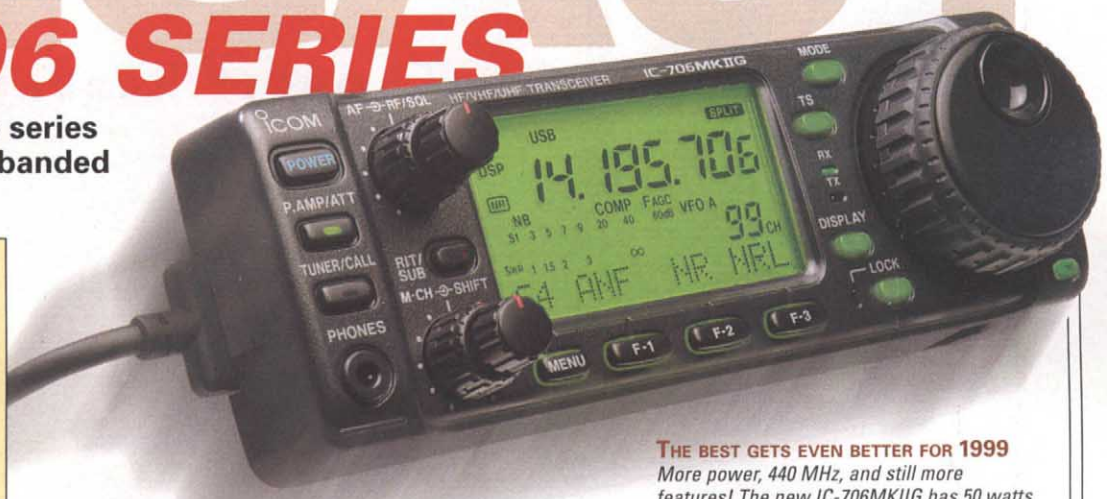
"This is my first ICOM & I am very pleased with it."
– Merlin R. Myers, KAØQZK,

"God, I love this rig. My little 706MKII goes with me everywhere and is on 24 hours a day."
– James H. Weidner, K2JXW

"The DSP unit works great for knocking out the heterodynes from the foreign broadcast on 40 meters. Thanks for making such a great compact rig."
– Bill Youse, N6DZS

"706 -- the love of my life."
– Gary Mashburn, KF4PTW

Try out all the latest ICOM rigs in the Funmobile. We'll be visiting Texas in January and Florida in February. Log on today: www.icomamerica.com



NEW IC-706MKIIG*

THE BEST GETS EVEN BETTER FOR 1999
More power, 440 MHz, and still more features! The new IC-706MKIIG has 50 watts on 2 meters, 20 watts on 440 MHz, DSP as standard equipment, auto repeater, CTCSS, and backlit keys. Tried, tested and proven, the 706 series is your best choice for a complete ham rig.

NOW WITH DSP AS STANDARD EQUIPMENT on version 15

IC-706MKII

IN 1997, HAMS WERE "WOW"ED AGAIN
The IC-706MKII added still more features and more power. Today, the '706 series radios have earned a reputation among hams as rugged, hard working rigs. They perform as well on a serious DX'pedition as they do in a car or in a contest shack.

IC-706

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

PC Ready!

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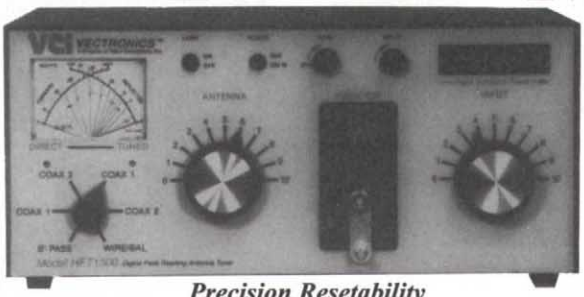
$459.95



The VECTRONICS HFT-1500 is not just an antenna tuner . . . it's a beautifully crafted work of art, using the finest components available and the highest quality construction.

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Absolute Minimum SWR

***You** can tune your SWR down to absolute minimum!*

Why? Because *all* three matching network components, the roller inductor and both variable capacitors, are *fully* adjustable.

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You can tune any real antenna from 1.8 to 30 MHz, including all MARS and WARC bands. You can tune verticals, dipoles, inverted vees, yagis, quads, long-wires, whips, G5RVs, etc . . .

*SSB*Analyzer Bargraph™*

VECTRONICS' exclusive 21 segment bargraph display lets you visually follow your instantaneous voice peaks. Has level and delay controls.

Accurate SWR/Power Meter

A *shielded* directional coupler and backlit Cross-Needle meter displays *accurate* SWR, forward and reflected power simultaneously. Reads both peak and average power on 300/3000 Watt scales.

6 Position Ceramic Antenna Switch

Select two coax fed antennas (tuned or bypassed), balanced line/wire or bypass.

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A 4:1 Ruthroff voltage balun feeds dual high voltage Delrin terminal posts for balanced lines. HFT-1500 is 5.5x12.5x12 inches.

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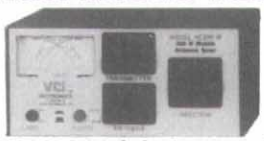
You can tune any antenna 1.8-30 MHz. Custom 48 position switched inductor and continuous rotation 1000 Volt capacitors provide arc-free operation. Handles 300 Watts PEP SSB, (150 Watts on 1.8 MHz).

8 position antenna switch, built-in 50 ohm dummy load, peak reading backlit cross-needle SWR Power meter, 4:1 balun for balanced line antenna. Scratch-proof Lexan front panel. 10.2x9.4x3.5 in. Weighs 3.4 lbs.

300 Watt *Mobile* Tuner

VC-300M
$109.95



The VC-300M *Mobile* Antenna Tuner is compact, lightweight, easy-to-operate and is our most economical tuner.

It's compatible with *any* mobile antenna and *any* mobile HF transceiver and is compact enough to fit in the most compact car.

It can also be used at home with dipoles, vees, verticals, beams or quads fed by coax.

Backlit dual movement meter simultaneously monitors Power and SWR. Covers 1.8-30 MHz. Handles 300 Watts SSB PEP, 200 Watts continuous, (150 Watts on 1.8 MHz.). 7.25x8.75x3.6 in. Weighs 3.4 lbs.

SWR/Power Meters

PM-30
$79.95
PM-30UV
$89.95

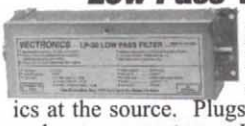
PM-30, $79.95, for 1.8 to 60 MHz. Displays forward and reflected power and SWR simultaneously on dual movement Cross-Needle Meter. True *shielded* directional coupler assures accuracy. Backlit meter displays peak or average power in 300/3000 Watt ranges. First-rate construction includes scratch-proof case/front panel. 5.3x5.75x3.5 inches. SO-239 connectors.

For 144/220/440 MHz, 30/300 Watt ranges. PM-30UV, $89.95, has SO-239 connectors. PM-30UVN, $89.95, has N connectors. PM-30UVB, $89.95, has BNC connectors.

1500 Watt *dry* Dummy Load

DL-650M, $64.95. Handles 100 watts continuous, 1500 Watts for 10 seconds to 650 MHz. Ceramic resistor. SWR < 1.3. SO-239 connector. **DL-650MN, $69.95** has N connector.

Low Pass TVI Filter



LP-30, $69.95. Eliminates TVI by attenuating harmonics at the source. Plugs between transmitter and antenna or tuner. Handles 1500 watts.

High Pass TVI Filter

HPF-2, $24.95. Installs between VCR/TV and cable TV or antenna lead-in cable. Eliminates or reduces interference caused by nearby HF transmitters.

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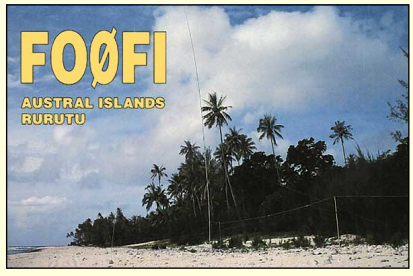

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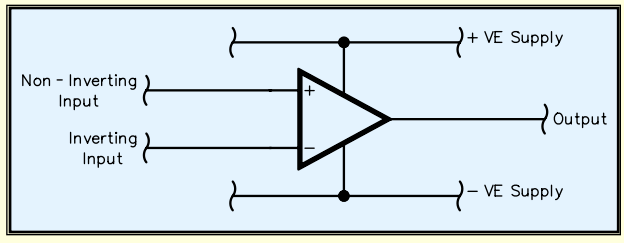

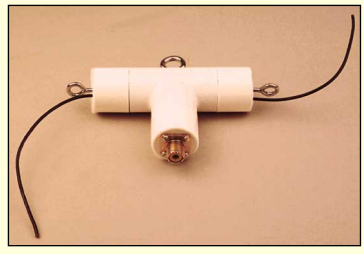

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Our Cover

This month Steve Hageman presents an easy-to-build 2-meter scanning receiver. It only takes a few hours to put together a hand-held model with an LCD display, or a modular "hideaway" unit. Both receivers are computer controllable. See "A Synthesized 2-Meter FM Receiver with PC Control" in this issue.

Membership in the ARRL, including a subscription to *QST*, is available to individuals at the following rates: $34 per year in the US and possessions, $47 elsewhere, payable in US funds. Age 65 and over, with proof of age, $28 (US only). Licensed radio amateurs age 21 and under may qualify for special rates; write for application. Life membership is also available. Membership and *QST* cannot be separated. Fifty percent of dues is allocated to *QST*, the balance for membership. Subscription rate for libraries and institutions: $34 per year postpaid in the US and possessions, $47 elsewhere. Single copies $5 in the US.

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OUR Battery: 1800 NiMH
Suggested Retail Price: $58.90

For Icom Radios

PR-BP7H
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Original Battery: 600 mAH NiCad
OUR Battery: 1000 NiMH
Suggested Retail Price: $67.90

PR-BP173
Compatible With: IC-T22, IC-W32, IC-T7
Original Battery: 600 mAH NiCad
OUR Battery: 650 NiMH
Suggested Retail Price: $61.90

For Kenwood Radios

PR-PB34H
Compatible With: TH-22AT, TH-79A
Original Battery: 600 mAH NiCad
OUR Battery: 1000 NiMH
Suggested Retail Price: $55.90

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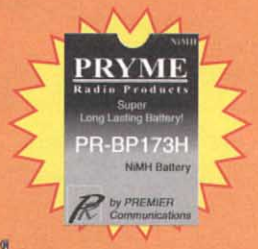

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AT-400 440 MHz HT

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AT-400: Tx: 430-450 · Rx: 400-470 MHz · MARS and CAP capable (permits are required) · 5-watts output (with 12 VDC) · 20 memory channels store any offset or tone · CTCSS encode and decode included · programmable band and memory scan modes · DTMF paging included · backlit display and keypad · 2.5 and 5 watt versions available · Size: 4.25" (H) x 2" (W) x 1.3" (D) excluding battery pack

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NEW

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NEW

AR-146 TWO METER MOBILE
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Best Adjacent Channel Rejection!
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- Easy to change pre-programmed frequencies
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"It Seems to Us..."

Pollution

Over the past few decades, people have become a lot more conscious of the need to avoid polluting the environment. Things aren't perfect, but they have improved in a lot of areas. Here in the Hartford area, for example, there is renewed interest in the riverfront. Years ago, the city turned its back on the Connecticut River—understandably, since it resembled an open sewer. Today, the river is a lot cleaner and once again is viewed as a valuable resource for enhancing the quality of life.

Unfortunately, the same sort of environmental awareness has not permeated all areas of technology. Our RF environment has become increasingly polluted with unnecessary noise—and unless corrective action is taken, the situation is about to get a lot worse.

Writing in the EMC column in the December 1998 issue of *RadCom*, the journal of the Radio Society of Great Britain, David Lauder, G0SNO, observes: "The MF/HF radio spectrum seems to be under siege from certain sectors of the data communications industry who are busy designing systems to send high speed data along unsuitable types of cable.... There seems to be a mistaken belief among some system proponents that the LF, MF and HF bands can be degraded and that it won't matter if they become unusable due to RF leakage from high speed data transmission using unsuitable cables."

The "unsuitable cables" David Lauder is referring to are power and telephone lines. Yes, that's right: some people think it's a good idea to distribute high speed data signals—in other words, RF—into and around your home through your unshielded ac and telephone wiring!

It is, of course, possible to put RF on an unshielded line without its radiating significantly. Amateurs have used open-wire and other kinds of balanced transmission lines for years, with good results. However, as anyone knows who has worked with balanced lines, good performance depends on careful installation. It's important to keep the balanced line away from any nearby objects that might upset the balance, and to make sure it is properly terminated. Otherwise, your line becomes an antenna.

The fatal flaw in the plans to use power and telephone lines to distribute RF is that existing residential wiring was *not* carefully installed to maintain balance at radio frequencies. Why should it have been? There was no particular purpose in doing so. Besides, even if the initial installation were made with that in mind, simply using an appliance can upset the balance—and even if it didn't, it wouldn't take long for do-it-yourselfers (you and me, for example) inadvertently to undo the best of intentions.

Recent experience with "wireless telephone jacks" has provided a perfect example of why it's generally a bad idea to send RF down power or telephone lines. These devices, manufactured by the Phonex Corporation of Midvale, Utah, and marketed under a variety of labels, are subject to Part 15 of the FCC regulations. They are, in effect, duplex HF FM transceivers that are intended to operate in carrier-current mode—in other words, they are supposed to communicate by conduction through the power lines rather than by radiation. Unfortunately, they **do** radiate. In some installations, they radiate a **lot**. Even this might not be a major problem but for the fact that in filling an order placed by a cable company, TCI , 3.53 MHz was selected as one of the nominal operating frequencies. Needless to say, this has caused **big** problems with interference to 80 meters (and in some cases to 40 meters, from the second harmonic). While TCI's intended use is for automated billing of digital services, in at least some cases the customer's telephone conversations also are broadcast all over the neighborhood.

To their credit, Phonex and TCI have admitted that it was a poor choice of frequencies and they are taking steps not only to prevent the further manufacture of devices operating in the ham bands, but also to replace the units that have already been installed. TCI's local cable offices have been advised of the problem and should respond to complaints by expediting the replacement of the offending units, either with new ones operating on different frequencies or (preferably) with a wired telephone connection. If you're in or near a TCI service area, listen around 3.52 to 3.54 MHz; if you hear a carrier with a bit of ac hum and perhaps a bit of drift, chances are you've found one (they transmit continuously when they're plugged in, unfortunately).

There are two lessons to be learned. First, the amateur bands *must* be added to the list, in §15.205(a) of the FCC Rules, of frequencies where the operation of Part 15 devices is more strictly limited. This is the most direct way to convey to Part 15 manufacturers that it is in their best interests, as well as ours, to avoid these frequencies. Second, in its rush to offer consumers more choices of competing telecommunications services, the FCC *must* make it clear that spectrum polluters are no more welcome than would be polluters in any other segment of the economy. More choice in transportation might be desirable, but would the government permit the marketing of a vehicle that generated excessive pollution in the interest of increasing competition? Of course not. The same principle must apply to ADSL, VDSL, and other high speed data systems that are intended to use, as David Lauder has so aptly put it, "unsuitable cables" to compete with telecommunications systems that use more appropriate distribution media.—*David Sumner, K1ZZ*

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San Francisco	John Wallack, W6TLK, PO Box 1115, Kenwood, CA 95452 (707-833-1873); **w6tlk@arrl.org**
San Joaquin Valley	Donald Costello, W7WN, 1900 N Ashby Rd, No. 9, Merced, CA 95348 (209-383-5739); **w7wn@arrl.org**
Santa Clara Valley	Geoffrey Ellis, KD6MFM, 212 Germaine Ave, Santa Cruz, CA 95065 (831-475-1262); **kd6mfm@arrl.org**

Roanoke Division

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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**
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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

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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**
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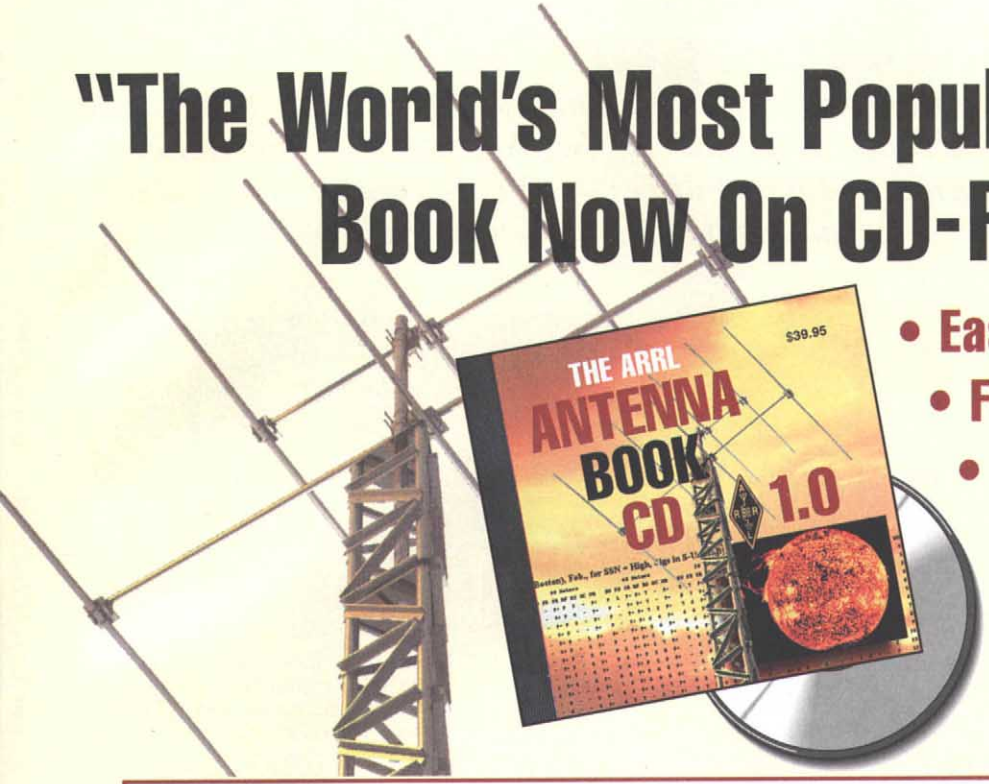

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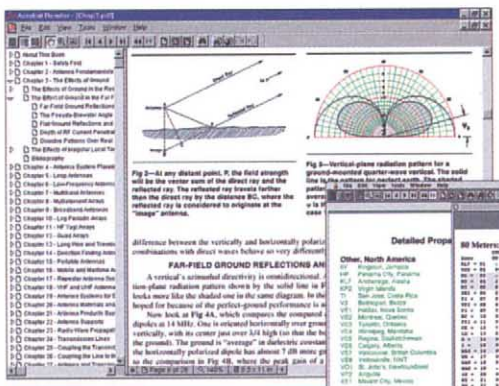

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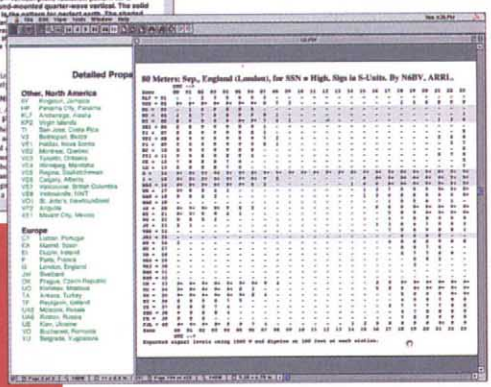

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DC Currents

By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs

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

Congress Hits the Road to the Millennium Staggering Under Impeachment Load

Anybody who claims to know with any degree of certainty what's going to happen in the 106th Congress set to convene in January may have inhaled one too many times. In fact, with the impeachment vote in December, Congress kicked off a spasm of partisan warfare that may prove to be unprecedented in our lifetimes. And that warfare has generated sorrow, anger, increasingly weird disclosures and a startling resignation on Capitol Hill.

As we went to press, President Clinton had been impeached by the House on a vote that largely followed party lines, but the Senate had not yet launched the trial that would remove the President from office or allow him to complete his term. As part of the fallout, the Speaker-to-be had resigned after a confession that he had engaged in marital infidelities. On both sides of the aisle, the gloom seems palpable and real, with members of the House of Representatives resembling nothing less than spectators gathered around a bad automobile accident.

What does all this have to do with Amateur Radio?

The answer is simple: this is the environment in which we must work for legislation that improves the prospects for Amateur Radio in the future. Sadly, our recent visits on The Hill suggest that the environment may be polluted by politics for the foreseeable future. While many staff members we spoke with are hoping for inter-party cooperation on key committees such as the House and Senate Commerce Committees that control the flow of legislation on telecommunications matters, it appears increasingly possible that progress will grind to a halt. The impeachment is a major element in two inter-related "macro" issues now driving the public policy process: the first is the Presidential election two years from now on the eve of the millenium, the other is the slender six vote majority House Republicans maintained after last November's election. Both sides understand that significant consolidation of public sentiment (which right now seems inclined toward "a plague on both your houses") could dramatically alter the balance of political power in the US for years to come.

It is also becoming clear that the impeachment inquiry may actually have masked some more fundamental fractures. First, the Republicans appear to be splintered into conservatives and moderates; the Democrats into moderates and liberals. On ideological issues in telecommunications—like how to handle spectrum auctions—members are scrambling for positions. Are they free market deregulators who think all spectrum ought to be auctioned? Do they want a little bit of regulation? A lot? A number of seemingly "technical" issues seem to have acquired an ideological dimension in this hyper-politicized atmosphere.

If Congress is able to rouse itself from the impeachment doldrums, some Congressional staff members believe that Electric Utility deregulation will occupy much of the attention of the House and Senate Commerce Committees during the coming year. There has been an expressed desire by some members to examine whether there is a way to introduce regulated utilities to the idea of competition.

If telecommunications does move to the forefront, the going won't be easy. For example, there's a conflict brewing over whether to leave the Telecommunications Act of 1996 alone, or to take the hood off for further tightening of provisions that were supposed to create more competition, particularly in the most "visible" areas of telecommunications such as broadcasting. Senator McCain, Chairman of the Senate Commerce Committee, has long urged Congress to revamp the Act, and now House Telecommunications Subcommittee Chairman Billy Tauzin (R-LA-3rd) and John Dingell (D-MI-16th), who is Ranking Minority Member of the Commerce Committee, have indicated they'll also take a look at the Act next year. And if the Committees are able to move on other telecommunications issues, so-called "must carry" provisions for cable TV as well as satellite broadcasting are likely to be high on the agenda, as well as possible initiatives on FCC reorganization. But until Congress gets past the current crisis, all bets are off.

Spectrum Bill Likely to be Introduced

♦ The Amateur Radio Spectrum Protection Act, HR.3572, which gathered 83 cosponsors last session in its brief eight-month life span, is likely to be introduced next session according to sources close to the office of Representative Michael Bilirakis (R-FL-9th). While reintroduction will be at least partially dependent upon the shaky political climate, a spokesperson for Mr. Bilirakis reports that the Congressman was favorably impressed by the number of cosponsors the enthusiasm and letter writing of ARRL members generated. If your member of Congress cosponsored HR.3572 last session (see December 1998 "DC Currents" p 15 for a complete list), you can help by writing a brief note urging him or her to contact Mr. Bilirakis' office in support of reintroduction of the bill.

FCC Names New Wireless Chief

♦ Thomas J. Sugrue has been named chief of the FCC's Wireless Telecommunications Bureau, effective January 19. The WTB oversees Amateur Radio at the FCC. A communications lawyer in private practice since 1995, Sugrue has previous FCC experience as chief of the Policy and Program Planning Division in the FCC's Common Carrier Bureau and as special council for competitive policies. He later spent six years as deputy assistant secretary of Commerce in the National Telecommunications and Information Administration and twice served as acting NTIA administrator. Sugrue replaces Dan Phythyon as WTB chief. He's a graduate of Harvard Law School and also holds a master's in public policy from Harvard and a BS in physics from Boston College.

Commerce Committee Appointments Announced

♦ Georgia Senator Max Cleland has been added to the roster of the Senate Commerce Committee that will consider telecommunications and other matters once the 106th Congress gets back to business as usual. Cleland, a Democrat, was elected in 1996. Cleland takes the seat of the retired Wendell Ford (D-KY). The ratio on the committee remains 10 Republicans to 9 Democrats. Changes on the House Commerce Committee include the addition of Representatives John Shadegg (R-AZ-4th), Charles "Chip" Pickering (R-MS-3rd), Vito Fossela (R-NY-13th) and Roy Blunt (R-MO-7th) on the Republican side and Thomas Barrett (D-WI-5th) Bill Luther (DFL-MN-6th) and Lois Capps (D-CA-22nd) on the Democratic side. All were re-elected in 1998. Capps took office in 1998, filling in for her husband the late Walter Capps. The new committee assignments in the House add one member to the Democratic side, making the ratio 28 Republicans to 24 Democrats.

New Members of the House and Senate Commerce Committees

Senate
Republicans
McCain (R-AZ)
Stevens (R-AK)
Burns (R-MT)
Lott (R-MS)
Hutchison (R-TX)
Snowe (R-ME)
Ashcroft (R-MO)
Frist (R-TN)
Abraham (R-MI)
Brownback (R-KS)

Democrats
Hollings (D-SC)
Inouye (D-HI)
Rockefeller (D-WV)
Kerry (D-MA)
Breaux (D-LA)
Bryan (D-NV)
Dorgan (D-ND)
Wyden (D-OR)
*Cleland (D-GA)

House
Republicans
Bliley (R-VA)
Tauzin (R-LA)
Oxley (R-OH)
Bilirakis (R-FL)
Barton (R-TX)
Hastert (R-IL)
Upton (R-MI)
Stearns (R-FL)
Gillmor (R-OH)
Greenwood (R-PA)
Cox (R-CA)
Deal (R-GA)
Largent (R-OK)
Burr (R-NC)
Bilbray (R-CA)
Whitfield (R-KY)
Ganske (R-IA)
Norwood (R-GA)
Coburn (R-OK)
Lazio (R-NY)
Cubin (R-WY)
Rogan (R-CA)
Shimkus (R-IL)
Wilson (R-NM)
*Shadegg (R-AZ)
*Pickering (R-MS)
*Fossela (R-NY)
*Blunt (R-MO)

Democrats
Dingell (D-MI)
Waxman (D-CA)
Markey (D-MA)
Hall (D-TX)
Boucher (D-VA)
Towns (D-NY)
Pallone (D-NJ)
Brown (D-OH)
Gordon (D-TN)
Deutsch (D-FL)
Rush (D-IL)
Eshoo (D-CA)
Klink (D-PA)
Stupak (D-MI)
Engel (D-NY)
Sawyer (D-OH)
Wynn (D-MD)
Green (D-TX)
McCarthy (D-MO)
Strickland (D-OH)
DeGette (D-CO)
*Barrett (D-WI)
*Luther (D-MN)
*Capps (D-CA)

*new members

Media Hits

- *The Chesapeake (Virginia) Post* reports local scouts "hamming it up" as part of the national Jamboree on the Air scouting event. The story quotes Richard Siff, WA4BUE, president, and Sonny Hood, K4WYS, vice president of the Chesapeake Amateur Radio Service (CARS). In the best Amateur Radio PR tradition, Siff used the Scouting story as an opportunity to talk about the broader activities of ham radio.
- *The Erie (Pennsylvania) Daily Times* carried a story by Tony Zona, WB3KGT (whose call sign appeared in the byline), about the excitement of DXing and how to set up useful wire antennas.
- A story in the *St. Paul (Minnesota) Pioneer Press* chronicles how Amateur Radio is coming to terms with new technologies such as cellular telephone, pagers and the Internet. The article quotes ARRL Dakota Division Director Tod Olson, K0TO who notes that, "until people lose their affinity for personal contact, whether it's across town or across the globe, there will be a place for Amateur Radio."
- *The News Journal* (New Castle, Delaware) profiles ham Charles E. Sculley, AE3H, who likens his DXing activity to fishing for signals. Sculley, who also collects stamps and is involved in photography reports that Amateur Radio helps "keep your mind sharp as you get older."

US Signs Tampere Disaster Mitigation Convention

An international agreement calling for UN nations to cooperate among themselves and with other organizations "to facilitate the use of telecommunication resources for disaster mitigation and relief" was signed recently by representatives of the United States Government.

Negotiated in June 1998 in Tampere, Finland, at the urging of humanitarian relief organizations and called the Tampere Convention, the US signed the international agreement on November 18, joining 33 other signatory countries. Other countries may sign on between now and June of 2003.

Proponents say the Tampere Convention will help expedite the movement of telecommunications personnel and equipment into disaster-stricken areas such Honduras and Sudan. US National Coordinator for Tampere, Larry Roeder, called the Convention "a practical instrument for the provision of emergency telecommunications resources." Roeder, a US State Department policy advisor, was chief of the US delegation to the June Intergovernmental Conference on Emergency Telecommunications, which hammered out the Convention. Roeder said the US hopes the Tampere Convention will lead to a second convention protecting all relief workers and the victims they assist.

Signatories to the Tampere Convention agree to end excessive import duties and to minimize administrative and political barriers that could prevent or delay the swift provision across national borders of emergency telecommunications. For the first time, signatories also agree to protect relief workers engaging in emergency telecommunications, and their equipment. In an effort to ensure that the Tampere Convention changes the current environment, the signatories have asked the Working Group on Emergency Telecommunications—managed by UN Emergency Relief Coordinator, Sergio de Mello—to standardize cross-border and security procedures.

FCC Enforcement Activities Up? Signs Point to "Yes"

Since last fall when the Compliance and Information Bureau (CIB) and the Wireless Telecommunications Bureau (WTB) agreed that all investigation, evaluation and processing of radio amateur related enforcement matters would be transferred to the CIB, it appears that the Commission has begun pursuing rules violators much more aggressively. Indeed, the FCC has generally begun to crack down on rules violators of all kinds. A quick review of CIB's section of the FCC's Web site shows that the FCC has shut down roughly two dozen pirate broadcasters, four pirate HF stations, and issued a Notice of Violation to a New Jersey ham for malicious interference on 40 meters and restricted him from further amateur operations.

Richard D. Lee, Chief of the Commission's Compliance and Information Bureau, said, "We are receiving an increasing number of complaints about malicious interference in the Amateur Bands, and such practices will be swiftly addressed by the Commission to ensure compliance with the rules."

The FCC's Riley Hollingsworth, who is acting as the "point man" for the Commission's enforcement efforts in the Amateur Service, has said that the bureau has largely identified the most active rules violators and is prepared to take action.

It also appears that the FCC is becoming more aggressive in pursuing allegations of license examination fraud in the Amateur Service.

The ARRL has lobbied the Commission and other governmental entities aggressively (and with some sense of frustration) for the past half dozen years to pay more attention to those few individuals who diminish the pleasures of Amateur Radio for the rest of us. It appears that our efforts have begun to pay off.

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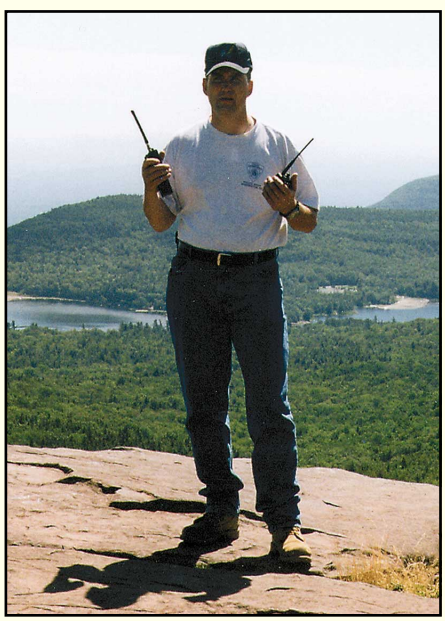
Up Front in QST

Can you spot the antennas? Pete Keller, DL9JPK, has taken stealth antenna installations to a new level. He mounted a pair of 40 and 80-meter Bilal Isotron antennas on a single mast and covered the mast with artificial grass (left). Some neighbors think it is an unusual tree; others assume the Isotrons are bird feeders. Just outside his bedroom window Pete installed a 20-meter wire beam antenna in a tree (right)! The beam itself is invisible in this photo, except for the feed line under the windowsill.

A half-century of service in Zimbabwe. Molly Henderson, Z21JE, has been secretary for the Zimbabwe Amateur Radio Society for 50 years. At the Society's 1998 annual meeting, they presented her with a plaque and six engraved goblets. Mary continues in her position as secretary and she is also an IARU Region 1 liaison officer.

Ahoy, matey! Herb, K2LNS (left), and Andy, WA2FGK (right) have been experimenting with antennas together for more than 40 years. In this photo they are preparing a stack of 50 through 432-MHz Yagis for a maritime mobile voyage to grid FM-39.

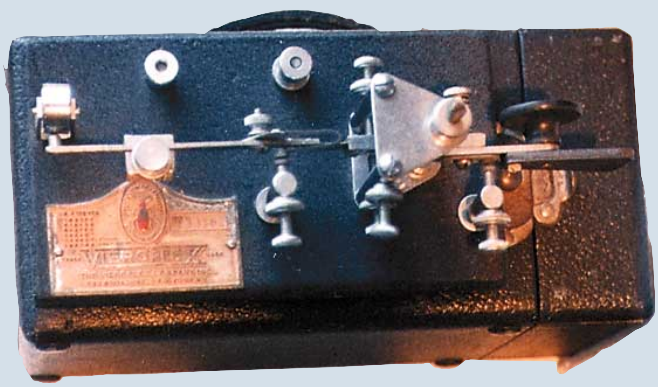


"Can you get me in the shot if I take a few steps backward?" Jim, KC2ATQ, and his daughter Heather, KC2DKY, carried a couple of H-Ts to the top of a 3500-foot peak in New York's Catskill Mountains. From there they checked into traffic nets in Connecticut and Massachusetts, and worked friends on a Staten Island repeater 200 miles away. Watch your step, Jim!

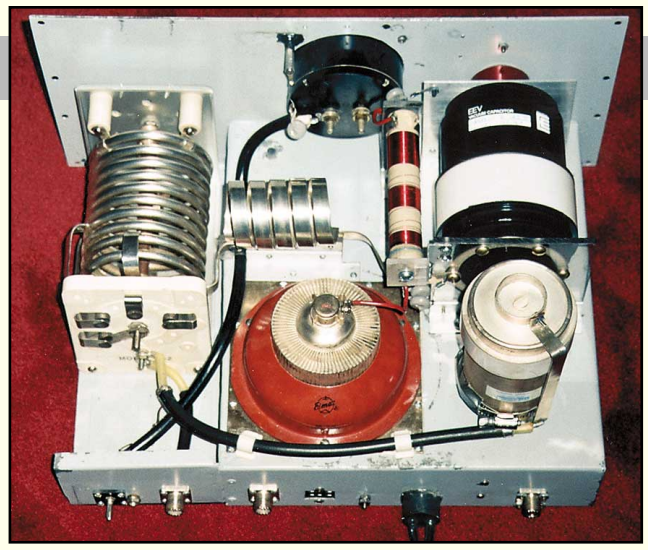
How do you squeeze a tall antenna into a low garage? You could remove the antenna before you drive in, but then you'd have to toss it into the back seat, or wherever you could store it temporarily, and remember to retrieve the antenna when it was time to hit the road again. Clint, WB4WMY, homebrewed a better way. He crafted an antenna mount for the rear window of his pickup cap. When the window is closed for driving, the antenna is up (left). When it's time to slip into the garage, Clint merely opens the window, which allows the antenna to lie flat on top of the cap (above).

TOM HORSFALL, WA6OPE

Recreating a classic. Dick Dillman, W6AWO, attempted to recreate the look of a commercial coastal station from years gone by. The Collins 51J-4 receiver (left) is lovingly restored and was used with a remote-controlled Collins 30K-5 transmitter during the 1998 Classic Radio Exchange. (His landlord won't allow transmitting antennas on the roof!) Dick used a Boehme tape reader (right) powered by a 120-Vdc motor to send CQs during the event.



The bug that announced the end of World War II. Bob, K6RML and Larry, N6LM snapped this photo of the Vibroplex Champion key that sent the message from the *USS Missouri* announcing the official Japanese surrender. They found the bug on display at the Monterey (California) Maritime Museum.



Serious HF muscle! Last year Gary Grimm Sr, W1TMX, was given two 4CX1500A tubes by an amateur friend. In the months that followed Gary began accumulating the parts that would finally allow him to build the HF power amplifier you see here. He placed a *QST* "Ham Ad" to find a source for an affordable socket and Fiberglas chimney. Then, the ARRL Headquarters Technical Information Service supplied some schematics to help him bring everything together. The result is a powerful work of RF art!

A ham's Ham. His name is Robert Ham, KK4IY (right), to be precise, and he received the ARRL Certificate of Merit from Roanoke Division Director John Kanode, N4MM, for his outstanding work on the Amateur Radio tower legislation in Virginia. Robert received the certificate at the 1998 Roanoke Division Convention in Virginia Beach, Virginia.

Some people are happy with call sign license plates, but ... Travis, N5TP, was astonished to find his call sign emblazoned on the tail of this Cessna. The aircraft is actually owned by the City of Tampa Police Department (hence the "TP").

High altitude hamming! Mats, LU9AY, does his mountaintopping in the Andes of Argentina. With the help of two climbing buddies, they managed to get an antenna, a Kenwood TS-870 transceiver and a car battery to this chilly summit.

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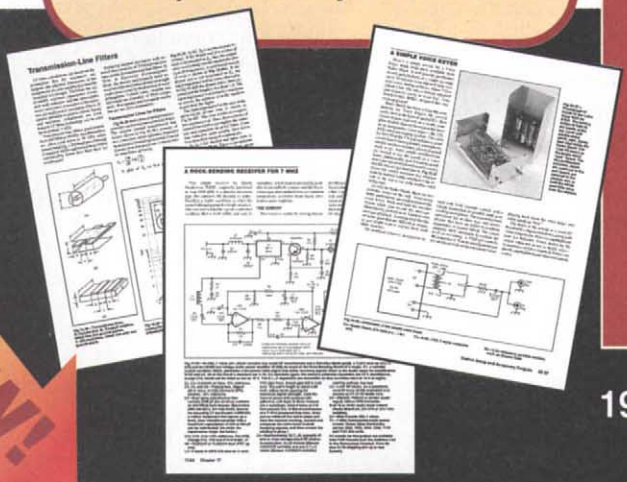

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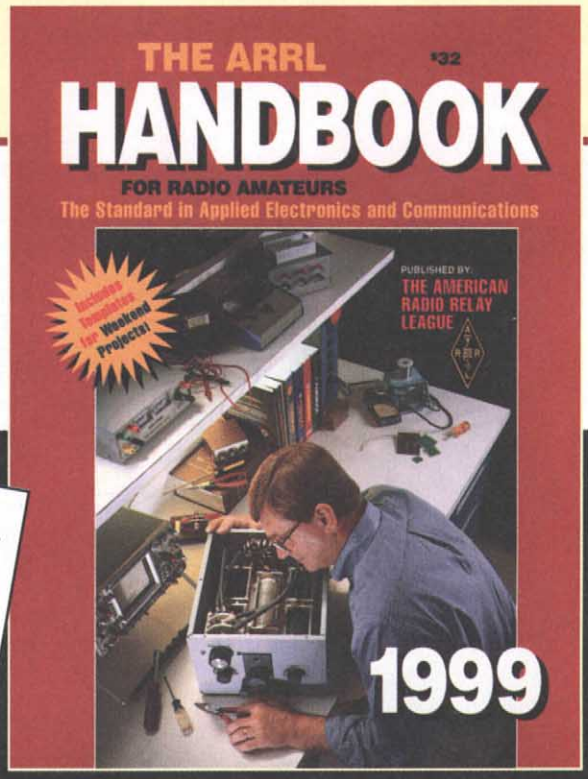

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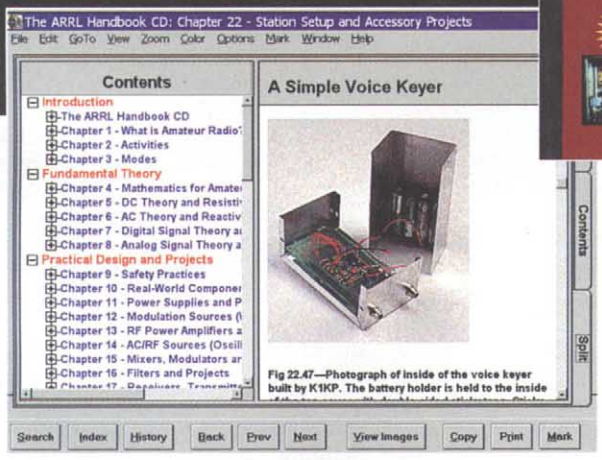

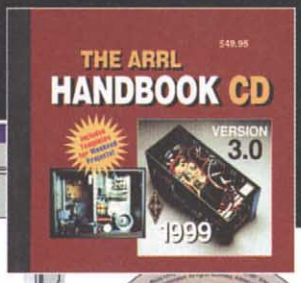

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OUR PUBLIC IMAGE

♦ It's difficult for people outside the hobby to appreciate what we do, and why we love doing it. I would like to see more emphasis in the media on the uniquely social nature of Amateur Radio operation. How many other radio services allow users to make random contacts just for the fun of striking up a conversation with a stranger? Bringing people together and creating a safe place to talk, if a virtual one, is just what this society needs in this age of isolation. Let's communicate this aspect of ham radio to people who are hesitant to join us because they're not sure if we welcome outsiders. After all, the bands belong to everyone, and they should know that it's okay to come on in. The water's fine.

I would also like to see, along with cutting-edge technology, some support within the hobby for *proven* modes and the skilled operators that make them work. I know I'm losing some friends here, but CW and SSB have their place. Part of our shining success at being reliable emergency communicators is because the protocols are ingrained in our operators, not built into the equipment. Our resourcefulness is what makes us come through in a pinch. It's why, when the tornado in Jarrell, Texas (see your January 1998 *QST*) knocked out everything from landline phones and cellular networks to Williamson County's UHF trunk system, the local ARES chapters were able to set up a fully functional emergency net within hours. The people who count on us know we come through.

I realize that all this is already being addressed; I just want to encourage more of it. I thoroughly enjoy this hobby and I want to spread the word about just how rewarding it is. If I can talk even one other person into getting licensed, I'll do whatever it takes.—*Bruce Bostwick, KD5BIV, Austin, Texas*

LAMP REPLACEMENTS

♦In the December 1998 *QST* there was a response to a letter in "The Doctor is IN" about replacing an indicator/dial lamp. The ham in question went to a considerable amount of work to replace his lamp with a light-emitting diode (LED). His method was not extremely difficult, and in the ham spirit of doing it yourself, and doing it inexpensively, it was well done.

However, there is a more expensive, but much easier way to replace indicator/dial lamps with LEDs. There are direct plug/screw-in replacements for most of the smaller lamps. Just unscrew the lamp and screw in the LED assembly (the assembly comes with an identical base). Different colors of LEDs are available and should be specified. Also pay attention to the LED assembly polarity or order bipolar assemblies. One manufacturer is Data Display Products (**http://www.ddp-leds.com**). Their Web site has a lot of good information about LEDs, lamp substitutes, etc. It is well worth a visit.—*Lawrence "Del" Freret Jr, W6KOZ, McKinleyville, California*

CHANGES, CHANGES

♦ I have been considering the license restructuring issue. After reading the article on the FCC's proposal in the November 1998 *QST*, I realize that changes are near.

My daughter and I started studying together for our license when she was 13. Her first ticket was the Novice. She struggled to earn her Technician Plus license, but passed after a few tries. Sad to say, her first contact on 10 meters was with a hateful old man who did not believe that a child her age could possibly hold a ham license. She was mortified, but decided to stick with Amateur Radio. Soon afterward she decided to spend some time listening to 75-meter phone. That experience ended her brief amateur career.

Now my 8-year-old son is showing an interest in the hobby. Should I encourage him—only to have him face the same "reception" as his sister? I'm not sure.

In the spirit of change, I favor a band portion and license class strictly for new, young hams. Listen across the bands. Where could a youngster feel comfortable? Let's make the bands more inviting to our youth. They are the future of Amateur Radio. If we're going to make changes, let's make them for the better.—*Mike Watson, KB9LII, Centralia, Illinois*

♦ With all the talk of restructuring I want to suggest that in the League's zeal to be all encompassing there is perhaps a group that you have ignored. That group would be those who like to take on challenges in life. I happen to be a member of that group. I have had my Amateur Extra license for 10 years—not once have I operated in the Extra portions of the bands. Quite frankly, 25 kHz in and of itself is not worth the effort. I don't really like code all that much. I studied and passed the exams because it was a challenge to be met, and for no other reason.

But now the League has proposed to eliminate all CW testing for the Amateur Extra—and substitute a more difficult theory exam. By removing the 20-WPM testing requirement, you will grossly reduce the challenge inherent in earning the Amateur Extra.

Life is so full of dumbed-down activities. It would be nice to have at least a few exciting and challenging things to do to keep the gray matter from hardening. What's next for me? Well, I had considered getting a commercial radiotelephone license, just for the fun of it, but they dumbed it down several years ago. I don't know, maybe I should try medical school. Thank goodness they haven't dumbed it down too much!—*Paul Dean, WB9HGZ, Charlottesville, Virginia*

TAKE THE LEAD

♦ In reference to the letter by Otmar Schreiber, W2UH, in December 1998 "Correspondence" concerning the possible threat from "digital AM" broadcasting on the HF bands, I believe Otmar is only partially correct. In addition to concerns of competition for spectrum, I believe the Amateur Radio community is being threatened by the competing interests in other high technology areas such as computers, cell phones and the Internet. Instead of being threatened by these other high technology interests we need to be *leaders* in high technology.

Today we depend on obsolete SSB and FM systems developed over a half century ago while we should be aggressively leading the move to new digital technology. While a digital AM system may be adequate for shortwave broadcasting, I do not believe that technology will of itself address the larger problem of communicating information other than by voice. In the future, and even today, there is a huge need within Amateur Radio to be able to communicate, in addition to voice, information such as diagrams, charts, maps, spreadsheets, and computer files, which can not be effectively communicated by voice systems.

I am proposing that we look to a common digital communication standard that will enable the transmission of binary data, and consider voice, video, and the various graphical modes as applications of binary data. The computer industry has well-developed techniques for manipulating binary data of all forms, which I am sure hams could easily adapt. I believe the chal-

lenge is to find a method of communicating binary data at an adequate rate and within the bandwidth (typically 500 Hz to 2.7 kHz in the high frequency bands) available to Amateur Radio stations to permit these applications to function.

There are currently computer modems running at 50,000+ bps using the telephone system bandwidth of about 3 kHz. This data rate is adequate for high quality music and video (albeit with a high signal-to-noise ratio). Presumably, with the lower signal-to-noise ratio conditions existing within the amateur bands, sufficient data rates to support communication quality voice could be maintained. For example, P. Michael Henderson of Rockwell Semiconductor Systems has prepared a very informative paper (**http://208.229.230.81:80/press_room/whitepaper/56kbps/index.html**) describing the operation of these high-speed modems, and I believe the principles presented there have the potential of being adapted for Amateur Radio communications.

Live trials will need to be conducted to prove any new technology, and for this to happen FCC authorization is, of course, needed. However, with the FCC's current interest in digital television and so on, I assume this would not be too difficult to obtain.

Certainly, there are many other issues, both technical and administrative, that will need to be addressed. However, if we move aggressively now, I believe there is still an opportunity to make significant technical contributions. That, I believe, is our best defense to the threats we face.—*Wilmer Radke, K7MCL, Bremerton, Washington*

MIKE FRIGHT

♦ It's relatively easy to get prospective hams to listen to a receiver, but getting them to talk on the air is another matter. Microphone phobia afflicts both children and adults.

Fifteen years ago I discovered at least one method to curtail mike fright. It occurred when my son brought some of his grade-school classmates over to our house for a demonstration of Amateur Radio. After making contact with my father, KA9ACS (now a Silent Key) in northern Illinois, we tried to get some of the students to speak with him on the air. Mike fright took hold, however, and no one wanted to talk.

We opted to make a game of the contact, a bit like "20 Questions." I hadn't told them where my father was located, so I challenged them to figure it out. They could do so only by asking questions such as "Are you east or west of the Mississippi?" or "Do you live near an ocean?" It didn't take long before they embraced the challenge and lined up behind the microphone to ask their questions!

Recently I used the same technique with my brother, N4GQQ, who was demonstrating Amateur Radio to some Scouts in his area. Once again we played "Guess Where?" with me at the mystery location and it was every bit as successful as before.

The moral of the story is simple: Don't just drop a microphone into someone's hands and expect them to speak. What comes second to us is completely alien to others. Give them a compelling, challenging reason to talk and they'll find their words!—*Bob Wertz, NF7E, Flagstaff, Arizona*

SHARE THE AIR

♦ It's contest season again and time to remind contesters—again—that they are not the only amateurs on the bands. I recognize that they have as much right as I do to use amateur frequencies as long as they adhere to Part 97 Rules, but this sense of recognition cuts both ways.

There have been many occasions when I've had to say, "The frequency is in use, thank you." Many contesters politely move on, but too many others opt to engage in ridicule. Apparently there is a digital message encoded with my sideband that advertises me as an old flatulent who has been "occupying" the frequency since the days when I kept regular skeds with Marconi. This is simply not the case!

I am 28 years old and have been a ham for less than three years. I'm hardly an ossified fossil; I just believe that once I have established a conversation I shouldn't have to move because a contester has decided to chase his newest multiplier on top of me. Where in the world would a wet-behind-the-ears ham like me get the idea that amateurs should be considerate of each other and share the bands? I think it was while I was studying for my exams.

In practice it isn't reasonable to expect everyone to hear our ongoing chat. Signal levels vary and mistakes happen. But all it takes is one inconsiderate operator who knowingly commandeers a frequency and everyone follows (especially if his location is a desirable multiplier!).

I would be interested in corresponding with other amateurs about this problem. Perhaps we can discover a solution that everyone can respect. My e-mail address is **Trapper27@juno.com**.—*Marty Hawkins, K4MLW, Greenville, South Carolina*

ENEMY OF THE STATE

♦ My daughter Elizabeth, KE4IWN, and I went to see the movie "Enemy of the State" the other night. Every time the movie showed a photographic spy satellite in orbit, the soundtrack included a little Morse code (as though pictures were sent from satellites by Morse). I broke out laughing, no doubt to the puzzlement of those around me, because the phrase they chose was very familiar: "CQ"! Somewhere in Hollywood there is a chuckling ham.—*Tom Bradbury, NU4G, Charlotte, North Carolina* QST

This Month in Amateur Radio

February is the month of wintertime fun and celebration. It is also one of the best months to sample some exciting HF band conditions—when you're not on the slopes, of course!

We have **winter carnivals** in abundance and at least two have Amateur Radio connections. Listen for carnival stations in Houghton, Michigan (the Husky Amateur Radio Club, W8C) and Saranac Lake, New York (the Black Fly Amateur Radio Club, KB2WWK).

The last American **Mardi Gras** party of this century will be underway in New Orleans February 13-16. If you can't attend the Fat Tuesday festivities yourself, get on the air and work W5GAD operated by the Jefferson Amateur Radio Club. You'll find information on other festival activities in "Special Events" in this issue.

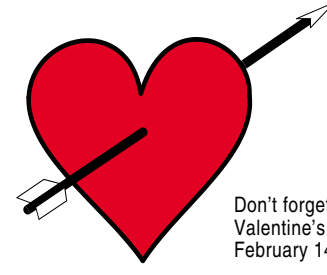
Listen for Mardi Gras station W5GAD this month!

Don't forget **Valentine's Day**, February 14. In Romance, Arkansas, the Metropolitan Amateur Radio Club will be on the air with N5RLJ *the day before* to honor the occasion. Why don't they operate on Valentine's Day? Well, if you had a spouse or other loved one in your life, would you really want to be on the radio?

With the hot HF propagation we've been experiencing, the **ARRL International DX Contest (CW)** on February 20-21 promises to be exciting. This is the type of contest where you can easily earn your DXCC in a single weekend. See the rules in your December 1998 *QST*.

Three of the rarest northeastern states will be in the spotlight with **QSO parties** this month: **Delaware, New Hampshire and Vermont**. **North Carolina** has a QSO party in February as well. See "Contest Corral" in this issue.

Miami is the hot family destination **February 6-7** when the **Southern Florida Section Convention** opens its doors. You can also take the family to see Disney World in Orlando this month and stop by the **North Florida Section Convention (the Orlando Hamcation, February 12)**. If you prefer more winter-oriented fun, try the **Vermont State Convention** in Milton or the **Great Lakes Division Convention** in Cincinnati, both on the weekend of February 27-28. "Coming Conventions" has all the details.



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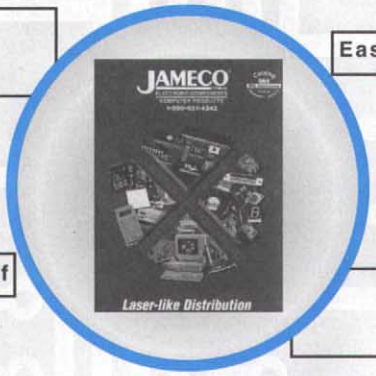

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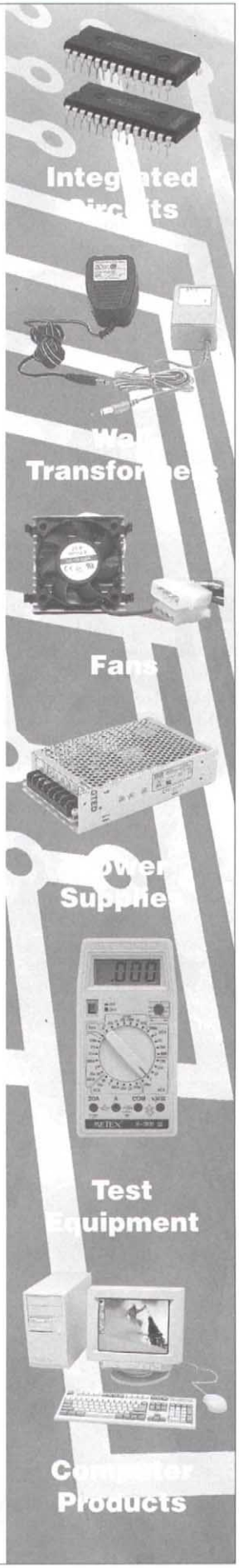


By Al Penney, VO1NO/VE1

The Crash of SwissAir Flight 111:

Amateur Radio at the Scene

As military and civilian rescue workers scrambled to find survivors of this mysterious and tragic jetliner crash, hundreds of Amateur Radio operators worked tirelessly behind the scenes to assist a wide variety of served agencies.

The air traffic controllers were first to alert the authorities. SwissAir Flight 111, traveling from New York to Geneva, had disappeared from radar after declaring an emergency. Radio contact had been lost, and controllers could only assume that the Boeing MD-11, with 229 people onboard, had crashed.

Shortly afterward, calls began to arrive at the local 911 call-processing center. Residents of the small communities around St Margaret's Bay, 25 miles southwest of Halifax, Nova Scotia, reported hearing the strained engines of a jet, followed by a tremendous explosion at approximately 10:30 PM, Wednesday, September 2.

Various emergency organizations began to mobilize. All along the coast, volunteer firefighters turned out to scan the waters in search of the crash site. Dozens of ambulances were dispatched to Bayswater Beach at the western entrance to St Margaret's Bay as hospitals went to high alert. Military, Coast Guard and RCMP (Royal Canadian Mounted Police) aircraft and vessels raced to the area. Navy ships exercising nearby were diverted. Despite heavy swells that threatened to swamp their small boats, fishermen from all over the bay selflessly put to sea in a rescue effort.

The Amateur Radio Response

Amateur Radio operators became involved at 11:45 PM, when Dave George, VE1AJP, received a request for assistance from Barry Manual, VE1JRG, the Emergency Measures Organization (EMO) coordinator for the Halifax Regional Municipality (HRM). Dave is the RAC (Radio Amateurs of Canada) Emergency Coordinator and EMO contact person for the area. He was already at the temporary Command Post at Bayswater Beach, having been alerted by Paul, VE1SAR, that all emergency frequencies on his scanner were "lit up." Dave contacted Bill Elliott, VE1MR, president of the Halifax ARC, who initiated our call-out procedure. In a short time, all key people had been informed of the crash and were standing by on the VE1PSR repeater.

My first warning came at 12:02 AM Thursday. As the Network Control Officer for the HRM EMO, my task would be to establish the nets required to support the operation. My wife Shelley, VE1NOS, and I quickly loaded our emergency kit and some extra equipment into our Jeep and waited for deployment orders. They came shortly before 2:00 AM. Tim Hemming,

Although a relatively new ham, Leo Sutherby, VE2PUP, was involved with the SwissAir tragedy from the start. He is shown operating as net control from the shack of Tom Caithness, VE1GTC.

The command bus used by the Halifax Regional Municipality. It quickly moved into position near the shores of St Margaret's Bay, the site of the SwissAir 111 crash.

Barry Manual, VE1JRG (center), the Emergency Measures Organization (EMO) coordinator for the Halifax Regional Municipality, consults with others on the scene at the command bus.

VE1RX, was dispatched to Shearwater, a Canadian Forces airbase near Halifax and home to the Sea King helicopters used on Canadian warships. Shearwater's hangars would soon house a temporary morgue and the headquarters for Transportation Safety Board investigators. Because we had an HF radio in the Jeep, Shelly and I were sent to Bayswater Beach to support the Command Post.

We left home in a heavy rainstorm. Halfway to Bayswater we encountered several ambulances speeding toward Halifax. Dave then reported that because wreckage had been found off Peggy's Cove, the Command Post had been moved there. He also indicated that there were unconfirmed reports of survivors being rescued.

Peggy's Cove is a picturesque fishing village with about 60 residents at the eastern entrance to St Margaret's Bay. Its rocky shoreline and beautiful lighthouse make it Nova Scotia's most popular tourist attraction. Shelley and I turned around and were soon part of a stream of emergency vehicles en route to the new Command Post.

As we neared our destination the entire area was lit in the eerie glow of parachute flares that had been dropped by the Canadian Forces *Aurora* maritime patrol aircraft overhead. Closer to the water were military, Coast Guard and RCMP helicopters. Also visible were the lights of many fishing boats. Their crews had responded without hesitation, knowing full well the dangers posed by treacherous swells and hidden rocks.

A Wide Variety of Comms Were Required

We arrived at Peggy's Cove at 2:50. I quickly found the deputy RCMP officer in charge and explained Amateur Radio's capabilities. He seemed quite impressed that I could communicate directly with Shearwater. After a short briefing, I began to set up in the Command Bus.

By that time Dave, his wife Sherry, VE1WST, Bill, and his wife, Lynn, VE1ENT, were also on the scene. Together we began to assemble the equipment. When we realized that the aluminum roof would not hold our mag-mount antennas, we secured them with duct tape—the last thing I had grabbed before leaving the house!

A requirement to communicate with military aircraft on 5717 kHz USB was met with Bill's TS-680, my 40-meter Pro Am mobile whip and an antenna tuner. When RCMP officers needed to talk with the Navy ships just offshore, Dave's H-T was programmed for VHF marine channels 8 and 16.

Joe McPherson, VE1CH, secretary of RAC and the local Red Cross Telecommunications Officer, dropped off a commercial H-T to enable us to keep in touch with Red Cross staffers. A scanner was set up to monitor other frequencies of interest, and my TS-711 was parked on the VE1PSR repeater Emergency Net.

We were also asked to communicate with the Coast Guard helicopters landing on a nearby parking lot. Attempts to have the chopper pilots call us on VHF marine channel 8 failed, however, and we did not have VHF AM equipment to contact them on regular aircraft frequencies.

Our training doctrine called for the Net Control Stations (NCS) for the Emergency and Standby Nets to be located in the municipal EOC (Emergency Operations Center) in Dartmouth, across the harbor from Halifax. In addition to net control duties, administrative tasks and operator scheduling would typically be done from there. Because of the need for a forward command post, however, the regular EOC was not manned. With no telephone, a limited number of available circuits and a cramped and noisy environment, we had our hands full with more immediate problems in the Command Bus. Planning anything beyond the next few minutes was nearly impossible!

Fortunately, Tom Caithness, VE1GTC, recognized our problem and assumed the duties of NCS and scheduler from his home at 3:00 AM. For the next six days his shack was manned around the clock. He, his wife Betty, VE1BSW; Helen, VE1HMR, and several other operators did an excellent job supporting the rest of us. The cooperation they received was truly gratifying. Very few people turned down their requests for assistance, and then only for the most serious of reasons.

As the magnitude of the disaster became evident, additional agencies became involved and more stations began to join the net. By dawn, Amateur Radio operators were manning communications in the Command Bus, the Canadian Red Cross (Halifax), the Provincial Emergency Operations Center, Base Ops at Shearwater and Net Control. Later in the day, the Red Cross Emergency Response Vehicle also joined the net. Amateur Radio operators were also asked to provide point-to-point communications for the RCMP. The police repeater systems became too busy to permit the main traffic checkpoint to keep in touch with the Command Post. When their handheld radios were hindered by the uneven terrain, the RCMP turned to Amateur Radio. A 2-meter simplex link worked well and drew praise from the officers.

A Canadian Coast Guard helicopter touches down at the impromptu helo pad constructed at Peggy's Cove.

Important Observations

It was soon evident that the extensive training program we had implemented just over a year ago had paid big dividends. People knew what to do, where to go, and what to take with them. The emergency net was activated without fuss, and voice pro-

cedures were crisp and professional. Many favorable comments were received from those in charge. In the words of one senior EMO official, "The amateurs did a terrific job. They provided me with connectivity that would not be possible otherwise and did so in a highly organized and professional manner."

Most of the traffic we handled was tactical, as opposed to the formal messages we had trained for. Because of the rapidly changing nature of the situation, carefully drafted written messages would probably have been overtaken by events before being transmitted. Nevertheless, whenever possible, formal message forms were used, even for short "celtel" messages. This enabled record-keeping and helped to prevent errors.

Despite the heavy demands made on the cellular system, it performed quite well. There were delays and interruptions, of course, but the system didn't crash as many of us had expected it to. I'm not an expert, but I suspect that our location enabled users to access several different cell sites. The cellular and telephone companies were also quick to react. By the second day of the operation a portable cellular site and a cellular site extender had been established at Peggy's Cove, and 82 extra lines had been installed.

To put things in perspective, however, it's important to remember that none of the area's communication infrastructure was damaged, unlike more typical disasters. Indeed, the primary reason so many telephone lines could be installed so soon seems to be that a great deal of excess capability existed because of the area's small population.

One of the primary cellular users was the media. By Thursday evening the site was overrun with reporters and field producers. Anything that moved was being interviewed. I was asked by the BBC to describe what I was doing. After outlining Amateur Radio's role, I included my call sign. The next morning, Shelley fielded a phone call from a Swiss news agency. They had heard the interview on shortwave, tracked me down via my call sign and called to ask if I knew of anyone who had overheard the exchange between the air traffic controllers and the aircraft. I did not, but a local newspaper did manage to track down someone who had.

At approximately 3:30 AM Thursday, the first body was recovered. By then we realized that the initial reports of survivors being found were incorrect. As more information was received it became clear that a miracle would have been necessary for anyone to have survived the crash. Sadly, there were no miracles that night for the passengers and crew of Flight 111.

Amateur Radio involvement began to scale back the week after the disaster as the urgency of initial rescue efforts was replaced with a grim determination to recover human remains and wreckage. On the morning of September 13, Barry gave the official word to close down the emergency net. Even then, amateurs were still active, providing communications for the many Ground Search and Rescue teams that continued to comb the region's beaches.

The author, VO1NO/VE1, handles traffic from his position inside the command bus.

Overall, I believe the amateur community responded well to this disaster. All required sites were on the air in a very short time, and connectivity was excellent. Our initial estimates suggest that some 110 amateurs assisted in the operation. The volume of radio traffic wasn't as large as we had expected. Had survivors actually been found, the circuits would undoubtedly have been much busier. I am confident we could have handled more. In an exercise last year we began to run out of messages to send in only three hours—after processing more than 250 formal messages.

Lessons Learned

In handling comms for the SwissAir incident, lessons from previous exercises and operations were confirmed, and a few new lessons emerged. Some of the more important observations include:

- The importance of a good training program cannot be overstated. Knowing what was expected of them enabled our people to react quickly and establish a functional emergency network on short notice. In HRM our program consists of several day-long courses, each with an associated training manual. Procedures are based on those in Allied Communications Publication (ACP) 125. Weekly practice nets and a monthly training session help maintain proficiency.
- Don't allow all of your key people to act as first responders. Although we all want to get out and help, someone has to handle administration and planning for long-term operations. I suggest that a technical response team should be the first crew to establish the required sites. These initial operators should set up the equipment and operate until relieved by those operators actually scheduled by an administrative support team.
- The EMO identification cards used by Amateur Radio operators were very useful in enabling our people to cross police lines.
- Every piece of equipment should have a spare fuse taped to it. This is in addition to the box of fuses in the toolkit.
- The ability to operate outside the ham bands is important. We were required to communicate with ships, aircraft and ground units. Our ops had to cover HF and much of the spectrum between 108 and 170 MHz. Don't forget that your teams will also need wideband antennas and portable masts.
- Kits containing message forms, paper, pens, and so on, should be stored in all likely operating sites (hospitals, Red Cross, EOC, etc). Several first responders must also have them. We learned that these kits should contain telephone books (white pages, yellow pages and telephone lists for any nearby military bases). In the future I will make sure that all trained amateurs have their own stock of message forms and radio logs.
- Important information such as Coast Guard, SAR and public-service frequencies, vital phone numbers and repeater linking arrangements must be close at hand. I suggest that key people have this information in pocket-size binders.
- If desk microphones are used, disable the "lock" function.

There were many other observations that could not be included because of space constraints. Anyone wishing to discuss them may call me at 902-876-2779.

As I look back at the events of the past several weeks, I am deeply impressed by the speed and effectiveness displayed by the people of the region as they came together to help in any and every way possible. I know I speak for all of them in extending the deepest sympathy to the relatives and friends of the victims of Flight 111. We're all sorry that we couldn't have done more.

Al Penney, VO1NO/VE1, was first licensed in 1976 and is active on MF through UHF, including satellites. He is president of the Halifax ARC and is an avid DXpeditioner. He is also a Lieutenant Commander in the Canadian Navy, and is currently the Under-Water Warfare Officer at the Canadian Forces Naval Operations School in Halifax.

You can contact the author at 39 Lakehigh Crescent, Timberlea, Nova Scotia B3T 1N1, Canada

By Bob Ferrero, W6RJ, and Robert Ferrero, W6KR, *as told to John G. Troster, W6ISQ*

The Great DX Adventure—To the Australs and Marquesas

This father and son dynamic duo worked the world from a pair of exotic "potentially new countries." And although their diets were largely fruitarian—out of necessity—these fructose-powered hams racked up serious QSO totals to the delight of DXers everywhere.

It was at an early April lunch at the local beanery when we began to casually talk about DXing under the League's new rules for DXCC 2000. The way we figured, according to the new rules, Tahiti would now be a Point One Country, which meant that the Austral and Marquesas Archipelagos would probably qualify as "new" countries or, as they are now called, new "entities."

We'd both been licensed in Tahiti about 10 years ago, so our former tickets might be easily renewable. Because we had been on several African DXpeditions in the interim, our radio equipment was neatly packed and ready to go—anywhere.

Who'd be first to put those new ones on the air? Why not us? By the time Bob had finished his open-faced lettuce sandwich (no mayonnaise) and Robert had topped off his steak sandwich with fries and a chocolate malt, we were nearly convinced that we should go.

Idyllic, faraway tropical islands…. Just think…no telephones, no traffic, fantastic pileups, fun and adventure, and a world of DXers eager for the new ones. After Robert finished his banana split we were thoroughly convinced. We *would go!* We raced back to the office and began phoning for airline tickets.

At our initial operating position in the Marquesas we used call sign FO0FI. Bob, W6RJ (left), worked CW and Robert, W6KR (right), ran SSB. Kan, JA1BK, signing FO0MIZ, was in the room next door!

What Problems?

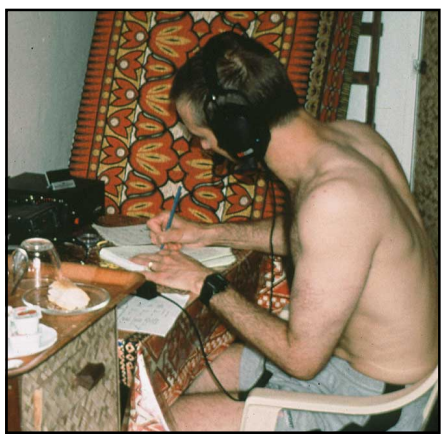
In our enthusiasm we naturally refused to consider *any* problems. It would be smooth sailing, and the DXers were out there waiting for us to arrive. Oh, our equipment, we might be a pound or two over the individual 22-pound-per-person weight limit on any of several airplane trips, but, *no problema*. We would negotiate.

We put aside fears of bodily harm, thoughts of destruction at the hands of large, inebriated French tourists, or threats to shred our coax by irate hotel guests—hey, this is an *international* mission. Things like that *couldn't* happen while we were serving the DXers of the world.

Where do we start? With Kan Mizoguchi, JA1BK, of course, who has a knack of knowing the best rare ones to operate from and how to get there. Kan had been to the Marquesas in 1994 with ARRL Headquarters staffer Nao Akiyama, NX1L.

They'd had a good operation, but their bid for activating a new country failed because Tahiti wasn't yet a Point One country. All that was now changed. We sent Kan an e-mail to see if he could help us with the logistics of getting to the islands in question.

That night, Kan called Bob on the phone and said, "Who told you I was going?" Bob told Kan that he was just looking for travel and housing information and didn't know



Robert, with the beam, moved to Chez Catherine, six miles over the mountains from Kan and Bob. Interstation QRM was reduced to nil.

While working as FO0FI in the Marquesas, Bob's painful back required a creative solution: keyboard in lap, key on chair, IC-706MKII on table. Bob didn't tune the transceiver too often, choosing to work fast tail-enders and experienced operators.

anyone else had planned a similar trip. After a chuckle, Kan divulged the needed information and we planned to meet him in Papeete on April 13.

Kan told Bob to contact Eddy, FO5OK, about license renewal. Five days later, Eddy had performed his magic and Bob was sporting his old call sign, FO0FI, while Robert had FO0FR.

On April 12 we began our 13-day odyssey to the Austral and Marquesas Islands.

Away to the Australs

We arrived at Papeete on an Air New Zealand flight the night of the 12th and collected all of our equipment—minus one package. One antenna carton was nowhere to be found! But as all DXpeditioners know, stress tends to develop operating skill…. The next morning, April 13, when we met Kan for the flight to Rurutu in the Australs, we were surprised and elated to find that the box had showed up. It was a good start after all!

We had packed a variety of gear: two ICOM IC-706MKII transceivers; a 500-W Finfet amplifier; a Force-12 C3S with a 26-foot push-up tower; a Titanex V80E 66-foot vertical (plus wire for elevated radials); miscellaneous quarter-wave verticals for 20 through 10 meters; a logging computer for Bob (seniority rights, of course); and some pencils and log paper for Robert.

Bob's negotiating skills took care of our 200 pounds of excess baggage, but it took some good words from FO5OK to secure a 15% discount. That was better than the full rate with Air New Zealand, where we got no discount!

When we met Kan that morning, he had just returned from the Marquesas, where he had spent four days, April 9-12, signing FO0MIZ. Hey! *Kan* had become the first op to activate that "entity," should it be declared a new one…. Kan had conducted a fine operation at both locations, as DXers around the world can testify.

Rurutu is a six-mile-long volcanic island about 565 kilometers south of Tahiti. The island's strange shape makes it look like the African continent. It has about 2000 inhabitants who live in small villages around the perimeter of the mountainous interior.

Our first location was on the northwest coast at the Hotel Rurutu in Rurutu village. Within two hours we were on the air signing FO0FI, having quickly assembled and raised the Force-12 C3S and the Tintinex V80E.

The beam would be for Robert's SSB and the vertical for Bob's CW. Kan had already erected his inverted Vs and dipoles and was working the world using FO0MIZ. Hey! *Kan* was also first to operate from the "potentially new" entity of the Austral Archipelago—if it's approved as a new one, that is!

Split up

We quickly discovered that installing three operating positions and six antennas within a 100-foot radius, without effective filters, was not going to work. Kan had operated here a few years ago, so he got first choice of frequencies. As he moved from band to band, we would QSY to avoid interfering with his operation on the same band. Kan would be here for only three more days, but it would be in everyone's best interest if we moved our SSB station.

The next morning we borrowed a truck and drove the six miles around the mountain range to the island town of Moerai. Along the eastern shore we found the Chez Catherine, an interesting hotel/bar. The owner was a large, muscular ex-Legionnaire—as in French Foreign Legion—named

This view, at FO0FR, is toward Japan and the US. The airport is near the beach.

Kan Mizoguchi, JA1BK, signing FO0MIZ, was the first to operate from the Australs and Marquesas. He used an FT-900 with inverted Vs and dipoles.

Yves. It was apparent that Yves didn't need a bouncer in his bar. He turned out to be a nice fella, quite interested in what we were doing. As long as he had final approval, he allowed us to put up our beam. The charge for the room? $39 per day. Sold!

We raced back to Hotel Rurutu, took down the beam in a fast 15 minutes, piled the gear in the truck and got back to Chez Catherine in about an hour and a half. Yves, of course, supervised the antenna-raising party.

Robert had operated from DX locations before, but not alone, and not with pileups the size of those that developed for this possible new country. Things were a bit wobbly for him during initiation day, but by the next sunrise he was in control and slogging through SSB pileups like an old pro.

This was a great location with good shots toward parts of Europe and Africa, and outstanding views toward Japan and the US. Most importantly, the mountains between our two locations effectively shielded our two stations, which now read a puny S2 on our respective signal-strength meters. There was very little power-line noise at either location, for which we were grateful.

Ground Mounted Antenna

On the last morning, Robert noticed that his SSB signals had gone way down. He had really struggled to log the last 50 QSOs. Looking outside, he noticed that someone had untied the antenna's guy rope, and that the antenna was flat on the ground with five elements damaged. Ugh! That meant that his last 50 Qs were made with five elements of the beam stuck in the ground. Now that's persistence! The perpetrator had been the gardener who had merely wanted to park his truck where the guy rope was anchored and had simply untied it!

Well, the antenna was down, so we might as well pack up and fly back to Papeete for the move to the Marquesas. Our operation in the Australs had really fired us up and we could hardly wait to get on the air again from the other "possible new country." We had made 22,691 FO0FI QSOs from the Australs!

On to the Marquesas

In Papeete, when we checked in for the flight to Nuku Hiva in the Marquesas, we found that our overweight baggage charges were two and a half times more than the flight to and from the islands themselves. Again, we skillfully slid into negotiating mode… which didn't do us much good. It wasn't just the money. It was the ego of the negotiator at stake here. We had to settle for only a tiny discount.

The volcanic Marquesas Archipelago is east and north of Tahiti and is home to about 8000 inhabitants. We were interested in the topography of Nuka Hiva in order to find the best location for our radio operations. The flight stewardess was most helpful and soon introduced us to the pilot—her boyfriend. He invited us to the forward cabin and deviated somewhat (read "a lot") from his announced flight plan to give us a tour of the circular island, which is about 15 miles in diameter. We soon discovered that our planned location on the south side had mountains blocking the way to Europe and the US, which would not be good.

Our friendly pilot said he had a friend who owned four bungalows that were used by airline flight crews. This location would keep us on the north side of the island. When we saw the site—with its 800-foot elevation and terrain that sloped toward the ocean—we knew this was *the* place to stay. A photo of this location is on our FO0FR QSL card.

We met Paul, the bungalow owner, and restored our ego by negotiating a reasonable price for the rent. It was then that we learned there were no restaurants or stores in the vicinity. But this was the best ham location on Nuka Hiva, so up the hill we went, to subsist for the next six and a half days on grapefruit, bananas, oranges and French bread.

Not to worry. Personal hardships never daunt DXpeditioners. We accept whatever comes for the sake of DXers everywhere. Actually, we were spoiled by the restaurants and hotels at our previous location….

It took just two hours to make the necessary repairs to the damaged beam and get on the air. We would sign FO0FR for the next six and a half days. This time we were able to separate the beam and the verticals by about 300 feet, which all but eliminated interference. The Finfet final was used mostly with the verticals to give us a transmit signal that was on par with the beam.

Band conditions were terrible for four of the six days, with WWV reporting geomagnetic disturbances. This caused the higher-frequency openings to be shorter, and signals traveling over the North Pole were weak and fluttery.

Whenever we heard a European opening we would direct our QSOs to that part of the world. In return for our efforts to work as many Europeans as possible, our friendly jammers gave us the worst time of the entire trip. When conditions really got bad, Bob shut down and experimented with tuning the elevated radials he used on 160 and 80. Reports suggested that his efforts had resulted in a great improvement on those bands.

An unexpected feature of this location was an unusually large population of gregarious local hams. Ham on the hoof, that is! The 25 local porkers ranged in size from piglets to 400-pound heavyweight contenders. If we left the door open, the piggies would barge in and join us at the operating table!

An unusually friendly tusker that we named "Babe" was curiously interested in the SSB noises. We tried to put him on the air when we were working big pileups from the US, but he only spoke French. Just kidding.

The mosquito population was large and fierce. We tried nets and sprays, but the netting was too big and the sprays too weak to discourage very many of 'em. There was also an interesting group of lizards that kept us under close and careful observation. We had names for the more recognizable reptiles. There was Kenwood the long one, ICOM the fat one, Hallicrafters the old one, Yaesu the bold one, and so on.

During this expedition we became reluctant and unwilling conservationists. The grapefruit and bananas were delicious, if monotonous. And we were too busy to realize that we were hungry. Bob lost more than a pound a day. As in the Australs, sleeping more than two hours at a stretch was impossible. We were too excited to sleep anyway, and were running on pure adrenaline. One day, Bob slept a whole four hours and was so ashamed he keyed the mike for 10 straight hours without a break.

We made 24,011 QSOs from Nuka Hiva.

Of course, it rained the last day when we took down the antennas and packed up the gear for the return trip to Papeete. When we arrived at the Nuka Hiva airport on April 28, we were presented with a final edict. The officials said we were limited to 22 pounds each and would have to leave our antennas and equipment behind. Apparently, the fact that we had *prepaid* the overweight duty on the way over held little weight!

It seems the airplane was full and maxed out cargo-wise. But many locals had loaded large personal parcels; so we decided to again fall back on our diplomatic skills. Bob stepped front and center, armed with charm and complete recall from the aforementioned Highway Patrol days when he smiled and forcefully inquired, "May I please see your driver's license?" He redeemed himself fully. He hadn't lost the old touch. With the help of our friendly pilot, we were ultimately welcomed aboard with all of our gear.

Who's the Best?

DXpedition operators are always asked, "Who did you work first?" "Who had the biggest signal?" and "Who were the best operators?" Our first FO0FI SSB QSO was with KL7J; the first CW QSO was with JA2VFO. Our first FO0FR SSB QSO was with N6DUR, while AC7P snuck in under the wire on CW.

In general, Japanese hams were loudest, which surprised us. European hams were difficult to copy at times because of the solar agitations. But when conditions were good, European ops came through well. North American stations were loud and workable almost any time.

Who were the best operators? The Japanese—without a doubt. When we called for Europe or Africa, we didn't hear a single JA calling. They were courteous and stood by as we requested.

Band Conditions

One-sixty wasn't a good band for us. We could hear stations calling, but we doubted that anyone had really heard us. Our rates sometimes dropped to 20 QSOs per hour. Eighty was quite good to Japan and the US, with QSO rates as high as 100 per hour (but poor elsewhere). Forty was great worldwide and sported QSO rates to 200 per hour. Rates on 30 meters—one of Bob's favorite bands—were about the same.

Twenty was the best band worldwide. It supported QSO rates of more than 200 per hour. Seventeen and 15 meters were just fine, but both bands had limited openings. Twelve wasn't open much (or was sparsely populated).

And Finally....

Our final tally was most gratifying. This father-and-son team had made a total of 22,691 QSOs from the Australs and 24,011 QSOs from the Marquesas for a total of 46,702 QSOs (pretty well divided between CW and SSB) in six and a half days of operation at each location (including the various aforementioned inconveniences). That's an average 3592 contacts per day for 13 days. This tally far exceeded our expectations, and we think it probably set a new two-man DXpedition record. Guinness, are you reading this?

Our DXpedition was the old-fashioned type: We paid our own way and had no outside sponsors. And we didn't do any sightseeing. We felt obliged to hand out as many "possible new country" QSOs as possible. We hope that the many DXers who hadn't worked Kan at both locations, on all bands, were able to work us.

When we got home we discovered that our QSL manager, Dick, K6SLO, was already overwhelmed with more than 8000 QSLs! They had to be filled out by hand because, as mentioned, Rob had logged by hand. For two months we spent our lunch hours helping Dick fill out QSLs. Ultimately, we mailed 24,000 cards, many with four or five QSOs per card.

Reminder for our next DXpedition: Take two computer loggers!

It was the thrill of a lifetime for Bob (the Old Man) and Robert (the son) to spend two weeks together doing what we like to do best. Thanks for your enthusiastic participation. We look forward to working you all again on our next DX adventure.

You can reach the authors at 241 Santiago Ln, Danville, CA 94526; **w6rj@hamradio.com**.

By Steve L. Sparks, N5SV

An RF Current Probe for Amateur Use

You can build this simple, inexpensive gadget in a few hours!

Recently I had a need to make some relative RF current measurements. Not having anything immediately available, I quickly assembled this simple, yet capable instrument. It's not only easy to build, but inexpensive, too.

The probe schematic is shown in Figure 1. With the component values shown, my unit has a half-scale-reading sensitivity of 0.2 mA (10 mW) into 50 Ω at frequencies from 1.8 to 30 MHz. By using a more-sensitive meter—such as a 50 µA unit—you can improve the probe's sensitivity.

Construction

The size of the enclosure you use is primarily dependent on the size of the meter. For ease of use, I suggest keeping the box size no larger than something you can comfortably hold in one hand. The enclosure I use measures 4.25×2.5×1.5 inches (HWD).

Secure the snap-open core to the top of the enclosure using epoxy or another strong adhesive. Before applying the adhesive to the box and core, rough up the attachment area to provide better bonding. Drill a hole through the enclosure on each side of the core to pass the ends of L1. To create the single turn required for L1, run a length of #14 wire through the core (in one end and out the other) and connect its ends to the full-wave diode bridge; see the accompanying photographs. Note that the entire circuit is floating and is not attached (grounded) to the enclosure.

The value of the **SENSITIVITY** pot, R1, isn't critical and can range from 100 to 500 Ω. I used a 10-turn, 100 Ω wire-wound unit.

Uses

There's not much to using the current probe: You simply snap the core around the conductor you're checking and adjust the **SENSITIVITY** control for a usable reading. You can use the probe to check RF current distribution in antenna elements, open-wire feed lines, guy wires and other conductors.

If you're bitten by RF in the shack, you can use the current probe to help you resonate the station's ground wire. Snap the probe around the ground wire, connect a variable capacitor—a broadcast-band type can be used—between the ground wire and your equipment connection and transmit using just enough power to obtain an indication on the probe's meter. Then, tune the variable capacitor for maximum meter deflection. It will likely take some experimentation to find the correct value of capacitance to series-resonate the ground wire. As your operating frequency changes, you'll need to readjust the capacitor accordingly. I used the resonant-ground procedure at a friend's house in Iowa. It cured the problem of RF getting into his computer while on the air.

Contact Steve at 2701 High Country Blvd, Round Rock, TX 78664; **slsparks@ix.netcom.com**.

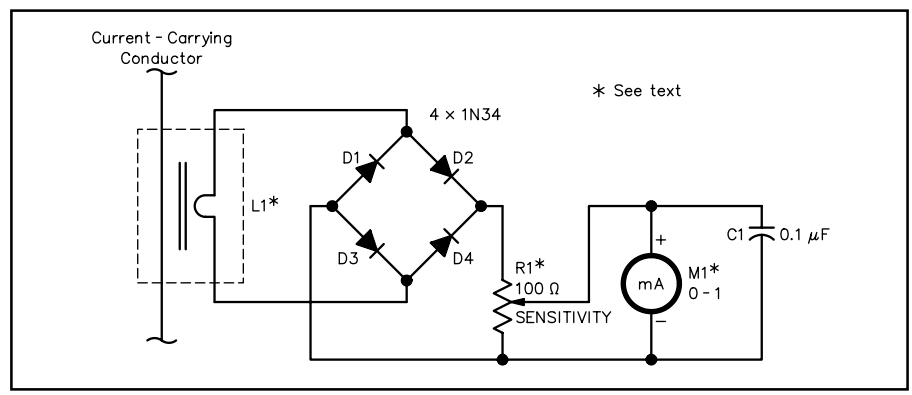


Figure 1—Schematic of the RF current probe. Unless otherwise specified, resistors are 1/4 W, 5% tolerance carbon-composition or film units. Part numbers in parentheses are RadioShack. Equivalent parts can be substituted.

C1—0.1 µF disc ceramic (RS 272-135).
D1-D4, incl—1N34 germanium diode (RS 276-1123); do *not* use silicon diodes.
L1—Single turn of #14 wire through a snap-on ferrite choke (RS 273-105); see text.
M1—0-1 mA or greater sensitivity; (an RS 22-410 can be used without the series multiplying resistor supplied as it's a 0-1 mA movement meter.)
R1—Panel-mount pot, 100 to 500 Ω; 10-turn pot used here.
Misc: Enclosure, knob, hardware, adhesive.

By Steve Hageman

A Synthesized 2-Meter FM Receiver with PC Control

Advanced chip technology and a popular microcontroller combine to make this neat project one *you* can build!

Two versions of the receiver are shown here: a hand-held portable and a modem-like unit that is controlled solely by a mating PC. On the rear panel of the hand-held are a speaker and an RS-232 port (a five-pin DIN jack) for optional PC control.

The wireless revolution is certainly making it convenient for amateurs who like to build radios! Every week, a fistful of new, highly integrated receiver chips is introduced. With today's experimenter-friendly distribution channels, it is even relatively easy to get parts. In fact, many manufacturers have Internet sites from which samples can be ordered directly. Perhaps the only downside to this revolution—for "homebrewers," anyway—is that the *size* of the parts keeps shrinking.

This project describes the construction of a highly integrated 2-meter FM receiver that employs an IC designed for use in commercial cordless phones. The receiver can operate as a portable scanner, or be connected to a *Windows 95/98* platform PC's RS-232 port and operate under PC control.[1]

RF Deck

The heart of any receiver is its RF deck; everything else is support circuitry. This receiver is no exception. Many projects in the past have used a Motorola MC336*x*[2] device. These parts were recently superseded by the more-highly integrated MC13135 family. Truly a receiver on a chip, the MC13135 contains almost all the functions required to get RF energy converted to audio; it even has relatively good large-signal-handling capability.

As can be seen in Figure 1, the support circuitry required for the MC13135 is minimal. The design uses the MC13135 in a dual-conversion configuration with an external first LO and internal, crystal-controlled second LO.

The 50 Ω antenna input is followed by a double-tuned LC filter. This filter is fixed-tuned to cover the entire 2-meter band. C1, C2 and L1 step up the 50 Ω antenna impedance to about 700 Ω to match U1's input impedance. The second filter section, C5 and L2, adds more selectivity. Values for C3 and C4 are chosen to set coupling and hence, filter bandwidth. I use two capacitors in series here for greater bandwidth adjustability when using standard, leaded-capacitor values.

U1's first mixer is a classic active Gilbert cell. These mixers have a low third-order intercept. This limits the receiver's large-signal-handling performance. On the plus side, an active mixer provides conversion gain, so no amplifier is needed after the mixer. Also, the mixer's sensitivity to output-matching problems is lower than that of a double-balanced diode configuration. Gilbert cells also operate with a very low LO input power. Because of this, physical layout is much less sensitive to spurious-signal pickup.

Choosing an LO frequency is a trade-off. The first IF—10.7 MHz—is picked to make parts procurement easy. A 21.4 MHz first IF would have improved image rejection, but crystal filters for that IF are not easy to come by in small quantities. With the first IF at 10.7 MHz, the first image frequency is around 165-169 MHz. This image frequency does not present much of a problem as the 165-169 MHz band is between the common pager frequencies.

U1 has an internal transistor that can be used as the first LO, but the transistor's operation is limited above 100 MHz, so a discrete transistor (Q1) is used instead. Q1 is configured as a Colpitts oscillator with C20 and C21 setting the feedback. C22 provides a dc block to L4. C23 limits D1's tuning range. When building a VCO, it is desirable—because of noise on the tuning-voltage line—to limit the tuning range as much as possible. Because the usable, linear-tuning range of the PLL is fixed at 1 to 4 V (set by the power supply voltage), the VCO is adjusted to just cover the LO frequency range required. Decreasing the VCO tuning sensitivity improves the VCO noise performance.

The first LO VCO is tuned to the operating frequency plus 10.7 MHz for high-side injection to the mixer. This produces a constant first IF of 10.7 MHz. The output of the first mixer (U1 pin 19) is impedance-matched to the 10.7 MHz, two-pole crystal

[1]Notes appear on page 40.

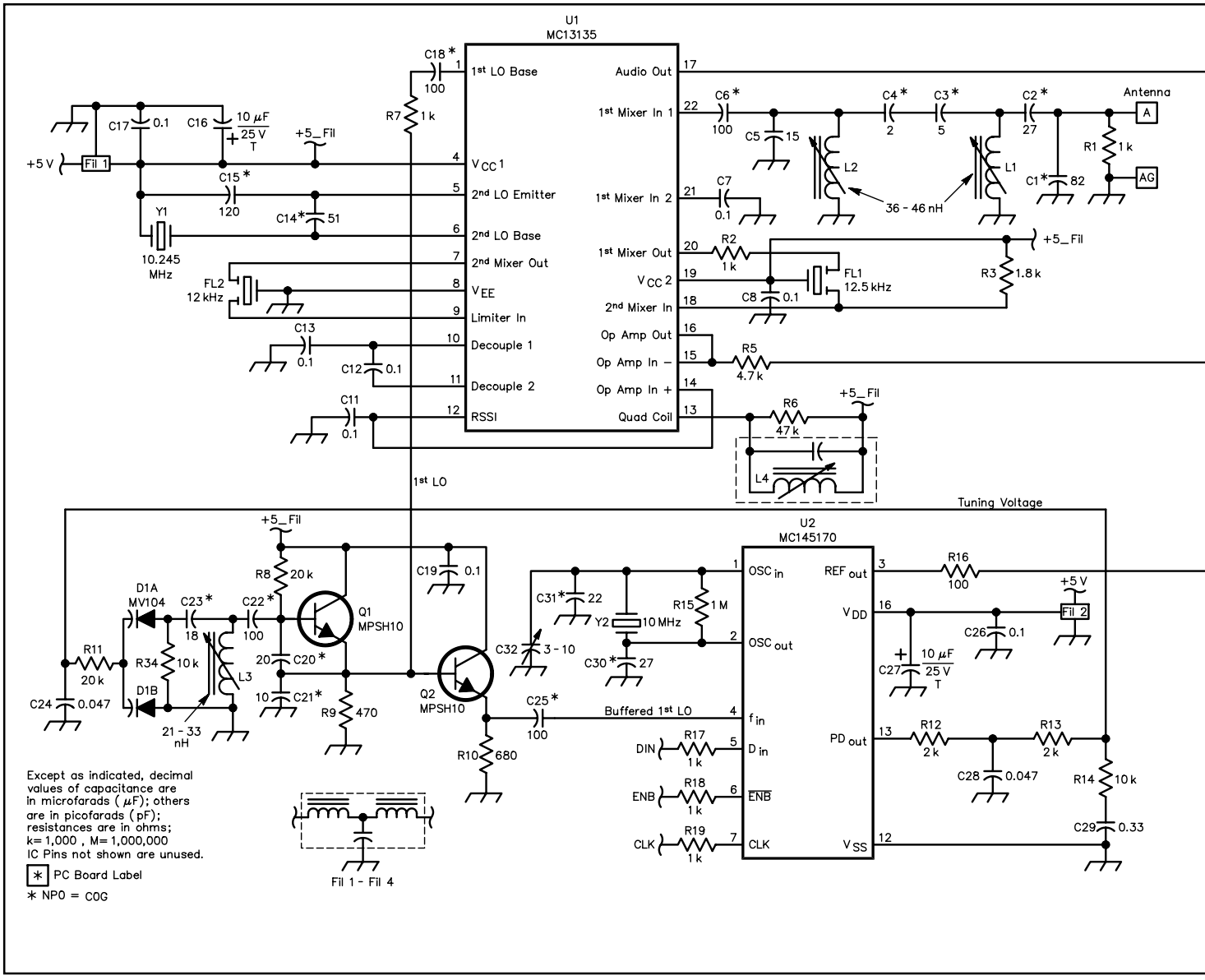
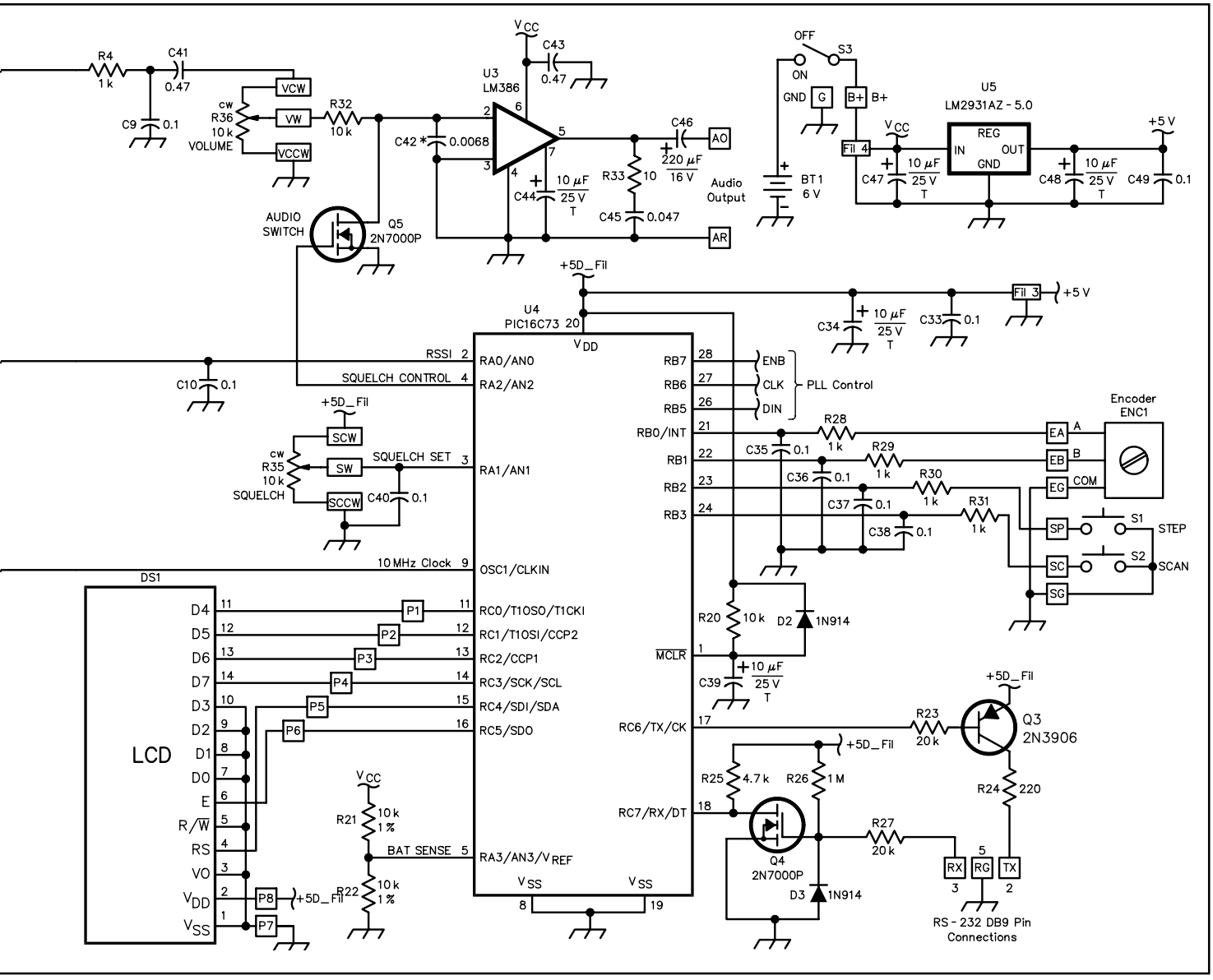


Figure 1—Schematic of the synthesized 2-meter FM receiver. Each receiver section is associated with one IC—that's how integrated receiver design has become. A PIC microcontroller takes care of the user-interface functions and programs the PLL for the chosen frequency. The only control that is not programmable is **VOLUME**. Unless otherwise specified, resistors are 1/4 W, 5% tolerance carbon-composition or film units. Equivalent parts can be substituted. Parts are available from these suppliers 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.digikey.com**; Mouser Electronics, 2401 Hwy 287 N, Mansfield, TX 76062; tel 800-346-6873, 817-483-4422, fax 817-483-0931; **sales@mouser.com**; **http://www.mouser.com**; Newark Electronics, 4801 N Ravenswood Ave, Chicago, IL 60640-4496; tel 800-463-9275; 312-784-5100; fax 312-907-5217; **http://www.newark.com**.

BT1—Five 550 mAh AAA NiMH cells (RadioShack 23-527)
C1—82 pF, 100 V, NP0, ceramic (Mouser 141-100N5-082J)
C2, C30—27 pF, 100 V, NP0, ceramic (Mouser 141-100N5-027J)
C3—5 pF, 100 V, NP0, ceramic (Mouser 141-100N5-005J)
C4—2 pF, 100 V, NP0, ceramic (Mouser 141-100N5-002J)
C5—15 pF, 100 V, NP0, ceramic (Mouser 141-100N5-015J)
C6—100 pF, 100 V, NP0, ceramic (Mouser 141-100N5-101J)
C7-C13, C17, C19, C26, C33, C35-C38, C40, C49—0.1 μF, 100 V, X7R, ceramic (Mouser 581-UEZ104K1)
C14—51 pF, 100 V, NP0, ceramic (Mouser 141-100N5-051J)
C15—120 pF, 50 V, NP0, ceramic (Mouser 140-CD50S2-121J)
C16, C27, C34, C39, C44, C47, C48—10 μF, 25 V tantalum (Digi-Key P2049-ND [Panasonic ECS-F1EE106K])
C18, C22, C25—100 pF, 100 V, NP0, ceramic (Mouser 141-100N5-101J)
C20—20 pF, 100 V, NP0, ceramic (Mouser 141-100N5-020J)
C21—10 pF, 100 V, NP0, ceramic (Mouser 141-100N5-010J)
C23—18 pF, 100 V, NP0, ceramic (Mouser 141-100N5-018J)
C24, C28, C45—0.047 μF, 100 V, X7R, ceramic (Mouser 581-UEZ473K1)
C29—0.33 μF, 100 V, X7R, ceramic (Mouser 581-UEZ334K2)
C31—22 pF, 100 V, NP0 (Mouser 141-100N5-022J)
C32—3-10 pF (Digi-Key SG10016-ND [Sprague GKG10016])
C41, C43—0.47 μF, 50 V, Z5U, ceramic (Mouser 581-UDW474M1)
C42—6800 pF, 100 V, NP0, ceramic (Mouser 581-UEC682J2)
C46—220 μF, 16 V aluminum electrolytic (Digi-Key P5232-ND [Panasonic ECE-A1CGE221])
D1—MV104 dual Varactor diode (Newark MV104)
D2-D3—1N914, 1N4148 (Digi-Key 1N4148MSCT-ND)
DS1—16-character, 2-line LCD (Digi-Key 73-1045-ND [Optrex DMC-16207N-B])
ENC1—Encoder (Digi-Key P80685-ND EVQ-VEMF0124B [Panasonic])
FIL1-FIL4—Panasonic EMI filter (Digi-Key P9809CT-ND)
FL1—12.5 kHz, 2-pole 10.7 MHz crystal filter (Digi-Key X701-ND)
FL2—12 kHz, 455 kHz ceramic filter (Digi-Key TK2334-ND)
L1, L2—36-46 nH SMT coil (Digi-Key TKS2715CT-ND)



L3—21-33 nH SMT coil (Digi-Key TKS2714CT-ND)
L4—Toko quadrature coil (Digi-Key TK1302-ND [RMC2A6597HM])
LS1—Panasonic EAS-45P104S (Digi-Key P10176-ND)
Q1, Q2—MPSH10 RF NPN (Newark MPSH10)
Q3—2N3906 general-purpose PNP (Newark 2N3906)
Q4, Q5—2N7000P, N-channel MOSFET (Digi-Key 2N7000P-ND)
R35, R36—10 kΩ, single-turn pot (Digi-Key RV6N10KC-ND)
S1, S2—SPST NO momentary contact; snap-action only (Digi-Key CKN4010-ND)
U1—MC13135P dual-conversion, narrowband receiver (Newark MC13135P)
U2—MC145170P PLL (Newark MC145170P)
U3—LM386N-1 (or -3, -4) audio amplifier (Digi-Key LM386-1ND)
U4—PIC16C73A/JW-20 (*programmed* PIC; see text and Note 1)
U5—LM2931AZ-5.0 low-dropout voltage regulator (Digi-Key LM2931AZ-5.0-ND)
Y1—10.245 MHz, 30 pF parallel mode, HC25/U (International Crystal Mfg Co, PO Box 26330, 10 N Lee, Oklahoma City, OK 73126-0330; tel 800-725-1426, 405-236-3741, fax 800-322-9426.
Y2—10.000 MHz, 20 pF (Mouser 73-XT49S1000-20 parallel mode)
Misc: Enclosure—Pac-Tec K-TT (Mouser 616-72821), hardware.

filter, FL1, by R2 and R3. The two-pole crystal filter specified has a 3 dB bandwidth of ±4 kHz and a stopband of 20 dB at ±18 kHz.

The second mixer uses a 10.245 MHz LO to convert the 10.7 MHz first IF to 455 kHz. FL2, the second IF filter, is a low-cost 12-kHz bandwidth unit that provides more selectivity and limits the noise bandwidth to the input of the limiting amplifiers. A narrower filter could be used here, but a 12 kHz unit allows for frequency drift in the second LO and provides more than adequate stop-band performance. (The MC13135 is so well thought-out that its impedances match those required by the second IF ceramic filter without any external components!) At the output of the second IF filter, the total gain of U1, after filter losses, is about 12 dB. At this point, the receiver's total noise figure is about 10 dB. This level of performance is sufficient for microvolt sensitivity.

The only shortcoming of these integrated receivers is the relatively low third-order intercept of the first mixer (–17 dBm). This manifests itself as a limiting factor in the receiver's overall spurious-free dynamic range. Spurious-free dynamic range (SFDR) can be defined as the ratio of the minimum detectable signal (MDS) to the signal level that produces third-order products that are equal to the MDS. In this receiver, the SFDR is about 60 dB. That may sound small, but in absolute voltages, the ratio is 1000:1. So for a 1 µV MDS, the largest spurious-free signal that can be processed is 1 mV (all in RMS volts). Larger signals than the theoretical SFDR predicts can be present at the input and a

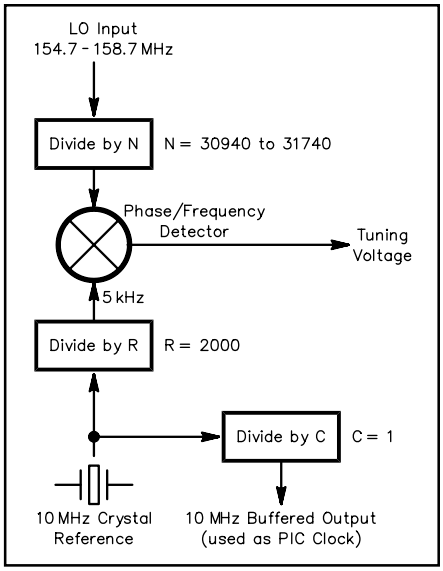


Figure 2—The PLL (U2 of Figure 1) has three counters that are programmed by the PIC. The R and C counters are programmed to the proper operational values at power-on. The R counter divides the 10-MHz reference by 2000 to get a 5-kHz internal signal that sets the receiver's minimum tuning-step size. Only the N counter needs to be changed to tune the receiver during operation.

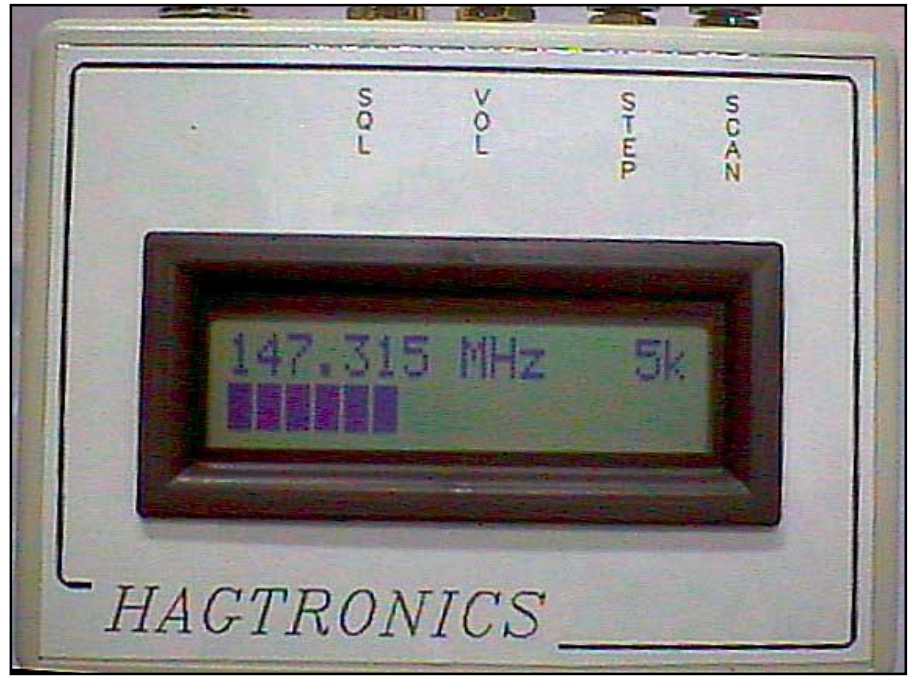
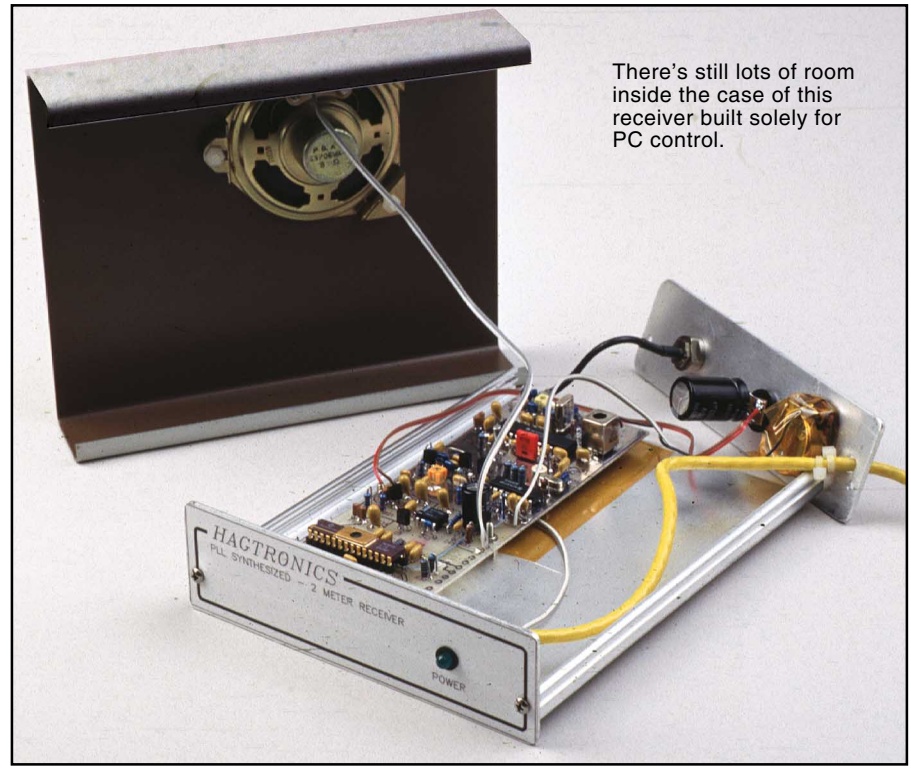


Figure 3—On the top line of the LCD, the frequency and tuning-step size are shown. The second line is a bar-graph signal-strength meter. During scanning and RS-232 operation with a PC, messages appear in the display to show the current mode. When the battery gets low, **BAT** flashes on the lower portion of the display.



readable signal heard, but the distortion products decrease the signal-to-noise ratio.

After the second-mixer IF filter, U1 has 110 dB of gain in the limiting amplifiers. This much gain usually presents an excellent opportunity for regenerative feedback and oscillation in the amplifiers. The MC13135 prevents some of these problems by rolling off the bandwidth of the limiting amplifier above 2 MHz. Use of a PC-board ground plane helps to keep the MC13135 oscillation-free.

The limiting amplifier produces a voltage proportional to the logarithm of the RF-input signal. This is identified as the *received-signal-strength indicator*, or RSSI. The RSSI signal is buffered by an uncommitted amplifier in the MC13135 (pins 14, 15 and 16) and fed to one of the A/D channels in the PIC microprocessor, U4. This RSSI signal is then used for squelch and a signal-strength indicator on the LCD.

FM signals are handled by a quadrature demodulator in U1. The 90° phase shift required for demodulation is provided by L3, a commercially made quadrature coil.

PLL Circuit

U2 is a Motorola MC145170, a fully programmable PLL that is controlled by the PIC (U4). The PLL gives the receiver the ability to be "digital." The LCD can show the exact frequency to which the receiver is tuned without actually counting the LO frequency (see Figure 2). This is accomplished in U2 by dividing the 10 MHz crystal-reference clock to 5 kHz with U2's R counter (divide by 2000). This 5-kHz reference frequency then sets the receiver's minimum channel spacing. From 144 to 148 MHz, there are 801 such channel steps. The PIC keeps track of the channel to which the receiver should be tuned and programs U2's main counter (the N counter) accordingly. When the N counter varies from 30,940 to 31,740, the first LO tunes from 154.7 to 158.7 MHz.

U2 also has a buffered output that is routed to the PIC for use as its clock (through the C counter). Because the PIC is performing RS-232 communications, it

Here's a close-up of the boards in the modem-like receiver.

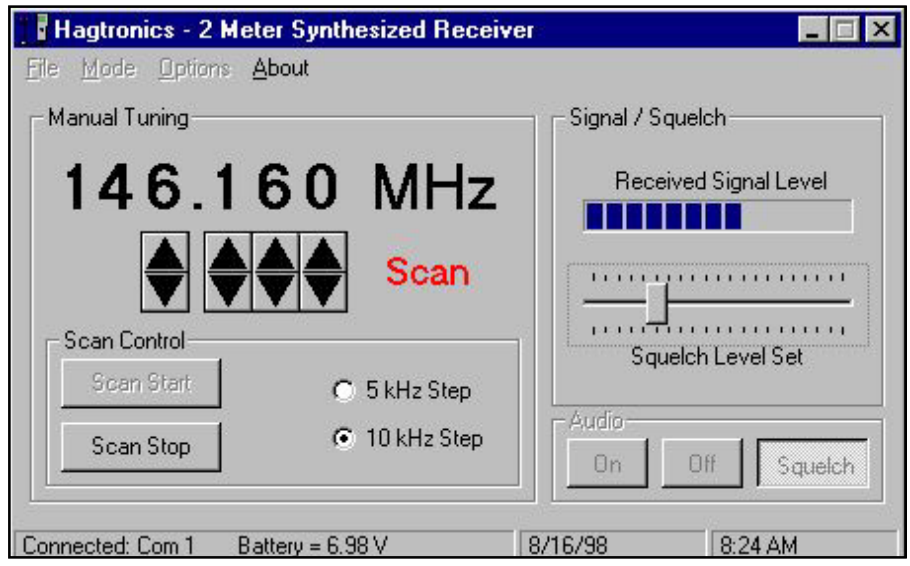


Figure 4—Under PC control, all receiver functions can be controlled via RS-232 commands. Shown here is the manual tuning portion of the PC control program. From this display, the entire receiver can be controlled and the entire 2-meter band scanned. In Memory mode, up to 10 specific user-programmed memory channels can be sequentially scanned. All receiver set-up parameters—such as how long the receiver delays on a scanned signal—can be set for individual users.

must have a stable clock source also, but the frequency accuracy required by the PIC for successful RS-232 operation is about 60 times less than the RF portion needs.

The PLL feedback loop is stabilized by the loop filter composed of R12, R13, R14, C28, C29 and C24. R12, R13, R14 and C29 add the main pole and zero to the PLL transfer function. These are the most important components in stabilizing the loop. C28 and C24 help filter any reference feedthrough and prevent it from modulating the VCO. C28 and C24 also destabilize the loop by adding more poles to the overall transfer function. These components were taken into account during the design of the loop to ensure stability.

The PIC

The user interface is managed by a Microchip Technology[3] PIC 16C73 microprocessor, U4. The PIC provides a very comprehensive set of features for the radio with minimum parts count. This PIC contains two 8 bit I/O ports, an internal four-channel, 8-bit A/D converter and RS-232 UART, all in a 28 pin package.

The radio operates in two basic modes: When the radio is turned on, it checks to see if a PC is connected to the RS-232 port. If not, the radio goes into *stand-alone mode*. In this mode, the radio operates like a portable receiver and all the knobs, switches and LCD are active. If U4 senses a PC connected to the RS-232 port at power-up, it enters *RS-232 mode*. In this mode, U4 *ignores* the radio's knobs and buttons and waits for RS-232 commands to control the receiver functions.

In stand-alone mode, U4 loops continually, looking for any input in the tuning knob encoder, switches, RSSI value and squelch setting. If it senses any change at these inputs, it takes the appropriate action. The receiver provides these functions:

- Volume level (not PIC controlled)
- Squelch level the PIC compares the level set here with the RSSI value from the receiver and determines whether the audio should be on or off.
- Tuning-step size in 5, 10, 100 kHz and 1 MHz increments, along with a means to lock the frequency to the current setting.
- Scan button—places the receiver in a scan mode in which it steps through the entire band and delays on any active signal.
- Tune encoder that allows an analog frequency-tuning input via a front-panel knob.

DS1 shows the currently tuned frequency in megahertz, and the currently selected tuning step size. In addition, the second line of DS1 acts as a bar-graph signal-strength meter (see Figure 3).

PC Control Program

I've written a program (see Note 1) that allows total control of the receiver by a PC. The PIC responds to RS-232 commands by setting receiver hardware as needed and sending receiver status information back to the PC. The PC program has three major modes:

First is the *manual/scan* mode (Figure 4). In this mode, the receiver can be tuned to any frequency in the 2-meter band. Also, a straight band scan can be performed. Another mode allowed by the program is a *memory scan*. In this mode, you load up to 10 frequencies into the computer's memory and the PC scans *only those frequencies*.

Perhaps the most interesting of the receiver's modes is that of *spectrum display* (Figure 5). In this mode, the PC continually sweeps the 2-meter band in 10-kHz steps and displays the RSSI value at each point. This generates a relative signal-strength versus frequency plot. A cursor allows you to determine actual frequencies, and by double-clicking on a peak, the receiver tunes to that frequency.

Usually when one composes a program, all sorts of constants get hard-coded. The constants contain display-scaling factors and things like the delay duration after a signal stops before scanning resumes. These decisions can make the radio inconvenient for other people to use who might have different preferences. I added an options screen to this program that lets *you* override all my preconceived constants! Every time the program starts, these preferences are reloaded from disk.

Options and Construction

The receiver can be built for manual and PC control, or for PC-only control. If PC-only operation is desired, several parts may be omitted: the LCD—it is not used in RS-232 mode; the tuning encoder, **SCAN** and **STEP** switches are not used, and neither is the **SQUELCH** pot. The radio then works

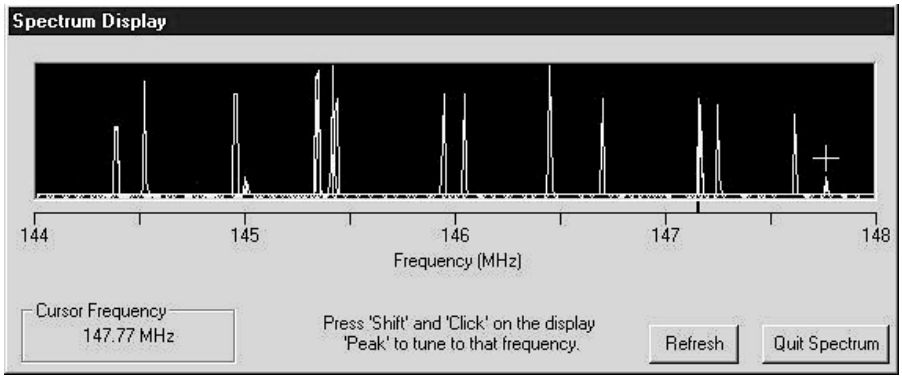


Figure 5—Perhaps the most interesting mode is that of spectrum display. Here the receiver is continuously tuned across the band in 10 kHz steps. The display operates in a storage-oscilloscope fashion so it shows all the signals the receiver has heard. The heights of the signal blips indicate their relative signal strengths. The small cross at the right-hand side of the screen is the PC's mouse pointer acting as a cursor. The exact frequency beneath the cross (mouse) is shown in the lower-left corner of the display. This is useful in determining the true frequency of any signals displayed.

only under PC control. The single remaining adjustment is the **VOLUME** control.

Building the radio is straightforward using a FAR Circuits[4] PC board. The PC board is designed for through-hole versions of U1 and U2. If these are unavailable, buy surface-mount devices and use Aries SMT-to-DIP adapter sockets (see the parts list). This provides maximum flexibility in constructing the receiver.

Several jumpers are used on the PC board. Use special care with one particular jumper: The one from R16 at U2 to U4 is the 10-MHz clock line for the PIC. This jumper has an associated ground trace on the PC board that it is designed to have a jumper wire placed *on top* of it. By placing the jumper on the trace, we make a kind of "poor man's coaxial cable." This helps to keep the clock signal clean and prevents 10-MHz harmonic radiation to the RF deck. The jumper can be made from a short length of wire-wrap wire. Tack the wire along the ground trace every $^1/_2$-inch or so with Super Glue or a similar adhesive.

L1, L2 and L4 are Toko surface-mount types. These inductors are positioned on the PC board, with one end soldered to the ground plane, the other end soldered to the pad on the top of the board.

Enclosure

You can house the portable receiver in any suitable enclosure, but it is designed to fit into a professional-looking Pac-Tec,[5] hand-held enclosure shown in the accompanying photo. All the pots, speaker, battery, display and RS-232/battery-charging connector can be shoehorned into the case without too much trouble. For the PC-only controlled version of the receiver, I used an aluminum case from my junk box that gives the unit an almost modem-like appearance.

There is just enough room in the Pac-Tec enclosure to contain five NiMH AAA cells. These cells (see parts list) have a rating of 550 mAh and can power the receiver for 5 to 10 hours, depending mainly on the volume level used. The five cells provide a nominal 6 V and can be recharged in the receiver using any convenient dc "wall wart" supply. I recycled a 12 V, 200 mA dc wall wart and use a 36 Ω, 2 W resistor in series with its output to limit the charging current. On my portable receiver, a five-pin DIN receptacle on the rear panel is used to supply charging power to the batteries and make the RS-232 connection when needed. I mounted the current-limiting resistor in the mating DIN plug.

Tune-Up

Receiver setup is relatively simple. First, tune the receiver to 148.000 MHz and set the PLL voltage by adjusting L4 until the voltage at R14 is about 3 V. Next, set the receiver to 144.000 MHz; the voltage at R14 should be around 1.5 V. Tune the receiver to a known station frequency (such as a local club's repeater frequency) and set the 10 MHz reference by adjusting C32 for the best signal.

The FM-demodulator adjustment (L3) should be fairly close to ideal as it comes from the supplier. You can optimize the audio quality by listening to a strong signal and adjusting L3 *slightly*. *Do not turn L3 more than one-half a turn either way* or you may get on the other side of the demodulation **S** curve, which will *reduce* the audio level and quality!

The input filter is the most difficult adjustment. If you have access to a network analyzer, use it. But I'm betting most people won't, so here is the manual procedure. Pretune the filter first: Set L1 so that the tuning slug is three-quarters of the way to the bottom of the core. Set L2 so that one-quarter of the slug is above the top of the core. Next, tune to a station at about midband. The signal source can be a signal generator, a dip meter (and frequency counter) or another transmitter at some distance from the receiver. To prevent misadjustment due to overloading, make sure that the LCD signal meter is at half scale or less during L1 and L2 tuning. Adjust L1 for a signal peak. Then adjust L2 for the best signal levels at 144 and 148 MHz. You may need to adjust L1 slightly to optimize the bandwidth, then readjust L2. Basically, L1 sets the filter's center frequency and L2 adjusts the bandwidth.

Future Directions

The next logical step in the development of this receiver platform is the addition of a transmitter to make a full-featured transceiver. Very little would need to be changed in the receiver. The PIC has enough memory for many more features than are implemented here (such as split-frequency operation). The PLL could be switched to the transmit frequency and a diode TR switch added to the antenna circuit to steer the signals as required for transmit and receive. The latest transmitter ICs developed for cell-phones cost about $15 in small quantities, and even though they are designed to operate at 900 MHz, many of them work acceptably well in the 2-meter band.

Notes

[1]Minimum program requirements are a PC operating under *Windows 95/98*, and a 16550 UART-driven RS-232 serial port. You can obtain the 2-meter FM receiver PC control program along with the object and source code contained in *HAG2MRX.ZIP* available from **http://www.arrl.org/files/**. Or, send author Steve Hageman a self-addressed, stamped diskette mailer and three (3) formatted, 1.44 MB floppy disks. Also available from author Steve Hageman is a *programmed* 16C73 PIC: $30 US, check only. Foreign orders add $5 US for shipping and handling; South American orders add $10 US for shipping and handling. You are encouraged to visit Steve's Web site **http://www.sonic.net/~shageman/**.

[2]Motorola Inc, Phoenix, AZ; **http://www.motorola.com**. A list and links to Motorola component distributors can be found at **http://mot-sps.com/sales/sales_web.html/**. Among them is Newark Electronics, 4801 N Ravenswood Ave, Chicago, IL 60640-4496; tel 800-463-9275, 312-784-5100, fax 312-907-5217; **http://www.newark.com**.

[3]Microchip Technology Inc, 2355 W Chandler Blvd, Chandler, AZ 85224-6199; tel 602-786-7200, fax 602-899-9210; **http://microchip.com**.

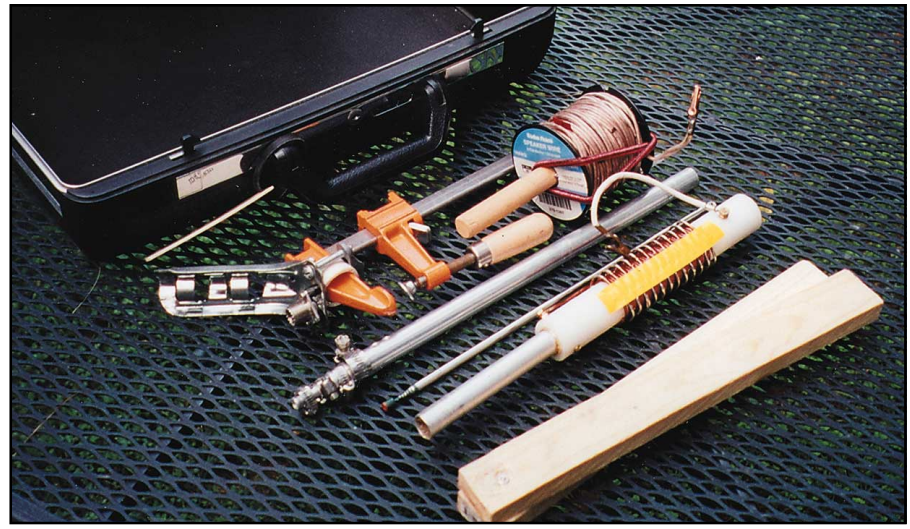
[4]PC boards for this project are available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269; tel 847-836-9148 (voice and fax). Price: $9.75 plus $1.50 shipping for up to four boards. Visa and MasterCard accepted with a $3 service charge.

[5]Pac-Tec, One LaFranca Way, Concordville, PA 19331; tel 610-361-4200, fax 610-361-4201; **http://www.pactecenclosures.com**.

Steve Hageman, a confirmed "analog-a-holic" has been involved in electronics since the fifth grade. Always interested in the magic of grabbing signals out of the ether, he is currently employed by Hewlett-Packard Company, where he develops RF semiconductor test equipment. You can reach Steve at 9532 Camelot Dr, Windsor, CA 95492; **shageman@sonic.net**.

By Robert H. Johns, W3JIP

A Briefcase-Portable HF/VHF Antenna



Here's a smaller version of the portable antenna for 80 through 2 meters that appears in the August 1998 issue. It includes a novel way to build a multitapped coil.

This antenna will pack in your luggage—even in a briefcase if need be. The components are 14 inches in length. This antenna uses the same mounting clamp and flagpole bracket that were described in my earlier article. Please refer to that article for construction details.[1] The aluminum-tubing element has been broken up into small units, however, and a smaller-diameter loading coil is used. You can still set up the antenna to match the space available: the upper half of this dipole can be anything from about 1 1/2 to 11 feet long, and the coil adjusted to bring the antenna into resonance.

This smaller version of the portable antenna sacrifices some efficiency because its coil diameter is smaller, and also some ruggedness, since the lighter whip element won't take as much banging around. Still, it works well and can mount anywhere.

Construction

The tubing element is made from telescoping 14-inch lengths of 3/4, 5/8, 1/2 and 3/8-inch (OD) aluminum tubes having 0.058-inch wall thickness. Hardware departments sometimes stock tubing with slightly thinner walls that works here, also. Each tube is slotted and tightened around the next-smaller tube with hose clamps. The rest of the element is a 6-foot-long telescoping whip (RadioShack 270-1408) that fits into the 3/8-inch aluminum tube after you drill out its inside diameter with a 9/32-inch bit. Drill about 3/4 of an inch into this aluminum tube before cutting slots in it.

There is nothing special about the 14-inch segment length. Increase it if you want a longer vertical element. The wooden legs that make a tripod for the tubing element also are 14 inches long. You can buy carpenter's clamps shorter than the 18-inch one shown in the first article, or cut the longer one with a hacksaw. I cut mine and put a 5/8-inch rubber tip at the cut end.

The coil is wound on a 9-inch length of one-inch Schedule-80[2] plastic pipe. The actual diameter of this pipe is 1.3 inches. The coils in the photo were wound on polypropylene[3] pipe, which is an excellent insulator. It could also be on PVC pipe unless you will be using high power. (At 100 W, PVC works well, but at kilowatt levels it can melt and burn!) In order to fit the 3/4-inch-OD aluminum tubing of the antenna, a 1 1/2-inch-long sleeve of 7/8-inch-diameter, 0.058-inch-wall aluminum tubing is glued inside each end of the

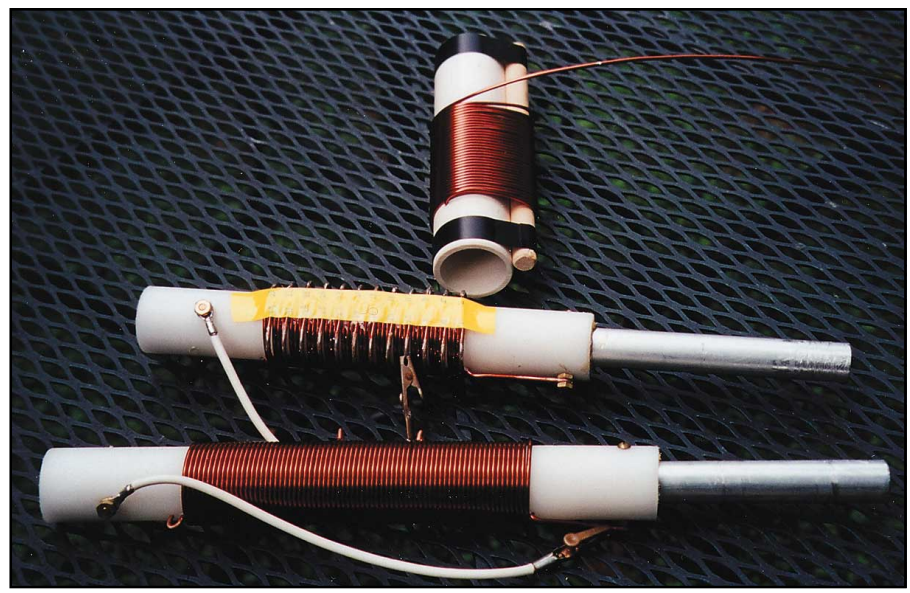


Figure 1—The 40 and 80-meter coils are only about 1.5 inches in diameter. To make many taps in the 40-meter coil, it is wound on an oversize form with a "bump" along its length (at rear). When the coil is removed and transferred to the correct form, the bends in the wire stick out to become taps.

[1]Notes appear on page 43.

Schedule-80 pipe with epoxy. The epoxy takes up the loose play between the plastic pipe and the aluminum sleeve. The 3/4-inch tubing of the antenna is a good fit into these sleeves. A 6-inch length of 3/4-inch-OD aluminum tubing is bolted into one end so that it extends five inches out. This goes into the flagpole bracket.

You may use the same spool of wire for the lower half of the antenna that was described in the original version. If that 4.5-inch diameter spool from Home Depot is too large for your luggage, smaller spools of wire are available at RadioShack, as in the photos. You could also cut down the diameter of the rims of the larger spool. This antenna wire is connected to the flange of the coax connector with a clip lead. This separates the spool from the clamp, making the antenna easier to pack.

Loading Coil

There are 45 turns of #12 magnet wire in the coil and 33 taps for connecting to it with the copper alligator clip. (See Figure 1.) How to make so many taps? It takes some extra effort, but is not difficult. The coil is wound on a length of 1 1/4-inch PVC pipe, which is actually 1.66 inches in diameter. A lengthwise ridge that is added to this form makes many bends in the wire as it is wrapped around the pipe. When the coil is removed, placed on the 1.3-inch-diameter tube and tightened, the bends stick out from the coil circumference at regular intervals. A little scraping finishes the tap points. Taps occur every one-and-a-third turn, but they line up with each other every fourth turn, making nice rows. The taps are far enough apart so they don't interfere with connections made to nearby taps. Here are the details:

The ridge on the larger form is made with a 1/2-inch wooden dowel. Simply tape it, lengthwise, on the winding form, as in Figure 1. After 35 turns are wound on the large form, pull out the dowel. This releases the wire to unwind and come free of the form. After transferring it to the smaller diameter form, pass one end of the wire through a set of diametric holes in the form (see Figure 2) with a four-inch lead that will connect to the 6-inch aluminum tube. Rotate the coil to tighten it around the smaller form and lay the turns against one another. This will take some gentle handling. After several passes of rotating and tightening, the winding should be snug and close-wound. Tighten the turns until the bends line up in straight rows. The other end of the coil wire passes through holes in both walls of the form. Cut off all but about one-half inch, scrape the lead clean and bend it into a loop (a connection point for this end of the coil). The coil can be made more rugged by gluing the turns together with epoxy. I made three lines of glue between the rows of taps.

The taps must be scraped to remove the wire insulation. In addition, each one should be coated with solder to provide a corrosion-free surface for the alligator clip to grip. This "tinning" operation will also reveal any streaks of insulation that weren't removed, since the solder won't stick there.

In this coil, the tap wire with the alligator clip attached is bolted to the sleeve at the open end of the coil form. Drill and tap through the polypropylene form and the 7/8-inch aluminum sleeve for #6-32 brass screws. They make the electrical connection from the tap wire to the sleeve.

Instead of counting turns to locate the connection for a particular band, I count taps. These are much easier to work with. In the photos, you can see a strip of white vinyl electrical tape between two rows of taps. The tap numbers are written on each edge of the tape: 1,2…4,5…7,8, etc. The missing numbers belong to taps on the opposite side of the coil.

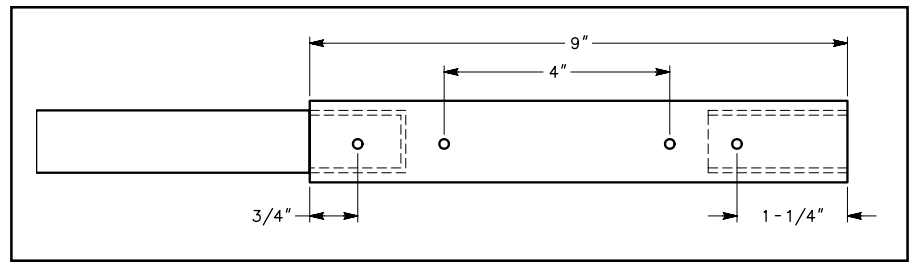


Figure 2—Coil-form hole locations. The 40-meter form is shown; the 80-meter form is similar except that it is 11 inches long and the holes for the coil are 6.3 inches apart.

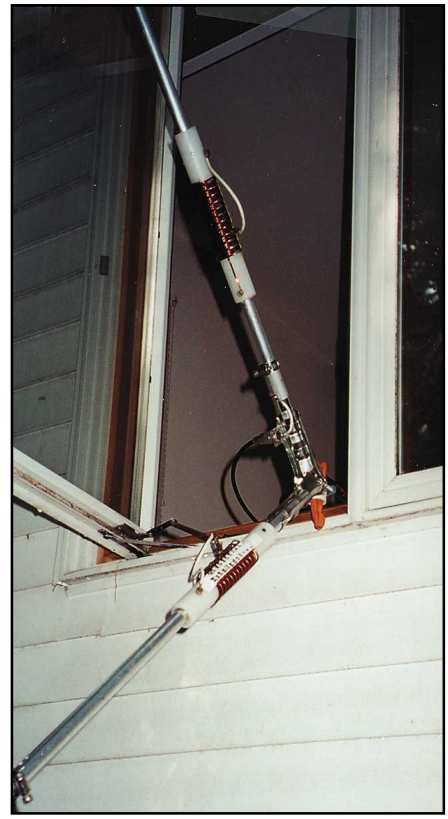


Figure 3—A briefcase portable made from two tubing elements forming a **V**.

80 Meters

I made a briefcase-sized coil for 80 meters on a one-inch Schedule 80 polypropylene-pipe coil form, see Figure 1. This coil has 72 turns of #12 magnet wire wound directly on the final form. See Figure 2 for the coil-form hole locations. For 80-meter operation, the coil is placed between the flagpole bracket and the 40-meter coil, that is, both coils are used. For continuous coverage, the 80-meter coil is tapped 24 and 41 turns from the end with the aluminum tube. These taps are made before final tightening of the wire on the form. To make a tap, pry a turn outward and bend the wire. The vertical half of the antenna must be fully extended for 80-meter operation. There is no extra inductance in the coil to compensate for a shorter whip.

Operation

I have not traveled with this briefcase portable, but have tried it in several places around the house and yard. It behaves just as does its big brother.

For *Really* Tight Spaces

If you don't have space for λ/4 of wire, it is possible to use two tubing elements, as shown in Figure 3. Two flagpole brackets are mounted on a bar clamp with the same insulator and ground clamp hardware that is used for a single bracket, see Figure 4. The resulting **V** antenna may be mounted on a deck rail or window sill with the elements in a vertical plane or on a flat surface—such as a table—for horizontally polarized waves. The tripod orients one element vertically and one horizontally.

To separate the two halves of the antenna, one of the elements must be insulated from its support. This is done by replacing the aluminum tube at one flagpole bracket with a 3/4-inch Plexiglas rod. (W1VT recommends polycarbon rod. It's UV resistant and much stronger than Plexiglas. You can buy it in small quantities from Small Parts Inc, 13980 NW 58th Ct, PO Box 4650, Miami Lakes, FL 33014-0650; tel 305-557-7955 Customer Service; 305-558-1255 Catalog requests; fax 800-423-9009; **smlparts@smallparts.com**; URL **http://www.smallparts.com**.) A two-inch length of 7/8-inch-OD, 0.058-inch-wall aluminum tubing fits over the plastic rod, where it is bolted in place to form a socket for the 3/4-inch tubing of the antenna element

Figure 4—Two flagpole brackets are attached to one bar clamp. One of them must have some of its mounting plate cut away to fit "inside" the other.

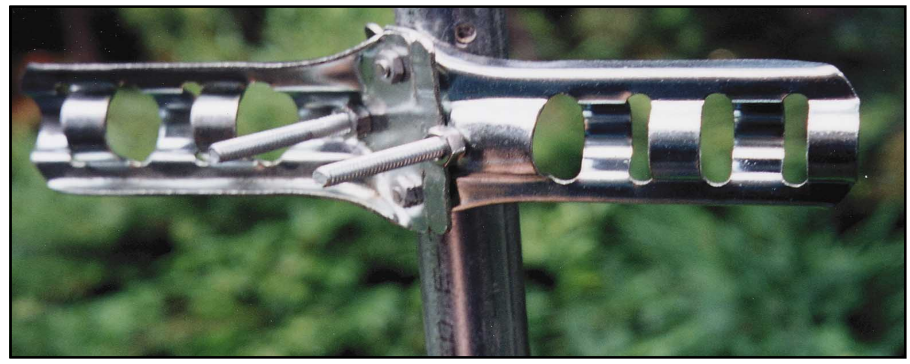


Figure 5—Two tubing elements will also form a dipole when their brackets are bolted together. A **U** bolt mounts them on a mast.

or loading coil. A coax connector is bolted to this bracket and a wire from its center terminal runs to the 7/8-inch tube, which makes the electrical connection to the element.

Straight Dipole Mounting

Two flagpole brackets may be bolted together to place the elements in a straight line with a **U** bolt attaching them to a mast, as in Figure 5. This arrangement also requires an insulated mounting for one of the elements, the Plexiglas rod in Figure 4.

Bigger is Better

If you want a larger antenna, it is easy to add extra length between the flagpole bracket and the coil. Fifteen-inch segments of 3/4-inch and 7/8-inch aluminum (0.058-inch wall) tubing can be telescoped together, with the 3/4 tubing going into the flagpole bracket, and the 7/8 tubing receiving the coil. More length increases efficiency. I have added four such segments that lengthen the tubing element to more than 16 feet. The clamp, bracket and tubing stand up well.

The longer element is not as convenient, however, since the coils may be out of reach for adjustments unless you remove the element from its bracket.

Notes

[1]Robert Johns, W3JIP, "Build a Portable Antenna," *QST*, Aug 1998, pp 44-46.

[2]Schedule 80 pipe has a thicker wall than the Schedule 40 pipe that is stocked in hardware, electrical, and plumbing departments. Schedule 80 PVC is available from some large plumbing distributors. Search by telephone to find a local distributor that carries it.

[3]Polypropylene pipe is available from Plastic Piping Systems, 2841 Egypt Rd, Audubon, PA 19403; tel 610-666-7155. One inch Schedule 80 pipe is $2.55 per foot, with a minimum order of 20 feet.

Bob Johns is a semi-retired physics teacher. First licensed in 1952, he builds and experiments with coils, traps and antennas. He can be reached at Box 662, Bryn Athyn, PA 19009; **ksjohns@mindspring.com**. QST

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 9×12-inch SASE for a certificate, or a business-size SASE for an endorsement.

♦ Teleprinter transmissions:

Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

♦ Voice transmissions:

Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

♦ Miscellanea:

On Fridays, UTC, a DX bulletin replaces the regular bulletins.

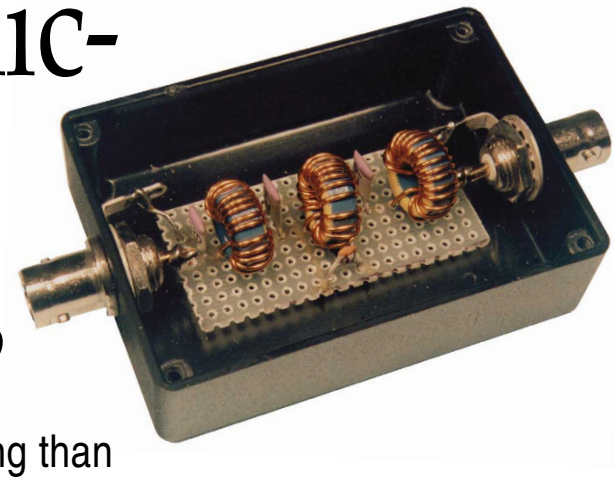
W1AW is open to visitors from 10 AM until 4 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day.

By Ed Wetherhold, W3NQN

Second-Harmonic-Optimized Low-Pass Filters



Sometimes we need a little more output filtering than traditional designs offer. Look at a new filter that can give you that extra boost.

Above: A QRP 20-meter CWAZ low-pass filter installed on a piece of perf board in a small (1×2 7/8×2-inch, HWD) plastic box available from Farnell (Ref 4), order #645-680, $1.56 each. The toroidal cores are Micrometals (Ref 5) T50-17. The capacitors shown are Philips 683 series, low-k, 100 V dc, with a 2% tolerance. Some of those shown have a 0.2-inch lead spacing, which is no longer available from Farnell. For new construction, use Philips 680, low-K series having 0.1-inch lead spacing. The Philips 680 series is good for all QRP filtering because of its 2% tolerance.

Introduction

The FCC requires transmitter spurious outputs below 30 MHz to be attenuated by 40 dB or more for power levels between 5 and 500 W (Ref 1). Radio amateurs usually attempt to satisfy this requirement by placing a seven-element standard-value capacitor (SVC) low-pass filter (LPF) after the final amplifier. This procedure was demonstrated by Dave Benson, NN1G, in his *QST* article discussing a 3-W PEP QRP SSB transceiver for 20 or 75 meters (see Ref 2). The seven-element Chebyshev LPF is adequate for Benson's application because spurious signals must be attenuated by only 30 dB at power levels less than 5 W.

For power levels greater than 5 W, the typical second-harmonic attenuation (40-dB) of a seven-element Chebyshev LPF is marginal. An additional 10 dB of attenuation is needed to assure compliance with the FCC requirement (Ref 3).

If the standard seven-element Chebyshev SVC LPF could be slightly modified to obtain an additional 10 dB of stop-band loss at the second-harmonic frequency without significantly decreasing its passband return loss (RL), the problem would be solved. The minimum passband RL of Benson's 20-meter LPF is about 21 dB, and this minimum RL level is suitable to use as a guide for an acceptable return loss after the filter design modifications have been completed.

We can easily increase the 20-meter SVC LPF second-harmonic attenuation at 28 MHz by adding a capacitor across the center inductor to form a resonant circuit. If this is done, however, the 20-meter passband RL decreases to an unacceptable level, less than 12.5 dB. We need a way to add the resonant circuit, while maintaining an acceptable RL level over the 20-meter passband.

The typical LPF used by Benson (and the Chebyshev SVC designs listed in *The ARRL Handbook*) all have maximum SWR (equivalent to a minimum RL level) specifications that extend from the filter ripple-cutoff frequency down to dc. For the usual Amateur Radio application, however, we need an acceptable minimum RL only over the amateur band for which the LPF is designed. If the passband RL below the amateur band (where it is not needed) could be exchanged to improve the RL only in the passband—while simultaneously increasing the stop-band loss at the second-harmonic frequency—it would be practical to resonate the center inductor at the second harmonic. Our problem would be solved.

This problem of significantly increasing the second-harmonic attenuation of the seven-element Chebyshev LPF while maintaining an acceptable RL over the amateur passband has been solved by Jim Tonne, WB6BLD. With Jim's approval and encouragement, I am using this article

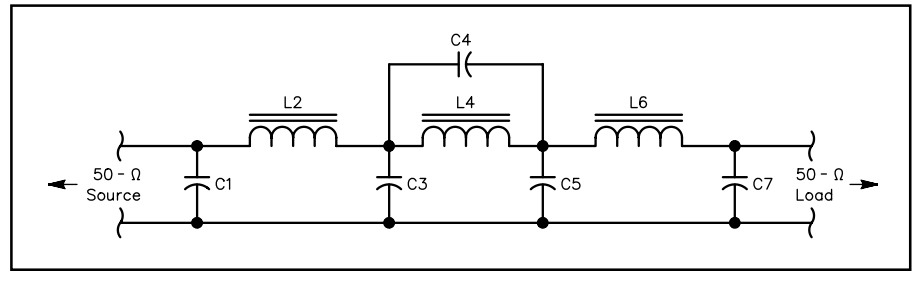


Figure 1—Schematic diagram of a CWAZ low-pass filter designed for maximum second-harmonic attenuation. See Table 1 for component values of CWAZ 50-Ω designs. L4 and C4 are tuned to resonate at the F4 frequency given in Table 1. For an output power of 10 W into a 50-Ω load, the RMS output voltage is $\sqrt{10 \times 50} = 22.4$ V. Consequently, a 100 V dc capacitor derated to 60 V (for RF filtering) is adequate for use in these LPFs if the load SWR is less than 2.5:1. For QRP filtering, use Philips 680 low K (high Q), 100 V dc ceramic capacitors, mainly for their close tolerance (2%). This capacitor is available from Farnell/Newark in values up to 330 pF and is listed on page 62 of the March/September 1998 Farnell catalog (Ref 4). For QRP filtering, the Micrometals T37, T44 or T50 cores of materials –2 (red), –6 (yellow) or –17 (blue/yellow) are suitable (Ref 5). These cores are available in small quantities from Amidon (Ref 6).

Table 1

CWAZ 50-Ω Low-Pass Filters

Designed for second-harmonic attenuation in amateur bands below 30 MHz.

Band (m)	Start Frequency (MHz)	C1,7 (pF)	C3,5 (pF)	C4 (pF)	L2,6 (µH)	L4 (µH)	F4 (MHz)
—	1.00	2986	4556	680.1	9.377	8.516	2.091
160	1.80	1659 1450 + 220 1500 + 150	2531 2100 + 470 2200 + 330	378 330 + 47	5.21	4.73	3.76 3.78
80	3.50	853 470 + 390	1302 1150 + 150 1200 + 100	194 150 + 47	2.68	2.43	7.32 7.27
40	7.00	427 330 + 100	651 330 + 330	97.2 100	1.34	1.22	14.6 14.4
30	10.1	296 150 + 150	451 470	67.3 68	0.928	0.843	21.1 21.0
20	14.0	213 220	325 330	48.6 47	0.670	0.608	29.3 29.8
17	18.068	165 82 + 82	252 100 + 150	37.6 39	0.519	0.471	37.8 37.1
15	21.0	142 150	217 220	32.4 33	0.447	0.406	43.9 43.5
12	24.89	120 120	183 180	27.3 27	0.377	0.342	52.0 52.4
10	28.0	107 100	163 82 + 82	24.3 27	0.335	0.304	58.5 55.6

NOTE:
The CWAZ low-pass filters are designed for a single amateur band to provide more than 50 dB attenuation to the second harmonic of the fundamental frequency and to the higher harmonics. All component values for any particular band are calculated by dividing the 1-MHz values in the first row (included for reference only) by the start frequency of the selected band. The upper capacitor values in each row show the calculated design values obtained by dividing the 1-MHz capacitor values by the amateur-band start frequency in megahertz. The lower standard-capacitor values are suggested as a convenient way to realize the design values. The middle capacitor values in the 160- and 80-meter-band designs are suggested values when the high-value capacitors (greater than 1000 pF) are on the low side of their tolerance range. The design F4 frequency (see upper value in the F4 column) is calculated by multiplying the 1-MHz F4 value by the start frequency of the band. The lower number in the F4 column is the F4 frequency based on the suggested lower capacitor value and the listed L4 value.

as a means of describing this LPF design advancement for the benefit of the Amateur Radio fraternity.

A New Type of Low-Pass Filter

This article introduces a new eight-element LPF having a topology similar to that of the seven-element Chebyshev LPF, with two exceptions: The center inductor is resonated at the second harmonic in the filter stop band, and the component values are adjusted to maintain a more than acceptable RL across the amateur passband. To distinguish this new low-pass filter from the familiar SVC Chebyshev LPF, I propose that this new filter be named the "Chebyshev with Added Zero" LPF or a "CWAZ" LPF design. With this designation, you should understand that these LPFs are *output filters for single-band transmitters*. They provide optimum second and higher harmonic attenuation while maintaining a suitable level of return loss over the amateur band for which they're designed.

Figure 1 shows a schematic diagram of a CWAZ LPF design. Table 1 lists suggested capacitor and inductor values for all amateur bands from 160 through 10 meters. These tabulated values were derived from the normalized values provided to me by Jim Tonne for use in this article. If you want to confirm my tabulated values or calculate the CWAZ values for different bands, simply divide the first-row C and L values (for 1 MHz) by the start frequency of the desired band. For example, C1, 7 for the 160-meter design is equal to 2986/1.80 = 1659 pF. The other component values for the 160-meter LPF are calculated in a similar manner.

CWAZ Versus Seventh-Order SVC Chebyshev

The easiest way to demonstrate the superiority of a CWAZ LPF over the Chebyshev LPF is to compare the RL and insertion-loss responses of these two designs. As an example of a Chebyshev design, we will use the 20-meter SVC LPF design used by NN1G for filtering the output of his 20-meter QRP SSB transceiver.

Figure 2 shows the computer-calculated return- and insertion-loss responses of a seven-element Chebyshev SVC LPF commonly used for attenuating the harmonics of a 20-meter RF amplifier. The plotted responses were made using Jim Tonne's *ELSIE* filter design and analysis software. This DOS-based program is available from Trinity Software (Ref 7). The component values, obtained from the LPF schematic diagram shown in Figure 1 on page 30 of NN1G's *QST* article, were used by *ELSIE* in plotting the Chebyshev SVC LPF responses. A sketch of the filter topology with component values is included in Figure 2.

Figure 3 shows the computer-calculated return- and insertion-loss responses of a CWAZ LPF intended to replace the seven-element 20-meter Chebyshev SVC LPF. The stop-band attenuation of the CWAZ LPF in the second-harmonic band is more than 60 dB and is substantially greater than that of the Chebyshev LPF. Also, the pass-band RL of the CWAZ LPF is quite satisfactory, at more than 25 dB. The disadvantages of the CWAZ design are that an extra capacitor is needed across L4, and several of the designs listed in Table 1 require paralleled capacitors to realize the design values. Nevertheless, I believe these disadvantages are minor in comparison to the increased second-harmonic stop-band attenuation that is possible with a CWAZ design.

LC Filter-Design Demo Software is Available

Those involved in passive LC filter design on an amateur and semiprofessional basis may experience the capabilities of *ELSIE* through a demo disk that is available from Jim Tonne. I use *ELSIE* V 1.11 with a 386SX CPU operating at 20 MHz. Although the plotting response of this computer is slow, I can evaluate the return- and insertion-loss responses of a design in less than 10 seconds, by using the minimum number of data points for preliminary plots. V 1.11 requires less than 1 Mb of hard disk space, while a more recent V 1.23 requires about 1.1 Mb. *ELSIE* requires a hard disk.

The *ELSIE* demo disk is restricted to LC filters of the third-order or less, but one can still explore all the capabilities of *ELSIE* in the design and analysis of filters. For ex-

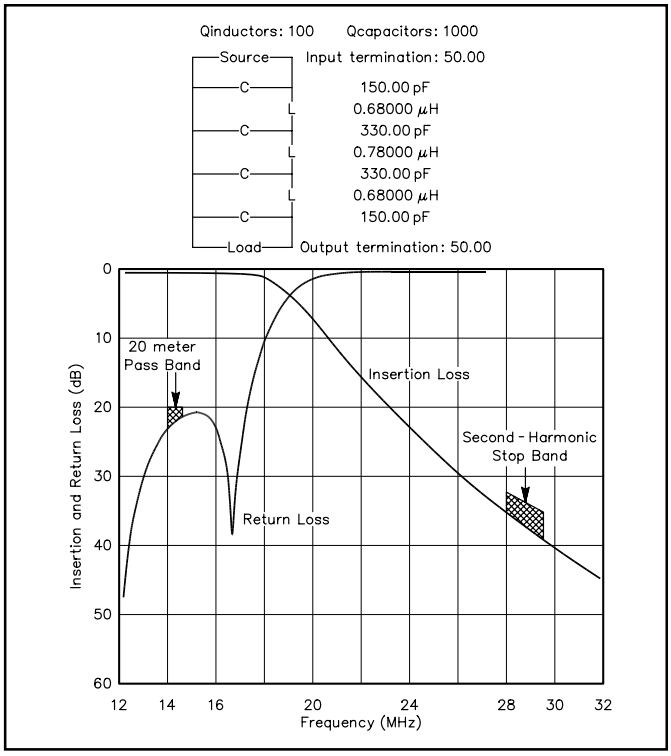


Figure 2—The plots show the *ELSIE* computer-calculated return- and insertion-loss responses of the seventh-order Chebyshev SVC low-pass filter used in the April 1997 *QST* article to attenuate second-harmonic signals. The 20-meter passband RL is about 21 dB, and the insertion loss over the second-harmonic frequency band ranges from 35 to 39 dB. A listing of the component values is included.

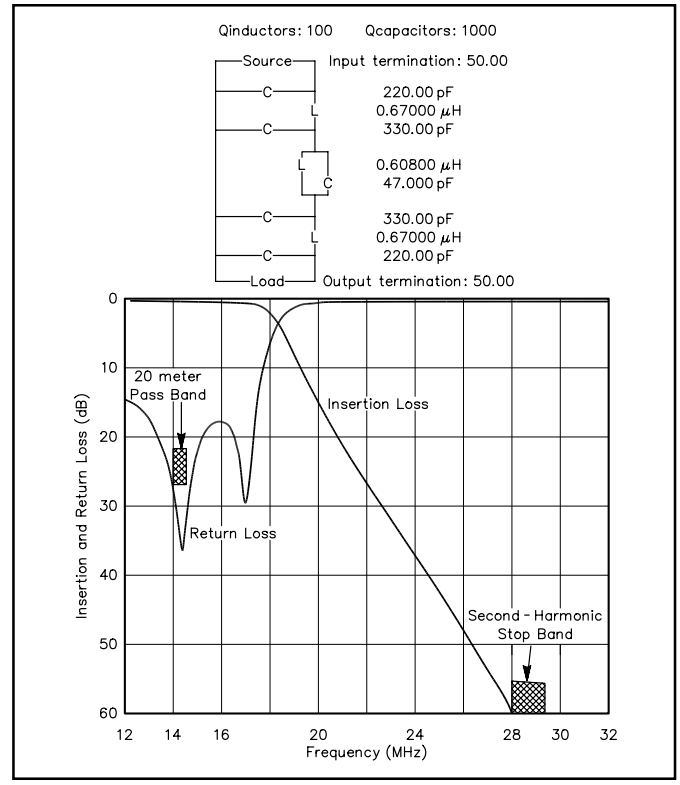


Figure 3—The plots show the *ELSIE* computer-calculated return- and insertion-loss responses of the eight-element low-pass filter using the CWAZ capacitor and inductor values listed in Table 1 for the 20-meter low-pass filter. Notice that the calculated attenuation to second-harmonic signals is greater than 60 dB, while RL over the 20-meter passband is greater than 25 dB.

ample, you can use the tune option to adjust the component values of a Cauer third-order band-pass filter until the transmission zeroes fall in the centers of the adjacent ham bands for optimum RF selectivity. This would be impractical with tables of normalized values, but *ELSIE* can evaluate many different designs in a relatively short time.

If you are seriously interested in passive LC filter design and analysis, but cannot afford the high-priced software used by professional filter designers, contact Jim Tonne at Trinity Software (see Ref 7) about the *ELSIE* demo disk.

Summary

The seven-element SVC Chebyshev low-pass filter is commonly used to attenuate the second and higher harmonics of QRP RF transmitters to comply with FCC requirements. Using *ELSIE,* I've demonstrated that the second-harmonic attenuation provided by a seven-element Chebyshev SVC low-pass filter is marginal. I introduced a new filter that provides maximum attenuation at the second-harmonic frequency while simultaneously maintaining an acceptable return loss in the filter pass band. This is accomplished by forming a resonant circuit (the center inductor and capacitor) and using special values of inductance and capacitance to restore the passband return loss. A table of precalculated 50-Ω CWAZ LPF designs is presented for all the amateur bands. I evaluated an example 20-meter CWAZ LPF design to demonstrate how the harmonic attenuation is improved over that of a standard Chebyshev LPF while still maintaining an acceptable pass-band return loss.

Whether or not these new CWAZ LPFs will eventually supersede the more familiar seven-element Chebyshev SVC LPFs remains to be seen. I encourage you to try these new CWAZ designs and report your experience with them.

References

1. Dean Straw, N6BV, Ed., *1998 ARRL Handbook for Radio Amateurs*, 75th Ed, (Newington: ARRL, 1997) Figure 29.3, p 29.7. (Because of WRC-97, new, more-stringent emission standards will take effect over the next few years. For details see Technical Correspondence (*QST*, Jun 1998, pp 61-62) and Larry E. Price, W4RA, and Paul Rinaldo, W4RI, "WRC-97—An Amateur Radio Perspective," *QST*, Feb 1998, pp 31-34.—*Ed.*)
2. Dave Benson, NN1G, "A Single-Board QRP SSB Transceiver for 20 or 75 Meters," *QST*, Apr 1997, p 29.
3. These filters are most useful with single-band, single device transmitters. Common medium-power multiband transceivers use push-pull power amplifiers because such amplifiers inherently suppress the second harmonic. This suppression then permits the use of octave-related low-pass filters (eg, 2, 4, 8, 16 and 32 MHz) rather than a separate filter for each band.—*Ed.*
4. *Farnell Electronic Components Catalog*, copyright 1998 by Newark Electronics, Chicago, IL 60640; tel 800-718-1997, fax 800-718-1998; **http://www.farnell.com**.
5. Iron-powder cores catalog RF Applications, Issue F, Sep 1996. Micrometals, 5615 E La Palma Ave, Anaheim, CA 92807; tel 800-356-5977; **http://www.micrometals.com**.
6. Amidon Associates, Inc, 240 Briggs Ave, Costa Mesa, CA 92626; tel 800-898-1883, fax 714-850-1163.
7. Trinity Software, 7801 Rice Dr, Rowlett, TX 75088, (Jim Tonne, President); tel 972-475-7132.

Ed Wetherhold, W3NQN, received a degree in Radio Engineering from Tri-State University, Angola, Indiana, in 1956. From 1962 to 1992, he was employed at the Annapolis Signal Analysis Center of Alliant Techsystems, Inc (Alliant Techsystems was formerly the Defense Division of Honeywell, Inc), as a communications systems test engineer and as a certified TEMPEST Professional Level II.

Ed obtained his Amateur Radio license in 1947, while serving in the Air Force as a radio mechanic instructor at Scott AFB, in Illinois. For the past 22 years, he has been a technical advisor to the ARRL on passive LC filters. Ed's many articles on simplified filter design have been published in the electronics trade and Amateur Radio journals, such as Interference Technology Engineers' Master *(ITEM),* QST, QEX, CQ *and* Practical Wireless, *and in professional EMC journals. The* 1998 ARRL Handbook *contains Ed's SVC filter design tables and an explanation of how to design passive LC filters.*

While not working on filters, Ed is active as a tournament tennis player and is ranked Number 1 in the Men's 70 doubles in the USTA's Middle Atlantic section. You can contact Ed at 1426 Catlyn Pl, Annapolis, MD 21401-4208; tel 410-268-0916, fax 410-268-4779.

By Lloyd Verhage, KD4STH

Ham Radio Ballooning to Near Space

Part 2—Let's do launch!

Last month I discussed the concepts, the hardware and some of the procedures required to launch and recover sophisticated near-space capsules. With those preliminaries out of the way, let's move on to the fun stuff—launch, tracking and recovery!

Something unusual—a night launch. The balloon sits ready for takeoff while we make our final tests of the capsule electronics.

First Things First

Before launch we need to get an idea of where our balloon and capsule will land so they can be easily recovered. For this we need a winds aloft report. Every 12 hours the National Weather Service (NWS) launches radiosondes, simplified near-space capsules containing weather instruments and telemetry transmitters. The NWS winds aloft reports are available on the internet several hours after each flight.

The winds aloft data we use is called *Skew-T*, and includes information on altitude, wind speed, direction and temperature. We convert this report to an appropriate text format and use it as input for *Balloon Track*, a balloon-tracking program recently updated by Rick van Glahn of EOSS and originally written by radio balloon pioneer Bill Brown, WB8ELK.

Other information needed by *Balloon Track* includes the balloon's estimated ascent rate, descent rate and maximum altitude. In our experience, with one pound of positive lift, we assume an ascent rate of 700 feet per minute and a descent rate of 1400 feet per minute. We usually estimate a maximum altitude of 90,000 feet. After running the tracking software we are left with a range and azimuth to the capsule's projected landing site.

Calling the FAA

Once we have a projected recovery track it's time to contact the FAA. For our flights we call Midwest Airspace in Kansas City. For our first flight we called a few weeks in advance so we could work out the details and give the officials time to consult FAR 101 (the regulations that govern kites, rockets and balloons). If our experience is typical, your request may be handled by an FAA administrator who isn't experienced with balloons. Before your first flight, be sure to read FAR 101. This way you'll be able to help your FAA contact person, if necessary. Some situations and conditions may be open to interpretation, and by being familiar with FAR 101 you'll be able to recommend workable solutions.

Now that we have launched several balloons, we notify the FAA a week before launch. In addition to calling Midwest Airspace, we also file a NOTAM a few days before the launch. By making the toll-free phone call we can notify private pilots of the balloon launch. On the day of launch, we notify the FAA and update our NOTAM at launch time and when the balloon passes 60,000 feet (ascending and descending, as controlled airspace extends to 60,000 feet). During each call we provide the location of the balloon by its distance and heading from the nearest town.

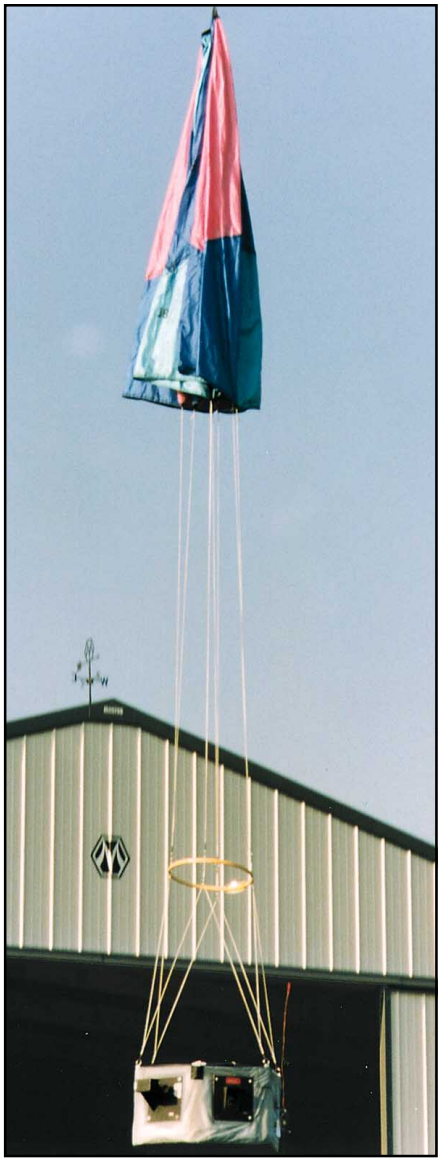
Pre-launch Details

We assemble our capsule the night before the launch so we have time to correct any problems that may arise. There's enough panic and confusion on launch day without adding to the pressure! We launch early in the morning to avoid the surface winds that tend to pick up later in the day. Morning launches also provide more time to search for the capsule if it gets lost.

Because of the many booms and antennas, we don't want to transport an assembled capsule any significant distance. By leaving it at the launch site overnight we're sure that it won't be damaged in transit the next day. Once assembled and tested, any remaining space inside the capsule is filled with styrofoam peanuts to absorb shock, keep loose wires from moving around and provide additional insulation.

Our balloons are filled inside a building to minimize interference from wind gusts. When filling a balloon indoors, make sure the doors you'll have to carry the balloon through are tall enough (at least 10 feet tall). Also, be sure to launch your balloon from property that isn't ringed by nearby trees. As Murphy can predict, if there's a tree nearby, the capsule will certainly collide with it after lifting off!

The FAA requires that you launch balloons in an area that doesn't endanger innocent bystanders or their property. Our



Lift off! The balloon carries the recovery parachute and capsule aloft.

launch facility is surrounded by a couple of acres of empty land (thanks, Dr. Johnson), so we're clear of other people and property during the early part of the launch.

After the balloon is filled, but before the launch, we activate the capsule outside the building and make sure its sensors and telemetry systems are working properly. We also wait until the GPS receiver has a position lock and is transmitting good data.

Once telemetry quality is confirmed, we're ready to launch. All balloon and load line handlers wear cotton gloves to avoid "string burns." There are at least two people handling the capsule, a few on the load line and one on the balloon (holding it by its nozzle).

The stack is moved away from the building and lined up with the wind (with the balloon downwind). Several people work together—hand over hand—to slowly let the balloon lift off. You don't want the balloon or load line to "snap," which can potentially break the load line or damage the capsule. We managed to launch two balloons without capsules because of snapping load lines!

In the end, one handler slowly lets the parachute up and gets the shroud lines tight while a second wrangler holds the capsule. When both helpers are ready, the tightened parachute can be released, which allows the capsule to gently rise out of the hands of the capsule handler. The capsule handler merely has to prevent the capsule from falling before the balloon carries it away.

We typically use a single capsule handler to make sure others don't get tangled in the lines or antennas. Even so, we always make sure nobody gets tangled or otherwise damages antennas or experiments during liftoff. Once the capsule leaves your hands, it's too late to fix anything!

If there's any wind, the capsule handler will have to run with the capsule until it's fully airborne. This prevents the capsule from swinging on the end of the load line. Swinging capsules tend to collide with fences, the ground, cars, trees, etc. Needless to say, never launch in high winds. Handlers can't run fast enough, and the chances are pretty good that the balloon will burst during the launch attempt.

Once the capsule is launched and the FAA has been notified, we drive to a convenient location near the capsule's predicted landing site. On occasion, we have had significant wind changes since receiving the last winds aloft report, forcing us to change our driving plans during the flight (by as much as 90° from the predicted flight path). So, keep track of the balloon constantly to see where it's going, and maintain radio contact with other chase crews.

Don't be surprised to see the balloon turn 90° or more when it reaches altitudes above 60,000 feet. Those changes in direction usually occur near the balloon's burst altitude, where the winds are light. Lower-level winds (at 30,000 feet) have a far greater impact on the balloon's flight path.

Once the balloon bursts the capsule will return to earth along a flight path similar to that of its ascent. When descent begins, we plot a line that extends 50% beyond the ascent path (as plotted from the launch point to burst point). This provides a quick estimate of the landing point.

What to Expect During a Flight

Just after liftoff, we typically see a greater-than-average ascent rate, sometimes as much as 1000 feet per minute. The ascent rate soon slows, however, to a more typical 700 feet per minute. During the ascent the capsule slowly rotates at 1 to 2 rpm. Asymmetry in the balloon's shape seems to cause this, and we have determined that the balloon rotates faster than the capsule.

As the capsule ascends, air temperature and barometric pressure drop. The capsule's internal temperature also drops, but at a slower rate. As the air pressure drops, the balloon expands to compensate by keeping the air pressure inside the membrane similar to the air pressure outside

This shot was taken 6200 feet over Interstate 70 in Kansas. The low-power backup beacon is dangling at the top of the image.

(minus the pressure exerted by the skin of the balloon).

As the capsule continues to rise, the distance to the horizon increases. This allows a larger geographical area to hear and see the capsule. The distance to the horizon expands at a rate that's roughly the square root of the change in altitude. Initially, there is no noticeable change in sky color, but as the capsule climbs higher, the sky begins to darken and take on a purple hue.

Once in the stratosphere, air temperatures rise, as does the temperature of the capsule's interior. Internally generated noises will disappear as the air becomes too thin to effectively transmit sound. At progressively higher altitudes the thin air hardly supports convection and conduction. Any heat generated by the capsule will have to be dissipated by radiation rather than by the mechanisms we're accustomed

Near-Space Ballooning—It's not just a Hobby, it's an Adventure!

As I hauled our balloon equipment, including a remote-release glider, out to the KNSP launch site Friday afternoon, I was a little concerned that the weather might not cooperate. By that evening, however, things were really looking up. On Saturday morning the weather was a sure thing, so we were going to do launch after all. After a quick breakfast and a shower I ran the *Balloon Track* prediction program. Using Topeka winds (already 12 hours old) our near-space capsules were predicted to land in Kansas City.

On the 10-mile drive to the launch site, a deer ran in front of my car. Needless to say, my car won and the deer lost, but not before inflicting some exterior damage. The pre-launch frenzy is no time to call an insurance company, so the details of the claim would have to wait until after the recovery.

At the launch site, the two balloons were filled and the capsules readied and certified. To our dismay, we found that the release mechanism for the glider wasn't working correctly. I don't remember playing around with the dropper after our last flight, where the mechanism worked perfectly. Be that as it may be, we attempted to launch the glider on the *Asimov II* anyway.

The capsules were successfully launched at about 7:15 and 7:25 AM. At an altitude of about 200 feet the glider slipped off the dropper mechanism and gently spiraled to the ground. It was proof that the procedure works and that we can recover a balloon-launched glider. Of course, all this was supposed to happen at 50,000 feet! We managed to recover the glider for future flights.

After passing through 14,000 feet, the IHU of the *Asimov II* detected a 500-meter drop in altitude and put the capsule into descent mode. In descent mode the computer stops sending some of the scientific data and stops testing the tethered capsule.

After six flights, the software routine for detecting balloon bursts had gone bad. We later discovered that the GPS receiver had sent a GGA string that was missing a time stamp, displacing the altitude bytes from their normal position in the data stream. Next time I'll add a sanity check to this routine to make sure isolated flukes don't spoof the capsule!

The *Asimov II* made it to 90,000 feet when its balloon burst. The *Sagan* went on to an impressive 98,000 feet, a record altitude for us. The problem, however, was that *Sagan's* data was 15 minutes old. Apparently, the capsule had stopped transmitting at an inopportune moment!

We left Bob Davis at Bonner Springs, Kansas, to try to find the *Sagan* while the rest of us (Mark, Nathan, Tatter, Charles and I) drove to Independence, Missouri, to recover the *Asimov II*.

Following APRS data we drove down a residential street and saw a private yard with half a dozen people gathered around. We couldn't see what was on the ground behind the cars, but since the people in the yard were looking at the ground we knew what they had found. The *Asimov II* had landed in someone's front yard, about 25 feet from their house. The owners and neighbors had gathered around to see what had just landed.

As we parked the car and got out, we must have looked like something out of an *X-Files* episode. We explained the strange device to those present as we powered down the capsule. Channel 4 (a FOX television station) in Kansas City had been called, so we waited for the reporter to show up. We explained our activities to the television audience and asked viewers to keep an eye open for the *Sagan*.

Now it was back to Bonner Springs to start searching for the missing capsule. We combed a 10-mile region looking for a downed capsule, but found only home electronics. Apparently, the backup beacon frequency had some competition!

After an hour of fruitless searching we tried to take to the air. We drove through a cemetery to get to "their" airfield! Believe it or not, in Kansas we have a cemetery that owns a runway (actually, they rent the land out to a private airstrip).

As soon as we arrived an old man on a motorcycle showed up. He owned a Cessna 152 (a small two-seater) and said he would be happy to take a volunteer up in his plane to do an aerial search. Nathan lost. He would go up.

The old plane was checked over as Nathan was outfitted with the latest in personal electronics. We, the lucky ones, watched the dusty old airplane as it took to the air in a less-than-graceful fashion.

After the Cessna took off, Don arranged for a flight with the pilot of a two-seater ultralight. (I'm not making this up, folks. Reality *is* truly stranger than fiction.) The ultralight started its takeoff run when the pilot throttled back and guided the small plane to a stop. Two fuel valves had been accidentally switched off, cutting the fuel supply to the 42-HP engine. Once the valves were properly set it was back to the runway for a successful takeoff.

Don's ultralight had to return early because the afternoon thermals made flying too difficult. Nathan returned in the Cessna after about an hour in the air with no luck in spotting the *Sagan*. After Nathan's heroic return we all went to get some dinner. I had basically written off the *Sagan*, with its GPS, radio, MIM and camcorder.

The next morning, Channel 4 in Kansas City called my office asking for more information on our project. After lunch I got another call from the station saying someone had called after finding the missing craft. I talked to the finder by phone and he confirmed that it was the *Sagan* and not a National Weather Service radiosonde.

I drove the two-hour trip to Tonganoxie, Kansas, at 98,000 feet (or so it seemed). I found the place without too much trouble and was amazed to see that the balloon had landed in the backyard. We had gone two for two, with both capsules landing in yards! We've never done anything like that before. The landing had gone well, but the MIM-to-GPS connector had pulled loose at balloon burst.

During descent the capsule was probably sending telemetry, but not its position. I've now purchased a DF outfit for future chases. The *Sagan's* landing position was 91 miles from the launch site and 30 miles away from the *Asimov II*. The *Sagan* landed on the very eastern edge of the area we had searched, so we were close with our prediction of its landing site (and so was Bob Davis with his).

The camcorder recorded the balloon bursting, but we only see half of the balloon. When the balloon bursts it leaves behind a cloud of white talcum dust and plenty of latex fragments. There's a boom when the balloon bursts and a roar as the capsule descends. The parachute collapses several times during the descent only to reopen within a second of collapsing (the collapse was caused by the balloon and load line falling on the parachute). A few times the capsule turns on its side to show the parachute and the edge of the Earth. At these altitudes it looks like space.

What was supposed to be a half-day event took 36 hours and involved two families, a television station and an attempted air rescue.

What's next? Your own balloon adventures, perhaps?

to on the surface. Keep this in mind if you have electronics inside that are designed to be cooled by airflow!

The thin, cold air of the near-space environment is deadly to most living organisms. It's definitely too thin to support respiration. This is an ethical consideration to be aware of if you intend to send living organisms into near space as part of an experiment.

To date, our group, the Kansas Near-Space Project (KNSP), has sent only cockroaches, bacteria and seeds into near space. We have determined that seeds and bacteria can survive short exposures to this harsh environment, although the increased ultraviolet exposure can cause mutations in bacteria.

The thinner air allows a stronger cosmic radiation flux to strike the capsule, but the exposure times are too short to cause problems. KNSP has determined that near space is an environmentally benign way to eliminate cockroaches. They may be able to survive nuclear wars, but "roachonauts" can't handle altitudes above 85,000 feet…

At the highest balloon altitudes the skies are inky black. An intense, unfiltered sun shines down on the balloon and the capsule. At 90,000 feet the balloon is about 30 feet in diameter and visible from the ground as a bright pinpoint of light (if you know where to look).

What Goes Up...

At some point the balloon will be unable to expand further and the envelope will shred into dozens of thin spaghetti-like

strings, leaving behind an expanding bubble of helium gas and a swirling cloud of talcum dust and latex fragments. ATV transmitters and camcorders can record the sound of the burst as the helium bubble expands and passes over the microphone.

After the balloon bursts, the capsule and its parachute will continue to rise for a moment, then start to fall as gravity overcomes the capsule's upward velocity. The parachute opens immediately during the descent, but the air is far too thin to create any significant drag. The capsule initially falls at a brisk 110 miles per hour. Wind chill quickly reduces the capsule's interior temperature.

The descent is a very traumatic event, and it's one ride you wouldn't want to experience. The capsule spins faster and begins to tumble. Various accelerations pull on the capsule's innards in many different directions. The parachute keeps the capsule from flipping over, but it doesn't do much more until about 60,000 feet.

After the capsule drops below 60,000 feet its speed begins to bleed rather quickly. By the time the capsule passes 30,000 feet it will have slowed to a velocity near that of its final landing speed. At 10,000 feet we can sometimes see the parachute and capsule from the ground.

During the final part of the descent, chase crews should be extra cautious. There's always excitement in the air as teams converge on the landing site. Thankfully, we've never had a capsule land on a hard surface. They've always managed to land in trees, power lines, front yards, or grassy fields (scaring the cattle). We always leave the capsule at the landing site until everyone has arrived and has had a chance to see it.

Before retrieving the capsule, be sure to get access permission from the land owner. So far we've never had a problem with our capsules landing on private property. In fact, the owners have been very interested in what we're doing. Sometimes the land owner is the first person on the scene. Imagine their surprise when a strange capsule—sprouting antennas and cameras—parachutes into their front yard!

Once the capsule is retrieved we turn off the power and remove any film. While the film is being processed at a one-hour photo lab, chase crews retire to lunch and share lusty tales of near-space adventures (and other assorted lies!).

With a little luck we're home before dinner with nifty pictures and videotape. Afterward comes the long task of analyzing the collected data. Spreadsheets come in handy here!

The recovery team celebrates another successful flight. From left to right, Frank Kent, KB0UYF; Jim Duncan, KU0G; Jerry Beebe, KC0DTT.

Conclusion—No, a Beginning!

This article, while providing a taste of what it's like to launch near-space ham radio balloons, is just a beginning. There are many other subjects to touch upon. I hope, however, that I've piqued your interest in near-space ballooning. Amateur Radio is in a unique position to make a program like this a reality. There is no other readily accessible technology that allows individuals to track balloons and record flight data. We can share the experience with students and the public, exciting them in near-space flight and the science behind it—and on a budget, no less! As Pete Sias said, Amateur Radio ballooning really is a poor man's space program. If you're interested and looking for help, please consult the Web sites below for advice, parts and information.

For times, dates and locations of upcoming launches, check out Hank Riley's High Altitude Balloon Launch Information Center (HABLIC) at **http://www.geocities.com/CapeCanaveral/3161/hablic.htm**.

To get *Skew-T* for predicting balloon tracks, go to the University of Wyoming's Atmospheric Soundings site at **http://www.das.uwyo.edu/upperairsounding.html**.

To purchase latex weather balloons, check out Kaymont's Web page at **http://www.800web.com/Kaymont/**.

To get an online copy of FAR 101, point your browser to EOSS's FAR 101 Web page at **http://www.eoss.org/pubs/faaball.htm**.

To get a copy of *Balloon Track* for *Windows*, go to Rick von Glahn's site at **http://wwwmembers.iex.net/~rickvg/wbaltrak/default.htm**.

To find links to other balloon groups, amateur and professional, check out AMSAT's balloon page at **http://www.amsat. org/amsat/balloons.balloon.htm**.

Scott Edwards (with some of the neatest Stamp stuff I have ever seen) can be reached at **http://www.seetron.com/**.

To purchase Basic Stamps, browse the Parallax Web site at **http://www.parallaxinc. com.**

Ripstop nylon can be purchased from kite store Into The Wind. See them at **http://www.intothewind.com**.

A copy of Dave Mullinex's Balloon FAQ can be read at **http://www.eoss.org/pubs/faqloon.htm**. The FAQ is a good place to get information (after this article and my Web site, that is!).

For information on the DF Jr, go to **http://www.agrelo.com**.

The Southern Kansas Amateur Balloon Society maintains a Web site of their own adventures at **http://www.feist.com/~johndye/.**

Finally, allow me to make personal plugs for two other balloon groups in Kansas: Sky Science Over Kansas (SSOK) at **http://homepage.netspaceonline.com/~sias/**; and High Altitude Basic Investigation Testing And Tracking (HABITAT) at **http://netlab.org/habitat/index.shtml**.

Of course, you can check out the KNSP Web pages at **http://www.ksu.edu/humec/knsp/** (the best near-space site in my humble opinion!).

Thanks

I'd like to thank Pete Sias for introducing me to this fascinating hobby and for giving me a few pointers. Big thanks also go to Dr. Norm Dillman; Steve "the analog man" Kelly; and Jon Held for helping me design the capsules and their electronics.

I'd like to thank my past, present and future chase crews from Manhattan, Emporia, Wichita, Salina, Omaha and Kansas City. Thanks, guys, for risking your lives in exchange for seeing the dusty back roads of beautiful Kansas.

Additional thanks go to the helpful subscribers of the balloon listserv at Pixar (**ballooning@pixar.com**). And I'd like to thank Steve Hamilton, KB0JYL, and Ralph Wallio, W0RPK, for their support as fixed ground stations (where they enjoy cool drinks while the chase crews eat road dust).

Finally, thank you, Dr. Johnson, for letting us use your property to launch our near-space capsules.

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

By Jennifer Gagne, N1TDY

Announcing the Eighth Annual Philip J. McGan Memorial Silver Antenna Award

Each year, ARRL's Public Information Coordinators, Public Information Officers and other public relations volunteers strive to increase awareness of Amateur Radio in the local media and with the public. This dedicated group writes press releases, looks for interviews on local radio stations, promotes club activities and forms one-on-one relationships with *your* local news media. If you know someone who is deserving of the Silver Antenna Award, nominate him or her today!

The award's namesake, Journalist Philip J. McGan, WA2MBQ (SK), served as the first chairman of the ARRL's Public Relations Committee. His efforts, and the efforts of the committee, helped reinvigorate the League's commitment to public relations. Because Phil never got to see the fruits of his labor of love, his friends in the New Hampshire Amateur Radio Association joined with the ARRL Board of Directors to pay a lasting tribute to the important contributions he made on behalf of Amateur Radio.

The 1999 McGan award will go to that ham who has demonstrated success in Amateur Radio public relations and best exemplifies the volunteer spirit of Phil McGan. A committee of volunteers knowledgeable about Amateur Radio public relations will pick the winner, subject to approval by the ARRL Board of Directors.

Stephan Anderman, K2SMA (center), receives the 1998 McGan Award from Hudson Division Director Frank Fallon, N2FF (right), while ARRL President Rod Stafford, W6ROD (left), looks on.

CALL FOR 1999 NOMINATIONS

1) The award is given only to an individual (not a group), who must be a full ARRL member in good standing at the time of nomination. The nominee must not be compensated for any public relations work involving Amateur Radio (including payment for articles) and may not be a current officer, director, vice director or paid staff member, or a member of the current selection committee.

2) The winner of the Philip J. McGan Memorial Silver Antenna Award will demonstrate volunteer public relations success on behalf of Amateur Radio at the local, state or national level, and will live up to the high standard of achievement exemplified by Philip J. McGan.

3) Anyone may make a nomination. Nominations must be on an official entry form, available from ARRL Headquarters. The nomination will include a written summary whenever possible.

4) Deadline: Nominations must be received at ARRL HQ in Newington **by 5 PM May 28, 1999**. Nominations arriving after the deadline or without an entry form cannot be considered.

5) Eligible nominations will be screened by a committee of Amateur Radio operators knowledgeable about public relations, which will forward its recommendation to the Volunteer Resources Committee of the ARRL Board of Directors. The Board will make a final determination at its July meeting and the winner will be notified shortly thereafter.

6) To obtain an entry form, call ARRL HQ at 860-594-0328 or e-mail **jgagne@arrl.org**. Ask for an official Philip J. McGan Memorial Silver Antenna Award entry form.

7) Return the completed entry form and supporting materials to: Philip J. McGan Memorial Silver Antenna Award, c/o Jennifer Gagne, N1TDY, ARRL, 225 Main St., Newington, CT 06111. QST

A New Award for 1999

A new Professional Journalism Award has been created to honor the best news story that reflects the enjoyment, importance and public service value of Amateur Radio. Its predecessor, called the ARRL Media Excellence Award, was given in 1997 to Sam Brown, WA4IUM, for his long-time promotional work for Amateur Radio as a television news anchor.

Unlike the long-running McGan Silver Antenna award program for volunteer efforts, the new award will go to a professional in print, radio, television, video or multimedia. The winner will receive a plaque and a check for $500. In the case of a group entry, the recipient may be the group, but only one prize will be awarded.

Posters are being distributed to newsrooms throughout the country and entry forms are available upon request from ARRL's PR Department. The deadline for entries is October 1, 1999 and members of the League's Public Relations Committee will judge the nominees. For more information about the new award, rules for entry, to obtain nomination forms or a flier to post in your local newsroom, contact Jennifer Gagne, N1TDY, at 860-594-0328 or **jgagne@arrl.org**.

Q Jeff Lawson, KD1WZ, asks, "Can you help me better understand the nature of the audio/speech circuit in my Kenwood TS-140S transceiver? My concern is that I am not getting full output when operating SSB. The ALC and power meters indicate that the rig is operating properly, but during tests with another station my signal is reported to be almost an S unit stronger when I whistle as opposed to when I am just speaking. Why would there be a difference?"

A The ALC (automatic level control) in your transceiver generates a control voltage to ensure that the peak RF output does not exceed its ratings. It does so by responding to the voltage peaks in the input signal (whether it is human voice or a whistle.) When you're watching your rig's ALC meter, you are observing the action of the gain limiting control. The meter is displaying the amount of feedback voltage that is reducing the gain of the transmitter. The ideal situation is to have as much gain as you can without limiting, or with only a tiny bit of limiting. So, the proper way to adjust your mike gain is to set it so that the ALC indicator shows just a little ALC action on your voice peaks.

The ratio between peak and average power in any signal is dependent on the nature of the signal. A whistle is almost a pure sine wave, and its peak and average power are nearly the same. A human voice, however, has a waveform that has a fairly high peak-to-average ratio. Since your radio's wattmeter indicates full output power for both speech and whistles, it is a peak-reading wattmeter. Many wattmeters read average power, not peak power. Those wattmeters would indicate less power when you are speaking than when you are whistling.

On the receiving end, the S meter is actually measuring the receiver's AGC (automatic gain control) voltage. A good receiver will generate an AGC voltage from the signal peaks, but this may not always show on the S meter, which may indicate average power, or somewhere in between. If your transmitter's ALC settings are correct and your transmitter indicates full output power on voice signals, you should rely on that, not on the uncalibrated, unknown performance of a receiver S meter.

A good explanation about power is found in the article "Power—Watt's It All About?" by Mike Gruber, WA1SVF (now W1MG), May 1995 *QST*.

Q Dan Marriott, VE7CTN, asks, "I am looking, like most hams, for points of comparison when I read *QST* Product Reviews. And, while I think I understand what some of the tests mean, their labels or abbreviations are not always intuitive. For example, when evaluating receive performance I see references to MDS, IMD, IMD dynamic range, blocking dynamic range, third-order products and third-order intercept points. Can you clarify?"

A These terms, and many others, are described in great detail in the *ARRL Handbook's* Test Procedures and Projects chapter. A collection of *QST* articles that explain the Product Review process and tests can be downloaded from the ARRL Web page at **http://www.arrl.org/tis/info/bestrig.html**. Here is a very brief summary that will get you started.

The *MDS* (minimum discernible signal, or "noise floor") is a measure of receiver sensitivity. It describes the amount of receiver input noise. A receiver should be able to just detect a real signal at the level of the noise floor, thus the term, minimum discernible signal. MDS is usually expressed in dBm—decibels relative to a milliwatt. A typical receiver might have an MDS of –135 dBm, or 135 dB less than a milliwatt. That is an extremely small amount of signal power. The MDS numbers give you a reasonable idea of a receiver's sensitivity. Useful SSB sensitivity usually falls in a range of about –120 dBm to –135 dBm.

Intermodulation distortion (IMD), whether transmit or receive, is the mixing of two frequencies to produce additional frequencies. Recall that the chief property of a mixer is to produce sum and difference frequencies by mixing signals from the input with those from the local oscillator. Living in an imperfect world as we do, electronic circuits are not perfectly linear so additional mixing takes place between these original frequencies and the ones that are intended to appear.

Assume that your original frequencies are F1 and F2 with the difference between them being N Hz. The combination of all the above mentioned mixing creates undesirable signals at 2F1 – F2 and 2F2 – F1 (among others—these are just the ones that usually affect transmitter or receiver performance). These end up appearing at N Hz above and below F1 and F2. They are known as *third-order products*. There are other signals that appear as well (on a transmit IMD graph, you typically see third, fifth, seventh and ninth-order products or more), but these are not as high in amplitude as the third-order ones.

How does this affect real-world operating? On receive, if your radio is tuned to 14.020 MHz and two strong signals appear at 14.040 and 14.060 MHz, assuming nothing else is on the band, you will get a false signal appearing on 14.020 where you are tuned. Under test conditions, the two off-channel signals are identical in strength, at a level that gives an IMD response equal to the MDS level. The difference in strength between the on-channel signal "ghost" and the two off-channel signals is the *IMD dynamic range*, expressed in dB.

This test indicates the general intermodulation behavior of a receiver. If, for instance, you were slugging it out with the DX crowd trying to work a rare one, you would have signals of many different strengths appearing at many different frequencies inside and outside the passband of your receiver's filters. When the signals are strong enough, intermixing will produce false signals within the receiver's passband. The higher the IMD dynamic range of your receiver, the weaker (and less annoying!) these false signals will be. Typical receivers will have an IMD dynamic range of from 80 to about 105 dB.

Blocking dynamic range is basically a measure of how strong an off-channel signal must be to produce either an increase in noise in the receiver passband or a decrease in receiver gain, otherwise known as "desense." In ARRL Lab tests we use a signal that is 20 kHz away from where the receiver is tuned. A signal within the normal operating amplitude of the receiver is added on frequency and then the level of the off-channel signal is increased until the on-channel signal decreases by 1 dB (blocking is occurring) or the output increases by 1 dB because of receiver noise. (In this case, the measurement is reported as being "noise limited.") The difference between the off-channel signal and the receiver's noise floor (MDS) is the blocking dynamic range expressed in dB. Again, different combinations of frequencies and signal strengths

will produce different blocking behavior, but a higher blocking dynamic range number at 20 kHz indicates better general blocking performance. Typical receivers will have a blocking dynamic range of from 90 to over 150 dB.

Third-order intercept is related, of course, to two-tone, third order IMD. One characteristic of third-order products is that they increase/decrease three times faster than the on-channel products (if the input tones are of equal level). These responses can be plotted on a graph, but the two lines never actually intersect because the receiver always goes into gain compression well before that could happen. So, as signals keep getting stronger, both the on-channel and third-order responses "roll off." Third-order intercept is the theoretical point at which these two lines would cross. It gives a relative indication of a receiver's strong signal performance.

If two receivers have the same IMD dynamic range and one has an MDS of –125 dBm and the other –135 dBm, the third-order intercept of the –125 one will be higher. Read that again. Yes, the radio that doesn't hear as well will give a higher third-order intercept point. That doesn't mean that you want to always look for a lower third-order intercept point. Third-order intercept should always be evaluated in conjunction with MDS and dynamic range—they are all related.

Q Jim Brown, K5JAZ, asks, "I have a signal generator with a meter calibrated 0-10 µV. I am searching for the formulas and printed tables to convert µV to µW and dBm. Can you help?"

A Signal generators are usually calibrated to deliver their rated voltage into a specific value of resistive load. Most modern test equipment is calibrated in a 50-Ω system; equipment designed to test televisions and television systems is calibrated for a 75-Ω load. Some equipment, usually audio or telephone equipment, is calibrated into 600 Ω.

Let's assume that your generator is calibrated for 50 Ω. What this means is that it will deliver what is indicated on the output-level control and multiplier if it is operated into a 50-Ω load.

With this assumption, you can use Ohms Law to convert from µV to µW. The formula $P = (E^2)/R$ works if the units are volts, watts and ohms. If you wish, you can convert the µV to volts, obtain the power in watts, then multiply that result by 1,000,000 to convert the result to µW. In this case, we are assuming R to be 50 Ω.

To wrap that all into one formula, you can do the conversions all at once, using µV and ohms and obtaining a result in µW by:

$$P(\mu W) = (E(\mu V)^2)/R)/(1{,}000{,}000)$$

and, if you know R to be 50 Ω, you can use:

$$P(\mu W) = (E(\mu V)^2)/(50{,}000{,}000)$$

The term dBm means decibels related to a milliwatt, so, you can either convert the value in microwatts to milliwatts by dividing it by 1000, then use the formula:

$dBm = 10\log_{10}(P(mW))$ where P = the actual power in milliwatts, or, to do it all in one motion, you can use the formula:

$dBm = -30 + 10\log_{10}(P(\mu W))$ with P in microwatts or

$dBm = 30 + 10\log_{10}(P(W))$ with P in watts.

Q John Stewart, W3CID, asks, "I use a 40/80 meter vertical antenna (a Butternut HF2V) to work the higher bands with the help of an antenna tuner. Ignoring the effects of line losses because of the (presumably) lower SWR at the feed point, would I gain any efficiency by switching to a similarly sized vertical designed for multiband operation? Would the performance of the HF2V on other bands be improved if I added shorter radials cut for the higher frequencies?"

A The crux of the problem with your present system is that you *cannot* ignore the effect of line losses when you try to use the HF2V on higher frequencies, where it is not resonant. In other words, the SWR on the higher bands is *not* low. While your antenna tuner in the shack is able to provide a 50-Ω load to your transceiver, there is probably quite a bit of loss in the transmission line between the tuner and the antenna. Remember: The 1:1 SWR you see on your antenna tuner's meter is only present between the tuner and the radio. The higher SWR between the tuner and the antenna, and the resulting loss in the feed line, remains! In addition, there may be considerable loss in the tuner itself since it may be encountering impedances that are difficult to match efficiently.

Let me illustrate, using a model of a simple quarter-wavelength long vertical for 40 meters. I'm going to assume that the ground plane is perfect, so that we have a baseline from which to compare. At 7.1 MHz the feed-point impedance is the theoretical value of 36 Ω and the SWR at the feed point is 1.39:1 for the 50-Ω line. (I'll also assume that the feed line consists of 100 feet of RG-213 coax.) The total loss in this coax at 7.1 MHz is 0.566 dB, computed using the program *TLA* bundled with the 18th edition of *The ARRL Antenna Book*. The coax loss is essentially the matched-line inherent loss if the cable were working directly into a 50-Ω load. There is very little additional loss due to the small SWR at the load.

Now, this very same vertical at 14.1 MHz would be close to a half wavelength long and the feed-point impedance would be very high. The *EZNEC* program by W7EL computes it to be 814 + *j* 119 Ω. At this impedance the SWR on the RG-213 would be an impressive 52:1, and the loss in the cable would now be 7.5 dB! The loss in a typical antenna tuner feeding the input of this 100-foot length of coax would be on the order of an additional 0.35 dB. Feeding 1500 W into the tuner would result in only about 247 W radiated by the antenna! Something is going to get hot, mainly the coax.

At 21.1 MHz the situation would be somewhat better since the 40-meter vertical is three quarter wavelengths long and the feed-point impedance would be 63.4 –*j* 58.8 Ω according to *EZNEC*. This is an SWR of only 2.77:1 and the total loss in 100 feet of RG-8 would amount to only 1.47 dB, according to *TLA*. A typical tuner would lose only a negligible amount more, again because the impedance to be matched is reasonable. In this scenario, the total power delivered to the antenna for 1500 W input is 1057 W. That's a lot better than on 20 meters.

Unfortunately, another little problem rears its head at this point. Because the electrical length of the antenna is long at 21.1 MHz, the radiation pattern has developed lobes pointing up in the air. You're heating the clouds rather than aiming for lower angles that are most useful for DXing on the higher frequencies. This problem will get only worse on 12 and 10 meters where the electrical length is even greater.

So, you can see that having a multiband antenna that is quarter-wavelength resonant in the bands you desire would provide far better performance than trying to force-feed your existing dual-band antenna by using an antenna tuner in the shack. Of course, you could move your antenna tuner to the base of your Butternut. In this position most of the loss would be in the tuner only. But unless you installed an automatic tuner at the base of the antenna, it would be very inconvenient to use. (See "One Stealthy Wire" by Steve Ford, WB8IMY, in the October 1998 *QST*.) And you would still be presented with the problem of energy wasting higher angle lobes due to the electrical length of the antenna.

My recommendation would be to switch to a multiband vertical. Butternut and other manufacturers make such antennas.

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. QST

By Dave Evison, W7DE

The W7DE Balloon Erection Scheme

A lighter-than-air method to install a wire antenna!

My problem was simple enough, but the solution wasn't. I wanted to get the apex of a delta-loop antenna over a large pine tree on my Oregon homestead. I tried the standard method of launching a line over the tree with a bow and arrow, but the tree was too tall. Next came the slingshot attempt, but that failed, too.

Thinking Out of the Box

When you're faced with what seems like an intractable problem, you need to think creatively. After much pondering I finally hit upon the scheme you see depicted here. Yes, it may seem a bit odd, but it *works!* You can use this method to successfully raise just about any wire antenna over just about any tree.

All you need are:

- 14 party balloons roughly one foot in diameter
- A small tank of helium (party supply stores sell these)
- Two spools of lightweight nylon twine
- A willing accomplice
- A day with little or no wind

The Adventure Begins

Examine your chosen tree carefully. Make sure there are no power lines anywhere nearby. When you're satisfied that it's safe to proceed, join the two nylon lines with a secure knot. Fill all 14 balloons and begin attaching them to the nylon line between the spools. You can use basic slipknots to secure the balloons to the line.

After the balloons are all attached, you and your friend should begin "playing out" your lines, allowing the balloons to rise into the air. Do this in a clearing near the tree. Let the balloons climb until they reach the altitude necessary to clear the treetop. See Figure 1.

Now, "walk" the balloons sideways until you have them in position over the tree. This will require some coordination between you and your assistant, but it isn't difficult. Think about this maneuver and you'll understand why you need a windless day!

Once the twine is in position over the tree, one person should begin winding in their twine while the other plays theirs out (see Figure 2). In this way the balloons will be pulled down so that they can be used again—in case you need to loop your skywire over more than one tree. If not, the person receiving the balloons can promptly pop them as they arrive!

All you have to do now is tie your antenna wire to one end of the twine and pull it up and over the tree. You're done!

This method worked beautifully for me. It took only minutes to hang the apex of my delta loop and the antenna works like gangbusters!

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Palo Alto, CA 94306
w7de@aol.com

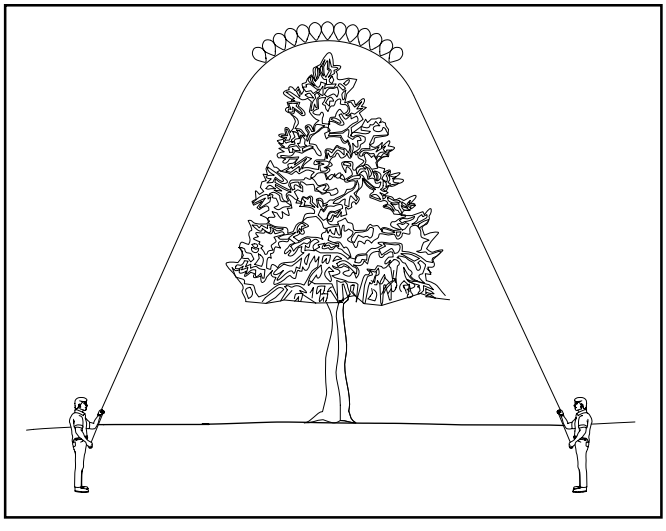


Figure 1—With the balloons securely attached, let them pull the line up to the necessary height. Now walk the balloons sideways until the line is over the tree.

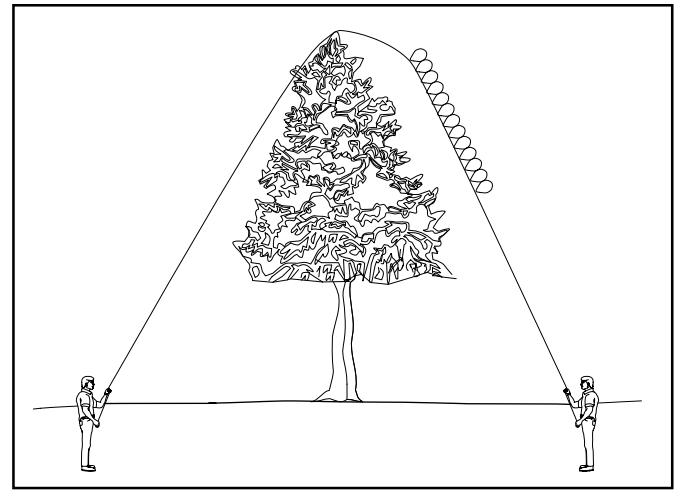


Figure 2—When the line is in position, one person begins reeling in the balloons while the other person allows their spool to unwind. After all of the balloons are down, attach the antenna wire and pull it through the tree. QST

By Ian Poole, G3YWX

An Introduction to Op Amps

Shake hands with these ubiquitous little devices!

One of the most powerful tools available to the analog circuit designer is the operational amplifier or *op amp*. It is a basic building block that is available in IC form and can be used for a wide range of applications in analog circuits. With a few additional components, op amps can form the basis of an enormous variety of circuits, including low distortion audio amplifiers, filters, voltage comparators, as well as monostables, inverters and many others.

The term "operational amplifier" dates back to a paper published in 1947. This described work that was undertaken using these amplifiers in analog computers of the day. It was not until the 1960s that the concept of these amplifiers could be fully realized, with the widespread introduction of integrated circuit technology.

What Is An Op Amp?

An op amp is a very close approximation to a perfect amplifier. Ideally, this should have an infinite gain. In reality, those commonly used have gains of 100,000 or more, which is sufficiently close to infinity for most applications! The amplifier also has two inputs. One is called the *inverting* input and is marked with a "–" sign. The other is the *noninverting* input and is marked with a "+" sign. See Figure 1.

A *positive* voltage applied to the *noninverting* input will produce a *positive* swing at the output. However, a *positive* voltage applied to the *inverting* input will produce a *negative* swing at the output. If the same voltage is applied to both inputs together, there should be no change at the output (as shown in Figure 2). In fact, the output is proportional to the difference between the inverting and noninverting inputs, and it is for this reason that op amps are often called *differential* amplifiers.

Op amps typically need only five connections; one for each of the power rails (normally a positive and a negative supply are required), one for each of the signal inputs, and one for the output. Some op amps have additional connections for what is called an *offset null*. This is used to reduce any dc offsets that may be present. For most applications in Amateur Radio these can be ignored and left disconnected.

Electrical Characteristics

Apart from very high gain, there are a number of other attributes expected of op amps. Firstly, their input impedances should be infinite. Op amps in use today come very close to this, with impedances anywhere from about a quarter of a million ohms upwards. Some, using MOSFET input stages, have an impedance of hundreds of millions of ohms.

Output impedance is also important, and this should be low. In the ideal op amp it should be zero, but in reality many amplifiers have an output impedance of less than 100 Ω, and many very much less than this.

Another important feature of the op amp is its *common mode rejection*. This refers to the condition where the same signal is applied to both inputs. In an ideal op amp no output should be seen under these circumstances, but the op amp will never be perfect. The actual common mode rejection is the ratio between the output level when the signal is applied to both inputs, compared to the output when it is applied to just one.

The bandwidth of an op amp can vary quite widely. An ideal op amp would have an infinite bandwidth, but as you might imagine this would be impossible to create and very difficult to use and to "tame." In reality, op amps have a limited bandwidth. Many of the chips used for audio applications may only exhibit their full gain over a relatively small bandwidth, after which the gain drops away. Despite this, most circuits act to reduce the gain and enable this smaller level to be maintained over a larger bandwidth.

Amplifier Circuits

One of the main uses for op amp ICs is within audio amplifiers. For these applications the full gain of the circuit is not required. By using a system known as *negative feedback*, some of the output can be fed back to the inverting input. In this way the gain can be

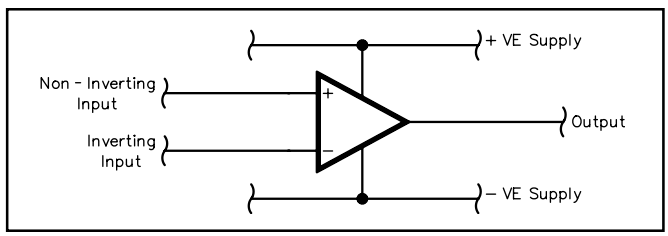


Figure 1—The circuit configuration of the typical op amp.

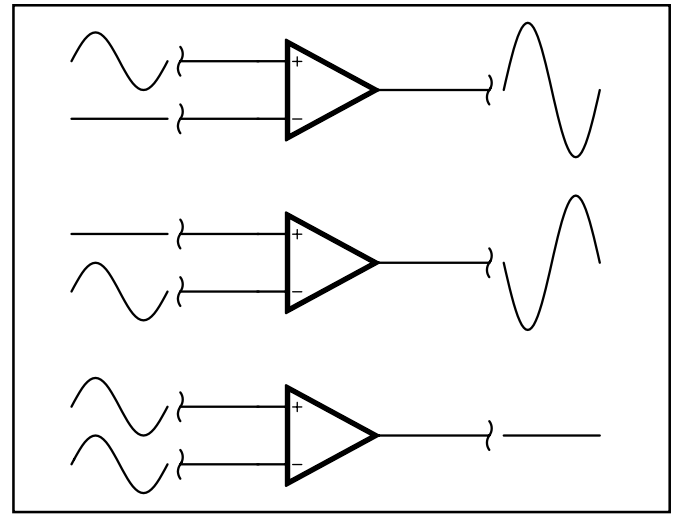


Figure 2—At (A) a signal applied to the noninverting input is amplified at the output. Apply the same signal to the inverting input (B) and it will be amplified, but its phase will be inverted. Apply the signal to both inputs simultaneously (C) and they effectively cancel each other at the output.

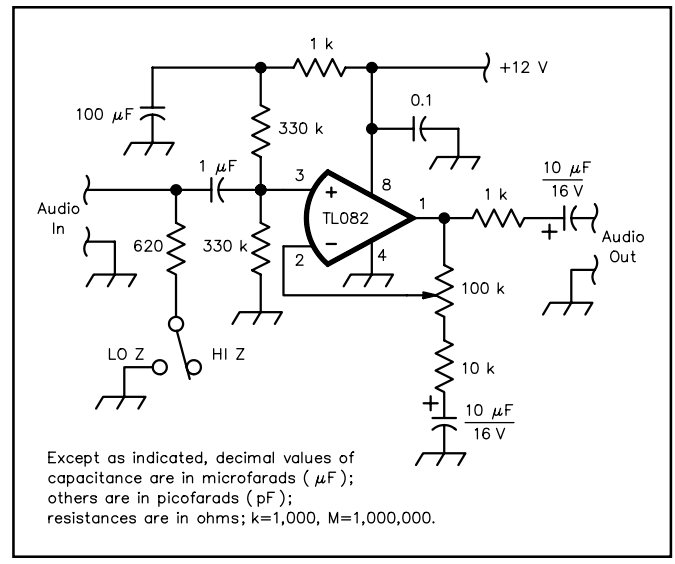
reduced to a well-defined level, determined by the external circuit components.

In addition, the bandwidth is increased, while levels of distortion are reduced. Furthermore, the output impedance may be reduced and the input impedance increased.

There are two main amplifier configurations for op amps: *inverting* and *noninverting*. Both are widely used and have their own advantages.

A *noninverting* amplifier exhibits a high input impedance and a low output impedance. The gain of the circuit can be easily calculated, as shown in the diagram. From this it can be seen that if a unity gain buffer is needed, this can be accomplished by simply connecting the output to the inverting input.

The second type of circuit is called an *inverting* amplifier. The advantage of this configuration is that the inverting input is virtually at ground potential. The reason for this is that the output voltage is the difference between the two inputs, divided by the open loop gain of the amplifier. As the level of gain of the op amp itself is exceedingly high, it means that the two inputs are at almost the same voltage. In turn, the noninverting input is connected to ground, which means that the inverting input must be virtually at ground potential. Several resistors from several different inputs can be connected to the different inputs required, as shown. This is the circuit that is used in most analog audio mixers today.



Here is a practical op amp circuit you can build tonight. It's a microphone amplifier that you can use with either high or low-impedance mikes. You can pick up the TL082 op amp for only $1.89 at RadioShack (part number 276-1715).

Other Circuits

Op amps can be used as the basic building blocks in a variety of other circuits. High and low-pass audio filters are often very useful. These can be made with a minimum of components, and the calculations for a filter with a simple Butterworth response are quite straightforward.

The circuits for a high pass and low pass filter are shown in Figure 3. Each section gives an ultimate roll-off of 12 dB per octave, and if a higher rate of roll-off is required then further sections can be placed after one another. With a little design work, you can create a very sharp audio filter.

Summary

The op amp is a very useful device for analog electronics. In view of their widespread use, op amp chips are very cheap and can be used for a wide variety of functions. It has only been possible to touch the surface here, but there is a wealth of further information in the *ARRL Handbook*. These devices are very affordable and easy to use. With a handful of parts and a breadboard, you can design op amp circuits of your own!

This article originally appeared in the October 1998 edition of RadCom, *published by the Radio Society of Great Britain.*

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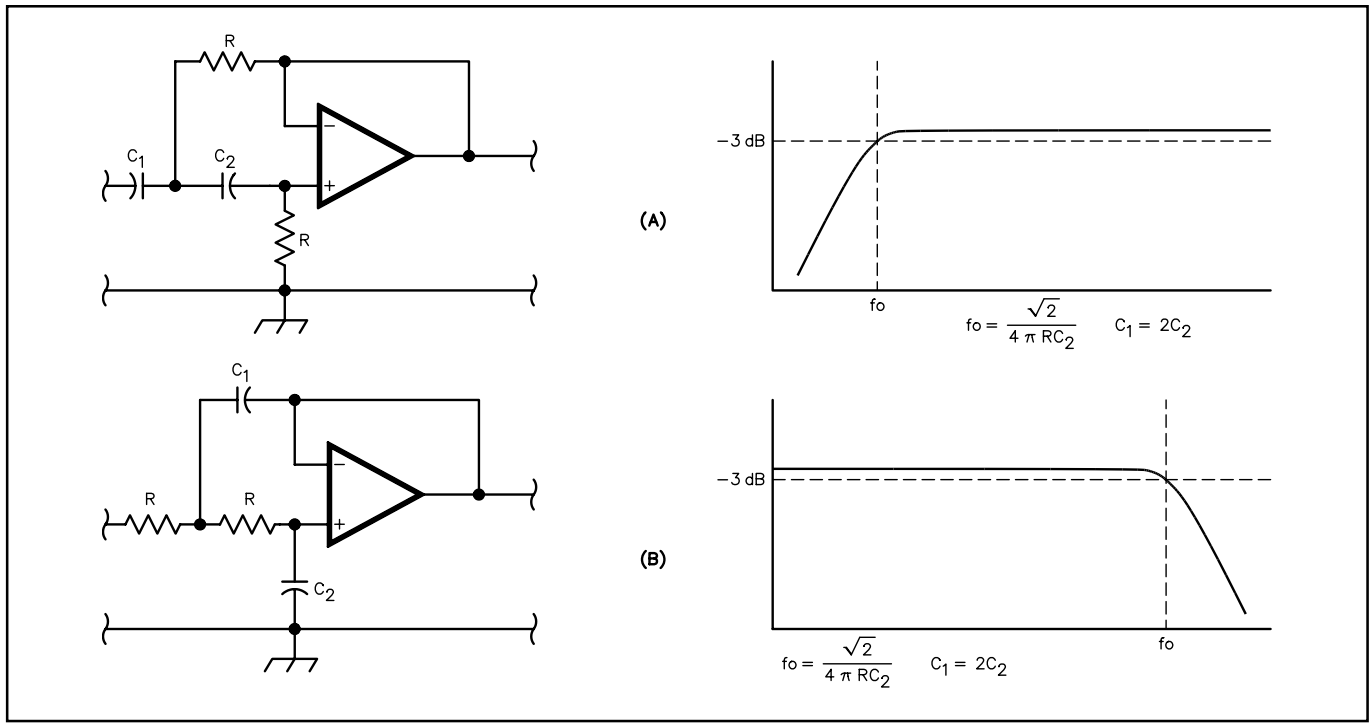

Figure 3—An op amp configured (A) as a high-pass audio filter, and (B) as a low-pass audio filter.

By Mark Hughes, WB4UHI

QSL Certificates

Tired of sending your generic QSL cards into a black hole? Want to boost your return rate in a big way? Then think big—certificate-size, that is!

I have always enjoyed receiving QSL cards. My mother used to explain to our small town postal clerks that I was *not* a Communist—I just liked listening to the short wave broadcast stations *in* Communist countries. (This was the mid-1960s, and the Cold War threatened to get hot at any time.)

I finally buckled down and learned the code in 1971. After I received my license, a local printer helped me design a QSL card. Unfortunately, I didn't get to send too many of them to hams I had talked with. Most of the local Technician ops had deserted 6-meter AM for the newest rage—2-meter FM. Because they don't count for awards, most hams don't acknowledge repeater contacts.

I was living in a rental house in Oklahoma when Technicians were given 10-meter privileges. I borrowed an old Drake TR-4 transceiver, strung up a 10-meter dipole antenna and ordered 100 QSL cards from a printer that advertised in *QST*.

Since then I have ordered QSL cards from five different printers. My cards looked okay—but they also looked a lot like everyone else's cards. Most QSL printers offer only about a dozen stock designs, and most cards have a dreadfully similar appearance. There *are* some nice stock designs, but with so much repetition, cookie-cutter QSL cards can get lost in the crowd.

If you want a unique QSL card you'll have to have one specially designed. I always wanted a custom card, but I didn't want to pay a custom price. Custom print jobs can be quite expensive!

A New Era

Last year, things changed. I moved home, and I built a house on the family farm about three miles from the Kings Mountain National Military Park. The Battle of Kings Mountain was the

WB4UHI

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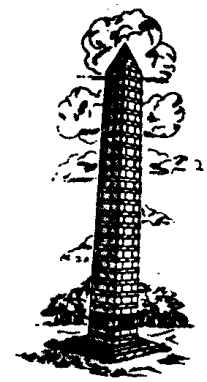
Cleveland County



Monument at the site of the surrender of the British forces at the Battle of Kings Mountain. October 7, 1780

To amateur radio station _____.

This confirms our 2-way SSB / FM / AM / CW QSO of _____ at _____ UCT on _____ MHz.

Transceiver _____ @ _____ watts. **Antenna _____**

Your report was _____ **Thanks for your QSL** **Please QSL** **73's _____**

Our farm is located in Cleveland County, North Carolina, about three miles from the Kings Mountain National Military Park which is in York County, South Carolina. The Battle of Kings Mountain is considered the turning point of the American Revolutionary War in the South. In May 1780, the British captured a large American (Whig) army at Charleston, South Carolina. Lord Cornwallis had captured Charlotte, NC, and was preparing to invade Virginia. Cornwallis dispatched Major Patrick Ferguson with about 1,100 Loyalists (Tories) to hunt down and punish the "rebels" in the upstate of the Carolinas.

"Backwater men" (Whigs) from North Carolina, South Carolina, and what is now Tennessee began to follow Ferguson. Ferguson chose to fight his pursuers on a small hill now known as Kings Mountain. Ferguson was killed and his entire command was captured. Cornwallis was forced to retreat from Charlotte. North Carolina was saved for the moment. Loses: "British" - 225 killed, 163 wounded, and 716 prisoners. Major Ferguson was the only British soldier in the battle. The rest of his troops were Americans loyal to the King. Whig losses - 28 killed and 62 wounded.

I've written two books about Civil War cemeteries: *Bivouac of the Dead* and *The Unpublished Roll of Honor.*
For more information write or email me: hughes@cleveland.cc.nc.us

My "certificate QSL" is hard to ignore.

What to Include on Your QSL

Like most hams, I like to exchange QSL cards for a variety of reasons. I'll often show visitors cards from some of the exotic places I've worked. Sometimes, I'll discover a card from someone I worked on 6 meters years ago. Some cards remind me of friends who are now Silent Keys. But, like many hams, my main reason for QSLing is to qualify for awards. Almost every major award requires Q2SLs, and you want to make sure your card contains all of the necessary information. Your QSL should include the following:

The date of the contact. I always write dates using "military style" (12Jan98 for January 12, 1998, and so on). Unfortunately, some hams write their dates using all numbers. Does 1/12/98 mean January 12 or December 1? In some parts of the world the day is written before the month. If your card goes to a DX operator, you might receive a dreaded "Sorry, not in log" reply. Some hams write the month in Roman numerals to avoid confusion.

The time. Always use Universal Coordinated Time (UTC).

The frequency or band. I use frequency, so I add "MHz" to the line for accuracy. You can use the "meter" band, but don't mix the two and write "80 MHz" on your QSL card!

The mode. The most common modes are SSB, CW and FM. If you QSL an FM QSO on a simplex frequency, be sure to put the exact frequency on the card. Specify "2×" if it was a two-way contact using that mode. Remember, contacts made through repeaters do not count for most awards.

The call sign of the station you worked. This seems simple, but on one of my first QSL cards I put the operator's name in the blank instead of his call sign. Bill—the recipient—pointed out while there were thousands of hams named Bill, there was only one WB4T**. I sent him a new card. That brings up an important point. Never erase or mark out entries on QSL cards. If you make a mistake, tear the card up and start over.

*The signal report of the station you worked***.** Use the RST reporting system.

A line for your signature. Be sure to use black, indelible ink. Blue ink can fade. You should sign the card. Don't simply print your signature on the card.

Your call sign. If you design a two-sided card, have your call sign printed on the back of the card. If your call sign is not on the back of a two-sided card, a busy QSL manager has to turn the card over to verify your call sign. Some DXers advocate the use of single-sided cards to avoid this problem.

Your address, county and grid square.

There are many other items you can include. I always like to know what type of equipment the other operator used, so I left a space to list my own equipment. I'm glad I didn't simply print the model number of my transceiver. A month after I had my QSLs printed I replaced my IC-730 with an IC-706MKII. If I had printed the original model I would have had to mark out the incorrect information. Indicating the type of antenna used adds a nice touch. Some hams even include a space for the weather!

Some operators list every award and special achievements they've earned, making their QSL cards look like the "salad bar" of medals pinned to an important General's dress uniform. If you operate mobile or portable, leave room to indicate your location (at least the county and state). I didn't, so I have to write my location if I'm verifying a mobile contact. If you have a Web page or an e-mail address, include them. At least for now, e-mail QSLs do not count for most awards. The QSL card must include your signature.

For more information on QSLing, see the latest *ARRL Operating Manual*.

turning point of the American Revolution in the South. Because I'm an amateur historian, I now had something special to put on my QSL card!

I scoured the ads in *QST* and contacted several printers who explained just how expensive custom QSLs can be. I considered buying picture postcards at the battlefield and customizing them,[1] but the postcards were 25 cents each. Anyway, homemade cards tend to look homemade. If you're going to spend the money to mail a card, mail one that looks decent. Sending attractive cards can definitely increase your QSL return rate.

Several years ago I ran a Special Event station to commemorate the anniversary of the Battle of Kings Mountain. A local printer, Carl, WA4DFP, helped me design a certificate to confirm the contacts. Carl printed the certificate on standard 8 1/2 by 11-inch paper. Most local printers don't keep QSL card stock on hand. Had I decided to have standard QSLs printed locally, it would have been much more expensive.

To make my new QSL card really stand out, I decided to design a certificate like the one Carl printed for my Special Event station and have it printed locally. To save money, I would do the layout myself and give the printer camera-ready copy. I used Microsoft *Word* and a laser printer to update the certificate. I wrote a short history of the battle and added a line drawing of one of the battlefield monuments. I also included information that every QSL card must have (see the sidebar). I even added a short blurb about my two books!

The printer ran 200 copies of the certificate on some tan paper he had in stock for $15.90. (Printers also tend to discount paper they already have in stock.) This was less than eight cents a certificate (and less than the cost of my last stock QSL cards). Although I chose to use offset printing, it might be possible to save a few pennies by using a less-expensive printing process. [If you have a suitable laser or ink-jet printer, consider purchasing blank "certificate stock" at a nearby office supply store and printing your own QSL certificates.—*Ed.*]

The Proof is in the Return Rate

I've had excellent results with my QSL "certificates." My QSL return rate increased from about 40% to nearly 80% (unfortunately, not everyone QSLs). I suspect that one reason for the higher return rate is that the certificate is different—it really stands out. It looks like a Special Event QSL. One person who received the QSL sent me a picture postcard of Sinclair Lewis' home in Sauk Centre, Minnesota. Another noted: "I've never seen anything like it." One DX operator replied: "Thanks for the unique QSL." I have even sold a few books because of the blurb.

There is one problem with using certificate QSLs, however. They are too big to send via QSL bureaus. The oversize certificates won't fit into the sorting bins. I'm in the process of designing a regular-size QSL card for transport via the bureau. The "regulation-size" card will have a line drawing of the monument and a short blurb about the battle.

It's not difficult to design custom certificates. Focus on something in your area that would likely be of interest to hams who live elsewhere. If you can't think of anything special, ask the local Chamber of Commerce. Every town or region has *something* worth noting.

I have operated from four towns: Kings Mountain has a battlefield; Durant, Oklahoma, has the world's largest peanut; Weatherford, Oklahoma, was the boyhood home of astronaut Thomas Stafford; and Orangeburg, South Carolina, has a world-famous rose garden. Any of these would have made an excellent QSL certificate.

Why not make your QSL something special?

[1]C. Bowles, AA1EX, "QSL Cards, Before You Write That Check." *QST*, Dec 1994, pp 64-66.

850 Dixon School Rd
Kings Mountain, NC 28086

By H. Ward Silver, N0AX

Test Your Knowledge!

Here's a "full gallon" of head-scratching problems.

One of the most popular homebrew projects is the RF power amplifier. They're simple, give on-the-air results, heat the shack and provide a place for the cat to snooze in the winter. Amplifiers are cornerstones of radio from the lowest of the low bands to microest of the microwaves. How's your amplifier IQ?

1. If an amplifier would increase your power output from 100 to 500 W, while a new tribander would add 6 dB of forward gain over your existing dipole, which device will make your signal louder?

2. Will a fan capable of moving air through an amplifier's cooling system at a rate of 1 cubic meter per minute be able to cool a tube that needs 25 cubic *feet* per minute?

3. The heaviest circuit available in the shack is rated at 20 A, 115 Vac. Your new amplifier consumes a maximum of 3 kW. Will the circuit handle the load?

4. To reduce the second-harmonic interference from a 20-meter amplifer to a nearby station operating on 10 meters, a quarter-wavelength stub is added at the amplifier's output. Should the stub be open or shorted? What length should the stub be if the amplifier is operating on 14.200 MHz and the coaxial cable's velocity of propagation is 66%?

5. A transmit/receive relay has a 12 Vdc coil with a resistance of 50 Ω. If your transceiver's keying line is rated at 100 mA, will it be able to switch the relay?

6. To combine the output from four solid-state amplifier modules, you decide to use a power combiner that has an insertion loss of 1.5 dB at each of its four inputs. If each module provides 100 W of power, how much is available at the combiner's output?

7. To avoid overdriving the amplifier input, the output of your 200-W transceiver must be reduced to 50 W. How much attenuation is required (in dB) to achieve this?

8. FCC Rules state that all harmonics must be at least 40 dB below the fundamental signal. You are transmitting on 20 meters using a triband Yagi antenna. A friend nearby using another triband Yagi informs you that your second harmonic on 10 meters is S3 at her house while your fundamental is S8. Without considering any mitigating propagation factors, are you legal?

9. Can a relay that switches in 5 m/sec support full-QSK at 35 WPM?

10. You're a member of a DXpedition team and you're assigned to carry the 40-pound amplifier power transformer along with several lengths of coaxial cable. The flight to the island allows 30 kg of carry-on weight. If your coax weighs 4 ounces per foot, how many feet of cable can you carry on board?

22916-107th Ave SW
Vashon, WA 98070

Total Your Score!
There are a total of 10 possible answers in this quiz. Give yourself one point for each correct answer.

8—10	Your knowledge is in the "high power" category!
5—7	Not quite a full gallon of expertise, but not bad.
1—4	Maybe QRO isn't for you.

Answers

1. The amplifier provides a gain of 10 log (500/100) = 6.9 dB.
2. Yes—one cubic meter equals 35.3 cubic feet.
3. Three kilowatts at 115 V ac translates to a current flow of 26 A—operating the amplifier on this circuit is dangerous! Run a separate, heavy-duty circuit to the shack just for the amplifier. If the amplifier can be powered from a 240-V line, use a 240-V circuit to cut the current in half. Check your local electrical codes as well.
4. While there are a number of possible combinations of stub designs, the most straightforward is a shorted stub, cut to $^1/_4$-wavelength at 14.200 MHz. The stub acts like an open circuit at the 14.200 MHz and like a short at the second harmonic, at which it is $^1/_2$-wavelength long, 28.400 MHz, attenuating the undesired signal. The length of the stub is $0.66 \times {}^1/_4 \times (300 / 14.2) = 3.49$ meters. Shorted stubs also have the added feature of not presenting high RF voltages at an exposed open circuit.
5. The coil current is 12 V / 50 W = 240 mA. Your keying circuit won't last long!
6. A dissipation of 1.5 dB passes 70.7% of the input power to the output. The 400 W going into the combiner results in 400 x 0.707 = 283 W at the output.
7. The attenuation must be −10 log (50/200) = 6.02 dB. A 6-dB pad will be fine. Note—the minus sign is required to calculate attenuation. The power ratio could also have been reversed.
8. If each S-unit is 6 dB, your harmonic is 5 × 6 dB = 30 dB below the fundamental. You have a problem!
9. At 35 WPM, each dit is about 25 ms. This relay will do the job.
10. Thirty kg is equivalent to 66 lb. Subtract the weight of the transformer and you have 26 lb for cable, four feet of which weighs 1 lb. You can carry 104 feet of cable (without connectors).

New Products

VIBROPLEX SQUARE RACERS

◊ Designed as a departure from Vibroplex's traditional Brass Racer models, the new Square Racers have heavy steel bases, springless magnetic keying mechanisms and serialized, brass Vibroplex logo plates. The Standard Model has a textured black base with chrome parts, while the Deluxe Model has a highly polished chrome base with bright chrome parts and red finger pieces.

Prices: Standard Model—$109.95; Deluxe Model—$134.95. For more information, contact Vibroplex, 11 Midtown Park E, Mobile, AL 36606-4141; tel 800-840-8873, fax 334-476-0465, **w4oa@vibroplex.com**.

Next New Product

By Paul Pagel, N1FB

A Heavy-Duty Homemade Dipole Insulator

In the antenna family, the dipole is the origin from which most other members of the family descend. For many radio amateurs, a dipole is likely to be the first antenna they install. Whether homemade or purchased, dipoles are relatively inexpensive and—in all their many variations—do a fine job of transferring signals to and from the ether. (Perhaps you never realized that radio was the *first* "Ethernet." Consider yourself enlightened.)

At the Dipole's Center

To get RF energy to and from the dipole's main working area, the station's transmitter or receiver uses some form of a feed line, usually coaxial cable or balanced line. Naturally, the feed line must be attached to the dipole so the energy transfer can occur. The brute-force method of attaching the feed line to the dipole is to simply wrap the feed line conductors around the respective dipole legs and solder them in place. That works, of course, but as is usually the case, there are other and better ways to do this.

When recently planning to erect a new dipole, I wanted to feed it with coaxial cable. To make attachment and removal of the feed line easy, I terminated the feed line in a PL-259 connector so it can mate with an SO-239 connector at the dipole's feed point. This required a means of attaching the SO-239 to the dipole's center insulator. I also wanted to be able to support the center insulator from a hook or line. Doing so relieves the dipole elements from some stress because they often bear the brunt of moving end supports and the weight of the center insulator and feed line. A run of RG-8 (or even RG-58) coax more than 20 feet long adds quite a bit of weight at the center of a dipole. By supporting the dipole at the center, you can reduce the stress that weight adds to the antenna legs.

One way of supporting a dipole's center conductor is to use an eyebolt. In an inverted V and other configurations, the eyebolt can be attached to a supporting mast or wall of a structure. In other arrangements, an auxiliary support rope can be strung parallel to the antenna through the eyebolt between the two dipole end supports. See Figure 1.

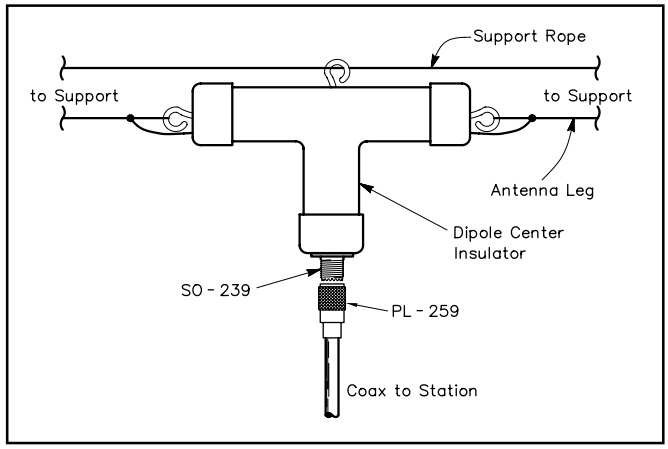


Figure 1—Artistic rendering of using a supporting rope above the dipole. Stress management comes easy for dipoles.

Inexpensive and readily available parts make a sturdy dipole center insulator/hanger.

A PVC Dipole Sky Hook

PVC tubing used in household plumbing has become a universal construction product, being used for everything from furniture to—well, dipole supports!

I purchased the PVC and eyebolts at a local Home Depot. (Actually, I had the PVC on hand and purchased only the eyebolts for this project.) All told, the parts for this dipole center insulator/support cost less than $10.

Purists might object to my use of other than stainless-steel hardware. But practically speaking, the chances of your changing your dipole setup before the zinc or cadmium-plated hardware fails are very high. (I can't remember the number of wire antennas that have come and gone at my station!) For me, the ready availability and cost of the hardware far outweighed the higher cost and difficulty in finding stainless-steel hardware for a Sunday afternoon antenna project.

Assembly

PVC is easy to work with. You can cut the three $1^{5}/_{8}$-inch lengths of pipe with a hacksaw, or use an inexpensive (less than $15) PVC pipe cutter. The pipe cutter eases through the pipe like a hot knife through butter! Don't try to use a standard metal-tubing/pipe cutter on PVC; you'll waste your time and not be satisfied with the results. When you've got the pipe sections cut, temporarily hand-fit the joining pipe sections to the caps and **T** to ensure everything fits as it should.

As shown in the accompanying photos, the eyebolts used for the center support and dipole elements are attached at the top center of the PVC **T** and the center of the end caps, respectively. How can you accurately drill a hole in the center of a PVC **T** and pipe cap? Start drilling the hole from *inside* the cap. Molding marks inside the **T** and caps provide a bulls-eye you can use as a guide. Use a center punch or nail to locate the hole position, then start the hole using a small-diameter drill bit, gradually enlarging the drill size. Because the plastic is soft, drilling the holes is a snap.

Make the hole diameters for the eyebolts a little smaller than the eyebolt's leg, then screw the eyebolt into the PVC cap. This creates a tight fit and adds a little sturdiness to the joint. Beneath the nut securing each eyebolt, add a flat washer and a lock-washer to further strengthen the joint and prevent the hook from loosening.

Beneath each dipole-element eyebolt, drill a hole to pass a #12 or #14 wire. (As discussed later, the wire joins the coaxial connector to each wire element.) To ensure you don't drill the holes too near the outer edge of the cap where they'll interfere with the PVC

BRAD THOMAS, KC1EX

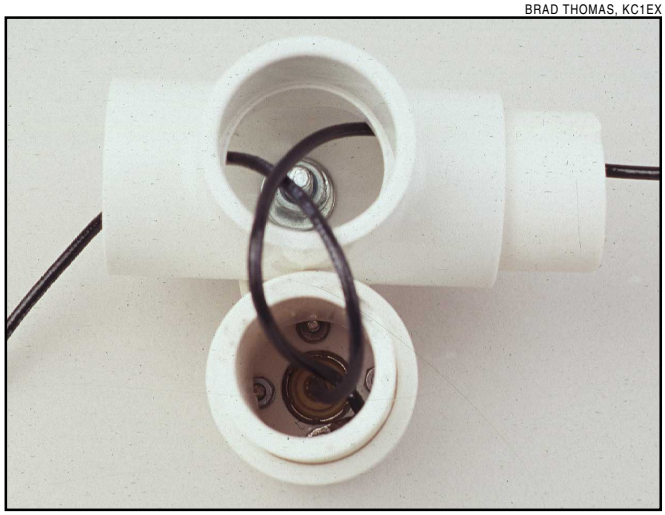


Figure 2—Lengths of wire connected to the SO-239 socket are routed through the PVC T and out to the antenna elements via holes in the end caps below the eyebolts.

BRAD THOMAS, KC1EX

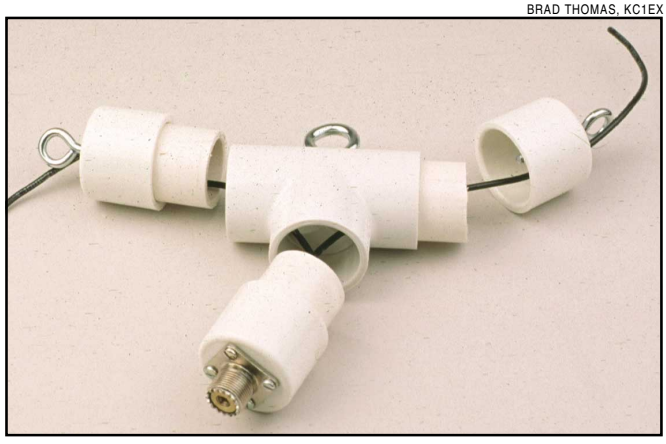


Figure 3—Group shot of the disassembled pieces showing how they fit together. Short sections (1 5/8 inches) of PVC pipe join the T to the three end caps.

Table 1

Parts Required for the Dipole Center Insulator

3—1-inch diameter PVC pipe caps
1—1-inch diameter PVC **T**
3—Lengths (1 5/8 inches) of 1-inch diameter PVC pipe
2—Eyebolts, 3/16 × 2 inches (for the antenna legs)
1—Eyebolt, 1/4 × 2 inches (for the center support)
1—SO-239 chassis-mount connector

Misc: Flat washers, lockwashers, nuts, PVC cement, PVC pipe cleaner.

pipe section that joins the cap, temporarily push the pipe section into the cap and mark its ID on the inside of the cap. Then, remove the pipe section and drill the hole.

The SO-239 connector requires a 5/8-inch mounting hole in its end cap. A standard chassis-mount connector fits the 1-inch pipe cap like a glove, so drill the starting hole accurately. Either ream the hole to the required diameter, or use a chassis punch. Use #4-40 hardware to secure the connector to the cap, installing a solder lug beneath one of the mounting screws and using lockwashers beneath all the nuts. Cut two 1-foot lengths of #12 of #14 wire. (Use #12 or #14 wire for your antenna elements for strength.) Attach the end of one wire to the coax connector center conductor, the other wire's end to the solder lug.

We don't want to rely on the dipole-element eyebolts as a means of making the electrical connection between the coaxial connector and the antenna elements themselves. To ensure a good connection, route both of the 1-foot lengths of wire from the coax connector through the interconnecting pipe and into the **T.** Direct one wire out each leg of the **T**, through the joining pipe section and through each cap. Test-fit the parts and correct as necessary.

Final Assembly

Perform the following steps outdoors or in a well-ventilated area. Following the directions on the container, apply the PVC pipe cleaner to the mating PVC sections; this helps to ensure a good bond. You're now ready to cement the individual sections together. Caution: PVC cement cures *rapidly*! Once you've applied the cement and joined the parts, the joint solidifies in a couple of seconds. If you want an esthetically pleasing end product, take care to properly align the parts before you run them home once the cement is applied. When everything's assembled, use a noncorrosive sealant to plug the wire-exit holes beneath the element eyebolts.

If you want to enclose a ferrite-rod balun within the center support, use a longer length of pipe between the bottom of the **T** and the pipe cap holding the SO-239 connector.

Installation

When cutting your antenna elements to size, allow a few inches more for looping through the center support eyebolts and wrapping around each antenna leg. Solder each wire of the center support to its respective antenna leg, connect the feed line and you're ready to raise the antenna. A rope or hook passed through the eyebolt at the top of the dipole center support will help to relieve the antenna elements from bearing the weight and pull of the center support and feed line. QST

New Products

ADJUSTABLE HIGH-CURRENT POWER SUPPLY FROM MFJ

◊ MFJ's new heavy-duty power supply puts out 30 A continuous, 35 A surge—with full regulation—from 1 to 14 V dc. Voltage is set with a front-panel control that has a handy detent at 13.8 V. Other features include lighted voltage and current meters; three types of output terminals (binding posts, quick connects and an automobile-type cigarette lighter socket); over-current protection; and a quiet internal cooling fan.

Price: $149.95. The Model 4035MV power supply 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**.

INTERNET-BASED TECHNICAL SUPPORT FROM CUSHCRAFT

◊ Cushcraft's new Internet-based tech support program, Tech-Express, is aimed at providing high-quality worldwide support for the company's antenna products customers. Hams with Web access can point their browsers to **http://www.cushcraft.com** (24-hours a day) to order parts, ask technical questions, review frequently asked questions (FAQs), locate part numbers and descriptions and initiate warranty procedures. The company says e-mail inquiries are answered within one business day.

In addition to TechExpress, Cushcraft customers can also call a new automated voice mail system that lets users leave messages concerning warranty issues, part orders, technical questions and catalog requests.

For more information, Contact Cushcraft, 48 Perimeter Rd, Manchester, NH 03103; tel 603-627-7877, fax 603-627-1764, **http://www.cushcraft.com**. QST

Next New Product

Product Review

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

Japan Radio Company NRD-545 DSP Receiver

Reviewed By Rick Lindquist, N1RL
Senior News Editor

SWLs, BCLs *and hams* take note! Japan Radio Company has introduced the NRD-545, a receiver that does all of its filtering in its DSP IF. The NRD-545 comes from a long heritage of fine JRC SWL/BCL receivers. We reviewed its most immediate predecessor, the NRD-535 HF receiver, in May 1997 (see "Product Review," *QST*, May 1997, page 68). The NRD-545 is the fifth generation in the JRC general-coverage line. It's the first to offer DSP, and it carries the DSP concept through to full execution in this unit: There are no optional crystal filters available for the NRD-545. All filtering is done in the DSP IF (20.2 kHz).

The first thing that struck me about the NRD-545 was its physical resemblance to the '535. While the internal design might have been updated, the external styling definitely has not been, but that was fine with me. I found the sizeable knobs and display comfortable and easy to manage. (Besides, it reminded me of my Kenwood TS-850S, and it's approximately the same size, too.)

Features

In addition to the flexibility afforded by DSP, the basic receiver covers from LF (100 kHz) through HF (30 MHz). You can get an optional wideband converter unit to expand the tuning range up through UHF (2 GHz). The CHE-199 converter is primarily designed for AM, FM and wideband FM (even FM stereo). A "power on" procedure for temporarily engaging one of the alternative modes (USB, LSB, CW or RTTY) in this frequency range is described in the manual. Receiver performance in these additional modes above 30 MHz is not specified or guaranteed. The converter did not become available until after we'd ordered our unit.

The '545 uses one-chip DDS to yield 1-Hz step frequency selection. Tuning is done by a varactor diode-based electronic tuning system. This is a triple-conversion receiver, with IFs at 70.455 MHz and 455 kHz plus the DSP IF at 20.2 kHz. AGC is looped back to the first IF amp from a digital/analog converter that follows the DSP IF.

Mega Memory Madness

The '545 has 1000 channels of memory. That's an increase from 200 in the '535. One note is in order here, however. We were not able to figure out how to enter a frequency into memory without referring to the Instruction Manual. Even after resorting to the manual it was confusing—the instructions in the book did not quite match markings on the radio's front-panel controls. The manual persists in calling the control labeled **AGC T/BWC** the "**FINE**" control, although this legend does not appear anywhere on the front panel.

Memory channels will save frequency, mode, IF filter bandwidth (ie, **WIDE**, **INTER** or **NARROW**, but not the variable **BWC** setting), attenuator, AGC and tuning step. Memory channels will not retain specific setting of the variable **BWC** control, only the wide, intermediate or narrow settings JRC assigns to each mode.

AM Listening Enhancements

A lot of AM BC and SW listeners prefer to have synchronous detection. As in the '535, the NRD-545 offers its "exalted carrier, selectable sideband" (*ECSS*) feature. This reduces—sometimes greatly—the distortion caused by selective fading in AM signals (where the carrier can fade and leave only the sidebands) by providing a local, synchronously locked "carrier" signal. You then are free to pick upper or lower sideband for listening.

This feature works quite nicely on the NRD-545, and makes AM BC reception a real pleasure, especially for distant, nighttime signals. The built-in speaker is quite good, and a tone control lets you tweak the frequency response somewhat.

The '545 offers a front-panel selectable **AMS** mode for enhanced AM listening. The manual says it permits you to "listen to AM broadcasts in hi-fi." Yes folks—this is *AM stereo*. While there are still a handful of AM broadcast stations transmitting in this mode (aka C-Quam), the number is steadily declining. Unfortunately the headphone jack does not provide separate left and right channel outputs. In order to investigate this aspect of the '545 you will need to connect a stereo amplifier—or your PC's sound card line input—to the two rear-panel line-level outputs. Groovy!

Speaking of AM, via the "user setup" (menu), you can select 10-kHz or 9-kHz tuning steps to accommodate different Standard Broadcast band tuning schemes, as well as a variety of other possible settings, timer relay operation, BFO offset, RTTY parameters and noise reduction.

Front Panel Stuff

The front panel has a lot of controls, but it's not overly busy. JRC keeps down the clutter in part by getting triple duty out of the single **AGC T/BWC** control, which—depending on which little button you press—adjusts the variable bandwidth and the AGC time constant or serves as a channel selector in memory mode. It might take users some time to acclimate themselves to

BOTTOM LINE

The NRD-545 appears to be a worthy successor to the popular and enduring NRD-535 and offers improved performance with the flexibility of DSP.

Table 1

Japan Radio Co, NRD-545 DSP, serial number 05112

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: 0.1-30 MHz.[1]	As specified.
Power requiremexnts: 100, 120, 200 or 240 V ac ±10%; 12-16 V dc at 1.9 A max.	DC current drain: 1.3 A tested at 13.8 V dc.
Modes of operation: SSB, CW, AM, FM, AFSK.	As specified.
Receiver	*Receiver Dynamic Testing*
SSB/CW sensitivity, 2.4 kHz bandwidth, 10 dB S/N: 0.1-0.5 MHz, 5 μV; 0.5-1.6 MHz, 2 μV; 1.6-30 MHz, 0.3 μV.	Minimum discernible signal (noise floor), 500 Hz filter: 1.0 MHz –135 dBm 3.5 MHz –138 dBm 14 MHz –135 dBm
AM sensitivity, 10 dB S/N: 0.1-0.5 MHz, 16 μV; 0.5-1.6 MHz, 6.3 μV; 1.6-30 MHz, 2 μV.	10 dB (S+N)/N, 1-kHz tone, 30% modulation: 1.0 MHz 0.45 μV 3.8 MHz 0.35 μV
FM sensitivity, 12 dB SINAD: 1.6-30 MHz, 0.5 μV.	For 12 dB SINAD: 29 MHz, 0.32 μV.
Blocking dynamic range: Not specified.	Blocking dynamic range, 500 Hz filter: 3.5 MHz 128 dB[2] 14 MHz 125 dB[2]
Two-tone, third-order IMD dynamic range: Not specified.	Two-tone, third-order IMD dynamic range, 500 Hz filter: 3.5 MHz 92 dB 14 MHz 91 dB
Third-order intercept: Not specified.	3.5 MHz +3.1 dBm[3] 14 MHz +4.5 dBm[3]
Second-order intercept: Not specified.	+73 dBm.
FM adjacent channel rejection: Not specified.	20 kHz channel spacing: 29 MHz, 78 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing: 29 MHz, 78 dB.[2]
S-meter sensitivity: Not specified.	S9 signal at 14.2 MHz: 69 μV.
Squelch sensitivity: Not specified.	At threshold, SSB, 14 MHz, 0.34 μV; FM, 29 MHz, 0.46 μV.
Receiver audio output: 1.0 W at 10% THD into 4 Ω.	2.7 W at 10% THD into 4 Ω.
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW-N (500 Hz filter): 555-1091 Hz (536 Hz); CW-W: 274-2027 Hz (1753 Hz); USB: 286-2874 Hz (2588 Hz); LSB: 283-2879 Hz (2596 Hz); AM: 243-1954 Hz (1711 Hz).
Spurious rejection, 60 dB; image rejection: 70 dB.	First IF rejection, 14 MHz, 109 dB; image rejection, 14 MHz, 113 dB.

Size (height, width, depth): 5.1×13.0×11.2 inches; weight, 16.5 pounds.

Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

[1]0.1 MHz-2 GHz with optional CHE-199 wideband converter (cellular phone frequencies are blocked).

[2]Measurement was noise-limited at the value indicated.

[3]Third-order intercept points were determined using S5 reference.

this arrangement.

In addition to large fluorescent numerals on the display, there's an analog-style S "meter" that's really comprised of fluorescent segments. The S meter is not tied to the AGC.

The pass band shift (**PBS**) control operates at IF to shift the DSP filter ±2.3 kHz. It works very well, and it's hard to detect that it's operating in the DSP IF as opposed to a conventional IF strip.

Adjusting bandwidth is simple but a bit perplexing at the same time. There are three overall **FILTER** settings, **WIDE**, **INTER** and **NARROW**. These big buttons are adjacent to the large, conventional-style tuning knob (it reminds me a bit of the one on the old Kenwood TS-520 with its analog apron). But the receiver also has a variable bandwidth control (it's a function of the multifunction **AGC T/BWC** knob). This can override the "primary" filter setting, but if you change the "primary" filter (say, from **WIDE** to **INTER**), the receiver goes back to a default bandwidth for the mode you're in. Bandwidth is displayed on the front panel.

If you ever wished for more control over the AGC than the typical fast, medium, slow and off settings you'll find on the average receiver, the NRD-545 is a dream come true. You can use the **AGC T** function to adjust the AGC time constant anywhere from a snappy 0.045 second to a torpid 5.15 seconds. No matter what you're listening to, you ought to be able to find a setting to suit your tastes somewhere in that range. The radio displays the AGC time constant on the front panel display. You also can turn the AGC off altogether, but that's another button, and it's not anywhere near the knob you use to adjust the AGC time constant.

The DSP noise reduction is great. The only complaint is that JRC makes you go into the menu to adjust the effect beyond the default setting. Many modern receivers or transceivers let you do this with a front-panel control.

There's a front-panel mini-phone jack that supplies audio output for hooking up a recorder or feeding your PC sound card. The radio also includes a built in clock with provisions to control an external device from a timer. It will switch a maximum of 24 V at 3 A. Timer on/off times can be programmed into the first 20 memories.

An interesting feature: An RTTY demodulator for several standard shift rates is built in. You can display demodulated output on a PC using the built-in serial (RS-232) interface.

Performance

I was impressed by the HF performance of the NRD-545, especially given the total reliance on DSP instead of crystal or ceramic filters. This is, overall, a sensitive receiver. It also does not apply huge amounts of attenuation in the Standard Broadcast band or LF segments. Sensitivity numbers we measured were less than 1 μV in any given filter setting at 1 MHz in the AM mode. It also had good sensitivity down in the nether regions (we measured –127 dBm at 100 kHz). By the way, this receiver has an attenuator but not a specific preamp.

Blocking dynamic range at 3.5 MHz came in at 128 dB (noise-limited), which is excellent performance. Two-tone, third-order IMD dynamic range topped 90 dB in the HF spectrum. Also terrific!

On HF SSB, the combination of the passband shift (**PBS**) and the bandwidth control (**BWC**) did the trick on a crowded 40-meter phone band. It was comparable to the performance on my competition-grade transceiver with its optional crystal filtering engaged.

Reception of CW was very good—but not great, however. The **BWC** lets you crank down the bandwidth to 10 Hz—although 100 Hz is about as low as you'd want to go for CW. In fact, 100 Hz is quite nice in that mode under certain extreme circumstances. On a busy contest band, the NRD-545 usually could pull out even a relatively weak CW signal from the rest of the crowd. But close-in signals also can pump the AGC and affect readability, something I typically can avoid with my transceiver and its pair of cascaded 400-Hz crystal filters (even leaving the external DSP box off).

The NRD-545's **PBS** control is a big help in QRM avoidance, though. In fact, outside of the **MAIN TUNING** knob, it's one of the most useful controls on the front panel.

The **NOTCH** control also was helpful for reducing QRM. It has two settings. Push the button next to the control once and it's a manual notch control that you can even use on CW—to knock out a nearby offending signal or to do a little bandpass shaping. Push the button again and the LED turns red to indicate notch tracking. This is an autonotch feature (for voice modes) that locks onto and tracks offending heterodynes within a range of ±10 kHz. Get outside the 10 kHz range, however, and the notch filter automatically shuts off. In the ARRL Lab, we measured a whopping 60 dB notch depth!

One control a lot of listeners don't often think of in terms of enhancing signal readability is the **ATT**enuator button. The NRD-545 does not have a selectable preamp as found on many transceivers—not that it suffers from this. As we said, the sensitivity is more than adequate. The **ATT** button is great when you're dealing with several strong signals in relatively close proximity. Reducing the receiver's gain by pressing the **ATT** button (it's supposed to pad it down 20 dB) is quite helpful in those kinds of situations.

Scan and Sweep

The NRD-545 can be set to scan between specific memory channels, or within one of 20 banks (50 channels each) of memory channels. You can also "sweep" all frequencies between two selected limits or within one of ten sweep range memories. Scanning speed is adjustable from 0.3 to 5 seconds per channel (0.2 to 3.3 channels per second); sweep speed can be varied between 2 and 20 frequencies per second. Scan delay—the time the receiver will stop to listen on any given frequency—can be varied from 0 to 10 seconds. CTCSS tone squelch is not available.

Computer Control

It's possible to control the NRD-545 directly from a personal computer using the serial port on the rear panel (DB-25 connector). All you need are a null-modem serial cable and the *Windows*-based software. (You can download *Windows 95* software and a software operator's manual from JRC/Japan's Web site, see: **http://www.jrc.co.jp/product/comm/e-comm/pc545-e.html/**.)

The available software provides a virtual front panel of the '545 and allows you to control most of the features of the radio with your mouse. While under computer control, the actual front-panel controls of the radio are deactivated—all operations are performed using your PC.

One of the more notable additional features provided by computer interconnection is a very well implemented band scope display. Unlike some of the other scopes we've seen, receive audio is audible while the frequency sweep is in progress, making initially identifying interesting "hits" easy. When the sweep is complete, double click on a displayed peak and the radio will tune to that frequency. A separate RTTY receive program is also included.

The '545's Instruction Manual provides all of the control commands so you can alternatively issue commands to the NRD-545 using any terminal program with the parameters set to 4800 bps N-8-1. Or, if you're creative enough, you could roll your own programming software.

Other Features

The NRD-545 is a fine-sounding receiver, even using the built-in speaker. It has a tone control, which JRC says can function as "a RTTY demodulation filter fine-adjustment control." The radio cranks out nearly 3 W of audio, and there are provisions to connect an external speaker at the rear panel.

The rear panel also provides for a low-Z (50 Ω) or high-Z antenna connection. The rear panel can also supply 10.8 V dc at 30 mA. This radio has a built-in ac power supply. You can operate the radio from 100, 120, 220 and 240 V ac or from 12-16 V dc. JRC includes an ac line cord *and* a dc power cable.

A connection point for a built-in muting circuit is also mounted in the rear-panel. This would come in handy if, for example, you wanted to use the NRD-545 in conjunction with a separate transmitter or transceiver.

The days of the beautifully matched transmitter/receiver pairs, such as those made by Collins, Drake, Hallicrafters and others, are probably gone forever. I can't help but imagine the impressive station that would result if JRC would only provide us with a matching transmitter. (Perhaps one that would cover up through the GHz range!) I suppose you could link one up with one of their JST-245 or '145 transceivers, but somehow—it just wouldn't be the same…

Manufacturer: Japan Radio Co Ltd, 1011 S W Klickitat Way, Building B, Suite 100, Seattle, WA 98134; 206-654-5644; fax 206-264-1168. Manufacturer's suggested retail price: $2000. CHE-199 wideband converter: $400. TCXO CGD-197 temperature compensated crystal oscillator: $130.

The TiePie Engineering µScope

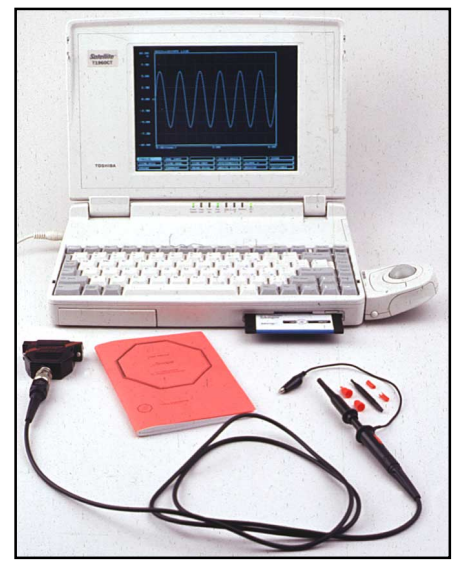
Reviewed by Michael Tracy, KC1SX
ARRL Lab Test Engineer

As an apartment dweller, my "shack" is really just a small corner of a room. Like many hams, I also have a limited budget, so I have acquired a collection of radios and other gear (mostly from hamfests) that needs a little "TLC." Consequently, I have found myself in need of certain pieces of test equipment to help me get the items in my collection working again. Unfortunately, because my shack space and budget for test equipment is rather limited (and I'd rather spend money on more radios!), the nice oscilloscopes, meters and other items in the glossy test equipment catalogs just don't fit my needs. Although I have picked up a couple of older 'scopes in my hamfest travels, they also need a little work. Needless to say, when I was offered the opportunity to check out a new mini, multi-function PC test accessory that is also fairly affordable and easily fits my available space, I jumped at the chance. Also, as a long-time computer junkie, I was intrigued by the PC-based approach, which seems to be a growing trend.

Although TiePie Engineering hasn't yet made a name for itself in the US (the company is based in the Netherlands), that may soon change, judging by the respectable line of test equipment products offered in their catalog.

BOTTOM LINE

If you need a compact, multi-function test instrument for dc to high audio frequencies and you already have a PC in the shack, the µScope will fill the bill nicely.



When I received the TiePie µScope package, I was surprised at just how small and light it was. When I opened it, the reason became obvious—the hardware looks like a hooded DB-25 connector, except that where the cable normally exits, there is a female BNC connector. Also included in the package is a 1×/10× switchable probe with several interchangeable tips, the software (on one 3½ inch, 720k floppy) and the manual (a handy 4 × 6 inch, 68-page booklet).

Although the name implies that this product is primarily an oscilloscope, that is not the case at all—the µScope's functions also include a dual-display voltmeter, spectrum analyzer and transient recorder. The voltmeter can be set to measure peak to peak voltage (for ac) or *true* RMS (for dc or ac) or it can be set to read either a minimum or maximum value. It can also measure power in W or dBm, the frequency and the crest factor of the signal you are reading. However, each of the two "voltmeter" screen displays only provide readings for one of these items at a time, so you can't measure frequency, RMS and maximum simultaneously, for example. The spectrum analyzer features both a "live" and "hold" mode and includes a special function that determines the distortion of the displayed spectrum (you are prompted for a reference fundamental frequency). The transient recorder takes periodic voltage samples and saves them in a file. You can capture up to 30,000 samples. The time period between samples can be varied anywhere from 0.01 to 300 seconds. (At the slowest rate, you can record events once every 5 minutes for 104 days!)

Now that you know what it does, you need to know what the µScope doesn't do—RF measurements. Because the fastest sampling rate of the A to D converter is 100,000 samples per second, the theoretical upper frequency limit of the µScope is about 50 kHz. (To reproduce a signal without aliasing, the sample frequency must be more than twice as high as the maximum signal frequency.) However, because of the simple method the µScope uses to reproduce the sampled waveform, the maximum practical frequency that you can measure without excessive waveform distortion is just a bit above 25 kHz. The effects of aliasing and the measurement limitations of the µScope are spelled out quite clearly in the manual. For those who need an RF capable instrument and have a more generous budget, TiePie makes a number of other models of PC based instruments that are suitable to the task. These other models aren't quite as small as the µScope, but they will still take up far less bench space than a conventional oscilloscope.

Although many hams like to "dive right in" and "twiddle the knobs" on a piece of new equipment, in this case it really is important to read at least some of the manual first so that you are familiar with the basics. The first thing worth noting is that the µScope software is a DOS program. While the program will run in a DOS window under *Windows 3.x* or *Windows 95*, it will not give correct results—the program needs to communicate with the hardware without being interrupted by other program tasks. The obvious disadvantage is that you won't be able to run other programs on the same PC at the same time. The advantage is that you can use the µScope with any old PC (although the maximum sampling rate is slower on some older PCs, such as a 4 MHz 8086 machine). In fact, a 286 or 386 laptop would make a perfect companion for this multi-function instrument. The hardware attaches to a printer port, so if your computer only has one and you still want to use the printer, you'll have to decide if you want to install a second port, use an external switchbox or just keep swapping cables around. Since the µScope gets its power from the port, you won't need an ac outlet if you go portable with a laptop computer.

Like a lot of other single-floppy DOS software, there is no install program on the µScope program disk. Instead, you just copy all the files on the floppy to a convenient directory on the PC's hard drive (the software can be run directly from the floppy, but a hard drive installation is faster and more convenient for keeping files of

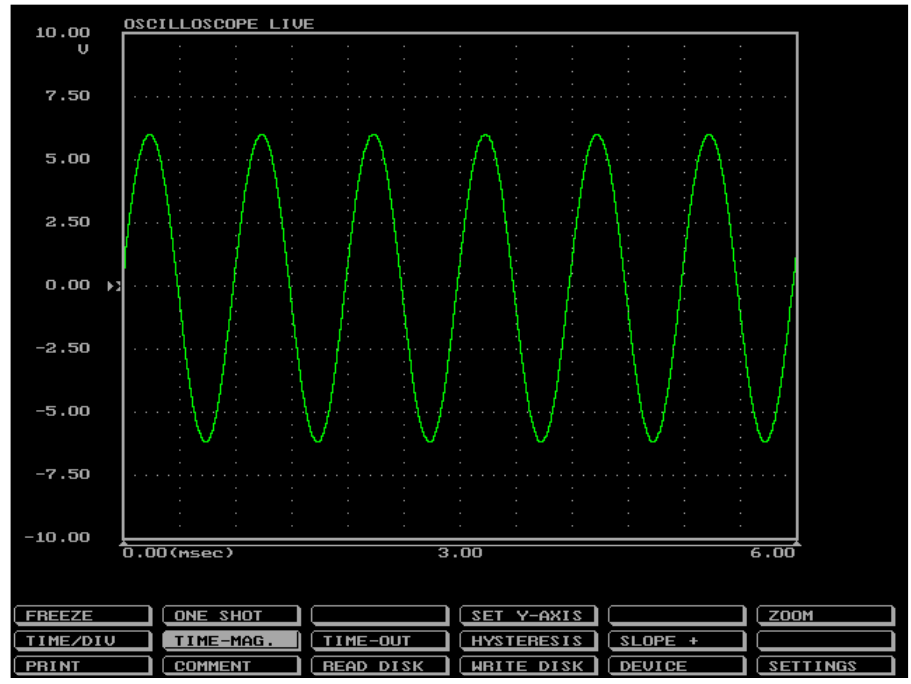


Figure 1—The µScope's oscilloscope display of a 1-kHz sine wave.

Table 2
TiePie Engineering µScope: accuracy

Frequency		*RMS Voltage @ 5 kHz*	
Signal Generator†	***µScope***	***Signal Generator†***	***µScope***
0.5 kHz	0.496 kHz	1.00 V ac	0.94 V ac
1.000 kHz	1.000 kHz	1.50 V ac	1.25 V ac
1.500 kHz	1.500 kHz	2.00 V ac	1.60 V ac
2.000 kHz	1.996 kHz	5.00 V ac	3.63 V ac
5.000 kHz	4.990 kHz	7.50 V ac	5.XX V ac
7.500 kHz	7.508 kHz	10.0 V ac	7.XX V ac
10.00 kHz	9.98 kHz[1]		Readings unstable
12.50 kHz	12.46 kHz[1]		above 10V
20.00 kHz	18.88 kHz[2]		
30.00 kHz	29.73 kHz[2]		
35.00 kHz	34.63 kHz[3]		
38.00 kHz	37.3X kHz		

†Calibrated HP-8116 signal generator
XDigit unstable (varying by 5 or more)
[1]Moderate waveform distortion on µScope display screen.
[2]Severe waveform distortion on µScope display screen.
[3]Waveform shape on µScope display screen not useful above 30 kHz.

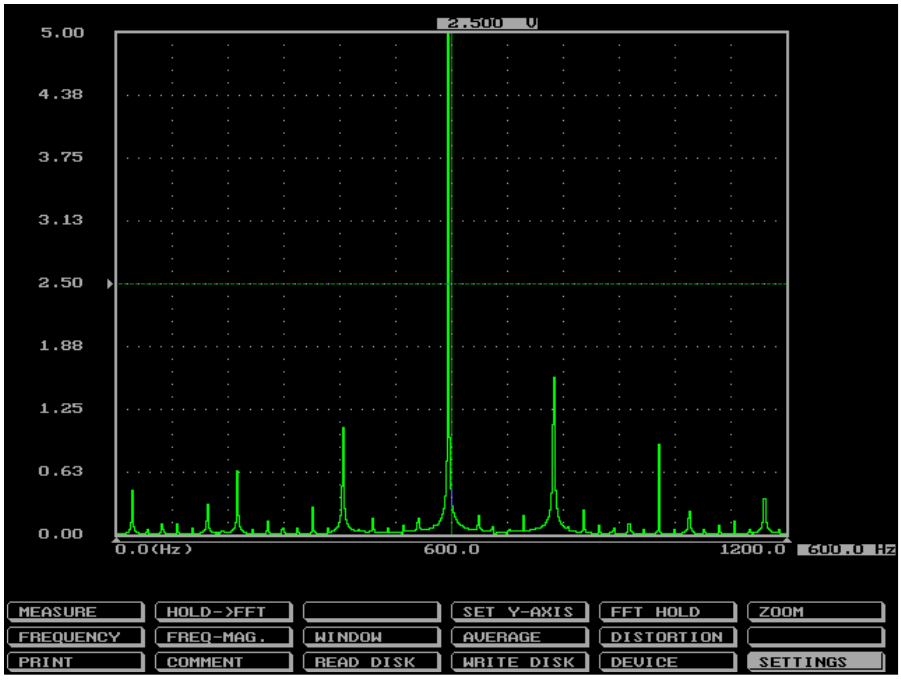


Figure 2—The spectral display of a 5V, 600 Hz square wave with the µScope in the spectrum analyzer mode. Notice the position readings for the measurement cursor at the top center and to the lower right of the display field. The cursor crosshair is shown set to the center of the screen (2.500 V, 600 Hz).

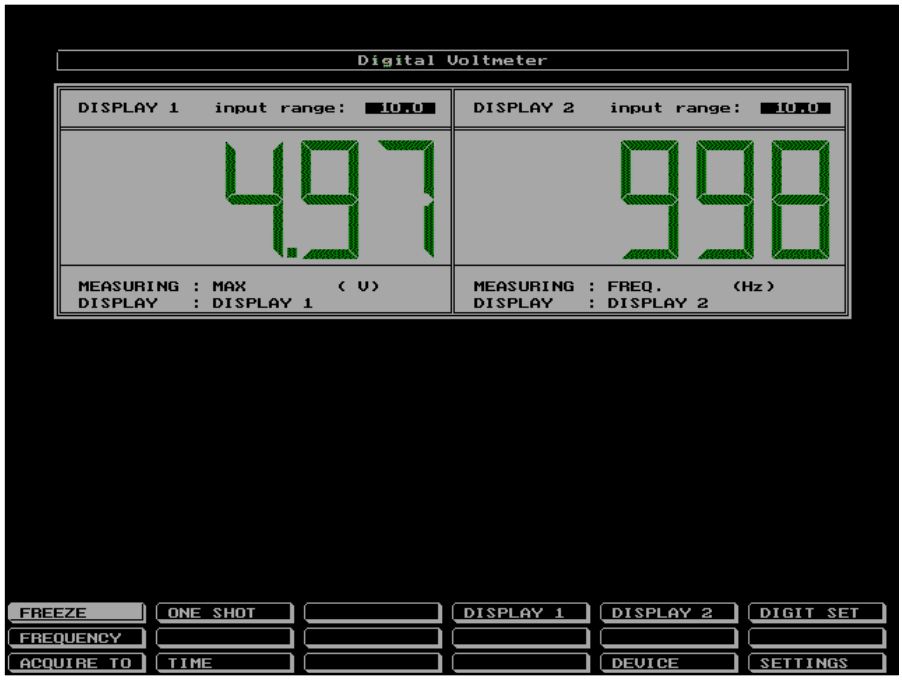


Figure 3—The µScope's digital voltmeter function, showing voltage and frequency. See the text for information on its additional measurement capabilities.

captured data). A mouse is not required to run the program, but it does make it easier to work with some of the µScope's more interesting features (more on this later). When the program is started, you see a welcome screen flash by and then the oscilloscope screen appears. The trace display window is large, occupying about the top three-quarters of the screen. Across the bottom are three rows and six columns of control and function "buttons." The currently selected button appears in reverse video and the selection can be changed with the cursor keys or the mouse (the highlight follows the mouse pointer). The default display color scheme is basic white on a black background with a cyan trace, but you can change either of these to one of 16 other colors to suit your personal tastes.

The program is fairly intuitive. Once I had the basics down, I only had to refer to the manual for an explanation of a few minor details. The oscilloscope and voltmeter screens offer voltage autoranging, so you only have to be concerned about keeping the input voltage within the hardware's limit of ±20 V (the included 10x probe gives you a range of ±200 V at the probe tip). A striking difference between the program's oscilloscope display and the CRT of most 'scopes (older ones, at least) is that the voltage and time scales are marked directly on the screen in the units they represent. You don't have to convert divisions and values per division to know, for example, that a TTL signal you might be looking at is varying between 0.3 and 4.5 V dc. In the hold (storage) mode, the 'scope screen has a cross-hair cursor that you can position anywhere within the display window for more precise measurements. This is one of the times when the mouse comes in real handy, since the keyboard control of the cursor position is rather slow and awkward. The voltage and time values for the cursor's location appear in reverse video at the top and bottom of the display area, respectively. You can also use the cross-hair cursor to make relative measurements easily. To do so, the reference position is set to a relative zero (the displayed coordinates reset to zero) and any subsequent movement of the cursor will show values relative to the point you initially selected.

In spectrum analyzer mode, voltage autoranging is not available, but the maximum displayed value can be toggled between 20, 10, 5 and 2.5 volts. You can also set it to a log scale (reading in dB). The same cross-hair cursor used for the oscilloscope also appears on the spectrum analyzer screen and can be used to the same advantage. The spectrum analyzer defaults to the hold mode and a new set of samples is taken only when you press the measure button. While the analyzer is sampling, a message box pops up and says, "measuring, please wait..." Although you can switch the analyzer to a live mode, it is inconvenient to use because the aforementioned message stays on the screen, preventing you from accessing any of the control buttons. The escape key stops the sampling process and cancels the message, however.

Data displayed on the oscilloscope and spectrum analyzer screens can be saved to disk and then loaded and redisplayed at a later time. The transient recorder data is always saved to disk (in addition to being plotted on the display). The voltmeter function also allows you save readings to a disk file and will continue to do so until you stop the process. (When the instrument is in this mode, a message box pops up to let you know readings are being saved to prevent you from unknowingly filling up your hard drive.)

Live output, captured output and saved

data can all be sent to a printer, *but the choice of printers is limited*. You'll need to have either an HP-compatible laser printer or an Epson-compatible dot matrix printer. The printer in my shack doesn't emulate either of these, so I had to make use of one of the HP LaserJets at work. This printer normally resides on the network, but I temporarily disconnected it for testing purposes (because our network is Windows based, I couldn't try using the printer while it was still on the network. I don't have access to a DOS based network, so I don't know if the µScope will allow network printing). Printout quality on the laser was excellent and the trace window is $4^1/_4 \times 6^3/_8$ inches on a standard $8^1/_2 \times 11$ sheet.

One of the flea market specials in my collection is a no-name audio CW filter. I was curious as to what its bandwidth and passband shape was, but previously had no convenient way to find out. I hooked it up to my receiver and tuned to a noisy section of 80 meters. I used the µScope's spectrum analyzer function to view the passband spectrum. The display showed rather shallow filter skirts with a –6 dB bandwidth of about 400 Hz. Not ideal, but not bad for a filter I picked up for next to nothing.

Next I decided to check the effect of the weight control on my Curtis 8044-based keyer. I only operate CW on occasion, so I have a bit of trouble discerning by ear what the actual effect of this control is. With the µScope's oscilloscope display, it was easy to measure the dit and dah times and adjust the weight control for a 1:3 nominal ratio. (Sharp-eyed readers will note that this is something that we also did in our August 1997 *QST* Product Review of the Radio Shack ProbeScope.)

Another "bargain table special" that I had picked up is a homebrew power supply. I wanted to see if the filter capacitors were working as well as they should, so I put a full load on the supply and used the µScope to check the peak-to-peak ripple voltage. A quick check of the *ARRL Handbook* section on power supply filter calculations showed that the caps were indeed working "up to snuff."

The TiePie Engineering µScope is a good value for those who have a computer in the shack and need a collection of audio-frequency test instruments. Although its performance may not be quite as good as some of the full size (and higher-priced) alternatives, it offers a wide variety of measurements capabilities in a compact and economical package.

Manufacturer: TiePie Engineering, Koperslagersstraat 37, 8601 WL, Sneek, The Netherlands; **http://www.tiepie.nl/**. TiePie products are distributed in the US by Conway Engineering, 8393 Capwell Drive, Oakland, CA 94621; 800-626-6929; 510-568-4028, fax: 510-568-1397; **http://www.conway-engineering.com/**. Price: $119.

SOLICITATION FOR PRODUCT REVIEW EQUIPMENT BIDS

[In order to present the most objective reviews, ARRL purchases equipment off the shelf from dealers. ARRL receives no remuneration from anyone involved with the sale or manufacture of items presented in the Product Review or New Products columns.—*Ed.*]

The ARRL-purchased Product Review equipment listed below is for sale to the highest bidder. Prices quoted are minimum acceptable bids, and are discounted from the purchase prices. All equipment is sold without warranty.

Yaesu FT-8100R 2-meter/70-cm FM mobile Transceiver (see "Product Review," November 1998 *QST*). Minimum Bid: $330.

ICOM IC-207H 2-meter/70-cm FM Mobile Transceiver (see "Product Review," November 1998 *QST*). Minimum Bid: $240.

Standard C510A 2-meter/70-cm FM handheld transceiver with with CPB510DA Docking adapter 50 W mobile converter (see "Product Review," April 1998 *QST* and November 1998 *QST*). Sold as a package only. Minimum Bid: $435.

Kenwood TM-G707A 2-meter/70-cm FM Mobile Transceiver (see "Product Review," November 1998 *QST*). Minimum Bid: $245.

Alinco DJ-190T 2-meter FM handheld transceiver (see "Product Review," December 1997 *QST*). Minimum Bid: $130.

Alinco DJ-280TH 1.25-cm FM handheld transceiver (see "Product Review," January 1999 *QST*). Minimum Bid: $150.

Pryme PR-222 1.25-cm FM handheld transceiver (see "Product Review," January 1999 *QST*). Minimum Bid: $145.

PC Electronics TC70-10 70-cm ATV Transceiver with transmit crystals for 439.25 and 434.0 MHz (see "Product Review," December 1998 *QST*). Minimum Bid: $345.

MFJ-224 2-meter FM Analyzer (2 units available) (see "Product Review," November 1998 *QST*). Minimum Bid: $110 each.

Sealed bids must be submitted by mail and must be postmarked on or before March 1, 1999. Bids postmarked after the closing date will not be considered. Bids will be opened seven days after the closing postmark date. In the case of equal high bids, the high bid bearing the earliest postmark will be declared the successful bidder.

In your bid, clearly identify the item you are bidding on, using the manufacturer's name and model number, or other identification number, if specified. Each item requires a separate bid and envelope. Shipping charges will be paid by ARRL. Please include a daytime telephone number. The successful bidder will be advised by telephone or by mail. No other notifications will be made, and no information will be given to anyone other than successful bidders regarding final price or identity of the successful bidder. If you include a self-addressed, stamped postcard with your bid and you are not the high bidder on that item, we will return the postcard to you when the unit has been shipped to the successful bidder.

Please send bids to Bob Boucher, Product Review Bids, ARRL, 225 Main St, Newington, CT 06111-1494. QST

New Products

RITTY 3.0 Now Available

◊ *RITTY* version 3.0 by Brian Beezley, K6STI, is now available. This innovative software package enables soundcard-equipped PCs to send and receive Baudot RTTY.

RITTY 3.0 includes extensive changes to the DSP receive algorithm to further improve the software's already outstanding weak-signal performance. In addition, *RITTY 3.0* includes a ticker-tape text readout below the waveform display. The special five-pixel-wide font exactly aligns text characters with the waveform samples from which they were derived so you can visually correlate decoding errors with signal corruption.

RITTY 2.0 included PACTOR, but most users indicated little interest in PACTOR operating. So, to reduce the size and cost of *RITTY 3.0*, PACTOR has been eliminated in this version. You can now purchase *RITTY 3.0* for only $100. You can upgrade from *RITTY 2.0* for $50. And if you purchased *RITTY 2.0* after November 1, 1998 you can upgrade to *RITTY 3.0* for only $20 until February 1, 1999. Minimum system requirements: 486DX-66 PC with VGA display and a 16-bit Creative Labs sound card (no "compatibles"). Brian Beezley, K6STI, 3532 Linda Vista, San Marcos, CA 92069; tel 760-599-4962; **k6sti@n2.net**; **http://www.megalink.net/~n1rct**.

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◊ Vibroplex's new Wooden Key Cases are designed to protect original Vibroplex "bugs" from the rigors of the environment. The handcrafted hardwood cases have brass hinges and handles, soft felt-lined interiors and serialized brass logo plates.

Price: $119.95 plus shipping and handling. For more information, contact Vibroplex, 11 Midtown Park E, Mobile, AL 36606-4141; tel 800-840-8873, fax 334-476-0465, **w4oa@vibroplex.com**. QST

Next New Product

New Books

MY 20 YEARS OF RV ADVENTURES

By Everett L. Gracey, WA6CBA

Published by Everett L. Gracey, PO Box 6000, Reno, NV 89513-6000; tel 702-324-3290; fax 702-324-3289; gracey@eg.reno.nv.us. First edition, 1998, 55 pages, 9 × 6 inches, B & W illustrations. $9.95 (Nevada residents add sales tax.)

Reviewed by Steve Ford, WB8IMY
QST *Managing Editor*

At first glance *My 20 Years of RV Adventures* appears to have nothing whatsoever to do with Amateur Radio, other than the fact that the author is a ham. You won't find a single call sign in this book, and there are only momentary references to antennas or transceivers. So why would *QST* devote paper and ink to a review?

The answer is that an increasing number of ham retirees (including those opting for early retirement at 55 and even younger) are choosing to enjoy their senior years on the road in *recreational vehicles*, better known as RVs. No doubt you've seen these behemoths on the highway; homes on wheels with almost every amenity except basements. Some RVers use their vehicles for extended vacation trips, but a substantial number call their RVs "home" on a *permanent* basis. They travel the continent like modern-day hobos, cruising from one RV campground to another, and visiting friends and relatives along the way.

Amateur Radio is often an integral part of the RV experience. The RV becomes a platform for HF, VHF and even satellite operations. There are HF nets devoted to RVs. An RV-mobile amateur can even use HF digital modes such as PACTOR to link with gateway stations and exchange e-mail with nonham friends and family via the Internet. With Amateur Radio onboard, you are never out of touch, no matter where your journeys make take you.

Making the decision to adopt a nomadic RV lifestyle isn't one to be taken lightly, and that's where *My 20 Years of RV Adventures* is of greatest value. Everett has condensed two decades of RV experience into a mere 55 pages (it's really more of a "booklet" than a book).

My 20 Years of RV Adventures is mostly a cautionary tale. Everett isn't trying to frighten you away from the idea of embracing the allure of the open road. Even so, he *does* want you to make sure you understand the hard facts and pitfalls before you plunk down great wads of cash on the RV of your dreams.

Everett's shopping tips include asking the dealer if you can take the RV through a truckwash before you commit to a purchase. The idea is to look for any signs of water leakage, one of the banes of RV travelers. He suggests you check the power inverters carefully. Will they power your TV and other electronics (in other words, your ham gear) without contributing noise and interference? And how loud is the engine? Would a diesel engine be quieter? If you choose diesel, will you always be able to find fuel? These are just a few tips in a rather extensive list.

To show what can happen when you choose unwisely, Everett offers his own experience with what could best be described as the "RV from Hell." Although Everett wasn't trying to be funny, I couldn't help but laugh as he as his wife faced one unbelievable crisis after another with their new RV—including brake failure while descending a steep mountain pass. The entire experience reads like a cross between *National Lampoon's Vacation* and the Old Testament *Book of Job*.

If you're dreaming about chucking your current homestead and buying something mobile, I strongly suggest that you pick up a copy of *My 20 Years of RV Adventures* first. If you finish the book and still have the strength of your conviction, go for it! Just keep the book handy as you purchase and equip your highway haven. Everett Gracey has done most of the hard work and suffering for you. Follow his advice and you'll avoid costly mistakes.

DRAGONFLY—NASA AND THE CRISIS ABOARD *MIR*

By Bryan Burrough

Published by Harper Collins, New York, NY. 1998. 528 pages with index; 6½×9½ inches, B&W illus; ISBN-0-88730-783-3. $26.95.

Reviewed by Sandy Donahue, W4RU
Georgia Section Manager

On June 25, 1997 at 12:06 PM, a collision between the space station *Mir* and an unmanned Russian supply ship caused havoc aboard the station and caught the immediate attention of an American populace long blasé about the dangers of space flight. Aboard the *Mir* were two Russian cosmonauts and a British-born US astronaut, Mike Foale, KB5UAC. The collision punctured a hole in one part of the space stations causing it to decompress and putting the three in great danger. The story of the events leading up to the collision and its aftermath is chronicled in a new book *Dragonfly—NASA and the Crisis Aboard Mir* by Bryan Burrough.

The author, writer of the bestseller *Barbarians at the Gate*, strips off the "Right Stuff" veneer of NASA public relations puffery and leads the reader step-by-step, minute-by-minute through the mistakes, foul-ups, and ego-trips that brought two such culturally diverse countries to attempt such a joint venture. In examining the day-to-day lives of the astronauts aboard *Mir*, Burrough touches on Amateur Radio aboard the station and the sometimes critical role that it was *not* designed to perform.

Burrough does not devote a great deal of print to our hobby. In fact the words "ham radio" or "Amateur Radio" never appear in the index. The *Mir* International Amateur Radio EXperiment (MIREX) is never mentioned. But this footnote appears on page 148: "The *Mir* astronauts send e-mail via ham radio with the help of software called the packet system. They refer to sending 'packets' back and forth, and sometime use the word as a verb: I'll packet that to you tomorrow."

A huge problem in the joint program was a lack of compatibility that made *Mir*-to-ground communication spotty when the spacecraft was not over Russia. When astronaut Jerry Linenger, KC5HBR, came aboard for his tour, he became very frustrated with his inability to use "voice-coms." For a while he refused to speak at all, relying instead on e-mail and packet radio—much of it relayed through a California ham—to send official and personal messages.

The problem with communication while over the US was actually solved by a NASA engineer and ham; Mark Severance, N5XWF, but no one paid attention:

> *"Analyzing the signal between* Mir *and the two (US) ground stations, he recognized two problems that should have been obvious to any amateur ham [sic] operator. For one thing, the NASA receivers weren't adjusting the signal to account for a simple auditory concept called the Doppler Effect. 'This is something that ham guys correct for on every pass, and yet we weren't doing that,' remembers Severance."*

Burrough goes on to describe an even more basic reason for communication problems while *Mir* was above the US. NASA receivers are set up for narrowband FM (5 kHz). The Russian space station was transmitting at their standard of 30 kHz. "This was something any 14-year-old hobbyist could have seen, but for some reason NASA hadn't," Burrough writes. (Burrough didn't get it quite right either. He rendered the deviations as "5 megahertz" and "30 megahertz."—*Ed*)

There are many other references to Amateur Radio in the book. After the almost-catastrophic collision, the module in which Mike Foale resided was not habitable. Fortunately the ham equipment was not located in that module of the station. With few official duties aboard *Mir*, Foale had more time to chat with his ham friends, according to Burrough.

The author pulls no punches when it comes to criticizing both the US and Russian space authorities, who, he says, had differing reasons to rush the joint program into action with seemingly little thought to the cultural, emotional, and scientific disparities that each side brought to the project. With the International Space Station now under construction, the author wonders if both nations have learned the lessons taught by the near disaster in space. QST

Hints & Kinks

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

LONGER LAMP LIFE

◊ Are your grain-of-wheat (actually any) lamps burning out too often? There are few things I dislike more than disassembling radio gear to replace the little 12-V lamps that light S meters, dials and the like. Well, I can't say lamp life is short, but one thing is certain: Burning a 12-V lamp at 13.8-V or more won't *lengthen* its life.

I've lengthened lamp life by wiring a 120-Ω, 1/4-W resistor in series with each lamp. I choose the resistor to drop a few volts across it, so the lamp gets only 12 V or a little less. This dims the light slightly (the power drops about 25%—*Ed*). The effect is miniscule in use, but it's a winner in the lamp-life area.

This technique also helps if you need to replace a 12-V lamp and only 6-V replacements are available. A 6-V lamp can "pinch hit" for a 12-V lamp if you use a 390-Ω resistor to drop 7 or 8 V in a 12-V circuit. (This reduces the power by 50%. I recommend a 6-V lamp with about twice the current of the 12-V lamp. That keeps the power, light output, about the same. Also, check to be sure that the supply circuit can handle the additional current.—*Ed.)* I like to use a 120 or 100-Ω resistor for a 12 V lamp.—*Jay Craswell, W0VNE, 321 W 4th St, Jordan, MN 55352-1313;* **73016.27@compuserve.com**

[Editor's note: While editing Jay's hint for publication, I learned a few things. Jay uses a 100-Ω resistor to produce a 2-V drop, which implies that the lamp current is 2 / 100 = 0.02 A = 20 mA. The lamp table in *The '98 Handbook* (based on the 1994 Sylvania Miniature Lamp catalog) shows several lamps in that current range, but *none* are rated at 12 V, and all have substantial service-life ratings.[1]

While the table lists a few lamps rated at 12 V and far more at 14 V, none are grain-of-wheat bulbs. Most grain-of-wheat lamps (a T-1 or smaller bulb shape, with wire terminals) are rated at 5, 10 or 28 V. Table 1 shows data for some small lamps selected from the *Handbook* table. If manufacturers use 5-V lamps in 12-V applications, it's easy to see why lamp life is short. RadioShack offers 12-V grain-of-wheat bulbs. Check page 198 of their 1999 catalog.

It seems that the real issue here is choosing the right lamp for the application. I see a couple of "good practice" solutions: Where a T-1 is required, use an 8099 (18 V) lamp with no dropping resistor. Its life is about 16 years! If there's room for a T-1 3/4 bulb (almost 1/4-inch diameter) and you want *long* lamp life, use an 1869 or 7344 lamp with a 390-Ω series resistor to drop 15 V to 10 V. They draw only 14 mA and offer a lamp life of 45 years! Several 14-V lamps in this size offer reasonable life (15 years) with no dropping resistor, but they draw 80 to 100 mA.]

[1]Most radios operate only two to three hours each day—about 1000 hours a year. Let's use that figure in this discussion. That means a lamp life of 4000 hours yields about four years of useful life.

Table 1

Miniature Lamps with T-1 3/4 or Smaller Bulb, 5 < V < 24 and Wire Terminals or Bipin Bases, Selected from *The 1998 ARRL Handbook*.

Lamp #	Base	V	A	Life†
T-3/4 Bulb (3/32-inch diameter)				
6803AS25	WT	5.00	0.060	60 k
6833AS15	WT	5.00	0.060	25 k
7153AS15	WT	5.00	0.115	40 k
T-1 Bulb (1/8-inch diameter)				
7265	BP	5.00	0.060	5 k
680AS15	WT	5.00	0.060	60 k
683AS15	WT	5.00	0.060	25 k
715AS15	WT	5.00	0.115	40 k
715AS25	WT	5.00	0.115	40 k
8099	BP	18.00	0.020	16 k
T-1 3/4 Bulb (7/32-inch diameter)				
3149	BP	5.00	0.060	5 k
7361	BP	5.00	0.060	25 k
7362	BP	5.00	0.115	40 k
7328	BP	6.00	0.200	1 k
7945	BP	6.00	0.040	20 k
1730	WT	6.00	0.040	20 k
2307	BP	6.30	0.200	5 k
2337	BP	6.30	0.200	20 k
7349	BP	6.30	0.200	5 k
7377	BP	6.30	0.075	1 k
7380	BP	6.30	0.040	30 k
7381	BP	6.30	0.200	20 k
2180	WT	6.30	0.040	20 k
2181	WT	6.30	0.200	20 k
7344	BP	10.00	0.014	50 k
7367	BP	10.00	0.040	5 k
1869	WT	10.00	0.014	50 k
2107	WT	10.00	0.040	5 k
7371	BP	12.00	0.040	10 k
2335	BP	14.00	0.080	15 k
7330	BP	14.00	0.080	1.5 k
7373	BP	14.00	0.100	10 k
7382	BP	14.00	0.080	15 k
7410	BP	14.00	0.080	15 k
1705	WT	14.00	0.080	1.5 k
2162	WT	14.00	0.100	10 k
2182	WT	14.00	0.080	40 k
2316	BP	18.00	0.040	10 k
7370	BP	18.00	0.040	10 k
2102	WT	18.00	0.040	10 k

†k = 1000 hours

A PADDLE-POLARITY SWITCH

◊ I was not satisfied with the keyer weight control on my FT-1000D, so I purchased an MFJ-407C Deluxe Keyer. My Bencher paddle is wired so that the left (thumb) paddle produces dots when connected directly to the Yaesu, but the keyer is wired so that I must reverse the paddle leads (underneath the paddles) to continue producing dots with the thumb paddle. Although this represents only a minor nuisance, it means that I would not be able to again key the Yaesu directly after the change. The obvious solution is a reversing switch that instantaneously swaps the paddle leads.

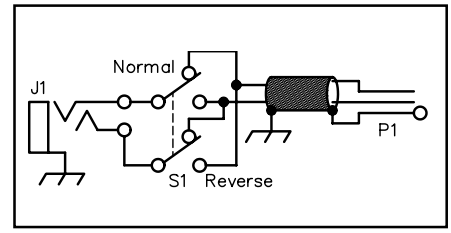

Figure 1—Schematic of W4ITD's paddle polarity switch.

I obtained all the components required for this simple circuit from RadioShack. The switch and wiring is housed in an aluminum box (#270-235) that measures only 2 3/4×2 1/8×1 5/8 inches (HWxD). A DPDT subminiature toggle switch (#275-614), connector and cable mount on the outer (flanged) half of the box. The switch is in the center of the top side. One end has a three-conductor, 1/4-inch phone jack (#274-312A); the other has a hole that passes a shielded, two-conductor mike cable—about two feet long—with a stereo 1/4-inch plug at its end.

The wiring is simple, and the total time to drill three holes, mount the components and wire them together required is perhaps two hours. Now I am able to use the paddle with any keyer.—*Steve Taber, W4ITD, 25 Cunningham Dr, New Smyrna Beach, FL 32168*

LABELS FOR WALL CHARGERS

◊ It seems as if every piece of electronic equipment I own has its own plug-in-the-wall transformer for power or charging batteries. I have about six supplies from RadioShack alone; so just reading the name on the transformer is not enough! In addition, the rechargeable batteries for each device have different charging times! Since I have enough problems remembering what day of the week it is (Gee, do I work today?), it's obvious that I need a little help. Here's the solution: I attach a small, self-adhesive label to each transformer. Then I write the name or model number of the device and its recommended charging time on the label. This makes it very easy to ensure that every battery is charged at the proper rate and time. Now if I could only keep all those transformers in one place!—*Wendell Smith, N9REP, 62 Barberry Dr, Crystal Lake, IL 60014;* **wendell@mc.net**

IC SOCKETS IN A PINCH

◊ While accumulating parts to build Ron Alspough's "A Computer Keyboard CW Encoder" (*QST*, Dec 1997, page 32), I couldn't find a 24-pin DIP socket to hold the 87C751 chip. I didn't feel like driving 60 miles to the nearest well-stocked parts shop to pick one up either. On a lark, I tried fitting the lengthy chip into three eight-pin DIP sockets, and it worked perfectly. So, when you're short a long DIP (or SIP—*Ed.*) socket for a project, use a couple of shorter ones to make do.—*Richard Stuart, WF7A, 5823 Sunview Ct SE, Lacey, WA 98513-4106;* **write2ft@halcyon.com**

6146B SUBSTITUTION

◊ As those of us know who have Kenwood and other rigs using 6146B/8298As in the final stage, replacements for these tubes are becoming expensive. I recently received a Summer Supplement catalog from Antique Electronic Supply listing 6883B/8552s for $5 each, about one quarter of the going rate for new 6146Bs. These tubes are exactly like 6146Bs except they have 12.6-V (at 0.625 A) heaters. The heaters for 6146Bs take 6.3 V at 1.125 A.

I ordered and received what appeared to be "new old stock," name-brand, American-label 6883Bs, which tested good on my TV7-B/U military tube tester.

I reviewed my TS-530S and TS-830S service manuals and found that for both transceivers, Kenwood uses the same 12.6-V transformer winding to supply the heaters of the 12BY7A driver (which has a 12.6-V heater) and the 6146B finals. Kenwood wired the 6146B heaters *in series*, thereby dropping 6.3 V across each when the heater switch is on.

The manual calls the 6146Bs V1 and V2. Heater pins for these tubes are 2 and 7. Pin 2 of V1 and pin 7of V2 sockets are connected to the hot and ground sides of the 12.6-V supply, respectively. A jumper on the final-amplifier PC board connects V1 pin 7 to V2 pin 2, thereby connecting the heaters of those tubes in series. Removing that jumper, connecting V1 pin 7 to ground and V2 pin 2 to 12.6 V connects the heaters of both tubes in parallel across the 12.6-V supply. It's not difficult. I bet you Kenwood thought about someone doing just that when engineering their 6146 rigs!

It is even possible to set up a DPDT switch to select between series and parallel heater connections, but I didn't do that. (Figure 2 shows how to wire such a switch.—*Ed.*)

The heater requirements of the two tube pairs are identical: Series-connected 6146Bs draw 1.125 A, as do parallel-connected 6883Bs. Just remember to reverse the wiring changes (or flip the DPDT switch, if connected) if you go back to 6146Bs. The 6883Bs do have slightly more capacitance from grid 1 to the plate (0.24 pF versus 0.22 pF). Make sure to properly neutralize the new tubes.

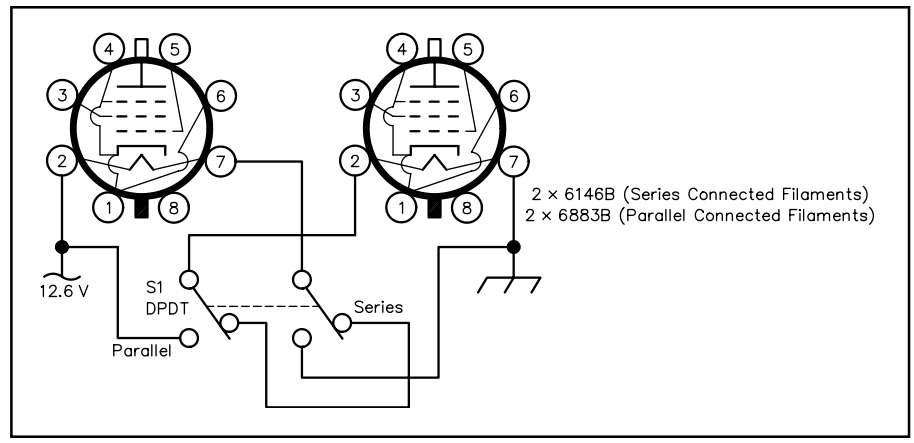

Figure 2—Schematic of switch arrangement for selecting series or parallel filament connection. S1 is a DPDT switch suitable for switching several amperes, such as RadioShack #275-403.

This filament arrangement is common in vacuum-tube radios because driver tubes often have a 12.6-V filament. It's possible to use 6883Bs in such rigs as Collins KWM-2s, Heathkit SB-102s, Johnson Rangers and so on—any rig designed around two 6146A, or B, finals. (Watch out! I checked to see if similar conversion is possible for Yaesu rigs. It should be for FT-901, FT-902 and FT-101ZD series, but earlier FT-101 series used sweep tubes, not 6146s.An article in *Radio ZS* (Aug 1998, pp 12-13) describes the conversion of an FT-101B to use 6146Bs. *Radio ZS* is the journal of SARL, the South African Radio League, **http://www.sarl.org.za/**.—*Ed.*) If the radio does not have a 12.6-V filament circuit, it's reasonably simple to install a new, properly sized 12.6-V filament transformer and associated wiring.—*Bob May, K4SE, PO Box 453, Jonesboro, TN 37659;* **robtmay@juno.com**

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

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New Products

GEOCLOCK, EXTRAS NOW ON CD-ROM

◊ GeoClock, the venerable global timekeeping and mapping program used by thousands of hams, is now available in version 8.1 on CD-ROM. The CD is packed with goodies, including DOS and *Windows* versions of *GeoClock*, *GeoGlobe*, and nearly 500 specialized maps (domestic and worldwide), many released here for the first time.

The year-2000-compliant (of course!) program lets you create flat and view-from-space maps with the click of a mouse. *GeoGlobe* can even run as a screen saver. A Ham Package add-on can create az-eq maps centered on your location, complete with graphical display of a remote station location, pointing angle, propagation path and more.

Price: $50, CD; $15, *GeoClock* on floppy disks; $15, ham package add-on (include your call sign and latitude/longitude); $5, extra for international airmail. For complete details, contact GeoClock, 2218 N Tuckahoe St, Arlington, VA 22205; fax 703-241-5809, **geoclock@compuserve.com**; **http://www.clark.net/pub/bblake/geoclock**.

NEW HAM RADIO KITS FROM VECTRONICS

◊ Vectronics' line of ham radio and communication-related hobby kits now includes more than 30 high-quality offerings. These include shortwave converters, crystal sets and ham radio receivers, transmitters, keyers, preamps and more.

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For prices and complete information, contact Vectronics, 1007 Hwy 25 S, Starkville, MS 39759; tel 601-323-5800, fax 601-323-6551, **http://www.vectronics.com**. QST

Next New Product

Technical Correspondence

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

COMMENTS ON A "VOICE-BALANCING AUDIO PEAK CLIPPER"

By Wes Stewart, N7WS,
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◊ This note is prompted by my concern about the article by John Burger, WB6VMI, in the July 1998 issue of *QST*.[1] From its tone, the article appears to be directed to beginners and I believe it does them (and their ham neighbors) a disservice. In addition to some of the phrases such as *"sidebands that deviate by more than they should from the reference frequency of a carrier"* and *"audio transformers and filtering capacitors that smooth the flow of an audio waveform,"* the most troublesome aspect of the article is the implication that the building and adjustment of an audio peak clipper is a simple process.

Although Burger's interests may focus on older tube-type DSB-AM equipment where simple audio speech clipping is more appropriate, today's beginning ham is much more likely to be using an SSB transmitter. In the latter case, audio speech clipping is most certainly nontrivial and is beyond the scope of a simple beginner's project.

Burger states that overmodulation can result in "splatter," and that by using an audio peak clipper this splatter can be prevented. He also claims that human voice waveforms are asymmetrical and that this condition needs special treatment. I would like to comment on these claims in turn.

Clipping and SSB

It is true that splatter[2] and excessively broad signals can result from overdriving the audio input (or any other stage) of a transmitter and that in some cases, judiciously applied audio peak clipping can be of assistance in alleviating the problem. However, it is equally true that the cavalier use of peak clipping can actually be counterproductive in the case of an SSB transmitter.

When a sine wave is *symmetrically* clipped or hard-limited, odd-order harmonics of the fundamental are generated, with the level of the harmonics increasing as the clipping becomes more severe. If there is *any* asymmetry, even-order harmonics are also produced. A sine wave that has undergone a large amount of symmetrical clipping approaches the appearance of an ideal square wave. In fact, Figure 3 in Burger's article is an example of this. By scaling the waveforms in the figure, I estimate that at least 15 dB of clipping is occurring in the "simple" clipper. This is a significant amount of clipping and is, in my opinion, beyond the realm of a device used to reduce "accidental overmodulation."

In the ideal square wave, the *in-phase* fundamental and odd-order harmonics add to produce the overall envelope. Figure 1 demonstrates this. In Figure 1, the fundamental and its third and fifth harmonics are shown, along with their arithmetic sum. This could be, for instance, a 500 Hz audio tone along with the 1500 and 2500 Hz harmonics, all of which would pass through a voice-bandwidth filter.

The presence of these harmonics produces in-band distortion. If the intelligibility improvement due to the clipping increases at a faster rate than the intelligibility reduction due to the distortion, then there is a benefit to increased clipping.[3]

The foregoing is true only when the harmonics due to clipping remain in phase with the fundamental. Unfortunately, after the AF to RF translation in an SSB transmitter, this phase relationship is lost. Schreuer[4] points out that when a heavily clipped, low audio frequency sine wave is used to modulate an SSB transmitter, the resulting RF envelope will actually have a 14 dB peak-to-peak variation, as opposed to the anticipated flat output. This comes about because the phases of the harmonics change with respect to the fundamental (see Figure 2). The effect of this is introduction of another modulating frequency (at twice the fundamental). With voice, the phenomenon is more random and occurs less often than in this steady-state example; however, the un-

[1]John Robert Burger, WB6VMI, "A Voice-Balancing Audio Peak Clipper," *QST*, Jul 1998, pp 45-46.
[2]R. P. Haviland, W4MB, "Single Sideband Speech Splatter," *ham radio magazine*, Sep 1975, pp 28-34.
[3]Harold G. Collins, W6JES, "Ordinary and Processed Speech in S.S.B. Application," *QST*, Jan 1969, pp 17-22.
[4]Walter Schreuer, K1YZW, "Speech Clipping in Single-Sideband Equipment," *ham radio magazine*, Feb 1971, pp 22-29.

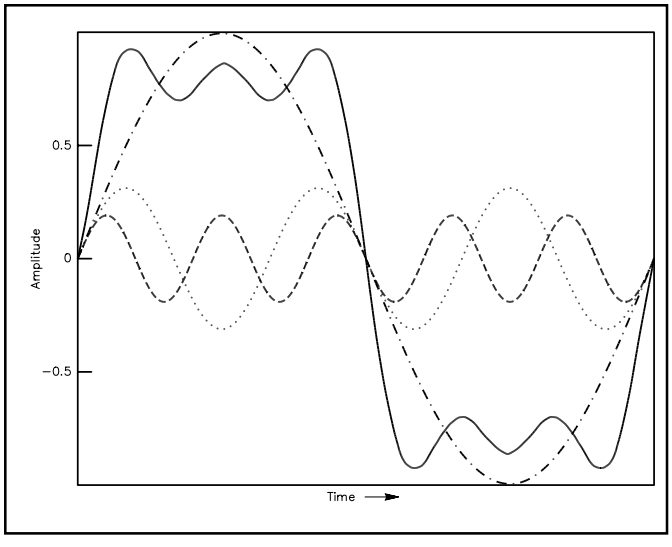


Figure 1—A square wave is the sum of a fundamental and its in-phase odd harmonics. ("In-phase" means the zero crossings are coincident and moving in the same direction.)

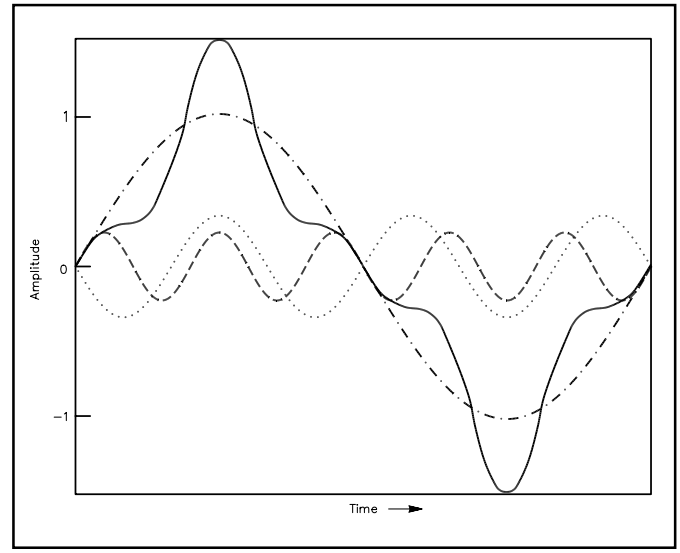


Figure 2—The same components as in Figure 1, with the phase of the third harmonic changed 180°. Note the scale change.

desired peaking still occurs.

Other texts point out that transmitting an ideal audio square wave requires infinite bandwidth and infinite peak power.[5] Of course, a square wave is never ideal, so these extremes are never reached. However, even in this case, the peaks will be very high. If a properly operating ALC is used, it will operate on these peaks and attempt to reduce them to the amplifier's linear region. This has the effect of *reducing* the average output power; exactly the opposite of the desired effect.

Well-designed SSB speech processors that use clipping either operate at the transmitter IF,[6] or—if the clipping is done at AF—use the "split-band" approach.[7] In the RF clipper, the harmonics generated are harmonics of the IF and are easily eliminated, leaving only some small intermodulation distortion products. Several popular transceivers use this method, although it does require a second IF filter.[8]

The split-band approach clips at AF, but does so in suboctave bands and follows the clippers with a second set of identical filters that remove the troublesome harmonics. I found this technique to be extremely effective. The split-band technique is currently used in the Kenwood TS-870S.

The fact that these relatively complicated techniques have been developed for SSB use is a clear indication that audio clipping used in SSB applications is more than a "beginner's" project. If it was that simple, the developers and authors of the referents would have spent their time doing something else.

Asymmetrical Clipping and SSB

Burger suggests that speech waveforms are asymmetrical, with positive peaks exceeding negative peaks or vice versa. He then suggests that the corrective action for this is to set different positive and negative clipping thresholds. Assuming—for the sake of discussion—that Burger's original premise (that the waveforms are asymmetrical) is true, I am still baffled as to why the clipping thresholds should be independently adjusted. First, as stated earlier, with asymmetrical clipping we no longer have only odd-order harmonics to deal with. The even-order harmonics generated are an even more onerous filtering problem.

Second, in the SSB case, there is no correlation between the audio waveform and the RF envelope. If a single audio sine wave is used to drive an SSB exciter, the ideal output is a single RF sine wave. Clearly, there will be no way to perform any kind of "voice balancing" in this situation, particularly when considering the admitted interaction of the two "independent" adjustments. Presumably, this is why the professor suggests adjusting the clipping levels while transmitting AM. Unfortunately, in modern transceivers, the AM is hardly ever true DSB-AM, but is instead SSB with inserted carrier. The use of this mode for clipping level adjustment is still problematic; in addition to two clipping-level adjustments, the reinserted carrier level becomes another variable.

Burger goes on to say that if the AM mode is unavailable, the builder should adjust the clipping controls to "avoid flat-topping." I guess this assumes that the experimenter has available a wide-band oscilloscope with which to observe a cycle or two of the RF signal.

Because any distortion (flat-topping) of this signal will generate harmonics of the carrier frequency, the bandwidth of the oscilloscope must be several times the carrier frequency. It will also be necessary for the observer to have a *very* keen eye in order to detect the onset of limiting (flat-topping). This is almost impossible to do, which is why a two-tone test is the preferred method for adjustment of final amplifier drive level.

In conclusion, I believe that John Burger's heart is in the right place and that he is truly trying to be helpful. However, considering the foregoing, I believe that it is evident that this is *not* a suitable beginner's project.

MORE COMMENTS ON "A VOICE-BALANCING AUDIO PEAK CLIPPER"

By Walter Schreuer, K1YZW,
4 Riverbank Ln, Ipswich, MA 01938

◊ The device described by John Burger, WB6VMI, in the July 1998 issue of *QST*[9] is suitable for FM, AM or any system with symmetrical sidebands. For SSB, however, it is not very useful. My article in *ham radio magazine*,[10] which is not the first on the subject, attempts to show that ordinary audio-frequency clipping should not be used in SSB generation. Jim Fisk, W1DTY (SK), has more on the matter in *ham radio magazine* for June 1976.[11] Early literature by Collins Radio (around 1960) also makes this statement. (Unfortunately, I no longer have a copy. [See Note 5.—*Ed.*])

Here is a brief review of the subject. A clipped wave contains odd-order harmonics that have a precise phase relationship to the fundamental. In an SSB generator, this phase coherence is lost and occasionally the peaks of the components add. To accommodate these without exceeding the PEP rating of the system, the generator input must be reduced by 6 dB. A further reduction is needed to allow for the transient response (ringing) of the SSB filter. To make matters worse, a large second-harmonic component is created (see Figures 2 and 3 of the referent in Note 2). I quote from my February 1971 *ham radio magazine* article: "I recall the outburst of an exasperated local ham who received consistent adverse reports on his $15 transistor clipper: 'It must work—you can't be listening right!'"

Author Burger Replies:

By John Robert Burger, WB6VMI,
836 Charles St, Moorpark, CA 93202;
hceen006@email.csun.edu

◊ The responses are highly appreciated. Of course, audio peak clipping is for beginners only in the sense that it is fairly easy to build. I hope that no one goes off the deep end with it. We are supposed to clip only the occasional random audio peak such that if any clipping is noticeable, there is far too much of it.

My personal view of Amateur Radio is that one must experiment constantly to improve a system, since otherwise, we are mere operators. Look at the bright side. Audio clipping with filtering should not ruin equipment. To the contrary, it can reduce flat-topping in the RF amplifier, especially in AM and FM, and perhaps in SSB also.

Gentlemen, judicious audio clipping in SSB might do some good. We tested a Kenwood TS-440 using single-tone audio, finding no problems while within the passband. Outside of the passband where phase shift is highly variable, below about 300 Hz in some transmitters, simple clipping leads to serious problems as noted. However, SSB is not intended for single tone. Anyway, such problems might someday be solved if *QST* readers are willing to ask that their transmitters accommodate a full voice range. Fellow hams, let's face it. It would be very nice to have an audio system such that the receiver says exactly what is said to the transmitter.

Letters for this column may be sent to Technical Correspondence, ARRL, 225 Main St, Newington, CT 06111, or via e-mail to **ppagel@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing a work, please send the author(s) a copy of your comments. The publishers of *QST* assume no responsibility for statements made herein by correspondents. QST

Feedback

◊ Please refer to "ChannelWatch: A Multiple-Frequency Activity Monitor," *QST*, Nov 1998, page 45, Figure 3. Reverse the polarity of C5; it is shown incorrectly in the schematic. The FAR PC boards have the polarity correctly indicated.—*tnx John Hansen, W2FS*

◊ Please refer to "Using PIC Microcontrollers in Amateur Radio Projects," *QST*, Oct 1998. In Figure 3, page 39, the junction of C2 and R2 should connect to U1 pin 16, not pin 15 as shown.—*tnx John Hansen, W2FS* QST

[5] *Fundamentals of Single Sideband* (Collins Radio Company, Cedar Rapids, IA) 2nd edition, 1959, p 1-15 to 1-16. (This publication is out of print.)

[6] William Sabin, W0IYH, "R. F. Clippers for S.S.B.," *QST*, Jul 1967, pp 13-18.

[7] Wes Stewart, N7WS, "Split-Band Speech Processor," *ham radio magazine*, Sep, 1979, pp 12-19.

[8] Leslie A. Moxon, G6XN, "Performance of RF Speech Clippers," *ham radio magazine*, Nov, 1972, pp 26-33.

[9] See Note 1.

[10] See Note 2.

[11] James R. Fisk, W1DTY, "Novel Audio Speech Processing Technique offers Maximum Talk Power with Negligible Distortion," *ham radio magazine*, Jun 1976, pp 30-34.

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

League Files "Restructuring" Comments with FCC

The ARRL has filed formal comments in response to the FCC's proposed streamlining of the Amateur Radio rules. The League delivered its comments to the FCC December 1, the final day for comments in the FCC's Notice of Proposed Rulemaking in WT Docket 98-143. The ARRL's comments were among the nearly 2000 filed by interested parties in response to the FCC's rulemaking proposal.

The League's filing promoted the ARRL Board of Directors' restructuring positions, adopted last July and fine-tuned at a special meeting in October (see *QST*, Sep 1998, p 48 and *QST*, Dec 1998, p 49). It also took the FCC to task on a few points. The ARRL said the FCC's NPRM failed to contain "a comprehensive license restructuring proposal or even an overall review of license restructuring" and generally "missed the mark."

The League called on the FCC to adopt the ARRL Board's restructuring plans as the centerpiece of its streamlining efforts. Among other things, the League plan calls for eliminating the Novice and Tech Plus licenses to reduce the number of license classes from six to four. The ARRL plan automatically upgrades current Novice and Tech Plus licensees to General. The General license would become the entry-level ticket to HF. Existing Novice and Tech Plus HF CW bands would be "refarmed" to provide additional phone spectrum for General, Advanced, and Extra class licensees.

The FCC also proposed a four-tier license structure, eliminating the Novice ticket and melding existing Technician and Tech Plus licensees into a common database while allowing current Novices and Tech Pluses to retain their current operating privileges. The ARRL said the FCC was on "the right track" in proposing to eliminate the Novice ticket. But the League said its "instant upgrade" plan for Novice and Tech Plus operators is a better approach because it permits "refarming" the underutilized Novice HF subbands. The League called refarming "critical to any comprehensive license restructuring proposal."

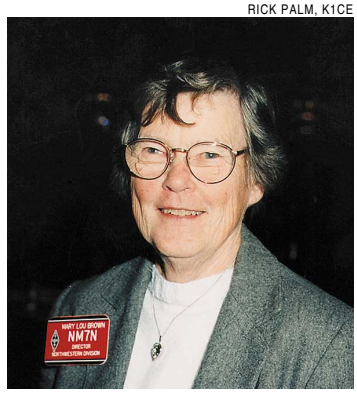
The FCC's NPRM sought comments on the issue of Morse code testing and requirements but offered no specific proposals. The ARRL called for a reduction in the number of Morse code examination tiers from three to two—5 and 12 WPM—and changes in the written examinations to make them more relevant and with greater emphasis on current operating practices and newer digital technologies. The League also recommended that the number of written exam questions "increase incrementally" for all license classes above Technician.

The League said that Morse code should not be overemphasized in the licensing process, but should be continued as a licensing requirement above the entry level. It has proposed that General class applicants pass

Northwestern Division Director Mary Lou Brown, NM7N, SK

Northwestern Division Director Mary Lou Brown, NM7N, of Anacortes, Washington, died December 3, 1998, in Los Angeles. She was 71. Brown had just been re-elected without opposition to a new two-year term on the ARRL Board. Her husband, Bob, NM7M, reports that Director Brown collapsed and died at Los Angeles International Airport, apparently after suffering a heart attack. She was returning from Australia where she had just taken part in the Lord Howe Island, VK9LX, DXpedition.

RICK PALM, K1CE



Mary Lou Brown, NM7N

DXpedition member Nick Hacko, VK2ICV, called Brown "the most-liked person" on the DXpedition. "Although I knew Mary Lou for only a few days, it was very clear to me and to the other Lord Howe operators that she was an exceptional person," he said in an Internet posting after learning of her death. He said Brown helped out with all phases of the operation and deserved "a lot of credit for helping the rest of us get a great lot of enjoyment out of our trip."

Brown had been the ARRL Northwestern Division Director since 1995 and was a vice director from 1990 through 1994. She also served as a member of the ARRL Executive Committee and endowed the $2500 Mary Lou Brown Scholarship that is granted by The ARRL Foundation. She was active in the YLRL, and a memorial fund is being established with the YLRL in her name.

ARRL Executive Vice President David Sumner, K1ZZ, said Brown was held "in the highest possible esteem" by her peers on the ARRL Board. He noted that Brown was elected to the Executive Committee after just one year as a director, and was re-elected twice. "Her enthusiasm for Amateur Radio extended beyond organizational affairs to on-the-air operating, especially operating with friends," he said. "Anyone who was fortunate enough to able to call Mary Lou their friend—and their numbers are legion, all over the world—knows the true meaning of friendship."

Outgoing Radio Amateurs of Canada President J. Farrell "Hoppy" Hopwood, VE7RD, called Brown "a special friend of Radio Amateurs of Canada" who was "always most generous in assisting RAC."

A native of Hawaii, Brown received her doctorate from Columbia University. Before retiring to Washington in 1982, she chaired the physical education department at the University of California at Berkeley for nine years. It was during her years at Berkeley that she met and married Bob Brown, NM7M, a physicist and associate dean at Berkeley.

ARRL Executive Vice President David Sumner, K1ZZ, was among the dozens of fellow amateurs and friends attending a December 17 memorial service for Mary Lou Brown on Guemes Island, Washington, where the Browns made their home.

RICK PALM, K1CE

Greg Milnes, W7AGQ

Northwestern Division Vice Director Greg Milnes, W7AGQ, accedes to the position of Director. Milnes also was just re-elected to a new two-year term. President Stafford will appoint someone to fill the vacant vice director's position.

a 5 WPM code test, while Advanced and Extra applicants pass the 12 WPM code test. Subsequent to release of its original restructuring plan, the ARRL Board also decided to ask the FCC to permit Technician operators to use Morse code on the General class HF CW segments without passing a specific code examination.

The ARRL said acknowledged abuses of the CW disability exemption process were an enforcement, not a testing, issue. For those claiming a disability waiver for the higher-speed CW test, the League urged testing accommodations as a preferable alternative. The League also urged an end to multiple-choice CW exams and proposed adding rules specifying that a passing grade for a Morse examination be either 70 percent correct answers to 10 fill-in questions or one minute out of five of solid copy.

The League also praised the "new dawn" in amateur enforcement undertaken within the Compliance and Information Bureau by Riley Hollingsworth, K4ZDH. The ARRL suggested that it would be "reasonable to withhold any further [rulemaking] action on amateur enforcement" for now and let the CIB continue its work.

The ARRL's comments stressed the value of increasing participation in the hobby and making it available to more people. "By increased participation, Amateur Radio can provide even more service to the United States than it does currently, with a simpler licensing structure," the League asserted.

A complete copy of the ARRL's comments in WT Docket 98-143 is available on *ARRLWeb* at **http://www.arrl.org/news/restructuring/** (see "ARRL's Comments to the FCC on WT Docket 98-143"). Reply comments on the FCC's rulemaking proposals were due January 15. The FCC was not expected to take action on restructuring at least until sometime this spring.

FCC ZEROING IN ON ENFORCEMENT TARGETS

After just a few months of listening and evaluating comments from the amateur community, the FCC's Riley Hollingsworth, K4ZDH, says he's got a good handle on where to focus his enforcement efforts.

"Fully half of the amateur problems on HF relate to a specific group of jammers—malicious interferers who apparently enjoy disrupting as much amateur communication as possible," said Hollingsworth, the FCC's point man for amateur enforcement within the Compliance and Information Bureau. "Enforcement action against this group is long overdue."

Hollingsworth has prepared a report to his boss, CIB Chief Richard D. Lee, detailing his findings and fingering the most serious violators in a "top 10" list which he declined to make public just yet. His memo urged "immediate enforcement action." As of press time in mid-December, Hollingsworth was suggesting that lumps of coal could show up in some Christmas stockings.

Hollingsworth said he's talked with more than 250 people on the amateur enforcement line since the end of September, when the FCC's latest amateur enforcement initiative kicked into high gear. In addition, he has received more than four dozen letters and e-mailed comments concerning problems in the Amateur Service. Hollingsworth has concluded that, while most amateurs abide by the rules, a few habitual offenders continue to flout the law.

"We are not going to stand for the Amateur Service to be further degraded or destroyed by them," he said, rising to a level of indignation comparable to that of the hams who've been calling his enforcement line. "These people don't realize that they are an international embarrassment."

Hollingsworth says that jamming and deliberate interference is the most common problem, accounting for 31% of all complaints. Repeater misuse and jamming account for another 29%. But he considers the HF abuses—most typically reported on 75 and 20 meters—to be the more serious offenses because they can be national or international in scope.

Other general problems such as single instances of jamming, use of obscene language, unauthorized use of call signs, operation beyond license class and poor operating practices accounted for another 17% of the complaints, Hollingsworth said.

A full 10% of complaints concerned an unlicensed individual in California who already has spent time in jail for past convictions.

Hollingsworth has sent out 30 informal "warning letters" to individual operators as a result of complaints. The letters warn the recipients that a complaint has been received about the recipient or someone using his or her call sign, indicate that the allegations—if true—could jeopardize the amateur's license, and request the recipient to contact the FCC to discuss the matter.

"In almost every case the recipient has contacted us," he said. "In one case, the licensee contacted us, apologized, and reports since that time indicate that the licensee has become a model operator." Some amateurs report that amateur behavior has improved—dramatically in some areas—since word hit the street that the FCC was taking amateur enforcement seriously. For its part, the League has said it's willing, for now, not to pursue its request to further privatize amateur enforcement.

Hollingsworth said the warning letters will continue, but now he's taking aim at the hard-core scofflaws within the Amateur Radio community, and that continued violations will "guarantee" license revocations, fines, or—in extreme cases—equipment seizures.

"Church is out now," he said. "We mean business and we're strapped in and ready to ride."

The Amateur Enforcement line is 202-418-1184. Comments also may be sent to Riley Hollingsworth, e-mail **rholling@fcc.gov**, or via FCC, 1270 Fairfield Rd, Gettysburg, PA 17325.

FCC ACTS IN ALLEGED EXAM, LICENSE FRAUD CASES

The FCC has acted in several cases where it appears that individuals attempted to obtain an Amateur Radio license or upgrade by fraud or misrepresentation.

On December 14, the FCC downgraded two amateur licensees and canceled the ticket of a third in Michigan. Busted from Advanced to Tech Plus were Lawrence A. Repp Jr., N8HFN, of Gaylord, and Alan E. Quirie, KA8ZRR, of Royal Oak. The FCC pulled the Tech Plus ticket of Steven A. Penn, formerly KC8HUM, of Southfield.

The Commission said the three filed amateur applications claiming to have taken Amateur Radio examinations at Oak Park June 3, 1997, at an ARRL VEC session. The FCC says its evidence shows that the three did not sit for the exams and that their names "were added and signatures forged, sometime after the tests were administered, by one of the four examiners." That examiner—the father of one of the exam candidates involved— forwarded the session package on behalf of the VE team to the ARRL VEC for FCC filing.

"Three of the examiners knew nothing of the scheme," the FCC said. The other three VEs brought the situation to the attention of the ARRL VEC and the FCC after learning that names had been added to the list and that their names had been forged on the ARRL VEC Administering VE's Record. The FCC was expected to act in the case of the fourth examiner by the end of December. The Commission also was looking into possible enforcement action against another ham whose name was added to the list after the test session but whose upgrade application was never submitted to the FCC.

The FCC also dismissed two amateur applications in Puerto Rico after the applicants failed to answer questions put to them by the Commission. In the case of Jose R. Velez-Rivera, of Rio Piedras, an FCC official said it appears that an imposter tried to change another amateur's call sign, address, and date of birth to his own to get a license without taking an exam. In the second case, the FCC dismissed the renewal and General class upgrade application of Hector A. Santiago, of WP4DCB, of Camuy. An FCC official said it appears Santiago tried to renew as a General when he only had a Novice ticket. Velez-Rivera and Santiago were notified by the FCC October 23.

On November 10, the FCC notified four individuals that it was setting aside their Extra Class license grants and privileges while it investigated alleged irregularities in the volunteer examination process. Letters went out to Elmer J. Smith, N3UNR, of Effort, Pennsylvania; Philip DiGenova, N3UNS, of Bartonsville, Pennsylvania; Wayne S. Bowden, AA3RT, of Millsboro, Delaware; and Kenneth L. Sharp, AA3RU, of Boyertown, Pennsylvania, that the Commission was setting aside their Extra Class grants.

The FCC said its letters were "not a finding that you have engaged in misconduct"

and that if the FCC's investigation concludes that it should grant the Extra class applications, it will reinstate the grants. An FCC official said the investigation was looking into testing irregularities including allegations that examinees might have been coached or given test answers.

For now, Smith and DiGenova have been bumped back to Technician class, while Sharp will revert to Advanced class and his former N3TPN call sign. All three took their examinations October 6 at a W5YI-VEC session in Warminster, Pennsylvania. Bowden apparently had not held an amateur license prior to taking the examination elements for Extra Class at Spring City, Pennsylvania, on October 4 during a W5YI-VEC testing session. The call sign AA3RT no longer appears in the FCC database.

The FCC also has pulled back a General Class upgrade from a Kentucky ham because it says the Physician's Certification used to obtain a Morse code testing waiver was "not a valid document." The FCC notified Richard C. Lalone II, KC5GAX, of Fort Campbell, Kentucky, of its action by certified mail November 18. But the Commission stopped short of revoking his license or levying a fine.

The FCC advised Lalone that he could run into problems later if he decides to renew his ticket or to upgrade. At that point, the Commission said, it might later decide to designate the issue for a hearing.

KANSAS KIDS TEST NASA QSO PROJECT

With a big lull looming for Space Amateur Radio EXperiment—or SAREX—school contacts, NASA is toying with the idea of launching a more earthbound version of the SAREX program that puts youngsters in direct contact with astronauts via Amateur Radio. On November 24, a group of pupils at the Pleasant Valley School in Winfield, Kansas, gave the idea a test flight during a 20-meter QSO with NASA astronaut Laurel Clark, KC5ZSU. Clark, a NASA mission specialist, spoke to the kids from W5RRR at the Johnson Space Center in Houston.

Helping out with the arrangements was John Nickel, WD5EEV, an early member of the SAREX Working Group and a retiree of Lockheed, a NASA subcontractor.

"I set up a portable station at the school, so we were all in a very full classroom," Nickel explained. His wife, Karen, WD5EEU, and he had a few practice sessions with the kids ahead of time so they'd feel at home with Amateur Radio. Nickel expressed thanks to Matt Bordelon, KC5BTL, and Dale Martin, KG5U, at Johnson Space Center, for their support, "and of course Laurel, who did an excellent job with the questions," he added.

The sole SAREX mission scheduled for 1999 is at least several weeks away, and construction of the International Space Station is only now getting under way. Amateur Radio is considered "required crew equipment" aboard the ISS, but the first Earth-to-ISS school contacts are at least a couple of years off.

ARRL Educational Activities Department Manager Rosalie White, WA1STO, of the SAREX Working Group said similar terrestrial but space-related QSOs could fill the impending gap in the SAREX program. "This terrestrial QSO was a test to see how this new project involving astronauts and schools can work," she said. "These exciting school QSOs can tide us over until we're all set for future International Space Station QSOs."

SAREX Working Group Chairman Roy Neal, K6DUE, agreed. He called the idea "an excellent way to stay in touch with our schools while SAREX converts into ARISS facilities over the next few years."

The Kansas youngsters had begun their own quest for space with a focused program with the theme "Blast Off to Reading." Among the program's goals was to improve reading skills and knowledge of the solar system.

Bordelon, who is SAREX Principal Investigator at NASA, said the current plan is to attempt these types of QSOs on an occasional basis, spending about 30 minutes with a school via HF or via one of the amateur satellites. "We'll do the contacts from the NASA JSC Amateur Radio station, W5RRR," he said. "It gives the astronauts practice with school contacts via Amateur Radio, and it keeps ham radio visible."

KRISTI MCNERLIN

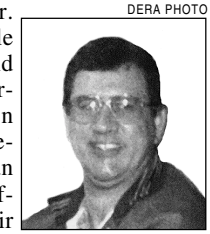
Sarah Littrell speaks with astronaut Laurel Clark while Kimberly Weiss awaits her turn and John Nickel, WD5EEV, looks on.

HAM RADIO HERO HONORED

Ham hero Lonnie McVaigh, KB9LUN, of Decatur, Illinois, has been honored as the latest recipient of the prestigious Samuel I. Keene Memorial Service Award from the Disaster Preparedness-Emergency Response Association. McVaigh received the award November 19. It carries a $1000 honorarium,

McVaigh was seriously injured while on storm-spotter duty. "Instead of simply reporting the location and movement of the funnel cloud that threatened Decatur on April 19, 1996, Mr. McVaigh warned people to get off the street and into shelters as the tornado bore down on them," a DERA statement said. As time ran out, McVaigh took refuge with a family in their basement as the twister hit their house. He was seriously injured when the storm toppled the chimney into the basement.

DERA PHOTO



McVaigh's wife, Melissa, KB9MDF, had stayed in contact with him via Amateur Radio as the storm hit. As a result, she was able to alert the rescue squad, which promptly located McVaigh and got him to the hospital.

McVaigh suffered a broken pelvis and nerve damage in his legs. He has had to endure several operations and a lengthy and difficult rehabilitation program. Because of his injuries, McVaigh can no longer work at his job and has had to rely on public assistance, Social Security, and help from friends and his church. The McVaighs have three children of their own plus five foster children. His slow recovery continues.

DERA Executive Director Bascombe "Jay" Wilson, W0AIR, said, "The heroism and continued courage of Lonnie McVaigh serve as an inspiration for us all." Steve Keene, Samuel Keene's brother, presented the award. "Lonnie McVaigh represents the courage, commitment, and dedication for which this award was intended," he said.

LIVE SSTV TRANSMITTED FROM *MIR*

For the first time, live SSTV images have been transmitted from the Russian *Mir* space station. SSTV equipment was transported to the spacecraft last fall and put on the air in December. Several stations, including W1AW, copied the images from

space on the *Mir* 2-meter frequency, 145.985 MHz, but plans called for the SSTV transmissions to move to a 70-cm frequency, 437.975 MHz, that was coordinated for that purpose.

As of mid-December, R0MIR was transmitting SSTV on some passes and packet on others. "We were able to see one of the solar panels and part of what appeared to be the lower outline of the spacecraft," said W1AW Station Manager Joe Carcia, NJ1Q, who copied pictures on several mid-December passes. Before the SSTV transmission commenced, the station sent "R0MIR" in CW, he said.

Neither of the cosmonauts aboard *Mir* during the current tour of duty is a licensed amateur. The SSTV equipment aboard the spacecraft was supplied to the Russians by Miles Mann, WF1F. He says the system operates in automatic mode and can display a new image every two minutes.

For details on how to receive SSTV using your PC, see **http://www.ultranet.com/~sstv**

ARRL E-MAIL ADDRESSES TO BE AVAILABLE TO MEMBERS

ARRL members soon will be able to announce their ARRL membership through their e-mail addresses! Starting February 1, 1999, a new membership service will be available for those wishing to have an ARRL e-mail address, and you won't have to switch e-mail services to do it. Not only that but it will be free-of-charge to League members!

The new, personalized League e-mail addresses will consist of the member's **call sign@arrl.net**. Electronic mail sent to the address automatically will be forwarded to any e-mail account you choose.

As long as you remain an ARRL member, you'll never have to notify people of an address change—even if you change Internet service providers.

As soon as the service becomes available, members will be able to sign up quickly and easily through the ARRL Members Only Web Site. If you are not already registered for the Members Only Web Site, you can do so at **http://www.arrl.org/members/**.

NOMINATIONS OPEN FOR MAXIM MEMORIAL AWARD

Nominations are open for the Hiram Percy Maxim Memorial Award. The award goes each year to a radio amateur under the age of 21 whose accomplishments and contributions are of the most exemplary nature within the framework of Amateur Radio activities. These include, but are not limited to:

- Participation or leadership in organizational affairs at the local or national level.
- Technical achievement.
- Operating record.
- Recruitment and training of new amateurs.
- Public relations activities.

In keeping with the tradition of the award when it was first established in 1936, formal nominations are made by Section Managers. Supporting information, including the endorsement of ARRL-affiliated clubs and elected or appointed League Leadership officials, should be submitted with the nomination. An award panel will review the nominations received and select the winner. The prize consists of a cash award of $1000, a suitably engraved plaque, and travel and accommodation expenses to enable the winner to attend an ARRL convention for a formal presentation.

Nominations should document as thoroughly as possible the Amateur Radio achievements and contributions of the nominee during the previous calendar year. Additional information concerning the character of the nominee should be as complete as possible.

The award is intended to provide a tangible reward to those deserving young amateurs who contribute their time, skills and energies daily through their commitment to Amateur Radio. "As models for their peers, and inspirations to us all, these fine young people are highly visible boosters of Amateur Radio awareness," said ARRL Field Services Manager Rick Palm, K1CE. "We must continue to recognize and encourage their hard work and contributions at every opportunity."

Nominations must be sent to the Section Manager, who must forward them to ARRL HQ by March 31, 1999. There is no limit to the number of nominations one may make.

Sixteen-year-old Antone "Tony" Duarte, N1XRS, of Dartmouth, Massachusetts, was the 1997 Hiram Percy Maxim Memorial Award winner.

For more information and an application form, contact ARRL Field Services Manager Rick Palm, K1CE, e-mail **rpalm@arrl.org**, or write him at ARRL Head-quarters, 225 Main St, Newington, CT 06111.

FAR OFFERS SCHOLARSHIPS

The nonprofit Foundation for Amateur Radio Inc—an ARRL-affiliated federation of more than 75 Amateur Radio clubs in the Washington, DC, area—plans to administer 66 scholarships for the 1999-2000 academic year to help licensed radio amateurs with their post-secondary education. Ten of the scholarships are fully funded with income from grants and the foundation's annual hamfest. FAR administers the remaining 56 scholarships without cost to the donors.

In Brief

• **SAREX turns 15!** The Space Amateur Radio EXperiment—or SAREX—program marked its 15th anniversary November 28. On that day in 1983, US astronaut Owen Garriott, W5LFL, was launched into space aboard the shuttle *Columbia* during the STS-9 mission. Thousands of hams heard W5LFL on 2 meters, and hundreds worked him. Lance Collister, WA1JXN (now W7GJ), of Montana is credited with being the first amateur to work an astronaut in orbit. In addition to random contacts, SAREX has permitted youngsters and youth in classrooms around the world to speak directly with astronauts in space for the first time. Since the inception of SAREX in 1983, Amateur Radio has flown aboard 23 NASA shuttle missions as well as aboard the Russian *Mir* space station. SAREX is a joint venture of the ARRL, AMSAT-NA, and NASA. For more information on the SAREX program, contact Jean Wolfgang, WB3IOS, at ARRL HQ, **jwolfgang@arrl.org**.

• **Sputnik 41/RS-18 QRT:** The second mini-Sputnik satellite, Sputnik 41, reportedly went silent on or about December 11. The little satellite, also known as RS-18, was launched by hand from the Russian *Mir* space station during a November 10 space walk by cosmonauts Gennady Padalka and Sergei Avdeyev. Sputnik 41 was powered by nonrechargeable batteries and designed to operate for up to a month. It transmitted recorded voice beacons in English, Russian, and French as well as a beacon tone that indicated the satellite's interior temperature. Reception reports go to AMSAT-France, Sputnik 41/RS-18 QSL Manager, 14 bis rue des Gourlis, 92 500 Rueil-Malmaison, France. Reports should include a 5×7, self-addressed envelope and two IRCs.

• **CW in the cinema:** Several ham-moviegoers have alerted ARRL HQ that the movie "Enemy of the State" contains a snatch of CW. (See "Correspondence" in this issue.) In scenes depicting a spy satellite, the sound track includes a little Morse code: The satellite calls CQ! "As though pictures were sent from satellites by Morse," said Tom Bradbury, NU4G, who saw the movie in November with his daughter, Elizabeth, KE4IWN. "I broke out laughing, no doubt to the puzzlement of those around me," he said. Steve Kaufman, VE2SKA/KB2SPH, says that characters in the movie also use what appears to be a Yaesu HF transceiver to break into police frequencies. "The frequency shown is in the 40-meter band," he says, "but they do speak to the police dispatcher." The movie stars Will Smith and Gene Hackman.—*thanks to Daniel Coates, N9XJF, Steve Kaufman, VE2SKA/KB2SPH, and Tom Bradbury, NU4G*

• **Strange signal:** ARRL HQ received a number of complaints during November—mostly from hams in Maine—about a very strong pulse-type signal between 3910-3950 kHz. The signal, which was S9+ at W1AW, was reported to the FCC, which listened for it for more than two weeks from their monitoring facility in Columbia, Maryland. The FCC also heard the pulse-type interference faintly on several days, but only well enough to determine the signal was coming from the north. The FCC heard nothing from November 28 to December 6 and has closed the case.

Licensed amateurs are eligible to compete for these awards if they plan to pursue a full-time course of study beyond high school and are enrolled in or have been accepted at an accredited university, college, or technical school. Awards range from $500 to $2500. In some cases, preference goes to those pursuing certain courses of study or to residents of specific geographical areas. FAR encourages all clubs, especially those in Delaware, Florida, Maryland, New Jersey, Ohio, Pennsylvania, Texas, Virginia, and Wisconsin, to spread the word on the availability of these scholarships.

Application forms and additional information are available by letter or QSL postmarked prior to April 30, 1999, from FAR Scholarships, PO Box 831, Riverdale, MD 20738. Contributions to FAR are tax-deductible.

ARRL COMMENTS IN PART 15 PROCEEDINGS

The ARRL has filed comments with the FCC in two proceedings that it says could lead to greater interference to amateurs.

The League expressed "continued strenuous opposition" to an FCC proposal to revise Part 15 of the rules to permit unlicensed, point-to-point transmitters in the 24.05 to 24.25 GHz band at field strengths of up to 2.5 V/meter, measured at 3 meters. Amateur Radio has an allocation at 24.0 to 24.25 GHz.

In September, the FCC released a Notice of Proposed Rule Making in ET Docket 98-156, in response to a petition from Sierra Digital Communications Inc. The company wants to market point-to-point microwave devices. The ARRL already had commented on the Sierra Digital Petition for Rule Making. It called the FCC's proposed rules changes "entirely inappropriate for Part 15 unlicensed facilities."

The League said the Commission considered and denied a petition in 1983 to permit unlicensed, uncoordinated, point-to-point microwave operation in the 24-GHz band. The recent petition amounts to "the exact same proposal," the ARRL said. At the time, the League said, the FCC "realized that licensing was necessary for such devices; no unlicensed operation was permitted at 24 GHz, due to interference potential." The current proposal offers nothing to depart from that position, the League concluded.

The ARRL also said the FCC is "without jurisdiction" to allow operation of unlicensed, point-to-point microwave devices that have "significant interference potential to licensed services in the same band." Such Part 15 devices have "no allocation status, internationally or domestically." Part 15 devices may not cause interference to other, licensed services and must accept interference from licensed band occupants.

The League said that a substantial amount of terrestrial amateur weak-signal activity centered around 24.192 GHz utilizes sensitive receivers. "This microwave band, and the 10-GHz band, are the two most heavily utilized amateur microwave bands above 2.5 GHz," the ARRL said. The League pointed out that the Phase 3D satellite, which plans to make use of the satellite band (24.0 to 24.05 GHz), requires extremely sensitive receivers. Sierra wants access to that band, but the FCC has not proposed authorizing it.

The League said it's obvious that "there are substantial interference contours created by the proposed Part 15 devices, and there has not been stated any means of avoiding interference, or resolving it when it is experienced."

If the proposal goes forward, the League asked the FCC to require extensive record keeping of purchasers, locations, frequencies, emissions, bandwidths, path lengths and azimuths, antenna gain and height, and to furnish the lists to the League periodically for coordination purposes. The ARRL asked that require the frequency of a device to be changed to resolve interference incidents or to terminate the path when interference cannot be resolved. The League also asked the FCC to assure that it will act on complaints that cannot be easily resolved by shutting down the device.

The League also commented in response to a Notice of Inquiry, in ET Docket 98-153, about whether the FCC should revise Part 15 to allow ultra-wideband (UWB) transmission systems. Such systems, operating in the VHF and UHF spectrum, include applications like radar, voice, data, and control communications devices. The League expressed concerns that Amateur Radio and home entertainment devices, including TV sets, could be subjected to interference from the Part 15 UWB devices.

The League proposed that the Commission ask manufacturers of UWB devices to develop and circulate technical standards "in support of a unified, comprehensive plan." The League also offered its services to help determine proper technical regulations.

ALVIN H. BATTISON, W2IEG, SK

ARRL Western New York Assistant Section Manager and former Vermont SCM Al Battison, W2IEG (ex-W1GNF), of Vestal, New York, died November 19. He was 81. A Dartmouth alumnus and World War II veteran, Battison was a life member of the ARRL. He also belonged to the Antique Wireless Association, the IEEE and the QCWA. As Section Communications Manger for Vermont in the 1930s, Battison provided vital leadership during severe flooding on the Connecticut River. A civil aviator and antique car buff, Battison was more recently known throughout the section for his presentations on radio-controlled sailplanes and early aviation.—*Bill Thompson, W2MTA*

Section Manager Election Notice

To all ARRL members in the Maryland/DC, Nevada, New Hampshire, Northern New Jersey, Rhode Island, San Joaquin Valley, Utah, and West Texas sections. You are hereby solicited for nominating petitions pursuant to an election for section manager (SM). Incumbents are listed on page 12 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. Petition forms (FSD-129) are available on request from ARRL Headquarters but are not required. We suggest the following format:

(Place and Date)

Field Services Manager, ARRL
225 Main St
Newington, CT 06111

We, the undersigned full members of the _____ ARRL section of the _____ division, hereby nominate _____ as candidate for Section Manager for this section for the next two-year term of office.

(Signature____ Call Sign____ City___ ZIP____)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on March 5, 1999. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before April 1, 1999, to full members of record as of March 5, 1999, which is the closing date for nominations. Returns will be counted May 18, 1999. Section managers elected as a result of the above procedure will take office July 1, 1999.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning July 1, 1999. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the July 1999 *QST*. A section manager elected through the resolicitation will serve a term of 18 months. Vacancies in any section manager's office between elections are filled by the Field Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Richard Palm, K1CE, Field Services Manager*

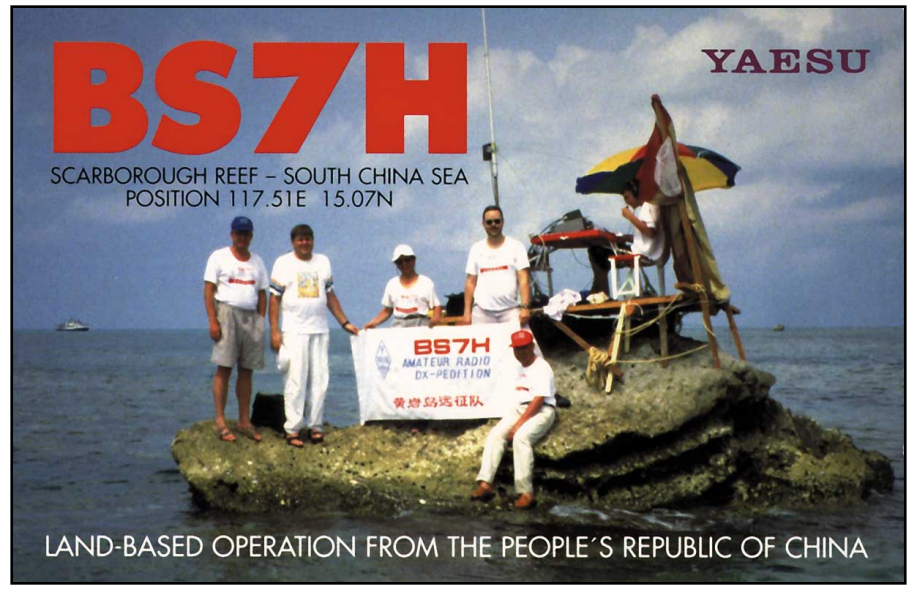
How's DX?

Edited by **Bernie McClenny, W3UR**

The DXCC 2000 Challenge—A New Direction

By Wayne Mills, N7NG

While the DXCC 2000 Committee was considering changes to the DXCC program, the DX Advisory Committee (DXAC) was being asked to consider the controversy surrounding operations within countries that don't normally issue authorizations for Amateur Radio activities. Limited operations from such entities have long been a thorn in the side of DXers at or near the top of the Honor Roll. A previous proposal would have given the DXCC Branch authorization to suspend accreditation for operations within these entities. This proposal was rejected by the DXAC. The DXAC and the Awards Committee were then asked to consider alternatives.



A QSL from the 1995 Scarborough Reef operation.

The Legacy of P5

The Minute 79 proposal ("Moved and Seconded," September 1996 *QST*, p 67) was made primarily in response to the controversy that arose out of the initial activation of the Democratic People's Republic of Korea (DPRK). The DXAC was asked to study a rule change in which "DXCC accreditation may be suspended for operations from countries or entities where Amateur Radio is specifically denied by said government. Accreditation may be allowed when said government fully recognizes and approves Amateur Radio operations."

Rusty Epps, W6OAT, and the Northern California DX Foundation made the addition of North Korea to the DXCC list possible in 1991 following a successful petition effort. The decision to add the DPRK to the list, however, came with a catch: North Korea would not appear in the DXCC list until the "first accredited operation" took place. Such delayed additions had been made in the past for Peter I island and Malyj Vysotskij Island. Delayed additions were not covered by the rules, though.

It took about four years before North Korea was activated. When activation did occur, it was in the form of an operation that, for various reasons, was extremely limited. The result was that no one in the US was able to log P5. The political fallout was legendary. The disappointment of thousands of DXers at not being able to work North Korea was aggravated by the fact that they were suddenly knocked out of their top spots on the Honor Roll. Many felt that they didn't have a "sporting chance," and many others visualized a conspiracy in which only a select few were allowed to work the P5 operation and therefore remain on the top of the Honor Roll.

Some DXers have complained that the P5 operation was a "demonstration," and that such activities should not be accredited. Some said that the League had disallowed demonstration operations in the past.

In fact, the ARRL has never refused to accredit a documented demonstration operation. An early operation in China, which might have been referred to as a "demonstration," was not accredited only because the documentation was never submitted. Nothing in the DXCC rules then or now deals with demonstrations.

Some consider the validity of a qualified operation to be based on a "minimum QSO rule;" a DXpedition must make a minimum number of QSOs in order for the operation to be accredited. The minimum QSO concept has been discussed in the past. There is virtually no interest among most DXers for this type of a rule. As a result, the DXAC voted 14 to 2 against studying the matter. (A hand vote in Visalia [1998] showed very little support as well.) In the end, the ire of the DX community seemed to be centered on a belief that a conspiracy existed to put a few friends on the top of the Honor Roll.

In order to understand the deep feelings about this situation, we need to consider the state of DXCC at the time of the P5 operation. In the early days of the DXCC program (the '40s and '50s) no one had worked all of the available "countries." From its inception, it is clear that DXCC was envisioned as an open-ended award program. It was assumed that since no one would be able to contact all countries or entities a DXer's individual merit would simply be judged by the number of countries that he or she had worked. Each month in the late '50s I would open my new *QST* and quickly find the DXCC listing and see where W6AM, W1FH and my local friend, W6MX, stood in the standings. Oh, good, I would think to myself, Charlie, W1FH, is still on top! You could really identify with this race, even if you weren't in the running.

Beginning in about 1961, the front runners began to reach the end of the line, the dreaded "Top of the List." They worked the last available countries. What were they to do now? This phenomenon was probably the root cause behind the efforts to add more countries to the list. The term "Separate Administration" was bandied about, and the definition of this separate administration was stretched very thin. Geographic separations were made from islands under the "separate administration" of the Coast Guard, the Department of the Interior and

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the Navy as though they were sovereign, political entities.

At this time DXpeditioning was temporarily jumpstarted. Gus Browning, Don Miller and Lloyd and Iris Colvin were very active, all in the name of keeping the game going. Perhaps the real cause of all of this activity was that the DXers, and indeed the program, were rapidly becoming saturated. The solution was to put more countries on and do it more often! The practice of continuously adding countries is still considered valid by many DXers today.

The '60s jumpstart ran out of steam in the '90s. By 1995 the DXCC program had seriously stagnated. For years, strong resistance to adding new entities had been growing. Perhaps this resistance was a result of years of inactivity on the part of those at the top. Perhaps it was due to the numbing effect of the seemingly endless stream of relatively meaningless entities being proposed for addition to the DXCC list. DXers became polarized. The sarcastic comment, "Good grief, another reef!" was often heard on the air.

Scarborough Reef may have been the last straw. Many DXers looked forward to having something new to work. "If you could put an antenna on your head and make QSOs from a rock, it was big enough," said one. But others felt that Scarborough Reef was not a real "country" and should not be added to the list. The community was split down the middle. The DXCC rules provided for such an entity, however, and even a belated attempt to add a minimum-size clause to the rules failed to stop Scarborough Reef's addition to the list. The DXCC rules are integral to the program, and running the program according to popular opinion can be done only at great risk.

So where are we today? A very large percentage of all DXers are now on the Honor Roll, and a significant percentage of those are at the top of the list—or at least they *were* at the top of the list. Their failure to work P5 (or failure of the P5 to work them) has demoralized these DXers. The top-of-the-Honor-Roll syndrome severely inflated the value of one DXCC entity. These are the issues and the causes for the discontent we observe today. Are there any solutions?

Alternatives

Let's take a brief look at three possible solutions:

1. A minimum QSO rule.

2. Accrediting only those entities that fully recognize Amateur Radio and offer significant operating opportunities.

3. De-emphasizing the significance of being at the top of the Honor Roll by providing new challenges.

Minimum QSO Rules

As we've already discussed, one solution to the "P5 question" has been the minimum QSO rule. Ideally, such a rule could be implemented to ease the pain of DXers who are not able to stay at the top of the Honor Roll list.

The idea that a DXpedition must make a minimum number of contacts in order to make it legitimate is not consistent with the basic principles of the DXCC program. IOTA has a minimum QSO rule. It requires that an operation make 50 QSOs in order to become accredited. Would the top American DXers have been satisfied if P5/OH2AM had racked up a grand total of 50 contacts rather than the 23 that were actually made? How many QSOs would be considered satisfactory? Many of those fighting for positions at the top of the Honor Roll would probably not have been satisfied with anything less than 5000 QSOs.

Again, the real issue is staying on the top of the Honor Roll. One DXer suggested that if an entity is not likely to be on the air for five or 10 years, it should be placed on an "inactive" list. If this rule were adopted, imagine what would have happened in the wake of the popular Heard Island DXpedition. Heard would have been removed from the list since it's quite likely that the island would not be on the air again for five to 10 years. For reasons such as this, the committee chose not to consider a minimum-QSO requirement.

Accreditation

By a large majority, the DXAC voted to reject the idea of suspending accreditation of legitimate operations in situations where these countries didn't "fully recognize Amateur Radio." Since the vote of the DXAC, the DXCC 2000 Committee has also considered the accreditation issue. The committee agreed that if a government issues permission for an Amateur Radio operation, the operation will be accepted and accredited. The new Rule 7 and the Accreditation Criteria are quite clear: Authorization to operate will be determined by the appropriate authorities of the entity involved.

We have seen many geopolitical changes over the years caused by wars, elections and other means. Even when it had not been active for nearly 35 years, who would have denied that China was a "country" in any sense of the word? During the many years throughout which no activity was permitted, China was not removed from the DXCC list. Likewise, Albania, a "real" country, remained on the DXCC list despite the inability to work it for nearly 20 years. All the while there were calls to remove such entities from the list in order to facilitate the attainment of the "top of the list." A country is a country, and the ability to log it or not is simply part of the game. The new rules, implemented on March 31, 1998, specify that a qualified entity will be added to the list whether or not an operation has occurred.

Accrediting only those entities that fully recognize Amateur Radio and offer significant operating opportunities would not solve the problem in the long run. Soon DXers would wonder why certain entities were not activated. A number of DXCC entities that have been widely available for many years do not fully recognize Amateur Radio. Past or future accreditation might have to be suspended for operations in these countries. Credit toward DXCC awards would become unstable. DXCC costs would rise significantly. Further, DXpeditioners would find little incentive to gain the necessary authorization to operate in certain countries.

De-Emphasizing Top-Of-The-List Syndrome with New Challenges

DXers need goals. But the traditional DXCC program offers little challenge for those who've reached the top of the Honor Roll. Worse yet, for those who wish to stay on the top, the importance of an entity like P5 becomes enormous.

The DXCC 2000 Challenge is a new direction and an exciting opportunity. With the DXCC 2000 Challenge Award one point is awarded for each band country credited on bands 160-6 meters (30 meters not included). Appropriate certificates, plaques/trophies and pins are available at the 1000, 1500, 2000 and 2500 point levels. The DXCC 2000 Championship Award, a special trophy, is awarded to the overall leader of the DXCC 2000 Challenge Award on record as of September 30 of each year. There is no charge for this award and there is a life-time limit of one per person. Finally, a Special DXCC 2000 Award will be offered in the year 2000 , working 100 or more countries during that year. It is non-endorseable and QSL cards are not required.

Since the DXCC 2000 Challenge depends on the progress toward an open-ended goal, any particular QSO on the way to that goal is relatively unimportant. A rare point on 160 or 6 meters can substitute for the missing P5. While the existing awards will continue to be available, there is now a new direction for all DXers.

WRAP UP

In next month's column we'll talk about DXing and contesting from the United Arab Emirates. Don't forget to mark your calendar for February 20 and 21 for the ARRL International CW DX Contest. In the week leading up to the event there will be lots of DX stations on the air trying out their equipment. This is an excellent time for those with less firepower to work the DX before the Big Guns come out for the weekend. If you have DX news, stories or pictures please send them in. Until next month, see you in the pileups!—*Bernie, W3UR*

QST

Public Service

Rick Palm, K1CE • *Field Services Manager*

SATERN Assists Hurricane Mitch Recovery

By Ann S. Shaver, WH2E

"The first word the Salvation Army got of Hurricane Mitch's terrible devastation was through Amateur Radio," explained Pat McPherson, WW9E. "Frankly, I was skeptical of the initial reports. It didn't seem possible that one storm could leave so many dead and homeless. A day or so later, when CNN and the other big news agencies were able to go in, the professionals confirmed what we already knew—through Amateur Radio operators."

McPherson, a Salvation Army Major whose job responsibility is directing disaster relief services for the Chicago Metropolitan Division, realized immediately that SATERN (Salvation Army Team Emergency Radio Network) would be heavily involved in a response. Just how heavy that involvement turned out to be, however, was something of a surprise.

SATERN's daily 20-meter net quickly became the focal point for all amateurs trying to assist in the colossal catastrophe. Working with the Hurricane Watch Net, ARES groups, Club de Radioaficionados de Guatemala (CRAG), the Mexican Hurricane Net, and numerous other groups as well as unaffiliated hams, the net remained open for 19 days, sometimes as much as 12 hours at a stretch.

Because of the magnitude of the effort, the FCC restricted SATERN's customary frequency (14.265 MHz) solely to hams actively involved in relief communications. Those communications ranged from devastation reports to logistical communications regarding flights bringing food and medical supplies, to health-and-welfare inquiries, to phone patches.

It is difficult to exaggerate the impact of Hurricane Mitch. As Marco Tulio Gudiel Dardon, TG9AGD, President of CRAG remarked, "This tragedy will be of much worse consequences to our country and its economy than that created by the February 4, 1976, earthquake that killed 23,000 people but did not harm the agriculture, highways, and bridges." CRAG members, Jerry, TG6IPS, and Sammy, TG9CB, as well as hams in Honduras including Herman, HR1HCP, and Father Ray Richard, N1AHB/HR5, were regular net participants, making certain that accurate information got out to the rest of the world.

The SATERN response was not flawless—no operation like this one ever is—but it functioned smoothly and efficiently for as long as the situation required. This was largely because SATERN volunteers constantly train, practice and sharpen their skills through attending disaster seminars, and participate regularly in HF and VHF nets. They know how to relay for weak stations, limit their operating to essential transmissions, copy messages accurately and make phone patches (remember that almost-lost art?).

Experienced SATERN NCSs such as Brad Pioveson, W9FX, and Russ Fillinger, W7LXR, skillfully integrated eager but nexperienced volunteers into the smooth flow of the net. Net regulars were aware that for every station that checks in, there were several more monitoring.

In short, SATERN practice paid off! Major McPherson observed, "The aggregate, overwhelming feeling for many of us is that this is what we have been training for, our destiny as an emergency response entity. For me, it was again a validation of the value of the SATERN system and proof that all of the work in training, in cultivation of people and resource expended was worthwhile."

Working within the SATERN framework, Amateur Radio operators were able to use their skills to mitigate one of the worst natural disasters ever. As Allen White, WB4MIO, observed, "The SATERN net operation certainly reinforces the value of Amateur Radio in a disaster. Lack of Amateur Radio communications would make the disaster even worse."

ARES PROVIDERS, SERVED AGENCY REPS TOGETHER IN TAMPA

Will ARES be relevant in the future? That is one of the questions the ARRL wanted to try to answer through a series of regional public service conferences held this past year. Bringing reps from served agencies and ARES together, the mission was to try to identify future needs of the public safety sector in the face of new technology such as the global mobile-satellite services. We wanted to know what the agencies themselves could tell us to help Amateur Radio adapt to their changing needs.

The first three conferences, held in Seaside, Oregon; Atlanta, Georgia; and Wichita, Kansas, were reported earlier (August 1998 *QST*, p 86; September 1998 *QST*, p 84; January 1999 *QST*, p 70; respectively). The fourth and final conference was held in Tampa, Florida, on November 21, with almost 50 in attendance. Representatives from the National Weather Service, Florida State Department of Emergency Management (DEM), and Collier County and Palm Beach County Emergency Management, American Red Cross, the state Department of Forestry, the National Hurricane Center, and the ARRL were on hand to present 10-15 minute programs each. Salvation Army, Florida State VOAD, and APCO reps were scheduled but unfortunately were not able to be present at the last minute. ARRL Field Services Manager Rick Palm, K1CE, and Hurricane Watch Net Manager Jerry Herman, N3BDW were also present.

State and County Emergency Management

Palm welcomed the group and explained the basic issues, especially the challenges to the future of Amateur Radio emergency communication services. But, it was John Fleming, Communications Coordinator for the state DEM, who really got things rolling. He stated flatly that Amateur Radio "is not dead in Tallahassee." Amateur Radio communications were critical to the response and recovery to the fires that devastated entire counties earlier in the year. Fleming said he is working on installing an amateur position colocated with other communications positions at the state EOC. He described the state's alert system, with its reliance on NOAA weather radio (with alert tone) and "EMWIN" systems in county EOCs.

Fleming made one of the afternoon's more interesting observations, one worth taking to heart. He cautioned that while Amateur Radio communications have been a significant resource to his agency, infighting and turf battles between clubs, ARES and RACES groups have undermined its utility. The message is clear: Amateur Radio should present a unified front to served agencies or risk weakening or even losing the opportunity to serve them.

Gary Arnold, WB2WPA, Assistant Director for Collier County emergency management, said that the county needs operators who are capable of operating all communication systems in the EOC.

Gary Arnold, WB2WPA, Assistant Director for Collier County emergency management, inventoried amateur capabilities in the county and explained that his goal is communication system redundancy. Arnold said that he has a need for operators who are capable of operating *all* communication systems in the EOC. "When hams come in, they should be able to operate anything," he said. Arnold, with only three paid staff, relies heavily on volunteer operators who are cross-trained in various functions.

Manny Papandreas, W4SS, Operations Coordinator for Palm Beach County emergency management, spoke about county plans and educational efforts. He is involved in teaching operators about county communication networks and weather spotter programs. A spotter net meets every week. Manny also serves as Southern Florida's SEC.

National Weather Service

Paul Duval, KA7RAV, of the NWS office at Tallahassee, and Walt Zaleski, a warning-coordination meteorologist at the NWS forecast office at Ruskin, Florida, teamed up to present the weather service's perspective. Duval and Zaleski briefed the group on the service's massive reorganization and the integration of new technology. They said, however, that "no matter how much new technology becomes available, there will always be a critical role for Amateur Radio in the NWS's programs, especially SKYWARN." Besides communications, "Amateur Radio operators are also excellent severe weather spotters." The weather service reps said that they cannot see the SKYWARN program "going away." They receive reliable information from program participants, and "Amateur Radio takes the job seriously."

Red Cross

Presenting the perspective of the American Red Cross was Fred Edwards, KF4MJJ, a communications coordinator with the state chapter. Edwards said that amateur operators manning shelters and "watch stations" are valuable to the organization. He feels that for the future, it behooves amateurs to become cross-trained in Red Cross functions such as shelter management, and disaster assessment, and also be able to work with other, nonamateur, radio systems. Amateurs who are also technically competent, with the ability to install radio systems such as repeaters, will also help ensure a place for Amateur Radio in Red Cross deployments in the future.

Fred Edwards, KF4MJJ, a communications coordinator with Florida Red Cross feels that for the future, it behooves amateurs to become cross-trained in Red Cross functions such as shelter management, and disaster assessment, and also be able to work with other, nonamateur, radio systems.

Department of Forestry

One of the more interesting presentations of the afternoon came from Bill Parish, a telecommunications administrator with the state's Department of Forestry. The department had not been involved with amateurs, but after the fires earlier in the year, they realized that "they could use some help."

The department's mission is to protect and manage forest resources, and to provide stewardship for future generations. The department is involved with fire control, and forest management activities under "Preservation 2000," a state mandate. The state forest system is growing rapidly, Parish said, and "more communication is needed." Field units with dispatch centers use telephones, but currently have no long haul radio capability. They didn't have the need, until now. The department has 54 single-channel radios for local communications.

Telecommunications Specialists for the department employ the radios they have for keeping track of their officials and for dispatching, functions that are critical during fire situations. One major problem encountered by the department occurred during the Florida fire disaster last year when interagency communication failed. Interagency communications would be a good mission for Amateur Radio. Parish said his department could also use Amateur Radio assistance on a day-to-day basis as well as during fire events. Amateurs could be especially useful in covering "pockets of communications outages" for firefighters on the fire lines. "Firefighters like good radio coverage," Parish said.

Parish also said his department would be interested in volunteers to help put communication kits together for deployment to the field. Other volunteers are needed to work with dispatchers and technicians.

While it was clear that involvement by amateurs in some Department for Forestry activities was inappropriate, there was much that Amateur Radio could bring to the table, and Parish seemed to open the door, a good opportunity for the state's amateur community. Northern Florida Section Manager Rudy Hubbard, WA4PUP, suggested that a long obsolete MOU with the Department of Forestry might be dusted off for the future.

National Hurricane Center and the Hurricane Watch Net

John McHugh, KU4GY, Amateur Radio coordinator for W4EHW at the National Hurricane Center, described the functions of the center: hurricane tracking/forecasting, and tropical predictions for mariners. The facility is also the home of the Miami NWS office.

McHugh reviewed the role of Amateur Radio at the Center, which was cemented in 1980 when Hurricane Alan wiped out the Brownsville, Texas, NWS office. Amateur Radio became the only communication link between the office and the Center. Amateur Radio was truly embraced after that episode. The hams on McHugh's team of volunteers at the center number 40, and are activated when a storm comes within 300 miles of landfall. They gather data from stations in and near the affected areas, much of it through the Hurricane Watch Net, and report it to the forecasters in the next room.

McHugh sees an expansion of APRS as their primary goal for the future. APRS provides automatic real time and measured reports via packet (VHF and HF) and has been a boon to forecasters recently. McHugh is working toward having more solar-powered APRS/weather stations placed strategically in the Caribbean.

Jerry Herman, N3BDW, manager of the Hurricane Watch Net, closed out the session with a review of his net's functions and the 1998 hurricane season which drew to an official close on December 1. Herman offered one of the most important, yet simplest, observations for Amateur Radio's future in emergency communications: "There will always be a need for a ham, his radio, and a car battery to report out critical information from affected areas in the immediate aftermath of a disaster when no other means of communications exist."

Conclusions

Some good points emerged from the session concerning the future of Amateur Radio's role in emergency communications:

- Amateurs need to present a unified front to the agencies they serve—avoid infighting and turf wars.
- More cross-training in served agency functions will add value to our contributions.
- More cross-training with other radio systems will make us more valuable in the EOC.
- Amateur Radio can provide interagency communications during multi-agency responses. This has always been a good traditional role for Amateur Radio, but it looks like the need will be perpetuated for the future.
- Development of APRS and home weather stations for reporting weather to agencies looks like a good direction for the future.

Thanks go to Southern Florida SEC Manny Papandreas, W4SS, Northern Florida SM Rudy Hubbard, WA4PUP, and Northern Florida SEC Nils Millergren, WA4NDA, for arranging for the speakers.

QST

Some Tips for the Net Control Station

As net control station (NCS), it pays to remember that the net regulars *are* the net. Your function is to preside over the net in the most efficient, businesslike way possible so that the net participants can promptly finish their duties and go on to other ones. You must be tolerant and calm, yet confident and quick in your decisions. An ability to "take things as they come" is a must. Remember that you were appointed NCS because your Net Manager believes in you and your abilities.

• *Be the boss, but don't be bossy.* It's your job to teach net discipline and train new net operators. You are the absolute boss when the net is in session.

• *Be punctual.* Many of the net participants have other commitments or nets to attend to; liaison stations are often on a tight schedule to make the NTS region or area net.

• *Know your territory.* Your net members have names - use them. Also, by knowing their locations, you can quickly ascertain who needs to get the traffic. As NCS, it's your responsibility to know the geography of your net. You also need to understand where your net fits into the scheme of NTS.

• *Keep your antennas in good shape.* Although you don't have to be the loudest one on the net, you do have to be heard.

• *The NCS establishes the net frequency.* If a QSO is already in progress on your net frequency, move to a nearby clear frequency that is close enough for the net to find you.

• *Keep a log of every net session.* Although keeping a log is no longer required, it's a good way to keep track of things. The Net Manager may need information about a checkin or a piece of traffic, and your log details can be helpful.

• *Don't hamstring the net by waiting to move the traffic.* Your duty is to get traffic moving quickly as possible. As soon as you can get two stations moving, send them off to clear the traffic. If you have more than one station holding traffic for the same city, let the "singles" (stations with only one piece for that city) go before the ones with more than one piece for that city. The quicker the net gets the traffic moved, the sooner the net can be finished and the net operators can be free to do whatever they want.

How to Check into a CW Net

Thanks to Mark, W2EAG, for summarizing the steps to checking into a CW net.

1. Listen for the Net Control Station (NCS) to call up the net. The net name will be abbreviated. (For example, East Mass-Rhode Island Net would be EMRI.)
2. When the NCS sends QNI (Net stations report in), you will send a letter.
3. If the NCS echoes your letter, he or she is inviting you to check in.
4. You send DE followed by your call, then QRU, if you have no traffic, then K (invitation to transmit). The NCS will acknowledge by sending R (roger) AS (wait).
5. To check in with traffic, follow Step 4, but send QTC (traffic) plus how many for the destination. Example: DE [your call], QTC Boston 2 K.

The NCS will acknowledge by sending R AS (roger, wait). You are in the net!

Field Organization Reports

Public Service Honor Roll
November 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

832 NM1K
718 WB0WNJ
399 K7BDU
345 K9RTB
315 KB8ZYY
277 WD8V
257 K4FQU
252 NZ4O
243 KA2ZNZ W7TVA
231 WA9VND
230 N5NAV
229 W4PIM KA2YZM
224 WB5NKC
216 KA4FZI
213 W6DOB KE4OAV
206 K6YR
203 WD4MIS
196 WA4GQS K4SCL
192 N2YJZ
187 NR2F
186 N2LTC K6YR
184 AF9FA N5JZ
183 KC2ACL
182 N4ZNO
181 WX8Y WB4GM
180 AD4DO
179 W0OYH WA1TBY KA7TTY
178 KA2GJV N5IKN K2PB
177 N2JBA
173 N1LKJ
171 N8FPN
170 N2CCN W5YQZ
169 K7VVC
168 KD4PDQ KU4JI K9FHI WA5AA
166 WB5ZED
165 W4EAT KL5T W6IVV
163 N2GJ
161 N1VXP W9CBE KD5CRX
160 WA7EES KB2VVB
159 AB7NK KB8UEY
158 NY2V
157 K0IBS
155 N2XOJ
153 KF1L KC5PNM
152 N0KJ NX1A K4IWW W9YCV N5OUJ
151 WO0A WA1FNM
150 KD2AJ AF4HE KE4JHJ AF4GF WA6ODQ
149 W3YVQ N2TTT
148 N2XPK
147 KB5W NZ1D KC5QZZ
145 W4ZJY
WN0Y KT6A
144 AA3GV W7ZIW
143 KR4MU KD4PWK N8FWA N7AIK KC5QGI
142 WB2ZCM KB2KLH AD4BL
141 N5XGI KA9KLZ K4RBR
140 KA1GWE W2RJL W0LAW W5GKH KC5OZT K4TQX N3DRM
139 K5DPG W2MTA WD8DHC KD4GR KF4NFP
138 WA4DOX
WA4QXT
K2BCL
N9BDL
WA1JVV
W7GB
KC4ZHF
K5AO
137 K2DN
136 AF2K WD4JJ W5ZX W2EAG
135 W4CAC K8GA WB2GTG N2OJI AA4HT W7NWP W2CC
134 N2WKE AA2ED WA5I
133 N3WAV WB4TVY
132 AA4AT WB0ZNY KC4RNF KO4OL K2CSS N2AKZ NN2H KE0K KB5TCH
131 KJ3E N9PF W7VSE
130 N2WDS K0PIZ W7LG KE4DO
129 WA0TFC
128 W3OKN WB2QIX W8IMX NN7H
127 KC4TLG
126 KG6TU KG2D K7GXZ W7GHT
124 KA7AID
123 KA0KPY
122 K5MC KE1AI N3WK W4MEN
123 KA8WNO W1PEX
121 K5IQZ WA8DHB W9ZY KA1JXH N1CPX KD1LE
120 KI4YV K3JL KG0IV WX4H
119 W2JHO K9GBR N7DRP KD7ME
118 K4MTX W4CKS K2BTP WA4EIC N7YSS WW4SC
116 KC8GMT
114 K5WOD W3BBQ AG9G
113 WI8K KL7Q K8TPF WD0GUF W1ALE N1DHT
112 WA5WBZ KC2AHS
111 WA2UKX
110 AE4WP N8DD N2XJ
109 KB3AMO KB2GEK W2PII N9KHD WB5NKD K5MXQ W2MTO N4GMU
108 AC4CS K4AIF KE6MIW K7MQF KT4SJ KE6MIW
107 KG5GE KC4PZA WA8SSI KE6GFV W2FR WA2GUP KS4FB KE6GFV
106 K8QIP K2GNZ N2RPI
105 K0PY N5JUU K2VX
103 WB4UHC WA8EYQ KD4HGU KA4LRM
102 KH6GR
101 N3ZPK W4DGH W2AKT N4JAQ
100 KE3OX
99 N2IKR KA5KLU KJ4N
98 W4XI W4CC KS4DW
97 K8VFZ KC3Y
96 KF4FXT N4YYQ W4ET KB2ETO
95 W1JTH K5UCQ KF5A AC5Z
94 WB4ZNB AA4PI K8XD
93 K8LEN NR9K
92 N0UOD KB2UQZ KB9GGA WB7VYH
91 N8VES N2JRS KA0DBK
90 WJ3K KO4A KB2VVD WB2IJH WL7COO
89 N8TDE W4BNY KA1OTN W4RRX W0MZI KD6YJB
88 K8ZJU WA5FXQ K1SEC KI0JO KC7NYR WB2CZW
87 WB1GXM
86 KF4HJW W1QU
AA2NX KD5GM
85 WR8F W7HH N1SGL N2OPJ
84 KB0DTI N5HK N1IST
83 KA1VEC W7EP
82 KC8HTP K8IG WB9GIU
81 WD9FLJ N7MPS
80 N1LAH KA1VAX KB4WBY
79 K8AI
78 WA4GLS
77 AE4NW KG2OY
76 W4ZBA W5XX KA9FVX N5LF
75 KB2YUR AL7N K8SH KC5VOG
74 WA1QAA AB5RV
73 K3UWO
72 W1JX N4MM KC7ZZB
71 N3KB
70 AA8SN K8QEW

The following stations qualified for PSHR during the month of October, 1998, but the results were not reported: KB5W 143, N5XGI 143, K8QIP 116, K5DMC 97.

Section Traffic Managers Reporting
November 1998

AL, CO, CT, DE, EMA, ENY, EWA, IA, ID, IL, IN, KS, KY, LA, MDC, MI, MN, MS, NC, NFL, NH, NLI, NNJ, NM, NTX, NV, OH, OK, OR, SB, SC, SD, SDG, STX, SV, TN, VA, VT, WI, WMA, WNY, WPA, WV, WWA.

Section Emergency Coordinator Reports
November 1998

There are 41,826 ARES members accounted for in SEC records. The following section emergency coordinators reported: IN, KY, MDC, MI, NC, NFL, NLI, SD, SFL, VA, VT, WMA, WV.

Brass Pounders League
November 1998

Call	Orig	Rcvd	Sent	Dlvd	Total
WB0WNJ	600	497	3159	0	4256
WX4H	2	857	1285	9	2153
NM1K	713	243	919	5	1880
N2LTC	0	813	860	17	1691
KT6A	3	540	537	4	1084
K7BDU	239	278	529	12	1058
K9JPS	0	634	40	373	1047
W1PEX	2	804	120	7	933
W6DOB	0	258	579	65	902
WA9VND	52	426	365	21	864
W3KOD	0	431	384	3	818
KE4DNO	3	354	444	7	808
KF1L	3	380	406	12	801
KI0JO	0	334	449	1	784
KF4VEX	374	9	374	9	766
W5YQZ	0	337	357	2	696
K7VVC	8	319	354	3	684
N5IKN	0	338	166	162	666
KA2ZNZ	31	306	250	74	661
N2YJZ	18	294	312	36	660
K9GU	0	360	25	259	644
W9IHW	2	300	158	181	641
W7GHT	0	319	310	8	637
N3DRM	2	314	294	30	630
KF5A	1	303	318	0	622
KD6YJB	7	275	274	7	563
NR2F	25	275	231	24	555
K4FQU	131	156	258	34	554
K9RTB	0	282	64	187	533
KA2YZM	37	193	266	34	530
W9CBE	1	263	263	2	529
KA1VEC	21	255	234	9	519
KT1Q	1	278	212	24	515
W3KOD	0	285	226	2	513
N0KJ	—	—	—	—	510
WB5NKC	64	128	293	22	507
KA2GJV	0	261	240	0	501

BPL for 100 or more originations plus deliveries: NZ4O 167, W3HK 149, W4PIM 119. The following station qualified for BPL during September 1998, but was not listed: W4EAT 747.

Emil Pocock, W3EP*

Leonids Fireballs

The number of bright meteors and fireballs was astounding. Every couple of minutes you'd get a bright flash behind you and you turn around to see the ion trail fading. The brightest meteors have bright green trails, often with bright red heads. On average, you could see a meteor every two or three seconds. You would get a gap for perhaps 10 seconds, and then three would occur almost simultaneously, quickly followed by another.—*Alan Fitzsimmons on La Palma, Canary Islands*

The Leonids meteor shower was spectacular in nearly every part of the world. A team of astronomers on the Canary Islands were just probably in the right place at the right time to observe the visual peak of the shower, which apparently occurred around 0330 (all times UTC unless otherwise noted) on November 17. Conservative estimates place the zenith rate at 200 to 300 per hour, including many great fireballs with persistent trails and exploding bolides. These were true rocks, from the size of marbles to golf balls. Some observers in Western Europe may have counted the equivalent of 500 meteors per hour for brief periods. These are the highest counts for any meteor shower since the 1966 Leonids.

As the radiant rose over the East Coast of the United States around 0700 (2:00 AM Eastern Standard Time), the rate had already declined to less than 100 per hour, but this was still sufficient to create quite a stir. Visual and radio observations suggest that the number of meteors may have surged several times over the next few hours, peaking to 120 over the West Coast later in the morning. There were still many bright fireballs, which provided both a visual show to those who were not clouded in and great conditions for meteor scatter.

Peak Times

The Leonids radiant is above the horizon roughly between 2:00 AM and 11:00 AM (local time) for observers in the northern middle latitudes around the world. On the US East Coast, that meant meteor scatter was possible from roughly 0700 to 1600 no matter when the actual peak of the shower occurred. The Earth crosses the densest portion of the Leonids stream in about 1.5 hours, so if the Leonids have not yet risen above your horizon, you miss the peak. Fortunately, it takes the Earth about 16 hours to cross that part of the stream that yields at least half as many meteors as the peak. Thus, most of the world still gets a good show even if the highest rate occurs when the radiant is still below the horizon.

The widely predicted peak, 1700 to 1900 in 1998, was based on the time the Earth crosses the plane of the Leonids parent comet Tempel-Tuttle. The nodal crossing, as this is called, is a fair marker for the Leonids meteors as well, but it does not necessarily correspond to the densest portion of the stream. In 1965, the year prior to the great 1966 storm, the Leonids peaked about 14 hours before the nodal crossing. This year (and some of you have guessed already) the peak occurred about 13 hours prior to the nodal crossing as well.

The great storm that yielded thousands of meteors per hour in 1966 lasted just 90 minutes and occurred about 2.5 hours prior to the nodal crossing. Experts are reluctant to say that means that the expected 1999 storm will also appear 2.5 hours earlier than the nodal crossing, primarily because the Leonids is as yet a young meteor shower and still full of surprises. For what it is worth, the 1999 nodal crossing will be about 2300 on November 16. Either prediction still puts the expected storm several hours before the Leonids rise over the East Coast. Thus North Americans are unlikely to see the peak of the shower and the possible storm later this year either, but undoubtedly rates will be much higher than 1998.

Radio Summary

Conditions were excellent over North America during the mornings of November 16 and 17, both before and after the peak. The consensus seems to be that early on the morning of November 17, soon after the Leonids rose above the horizon, was the most productive time to be on the air. Few operators even bothered to report what they worked on 50 MHz, because the band was open nearly continuously for many hours and sounded much like a sporadic-E opening. Even the proverbial "10 W and a dipole" station could make meteor-scatter contacts on 6 meters, as KB8TEJ proved. He made four contacts in a 45-minute period on the morning of the 17th. There were no exceptional contacts on 6 meters, such as double meteor reflections beyond the normal maximum distance of 2300 km.

The overwhelming amount of activity was on 144 MHz. Many stations reported bursts of 20 or 30 seconds, some for as long as two or three minutes, followed by quiet periods of 10 minutes or so, when more bursts appeared. This went on for several hours. Many stations made 50 or more contacts during the two mornings, almost all of those by calling *CQ* on SSB on, or near, the calling frequency. Many complained of the intolerable crowding and QRM that resulted (see the comments below). Typical distances were 1200 to 1800 km, but there were many in the 2000-km range and some exceptional contacts were even longer. See Table 1 for a list of claimed 2-meter contacts exceeding 2100 km.

Quite a number of operators tried the same techniques on 222 MHz and met with nearly equal success. Perhaps only the lack of activity on that band prevented QSO totals from being much higher. Contacts on 432 MHz were rarer still, no doubt because bursts last about one-tenth as long on 432 MHz as on 144 MHz. Still, there were a few spectacular contacts, including what may be a new 432-MHz meteor-scatter record between California and South Dakota.

N6RMJ completed his 222-MHz sched-

Table 1

Some Long-Distance 144-MHz Meteor-Scatter Contacts in North America, November 16 and 17, 1998

km	*Calls (grids)*
2317	N0KQY (DM98gk)—VE3SXE (FN25na)
2265	K5IUA (EL29da)—K2TXB (FM29pu)
2241	N0LL (EM09os)—W1AIM (FN34uj)
2222	N0KQY (DM98gk)—WA2AEY (FN23bx)
2193	N0KQY (DM98gk)—KN4SM (FM16qt)
2185	W5UWB (EL17ax)—K8BHZ (EN75db)
2158	K0GU (DN70mq)—NY2Z (FN02kb)
2102	N0KQY (DM98gk)—W3ZZ (FM19jd)

*Send reports to Box 100, Lebanon, CT 06249. Leave voice messages at 860-642-4347, or fax 860-594-0259 or e-mail w3ep@arrl.org.

ule with W7XU/0 at 1030 on November 17 in less than three minutes. He then quickly suggested—over the Internet—that Arliss try 432 MHz. A few minutes later, Arliss was so surprised to hear N6RMJ booming in at S9 on 432 that he got tongue-tied and had trouble getting out his own call sign in time. Luckily, the burn lasted 15 seconds or so, and the pair completed a 2040-km contact. N6RMJ ran 800 W to two 39-element Yagis. The amplifier at W7XU/0 was down, so he had to make do with 100 W and his four 30-element Yagis. Congratulations on some alert operating and a memorable contact!

Mark Mandelkern, K5AM, operates on the VHF bands with an entirely home-brew station from Las Cruces, New Mexico. Built over a period of 50 years, the amplifiers run 1500 W on all bands from 1.8 to 144 MHz. The transceiver has special built-in features for weak-signal VHF reception. A complete description of the station appeared in the July/August issue of the ARRL's *NCJ: The National Contest Journal*.

Two-Meter Radio Reports from North America

"Certainly not what I call a storm, but at least as good as the better Perseids we had a couple of years ago. Midnight through 6:00 AM Tuesday is when I made 95% of my QSOs." 28 QSOs, W1AIM (FN34). "This was the most memorable radio MS event I have yet to witness! Hopefully, next year we will really see a storm." 60 QSOs, WA1OUB (FN43). "For hours it seemed that there was almost constant scatter propagation. Someone said it sounded like a sea of voices and I would agree. I think most of the long-haul stuff got lost in the QRM." 58 QSOs and 2 on 222 MHz, K1UHF (FN31).

"Wow! What a fun time! Heard lots of activity from 144.190 to 144.210 and the sheer number and length of burns was awesome!" 50 QSOs, WA2AEY (FN23). "Several stations in the Midwest heard continuously over 2 to 3 minutes at a time on the 17th. Rather similar to E-skip!" 2 QSOs, WB2EZG (FN20). "Well, it wasn't a storm, but it sure was fantastic just the same!" 32 QSOs, K2TXB (FN02). "While conditions were first rate, there was no meteor storm. But there were lots of big meteors that burned long and high and apparently supported 222 and 432 better than any other shower in recent memory." 52 QSOs with 1 on 222 MHz, W3ZZ (FM19)

"All signals very loud on 2 meters. 144.200 was QRM city." WB5APD/4 (EM84). 38 QSOs, KR4QO (FM03). "Bursts longer than 40 seconds occurred about every 12 minutes." 32 QSOs, WW2R/5 (EM13). "I got up and turned the rig on at 0645. Immediately there was a burn in progress with W3ZZ coming through the chorus of call signs on 144.2 MHz." 17 QSOs, W3UUM/5 (EL29). "With the longer bursts…I was able to announce on .200 where I was listening. That did persuade a few to leave the zoo and move off the calling frequency." 23 QSOs, 1 on 222 MHz, W5UWB (EL17).

Twenty-seven QSOs, 3 on 222 MHz, 1 on 432 MHz, N6RMJ (DM14). "Many burns excessively loud (S9++) and up to 2 minutes duration. Much QRM both days from LA-area stations on 144.200." 14 QSOs, N6ZE (DM04). "WOW is all I can say." 73 QSOs, N7EIJ (DN17). "The signals were long and loud in the early-morning hours of the 16th and 17th." 44 QSOs, K7ICW (DM26). "Lots of people moving stations ±10 to 50 kHz away from the calling frequency. What a help that is!" 66 QSOs, N7LT (DN45). "Huge 2-meter burns." 18 QSOs, K7XD (CN85).

"Heard a lot on 144.200 but sure wish they would spread out a little. I'm sure many QSOs were missed because of the pileup on the calling frequency. I moved up to 144.215 and it worked great." 29 QSOs, AA8Q (EM79). "Well, it wasn't a blizzard, it wasn't a thunderstorm, it was just a steady shower." 6+ QSOs, N9BJG (EM57). "I don't think it reached storm proportions, but it was a good strong shower that lasted for several hours." 21 QSOs; 4 on 222 MHz, KA9CFD (EN40). "Signals kept popping in from all over the place, and often were in there for 20 seconds or more. I never thought 2 meters could ever be like this. It was great." 11 QSOs, WA9JML (EN51). "At times it did not make any difference where the antenna was pointed. Some signals were 10 over S9." 52 QSOs, 4 on 222 MHz, W9JN (EN54).

"Had a ball during the shower." 79 QSOs, W6AOL/0 (DM79). "The QRM on and adjacent to 144.200 was unbelievable when looking east. There was so much confusion at times on 144.200 that you could not be sure the station who "rogered" your report was the same one you were working. I usually waited for a burst by listening on 144.200 and then moved away by 10 kHz or so and started calling short CQs." 61 QSOs, K0DAS (EN42). "First time I ever played on the rocks. Everything was between 0800 and 1100Z." 10 QSOs, NN5DX/0 (DM79). "I had a lot of fun on randoms. Eight new grids and one new state (Wyoming). Not bad for a day off!" 20 QSOs, N0HJZ (EN34). "Out of bed at 0800Z on the 17th the Leonids were just awesome with even 222 randoms. The highlight for me was working W1AIM for state #47." 99 QSOs, 5 on 222 MHz, N0LL (EM09). "Could have worked a lot more if we could have dragged them off 144.200." 39 QSOs, W0PHD (EN18). "Only 90 W." 124 QSOs in 99 grids, K0WLU (EN13). "I thought the shower was great, but I wish I had gotten on earlier Monday morning." W7XU/0 (EN13).

"Lots of stations from FN grids were loud on 144.200 on the early morning of Tuesday, but too much QRM." 12 QSOs, CO2OJ (EL83). "The tail end of Leonids provided a good thrill and a 2 meter QSO with HC2FG, my first 144-MHz meteor-scatter contact since leaving HL in 1994." HP3XUG. "We completed only four of our scheduled 13 stations." XE2HWB (DL54).

European 2-Meter Sampler

"Visually impressive here at 0500 [November 17]. Many fireballs capable of casting shadows and reflecting light from colored walls here in the dark countryside. From 0600 to 0800 made 101 random QSOs." F/G8MBI (JN04). "As time went by, the signals became longer and stronger. Around 0300 it was like 20 meters during a contest. Signals were coming in from all over Europe, it didn't matter where I turned my antenna. Between 0300 and 0500 the band was just completely open all over Europe; some stations like UT8AL, SV1OE, SV0EC, SM5BSZ and many others were audible for 15 minutes with just minor dips!" 70 QSOs, PA0JMV (JO21).

"Very pleased to hear so many stations [on SSB] that are normally only available in high speed CW." 93 QSOs, PE1BVM (JO21). "Guuauu!! I expected good conditions this year, but never like I heard last night." 120 QSOs, EA7GTF (IM87). Table 2 summarizes long-distance contacts.

Table 2

Some Long-Distance 144-MHz Meteor-Scatter Contacts from Europe, November 16 and 17, 1998

km	*Calls (grids)*
2372	EA7GTF (EM87cs)—SP2FAX (JO83va)
2231	G4ASR (IO81)—RW1AW (KP50)
2214	PA0JMV (JO21)—UA3PTW
2123	PE1BVM (JO21ri)—UT5EC
2147	EA7GTF (EM87cs)—HA8UG (JN97)
2101	EA7GTF (EM87cs)—DL1SUN (JO53pn)

ON THE BANDS

In addition to the Leonids fireworks, there were enough other propagation events in November to keep most everyone interested in the world above 50 MHz. Six meters continued to provide DX opportunities around the world, but the long-expected transatlantic openings did not materialize. There was a bit of aurora, sporadic E and even tropospheric ducting to round out the month's offerings. Thanks to N1RWY, W9JJ/1, K2OVS, KB2TGU, WB2AMU, WA3CSP, KJ6HI, W3SE/6, K7ICW, K9RQ, W9VA, ND0DX, W0MTK, W0OHU, HP3XUG, VE2PEP, VE2ZP and WP4O for their otherwise unacknowledged reports. Dates and times are UTC, as always.

Six Meter DX

Six-meter DX possibilities advanced slowly during the month. North-South paths between the Americas, Europe to Africa and Japan to Australia continued to supply the bulk of the activity. Longer east-west contacts adjacent to the equator provided some new contacts, especially from Japan to central Asia and the Middle East. November 8, when the K index jumped to 7 and the solar flux reached 153, was probably the best day for 6-meter DX. Note the number of surprising contacts made that day in various parts of the world.

Inter-American DX

There were at least half a dozen late afternoons when stations scattered over a wide area of the nation worked into South America, primarily to Brazil (PY), Uruguay (CX) and Argentina (LU). The only US call area missing from the South Americans' logs was W7. On November 7 around 1730, W1LP (FN42), WA1OUB (FN43) and others in the Northeast briefly heard the 7Q7SIX beacon, but there were no contacts to Africa or Europe during the month.

November 8 may have been the best day for propagation between the Americas. From 1530 to at least 2030, stations in VE2, VE9 and all US call areas except W6 and W7 worked the usual fare of PY, CX and LU stations, along with HP2CWB (Panama), TI2KA (Costa Rica) and HC2K and HC2FG (Ecuador). Californian stations worked into Brazil around 0200. Many US stations worked these same countries again the next day beginning around 1600.

South America

Nestor Zucchi, LW5EJU, logged at least seven days of late-afternoon contacts with CT3FT (Madeira Islands) and EH8BPX (Canaries), along with EH7KW (Spain), CN2UN and CN8LI (Morocco). Several Brazilians made similar contacts into southern Europe during the month.

Pacific Area

Conditions across the Pacific showed marginal improvement over the previous month. On November 1 around 0100, K6QXY worked ZL3NW, but signals were weak and no other contacts were completed. *Internet Six News* reported that on November 8, stations in Brazil worked into Japan (JA), Hong Kong (VR) and Taiwan (BV). On November 14, JH2COZ copied the XE2UZL beacon around 2330 while beamed toward Hawaii and made a contact with N6RZ a few minutes later.

Japan and China

Japanese operators continued to make some astonishing contacts. JR6HI worked ST2SA (Sudan) on November 6. UN3G (Kazakhstan) ran off nine contacts with Japan on November 8 between 0500 and 0540, according to the *Internet Six News*. On November 14 and 15, many Japanese worked the 10-W special-event station 9V8SEA in Singapore (which normally does not authorize 6-meter privileges). On November 22 after 0800, nine stations in southern Japan pulled off another coup by working XZ1N (Myanmar), according to JA1VOK. Rounding out the month was a widespread five-hour opening on November 25 during which Japanese operators worked DU, VR, 9M, VK, FK and KH2. Finally, Hong Kong stations reported BQ9P (Pratas Island) on November 16 and 17.

Europe, Africa and the Middle East

Europeans continued to work almost routinely into South Africa during November. New excitement was generated by the E30GA expedition station in Eritrea, which provided a new country for many Europeans on November 6, 11 and 15. The best day was the 15th, when E30GA worked DL, SP, OE, OK, I, F and GJ. The most-astonishing contacts came on November 8, when E30GA ran many Hong Kong (VR) stations, according to *Internet Six News*. No doubt many country-to-country firsts resulted from the Eritrean expedition's efforts.

Aurora and Auroral E

The K index jumped to 7 during the early hours of November 8, but most operators did not notice auroral buzz until after 0300. Then there was widespread activity on 144 MHz as far south as Virginia to Missouri and west to Colorado and Oregon until at least 0800. Germain Bisson, VE2PEP (FN46), reported a 222 MHz contact with W1JR (FN43). KL7SIX began hearing auroral signals on 50 MHz as early as 0315, when he copied the VE8WD (DP22) beacon. Among others logged by 0545 were VE8JL, N0SRQ (EN18), W0FD (EN24), W7FI (CN97) and VE8AGG (heard). KL7SIX also heard numerous W7s jumbled up on 50.125. N7DB (CN85) found KL7NO (BP51) on auroral E after 0500.

The November 14 event also began relatively late for aurora. The first 144 MHz contacts were reported after 0130 and were confined to the northern tier of states and Canada. On 50 MHz, VE6NM (DO05) heard both the VE8WD and VE8SIX (CP38) beacons with clear auroral-E signals after 0300. Mike Smith, VE9AA (FN65) was surprised to hook up with VE7AGJ (CO96) for a nice 3850 km auroral-E contact around 0344. WA1T heard VE7AGJ, along with the VE6IMU, VE4VHF and OX3VHF beacons about the same time. W7HAH (DN26) in Montana worked KL7NO and KL7OD.

Sporadic E

October and November normally do not provide many opportunities for sporadic-E propagation, so it is not surprising that 6-meter operators reported only limited openings on October 12, 14, 20, 26 and November 9, 10, 16 and 17. The best day may have been October 20, when contacts were made throughout the western US and from New England to the Southwest and Midwest.

Tropospheric Ducting

Larry Lambert, N0LL (EM09), found tropo conditions good to the east on November 29. Just after 0000, he worked W4HP (EM75) and K4MRW (EM64) on 144 MHz. When he returned to the shack at 0300, he ran off a number of stations in Iowa and Minnesota, including W0OHU on both 144 and 432 MHz. QST

VHF/UHF Century Club Awards

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations of contacts with stations within the minimum number of Maidenhead grid-square locators (indicated in italics) required for each band. The number that appears after each call sign refers to endorsements. The totals shown are for credits given from October 7, 1998 to December 11, 1998. The VUCC appli-cation form, rules, field sheets and the list of VHF Awards Managers can be found on the Web at **http://www.arrl.org/awards/vucc/.** Please send an SASE if you cannot download this information online. VUCC lapel pins are available for $5 each. If you have a question concerning VUCC, please contact us at ARRL Headquarters, or e-mail **vucc@arrl.org**.

Compiled By Bill Moore, NC1L, Century Club Supervisor

50 MHz

100

967	KD4MWO
988	KE4LGL
989	N8COP
990	KC0AUY
991	OK1MP
992	K0IW
993	XE1J
994	W3UQH
995	KC7ESB
996	KB0TIJ
997	AF2K
EH7CD	250
VE6NTT	225
XE1J	125
WB0ULX	200
K2CS	200
AF2K	200
W3ZQN	150
N4MM	675
WA4GLV	300
KE4WDZ	150
AA5XE	175
WB7QBS	250
N8ZJN	300
KB8YKR	200
KB8KVJ	250
N8CN	150

144 MHz

100

N2WK	225
K3HZO	125
K8BHZ	325

432 MHz

50

275	N8ZJN
K0RZ	220

1296 MHz

25

K3HZO	55
K3HZO	60

3.4 GHz

5

55	K7ND

Satellite

100

85	KA0OXY
86	AC5DK
87	KB8TJX
KB8TJX	175
KF8OR	175

QST

YL News

Edited by **Diane P. Ortiz, K2DO***

Planning Ahead

With the holidays behind us, it's a perfect time to plan some activities for the upcoming spring and summer. Yes, they will be here before you know it! If you haven't made your New Year's resolution yet (or have already forgotten what it was if you did) take out that calendar or refrigerator magnet pad now. Look over some of the events scheduled in the next few months and see if there is something that piques your interest.

Dayton

If you've never been to the Dayton Hamvention, May 14-16 at the Hara Arena in Dayton, Ohio, it is definitely worth the trip. Many YLs have already made their reservations and hope to get a peek at the new YL harmonic of YLRL President Nancy Rabel Hall, KC4IYD and her OM Steve, W8HF. There is a YLRL forum and participation by YLs in many other areas, ranging from the CW preservation group called FISTS to the Youth Forum run by Carole Perry, WB2MGP. You will find licensed YLs manning the commercial booths, giving accounts of their latest DXpedition experiences, and getting together for "eyelash" QSOs at the area set aside by the local and very active YL group, the Buckeye Belles.

Field Day and the YLRL Convention

A major event for most hams is Field Day, June 26-27. One group in California always has an all-YL Field Day. They have a great time setting up and camping out. Whether you stay at home or go out in the field, alone or with a group, it's a great opportunity to practice your operating and setup skills.

Coming up in July is a major YL event, the YLRL Convention. It is going to be held in Long Beach, California on the Queen Mary, July 30-August 1. There are many international YLs attending and lots of fun activities are scheduled.

YL Action

While these large events are wonderful, there are many exciting things happening in your own backyard, just waiting for some YL participation. Many women have written me expressing concern about being the only licensed YL in their local area. It is often difficult to be one of a few—or possibly even the only—licensed YL at a local hamfest, club meeting, public service event or VE session. But most YLs find that once they take the first step and express interest, they are welcomed and treated equally as "just another ham." Often it just takes one YL to break the ice and then other YLs feel more comfortable participating.

Vicki Rudicel, KB9OME, of Marion, Indiana, wrote me that she and her friend Joan Hobbs, KB9RUM, passed their 13-WPM Morse code tests recently. Vicki said, "Although I had planned to advance to at least a General (I had been a Technician Plus operator for about a year), Joan has been an inspiration to me to 'get at it' and get it done. Her enthusiasm for the Amateur Radio hobby has been catching…" She and Joan are now planning to work on the General theory and hope to pass it early this year, before the recently proposed license structure goes into effect.

It's nice to hear about the many YL accomplishments from the "other side of the fence." I recently received mail from one of the men who reads this column. Dave Gollihar, KA5KLU, of San Antonio, Texas calls himself "the second ham radio operator in the family" even though he was licensed many years before his wife Lucy, N5RLQ.

Dave was a Navy radioman in the 60s and became a ham in 1980. He said his wife Lucy soon learned that the radio room was the best place to get his attention. The conversations he had with hams all over he world soon sparked her interest in the hobby and after much hard work Lucy got her Technician license in 1990, upgrading to Advanced in 1997.

Dave said he is very proud of her involvement in the hobby. "Best of all," he said, "she got me interested in a local club—the AARO (Alamo Area Radio Organization)—and convinced me to buy her a 2-meter H-T for her birthday." Lucy started working public service events and got involved with NDMS (National Disaster Medical System). NDMS does simulated disaster preparedness drills along with the military. Dave said, "It is quite a drill; last year there was a simulated volcanic eruption where 10,000 people were injured and airvac (C130s) brought the injured to the many hospitals located in our city. Her [Lucy's] job was to act as a radio operator for one of the hospitals sending information to a staff center on the number of patients and what kinds of injuries the hospital was receiving." He said he was very proud of her role in that event and it received major TV coverage.

Dave described one of Lucy's major involvements: "One of her greatest achievements came this year when San Antonio, New Braunfels and the local area had what is called the 100-year flood. Some areas received as much as 25 inches of rain in less than 24 hours. Many of the amateurs, including Lucy, were involved in supplying communications for the city. Our local Red Cross lost most of their radio equipment when it sustained flooding to the basement.

"Several of the high school gyms were set up as shelters for the many people who had lost homes during the flooding. Lucy worked at Highlands where she graduated from several years ago. While there she was interviewed by Channel 4 where she promptly told the reporter of the many ways that Amateur radio supplies free public service to the community. Although many have teased her about her role at being a TV celebrity I could see the pride in her face. She got one up on me again!"

Lucy also enjoys participating in Field Day, does duties as a Net Control Station for the National Traffic System and is active in contesting. Dave said that although he has had to take a backseat to his wife's many achievements in ham radio, he is very happy to be able to share his favorite hobby with his best friend. "I'm just glad that she prefers SSB to CW, which is my favorite mode," Dave commented. "It's good to see the ladies taking up what was once a male-dominated hobby. She has been instrumental in talking other wives into getting into the hobby at our testing sessions. While I am doing VE duty testing she works on encouraging those who come to upgrade or to go for that first license. She is not the only one however. We have several ladies in our club who are just as energetic as she is when it comes to the hobby."

Congratulations to Lucy and the many YLs who go out of their way to show the best side of amateur radio.

MARY LOU BROWN, NM7N

It is with great sadness that I report the death of ARRL Northwestern Director Mary Lou Brown, NM7N, who passed away in early December. She was very active in the ARRL and was past president of the YLRL. She will be missed and we send condolences to her family. See "Happenings" in this issue for further details.—*33, Diane, K2DO* QST

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A Raucous Cacophony! Oh, the Beauty . . .

By Steven J. Meyers, W0AZ
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Durango, CO 81301
sjmeyers@frontier.net

Please forgive me. I'm in the middle of a book—writing one, not reading one. It isn't the first, and I hope it won't be the last, but it is one I've been struggling with for some three years, and it has made me just a tad introspective. While many in the Amateur Radio community find themselves working in science or engineering, designing or repairing radios, making airplanes fly, helping to land instruments on distant moons and planets (I have read of their wonderful exploits in these very pages), my work is a bit more prosaic. I write. I write books about small town life, about hunting and fishing, about the loss of loved ones. About grief. About healing. About nature. I'm an essayist, and I'm allowed the luxury of scribbling about the things that matter most to me.

What struck me just now—slipping into a consciousness made receptive by all the recent talk about "restructuring"—is not the sameness of healthy communities, but their radical diversity. I was struck with the quite obvious but sometimes overlooked fact that it is this very diversity that allows communities to thrive. And I was struck, too, sitting as I sometimes do in a spectator's seat (the essayist's prerogative), with the incredible beauty of this delightful cacophony, this heartfelt, passionate debate.

In my lifetime Amateur Radio has twice found itself in tremendous turmoil over issues relating to licensing. I well remember the hard feelings that surrounded the "incentive licensing" controversy. In the past few years the matter of CW and how it will be regarded after "restructuring" has generated much heat. Lately, there has been ample discussion of the debate's divisiveness. Let me be counted among those who celebrate its beauty!

There's a lot of truth in humor. Surely, you've heard the one about the three Frenchmen who constituted four political parties? Nobody has ever accused the French of lacking passion; nor, would anyone familiar with French contributions to the arts accuse them of being a people lacking a profound appreciation for beauty. Might these notions, passion and beauty, be inextricably linked? I say yes, and I say we amateurs are every bit as passionate! It's time we recognized the beauty of our ardor for things related to radio. I say, show me three hams, and I'll show you a fistful of deeply held, radio-related convictions—and CW, pro or con, isn't the half of it!

I live in a part of the world that is home to a wonderful ham magazine that espouses the value of the valve, that shouts "AM forever!" It is the voice of one of ham radio's many constituent groups, a periodical that lovingly and ardently expresses the wish that all radios should now and forever glow in the dark. Last evening, I spoke with a retired engineer at his summer cabin in upstate New York. He ripped along in flawless code, faster than anything I'd copied in years. My adrenaline was pumping, even though the conversation was cordial, and I found it easy to believe in that moment that all men everywhere would benefit, as my new friend insisted, from a healthy dose of good CW!

The cover of the September 1998 issue of *QST* showed Dale Clement, AF1T, standing behind a microwave rig that was pointed down into the valley from the gray summit of a New England peak. He stood smiling in the cold, gray shiver that was the mountain top, content and at peace with the world, confident, I surmised, in his understanding that microwaves carry more joy than any other form of electromagnetic energy. Internet gateways gather digital data off the radio and turn it into e-mail; somewhere, there is a ham who finds pleasure in maintaining the system that provides the service, one who might well argue that only a fool sees the demise of Amateur Radio in the coming of the Internet. Rag-chewers chew, and contesters contest, each secure in his or her knowledge that chewing or testing are why old man Hertz elected to discover those wavy old Hertzes in the first place. QRPers work DX with milliwatts, while QROers grab rare ones even when the sunspots are hiding.

Contentment comes, in one case from barely perceptible motion on the wattmeter, and in the other from meter-bending kilowatts. We argue vociferously about what spectrum should be allocated for what purpose. We are equally happy as appliance operators or home-brewers. Some dedicate their ham lives to public service, and some use the radio only to maintain contact with family and friends. We either lament the loss of the good old days, or we decry fuddy-duddies who hold radio back. In any case, from all positions, we hurl ourselves passionately into the debate. We continue to argue, we continue to operate in an atmosphere of healthy diversity and strong opinions. We are drawn by wildly varying temperaments to one mode or another, by our life experiences to one position or another on the complex issues we confront, and as long as we remain civil, which, remarkably, we largely do, only good emerges.

From all the discussion I have read, from all the debate I have heard, only one fact that is indisputable appears: for all the many difficulties and decisions we face, nothing is more evident than our life. The air is humming not with portents and omens of radio's decline; but rather, with abundant signs of its gloriously raucous life! And few things are as beautiful.

QST Op-Ed Policy

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

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

2) No payment will be made to contributors.

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

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

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

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

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

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

Coming Conventions

*Edited by **Gail Iannone** • Convention Program Manager*

NORTHERN FLORIDA SECTION CONVENTION

February 12-14, 1999, Orlando

The Northern Florida Section Convention (HamCation and Computer Show), sponsored by the Orlando ARC, will be held at the Central Florida Fairgrounds, 4603 W Colonial Dr (State Rd 50). Doors are open Friday 5-9 PM, Saturday 9 AM to 5 PM, Sunday 9 AM to 3 PM. Features include swap, tailgating, commercial vendors, VE sessions, forums, foxhunt, RV overnight parking (Bob Cumming, W2BZY, 407-333-0690). Talk-in on 146.76, 145.11. Admission is $7 in advance and $9 at the door. Contact Ken Christenson, KD4JQR, 5548 C Cinderlane Pkwy, Orlando, FL 32808, 407-291-2465; **kd4jqr@juno.com**; **http://www.oarc.org/hamcat. html**.

VERMONT STATE CONVENTION

February 27, 1999, Milton

The Vermont State Convention, sponsored by the Radio Amateurs of Northern Vermont, will be held at Milton High School, Rte 7, 5 miles N of I-89, Exit 17. Doors open 8 AM to 2 PM. Features include flea market, vendors (please call for setup information), auction, dealers, book sales, forums (ARRL, DXing, VHF, satellite), exhibits, VE sessions (9 AM and 2 PM), commercial radio exams, refreshments. Talk-in on 145.15. Admission is $3, under 18 free. Tables are free while they last (maximum 2 per seller). Contact Mitch Stern, W1SJ, Box 99, Essex, VT 05451-8099, 802-879-6589; **w1sj@vbimail.champlain.edu**; **http://www.ranv.together.com**.

GREAT LAKES DIVISION CONVENTION

February 27-28, 1999, Cincinnati, OH

The Great Lakes Division Convention, sponsored by the Hamilton County ARPSC, will be held at the Cincinnati Gardens Exhibition Center, Seymour Ave at Langdon Farm Rd; I-75 to Ohio St (Rte 561), go E for approximately 1½ miles. Doors are open Saturday 8:30 AM to 5 PM, Sunday 8:30 AM to 4 PM. Features include flea market, commercial vendors, forums (ARRL, ARES), hospitality room, banquet, Wouff Hong, VE sessions. Talk-in on 145.37. Admission is $7 in advance and $8 at the door. Contact Bill Tittle, KA8LAY, 3038 Bracken Woods Ln, Cincinnati, OH 45211, 513-661-1861; **gldivconvention@juno.com**.

1999

January 29-30
Mississippi State, Jackson*

February 6-7
Southern Florida Section, Miami*

March 13-14
Roanoke Division, Charlotte, NC

March 19-20
Maine State, Lewiston
Oklahoma State, Tulsa

March 27-28
Maryland State, Timonium

***See January *QST* for details.**

NEBRASKA STATE CONVENTION

March 5-7, 1999, Norfolk

The Nebraska State Convention, sponsored by the Elkhorn Valley ARC, will be held at Northeast Community College, 801 E Benjamin Ave; from US Hwy 81, turn E on Benjamin Ave, go approximately 1½ miles. Doors are open Friday 5-9 PM, Saturday 8 AM to 10 PM, Sunday 8 AM to noon. Features include ARRL forum, VE sessions, Wouff Hong ceremony, special event station, evening banquet with speaker, refreshments. Talk-in on 146.73. Admission is $6 in advance and $7 at the door. Tables are $12. Contact Fred Wiebelhaus, N0VLX, 605 S 3rd St, Norfolk, NE 68701, 402-379-1929; **dfwiebel@sufia.net**; **http://members.aol.com/davidn0xbn/evarc.html**.

Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262.

Note: Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. QST

Hamfest Calendar

*Edited by **Gail Iannone** • Convention Program Manager*

Attention: The deadline for receipt of items for this column is the **1st of the second month preceding publication date.** For example, your information must arrive at HQ by **February 1** to be listed in the **April** 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 (Phoenix)—Feb 1. Ralph, W0DNO, 602-582-8208. (Auction)

†**Arkansas (Russellville)—Feb 20**, 8 AM to 4 PM. *Spr:* Arkansas River Valley AR Foundation. Hughes Community Center; Hwy 7 to Parkway, go E on Parkway to junction of Parkway and Knoxville. Forums (ARRL, QRP, antenna). *TI:* 146.82. *Adm:* $5. Margaret Alexander, KC5MCS, 1511 N Jackson, Russellville, AR 72801; 501-968-7270; **ealexand@cswnet.com**.

†ARRL Hamfest

British Columbia (New Westminster)—Feb 21. Harry, VE7HNC, 604-530-3962.

†**Colorado (Brighton)—Feb 14**, 8 AM. *Spr:* Aurora Repeater Assn. Adams County Fairgrounds, 9700 Henderson Rd. Swapfest, VE sessions. Wayne Heinen, N0POH, Box 473411, Aurora, CO 80047-3411; 303-699-6335; **nrclog@aol.com**.

†**Florida (New Port Richey)—Mar 6-7**; Saturday 8 AM to 5 PM, Sunday 8 AM to 3 PM. *Spr:* Gulf Coast ARC. Fred K. Marchman Technical Educational Center, 7825 Campus Dr; I-75 to US Hwy 52, turn W to Little Rd, turn S to Ridge Rd, turn W to Lemon Rd, turn S to hamfest. AR and Computer Show ("Hamfest Under the Sun"), commercial vendors, tailgating ($4 per space, includes admission), forums, RACES, code speed contest, VE sessions, free overnight camping with security. *TI:* 146.67, 145.33. *Adm:* $4. Tables: $4 (includes admission). Rick Brown, KF4GXS, Box 595, New Port Richey, FL 34656-0595; 813-842-2127; **richar@gte.net**.

Florida (Orlando)—Feb 12-14, Northern Florida Section Convention. See "Coming Conventions."

Florida (Pensacola)—Jan 23. Rowdy Lienhart, N4XOL, 850-968-1048.

†**Florida (Spring Hill)—Feb 20**; set up 5 AM; public 8 AM to 3 PM. *Spr:* Hernando County ARA. VFW Post 10209, 15166 Spring Hill Dr, between US 41 and Mariner Blvd. Tailgating ($6), refreshments. *TI:* 146.715. *Adm:* advance $5, door $6. Tables: $12 (8-ft). Ralph Wilson, AF4FC, 5556 Old California, Brooksville, FL 34609; 352-754-9653; **carolynr@gate.net**; **http://www.fiber-net.com/pub/hcara/index.htm**.

†**Georgia (Dalton)—Feb 27**, 8 AM to 2:30 PM. *Spr:* Dalton ARC. N GA Fairgrounds, Legion Dr, one block off Rte 41 S. *TI:* 145.23. *Adm:* $5. Tables: $5. James Jordan, K4FLG, 811 Piedmont Ln, Dalton, GA 30720; 706-278-0630 (after 6 PM only).

†**Illinois (Rock Island)—Feb 14**; set up Saturday noon to 6 PM, Sunday 6 AM; public 8 AM to 3:30 PM. *Spr:* Davenport RAC. QCCA Expo Center, 2621 4th Ave; downtown Rock Island, just off W bound IL Rte 92. Hamfest/Computer Show, flea market, commercial vendors, computer hardware and software, fast scan TV demos, handicapped accessible, free parking, refreshments. *TI:* 146.88, 146.64. *Adm:* advance $5 (double stub), $6 (single stub), under 14 free. Tables: $12 (8-ft, paid in advance); commercial booths $20. Kent Williams, K9UQI, 4245 10th St, E Moline, IL 61244-4154; 309-796-0718, fax 309-796-0629; **k9uqi@netexpress.net**; **http://www.arcsupport.com/drac**.

†**Illinois (Sterling)—Mar 14**. Set up Saturday

6-9 PM, Sunday 6 AM; public 7:30 AM. *Spr:* Sterling-Rock Falls ARS. Sterling High School Fieldhouse, 1608 4th Ave; Miller Rd, 1 block N of hospital, go E, use N entrances to Fieldhouse on Miller Rd. Indoor flea market, radio and electronic items, computers, self-contained campers and mobile homes, free parking, refreshments. *TI:* 146.85. *Adm:* advance $3, door $4. Tables: $5 (without electricity), $6 (with electricity, bring your own cords). Send SASE by Mar 1 to Lloyd Sherman, KB9APW, Box 521, Sterling, IL 61081-0521; 815-336-2434; **lsherman@essexl.com**.

Maine (Crystal Falls/Chelsea)—Feb 13. Bill, K1NIT, 207-623-9075.

†**Massachusetts (Marlborough)—Feb 13**, 10 AM to 2 PM. *Spr:* Algonquin ARC. Marlborough Middle School, Thresher Dr; Rte 85, N of downtown Marlborough. Flea market. *TI:* 146.61. *Adm:* $3. Tables: advance $12, door $15. Ann Weldon, KA1PON, Box 258, Marlborough, MA 01752; 508-481-4988.

†**Michigan (Farmington Hills)—Feb 21**, 8 AM to 3 PM. *Spr:* Livonia ARC. William M. Costic Activities Center, 26800 Eleven Mile Rd, between Middlebelt and Inkster Rds. Swap 'n Shop, Skywarn. *TI:* 145.35, 146.52. *Adm:* $5. Tables: $16 (plus advanced $5 admission). Send 4×9 SASE to Neil Coffin, WA8GWL, Livonia ARC, Box 51532, Livonia, MI 48151-5532; 734-261-5486; **swap@larc.mi.org**; **http://www.larc.mi.org**.

†**Michigan (Negaunee)—Feb 13**, 9 AM to 3 PM. *Spr:* Hiawatha ARA. Negaunee Township Firehall, 42 M-35; US 41 W from Marquette for approximately 6 miles, then M-35 S, Firehall on right. Swap and Shop, refreshments. *TI:* 147.27. *Adm:* $2. Tables: $6. John Veiht, N8RSE, 906-228-9417; or Bob Serfas, N8PKN, 906-226-9782.

Michigan (Traverse City)—Feb 13. Joe, W8TVT, 616-947-8555; or Chuck, W8SGR, 616-946-5312.

Nebraska (Norfolk)—Mar 5-7, Nebraska State Convention. See "Coming Conventions."

New York (Cheektowaga)—Feb 28. Luke Calianno, N2GDU, 716-634-4667.

New York (Elmira/Horseheads)—Feb 20. Gary, N2OKU, 607-739-0134.

†**New York (Freeport)—Feb 21**; set up 6 AM; public 8:30 AM to 1 PM. *Spr:* Long Island Mobile ARC. Freeport Armory, 63 Babylon Tpke, off Exit M7, W of Meadowbrook Pkwy. Giant indoor flea market, AR equipment, computers, commercial dealers, vendors, ARRL information, free VHF tune-up clinic, VE sessions (10 AM sharp, walk-ins, all classes of amateur licenses), free parking, refreshments. *TI:* 146.85 (136.5 Hz). *Adm:* $6. Tables: $25 (6-ft, includes 1 admission). Rich Selzer, N2WJL, Box 392, Levittown, NY 11756-0392; 516-520-9311; **hamfest@limarc.org**; **http://www.limarc.org**.

†**New York (Lindenhurst)—Mar 7**; set up 7 AM; public 9 AM to 2 PM. *Sprs:* Great South Bay ARC and Suffolk County RC. Knights of Columbus Hall, 400 S Broadway. Flea market, vendors (advance $15, door $20), computers and accessories, software, electronic components, radio equipment, ARRL info, free tune-up clinic, VE sessions, refreshments. *TI:* 146.685 (136.5 Hz). *Adm:* $6. Tom Carrubba, KA2D, 226 Sheffield Ave, N Babylon, NY 11704-5305; 516-422-9594; **info@gsbarc.org**; **http://www.gsbarc.org/hamfest.htm**.

†**New York (Melville)—Feb 28**, 8 AM. *Spr:* Radio Central ARC. Huntington Hilton, Rte 110 at Bethpage-Spagnoli Rd; LI Expressway (I-495) to Exit 49, Rte 110 southbound, go 1 mile to corner of Bethpage-Spagnoli Rd. *TI:* 145.15 (136.5 Hz). *Adm:* $8. Tables: $20 (electricity $5 extra). Jo Ann Colletti, N2IME, 125 Cranford Blvd, Mastic, NY 11950; 516-399-1877; **w02n@li.net**.

†**New York (Westfield)—Feb 13**; set up Friday 6 PM, Saturday 6 AM; public 8 AM to 3 PM. *Spr:* Chautauqua County Radio Amateurs. Westfield Exempt Volunteer Fireman's Assn Hall, 75 Bourne St, off Rte 394. Hamfest/Computerfest, flea market, VE sessions (preregistration requested), forums, convenient parking, refreshments. *TI:* 145.35. *Adm:* $5, under 12 free. Tables: $5. Eric Kroon, N2PCQ, 239 Maple Ave, Cassadaga, NY 14718; 716-595-3220; fax 716-595-8186; **EKroon@netsync.net**.

†**North Carolina (Elkin)—Feb 21**, 8 AM to 4 PM. *Sprs:* Briarpatch ARC and Foothills ARC. National Guard Armory. VE sessions. *TI:* 145.37. *Adm:* $5. Jimmy Holbrook, KB4GKI, 339 Mae Cockerham Rd, Ronda, NC 28670; 336-957-3820 (phone and fax); **kb4gki@aol.com**.

†**North Dakota (Bismarck/Mandan)—Feb 27**; set up 7 AM; public 8 AM to 3:30 PM. *Spr:* Central Dakota ARC. Spirit of Life Church, 801 SE 1st St. Flea market, VE sessions. *TI:* 146.94, 146.52. *Adm:* advance $5, door $6. Tables: $5. Dennis Murphy, K0GRM, 111 W Arikara Ave, Bismarck, ND 58501-2604; 701-258-6747; **http://www.qsl.net/cdarc**.

Ohio (Cincinnati)—Feb 27-28, Great Lakes Division Convention. See "Coming Conventions."

†**Ohio (Circleville)—Feb 28**, 8 AM. *Spr:* Teays ARC. Pickaway County Fairgrounds Coliseum, State Rte 22, E end of Circleville. Flea market. *TI:* 147.18. *Adm:* advance $4, door $5. Tables: advance $12, door $15. Roy Ulko, KG8EK, 132 W Main St, Circleville, OH 43113; 740-477-8310; **royulk@scioto.net**.

†**Ohio (Cuyahoga Falls)—Feb 28**, 8 AM to 2 PM. *Spr:* Cuyahoga Falls ARC. Emidio and Son's Party Center, 48 E Bath Rd, at corner of State Rd. Hamfest and Electronics/Computer Show, VE sessions, free parking, refreshments. *TI:* 147.27. *Adm:* advance $4, door $5. Tables: advance $8, door $10. Carl Hervol, N8JLQ, 11192 Cottingham Cir NW, Uniontown, OH 44685-9185; 330-497-7047; fax 330-497-0090; **carlh@pop.raex.com**; **http://www.cfarc.org/hamfest.htm**.

†**Ohio (Mansfield)—Feb 14**, 7 AM to 3 PM. *Sprs:* Intercity ARC and Mansfield Emergency Repeater Assn. Richland County Fairgrounds; from US 30 exit on Trimble Rd N, follow signs to far W side of Fairgrounds. *TI:* 146.94. *Adm:* advance $4, door $5. Pat Ackerman, N8YOB, 63 N Illinois Ave, Mansfield, OH 44905; 419-589-7133; fax 419-589-7139.

†**Oregon (Rickreall)—Feb 20**; set up Friday 6-9 PM, Saturday 7 AM; public 9 AM. *Sprs:* Salem Repeater Assn and Oregon Coast Emergency Repeater. Polk County Fairgrounds, 520 S Pacific Hwy W; W of Salem where Hwy 22 meets 99W. Salem Hamfair and Computer/Electronics Swapmeet, commercial dealers, vendors, country store, meetings (ARRL, ARES/RACES), self-contained RV camping ($10 per night), handicapped accessible, refreshments. *TI:* 146.86. *Adm:* advance $6, door $7, under 13 free. Tables: $13 (without power), $15 (with power). Evan Burroughs, N7IFJ, 6325 Joseph St SE, Salem, OR 97301; 503-585-5924; **n7ifj@teleport.com**; **http://sra.goldcom.com/sraflyer.htm**.

†**Pennsylvania (Oberlin)—Feb 13**; set up 6 AM; public 8 AM. *Spr:* Harrisburg RAC. Oberlin Firehall, Rte 441 and Ober St; Exit 1 (PA 441) off I-283, follow signs. Dealers, tailgating ($2, very limited), ATV demo, VE sessions (9 AM), refreshments. *TI:* 146.76. *Adm:* $2 (nonham spouses, sweethearts, and children free). Tables: $8 (advance registration). Richard Bordner, N3NJB, 2501 S 2nd St, Steelton, PA 17113-3009; 717-939-4825; **n3njb@juno.com**.

Tennessee (Knoxville)—Mar 6. Paul Baird, K3PB, 423-986-9562.

Texas (Dallas)—Feb 20. Bob Peters, K1JNN, 972-383-7507. (Auction)

†**Texas (Smithville)—Feb 20**, 8 AM. *Spr:* Bastrop County ARC. Riverbend Park Pavilion, just off Hwy 71. Swapfest, tailgating (covered $5, not covered $3), RV hookups, plenty of parking. *TI:* 145.35, 443.75. *Adm:* Free. Tables: $10 (inside), $5 (outside). Lynn Fisk, K5LYN, RR 2, Box 198B, Smithville, TX 78957-9551; 512-360-4809; **kc5kfv@onr.com**; **http://www.qsl.net/kb5yae**.

Vermont (Milton)—Feb 27, Vermont State Convention. See "Coming Conventions."

Virginia (Annandale)—Feb 28. Mike Toia, K3MT, 703-757-5021.

†**West Virginia (Fayetteville)—Feb 28**, 9 AM to 3 PM. *Spr:* Plateau ARA. Fayetteville High School, 515 W Maple Ave; Laurel Creek Rd Exit off Rte 19, go 2 blocks E to hamfest. VE sessions. *TI:* 146.79, 147.075, 443.3. *Adm:* $5. Tables: with electric $10, without electric $5 (Mark Skaggs, 304-658-5789). Juddie Burgess, KC8CON, Box 96, Fayetteville, WV 25840; 304-574-4847; **kc8con@usa.net**; **http://www.geocities.com/CapeCanaveral/Launchpad/4842**.

Wisconsin (Waukesha)—Mar 7. John Breecher, N9NWN, 414-835-7035.

Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as free prizes, handouts, and other support.

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to **giannone@arrl.org**. QST

New Products

THE STACKMASTER FROM ARRAY SOLUTIONS

◊ The StackMaster, a four-antenna stack controller for monoband Yagis, maintains a proper 50-Ω match to any one, any 2, any 3 or all four antennas in your array. The unit's new in-shack controller has pushbuttom switches with LED indicators. All unselected antennas are grounded, and lightning protection on all control lines is standard.

The StackMaster's high-power relays can handle more than 5 kW on CW and offer tremendous isolation. As a safety feature, the control unit monitors your rig's PTT line, preventing potentially destructive "hot switch" accidents. Antenna matching is accomplished via professionally built 1/4-wave coaxial stubs. Users can purchase the StackMaster with or without stubs.

For pricing and complete information, contact Array Solutions; **wx0b@arraysolutions.com**; **http://www.arraysolutions.com**. QST

Next New Product

Strays

PIC MICROCONTROLLER REFLECTOR

◊ Claton Cadmus, KA0GKC, has created an e-mail discussion group ("reflector") called Ham-Pic. It is devoted to PIC microcontrollers and their various Amateur Radio applications. To subscribe to the Ham-Pic list, send an e-mail to **majordomo@qth.net**. In the body of the message type: **subscribe ham-pic**.

Next Stray

Silent Keys

By Kathy Capodicasa, N1GZO

It is with deep regret that we record the passing of these amateurs:

W1GGB, Donald G. Hicks, Tewksbury, MA
W1JBW, Powell Murchison, Provincetown, MA
NS1RA, Allan R. Miller, Danvers, MA
*W1SE, Leland W. Aurick, Winter Springs, FL
W1SON, William J. Monahan, Norwell, MA
*W1TCD, Carter P. Pfaelzer, Weston, MA
N1UVV, Everett H. Swenson, Amesbury, MA
W1UWV, Erich Richter, West Cornwall, CT
W2ADA, Frank B. Flessel, Halesite, NY
*K2AOQ, Melvyn S. Stoller, Rochester, NY
W2CBF, Herbert Weitz, Cranbury, NJ
K2DX, T. P. Tissot, Cherry Hill, NJ
W2GMT, Irving Morris, Merrick, NY
KB2GNY, J. Corpac, Franklin Square, NY
K2IOE, John H. Carnes, Pulaski, NY
KA2IXV, Carl N. Guldenschuh, Honeoye, NY
KA2KAQ, Robert W. Mertz, Forked River, NJ
WB2MWQ, Charles W. Biermann, Whippany, NJ
*N2NS, Paul R. Krugh, Reynoldsburg, OH
*NA2Q, Stephen W. Rosecrants, Clinton, NY
NC2Q, Barbara Lottridge, Stone Ridge, NY
WB2RRY, Edward J. Karolski, Toms River, NJ
N2SXO, Ray W. Wrzeszczynski, Williamstown, NJ
W2YYL, Max Weinberg, Stony Brook, NY
N3AUW, Peter Koch, Southampton, PA
K3CI, John L. Hilbish, Drums, PA
KE3DB, Jerome C. Strohmeyer, Erie, PA
N3DB, Donald L. Backstrom, Russell, PA
K3GDI, Frank Bair, York, PA
W3KAG, Henry C. Miller, Hatfield, PA
N3MKK, George J. Ferenz, Lewistown, PA
N3NWM, Diana G. Thompson, Reynoldsville, PA
W3TYI, Johnnie W. Reisor, Bear, DE
W3YPW, James W. Leight, Conowingo, MD
KB4BEQ, J. R. Rockhill, Mobile, AL
K4BGZ, Louis T. Croneberger, Virginia Beach, VA
AA4DS, Phil C. Sharr, Salem, VA
KF4EXY, Carl D. Shelhamer, Charlotte, NC
*K4FD, William W. Muessig, Satellite Beach, FL
WA4GRW, Frank L. Williams, Upatoi, GA
K4IDB, Virgil F. Kramer, Elyria, OH
AF4IQ, William A. Wimer, Benson, NC
N4LHZ, Cleveland B. Cannon, Macon, GA
W4PSZ, Arnold E. Cheek, Peachtree City, GA
W4QB, Richard A. Walsh, Lynchburg, TN
KB4RUM, Gretchen A. Sharr, Salem, VA
KD4UHO, William T. Waters, Port Charlotte, FL
W4UIS, Calvin F. Showalter, Marshall, VA
N4WQN, Ruth G. Monsees, Clearwater, FL
KF4YB, Egon C. Timfold, Hendersonville, NC
W4ZKY, Suzanne H. MacLeod, Lumberton, NC
N5AEG, Orvis E. Meador, San Antonio, TX
W5AVF, Fred L. Ford, Vicksburg, MS
WA5EXN, Richard A. Pitts, Irving, TX
N5FQN, Paul Rosenkranz, Taylor, TX
K5IGW, Clarence E. Gibson, Monroe, LA
KA5KWM, Hershell R. Morris, Norman, OK
WA5LIX, Carl R. Allen, San Antonio, TX
WA5PCU, James B. Godwin, Boerne, TX
KG5TS, Thomas F. Rasile, Wichita Falls, TX
W5TYW, Robert C. Holmes, Texarkana, AR
N5XA, Clement R. Coggin, Biloxi, MS
WA6BUH, Howard W. Bobbitt, Fresno, CA
N6BYD, J. W. Sidwell, Ojai, CA
W6CDM, Herbert W. Wittenbrock, Ojai, CA
W6CVK, Sidney D. McCoy, Reseda, CA
W6ESO, Arthur L. Charlton, San Diego, CA
KI6GG, Frank J. Lapointe, Santa Clara, UT
K6IA, Austin J. Rudnicki, Santa Barbara, CA
AB6JQ, John R. Burgoon, Santa Clara, CA
N6KNZ, Laurence W. Geske, Barstow, CA
W6LYA, Robert G. Hester, Pearblossom, CA
WB6MCG, Ed Peters, Sanger, CA
KA6MTT, Harvey F. Haight, Costa Mesa, CA
KD6OMU, Loretta I. Bokemeier, Aptos, CA
KD6QPI, Bill D. Gonthier, College Place, WA
WB6SLX, Malcolm R. Stuart, Parachute, CO
W6SM, Rudolph H. Lindquist, Turlock, CA
W6UYH, Joseph M. Boyer, San Manuel, AZ
W6YO, Julius W. Wenglare, Delano, CA
KD6YRC, Sheila J. Gaither, Madison, CA
KD7ARR, John L. Baird, Quartzsite, AZ
KB7AWB, Linda D. Bedford, Gilbert, AZ
W7DJ, Earl H. Thoms, Seattle, WA
W7FHW, Pauline L. Avery, Pasco, WA
N7HHU, Richard W. Umberger, Yakima, WA
KJ7H, A. D. De Vore, Gold Beach, OR
KA7JFC, Robert J. Ryan, Seattle, WA
W7JXP, Victor M. Visotsky, Seattle, WA
‡WM7K, Paul C. Johnston, Merlin, OR
NM7N, Mary Lou Brown, Anacortes, WA
WB7PHJ, John L. Taylor, Glendale, AZ
*K7VXV, Murvin L. Colby, Richfield, UT
WA8AAV, Fred Cousino, Cleveland, OH
WA8BGK, Robert F. Whitehead, Cincinnati, OH
WB8BGQ, Stephen P. Cole, Manistee, MI
N8CPP, Wilson E. Hale, Wilberforce, OH
K8ES, Edward P. Forgrave, Powell, OH
WA8IGG, Frank V. Surma, Detroit, MI
KB8JSG, Bob La Chance, Farmington Hills, MI
WD8JVR, Raymond Hollabaugh, Harlingen, TX
W8MIG, John R. Yereb, Columbiana, OH
W8ORS, Leo O. Gerding, Cincinnati, OH
WA8YDE, Clarence L. Smith, Wayne, WV
W9AJX, Jack W. Rosier, Ottawa, IL
W9BIA, Russell W. Broten, Phoenix, AZ
W9BPK, Gilbert E. Leech, Coal Valley, IL
W9DHQ, Roy Schlender, Lake Mills, WI
WA9DHS, Bob D. Bruner, Newtown, IN
W9GJS, Woodrow M. Cook, Greenwood, IN
K9HPX, Joseph T. Craig, Lexington, IN
WA9IVE, John W. Lenn, Evansville, IN
KB9JVV, Ronald G. Eyman, Golden Gate, IL
KC9LR, Joseph L. Fanelli, New Port Richey, FL
W9MNR, Helen M. Zalucha, Bloomington, IL
NX9P, Robert G. Xenos, Alsip, IL
K9PTS, Noah Cox, Nashville, IN
KA9RKH, Eldon B. Shirley, Evansville, IN
KA9STX, John A. Arter, Pierceton, IN
KB9UN, Jerry A. Krizka, Nocatee, FL
W9VFY, Alfred J. Elstner, Martinsville, IN
W9YOA, Jack P. Klein, Beaver Dam, WI
N9YVN, Timothy G. Herbert, Marshfield, WI
N0BBI, Oliver L. Boutros, Kansas City, MO
N0BR, William J. Reagan, Columbia, MO
WA0COQ, James R. Bellville, Chesterfield, MO
WA0DNA, Robert Joy, Perryville, MO
‡K0DTX, John H. Lasley, Sr., Lakewood, CO
KB0DUE, Janet Rapp, Crete, NE
N0EGJ, Betty Burkine, Watertown, SD
KB0GBB, Bevin Russell, Winfield, KS
W0MYR, Paul N. Hoffman, Cedar Rapids, IA
W0UAA, Paul F. Leonard, Rochester, MN
KA0WBU, Darrel R. Morrison, North Platte, NE
KA0ZLW, Rebecca Tompkins, Vassar, KS

*Life Member, ARRL

‡Call sign has been re-issued through the vanity call sign program.

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

75, 50 and 25 Years Ago

February 1924

◊ Clyde Darr, 8ZZ-8MR's, cover art shows two sleepy-looking hams in the ham shack, ready for "the early-morning relay." The lead editorial addresses "International Amateur Radio," and presents the idea of an "International Amateur Radio Relay League, in which the A.R.R.L.…can join other amateur societies of the world in a common effort." A second topic announces "Our New Constitution" and tells how it seeks to best serve the membership.

Technical Editor S. Kruse presents his ideas on "Low Loss Tuners," to help the ham reduce received interference. Kruse also discusses "Amateur Wavemeters" that will help hams determine their transmitted wavelength. Ham history continues to be made, with the article "Direct Contact with Japan" telling about the contact between 7HG in Tacoma and Japanese ham JUPU. "The Progress of Transatlantic Amateur Communication" is detailed, with "many more stations in England, France and Holland hook[ing] up with [the] U.S.A. and Canada on the shorter wave" [108 to 118 meters]. "An Amazing World's Record," by F. Basil Cooke, describes a contact between New Zealander 4AA and Australian 2CM. 2CM spanned the 1500-mile path with an input power of 0.004 watt!

"Coolidge's Holiday Greetings to MacMillan Travel via Amateur Radio" tells about President Coolidge's December 22 filing of a message of holiday greeting to the Arctic explorer at the Radio Corporation of America's Washington office. RCA called the A.R.R.L. via long-distance telephone because they had no way to get a message through to the *Bowdoin*, and didn't know what to do. They "had heard that we amateurs could communicate with MacMillan…." HQ took the message over the telephone. That night, Kruse got on the air immediately following the transatlantic test period, and heard *QST* cover artist 8ZZ ragchewing with Mix at WNP on the *Bowdoin*! But conditions weren't right—neither Kruse at 1HX, nor big Eastern stations 1CKP, 8AGO, and "rock-crusher" 8BDA could break in! Many nights of bad conditions followed, but the message was finally delivered to Mix on the night of January 1-2.

February 1949

◊ Gil, W1CJD, draws a cover cartoon of a ham dozing at his operating position on the eve of the A.R.R.L. International DX Contest, with his dream showing an ARRL log book full of choice call signs. The editorial discusses "The A.R.R.L. International DX Contest," relates the history of the contest, and addresses the problem of some operators who choose to ignore the rules: "…the people we're talking about are no more 'fellow hams' than the guy with loaded dice and marked cards is a 'fellow gambler…'."

Phil Rand, W1DBM, continuing his work on TVI-proofing transmitters, tells about "The Little Slugger," a low-power 10-meter transmitter for use in "TV areas." Bill Orr, W6SAI, presents "A Plumber's Delight Beam for 14 Mc." Vern Chambers, W1JEQ, describes his bandswitching converter for mobile or home-station use in "A Compact Converter for 6 and 10." Frederick Gemmill, W2VLQ, describes "Harmonic Suppression in Class C Amplifiers." Paul Rockwell, W3AFM, tells about "Souping Up a War-Surplus HRO" [receiver].

February 1974

◊ With the "energy crisis" hard upon us all, the cover photo shows the windmill-powered electric generator used by Jim Sencenbaugh, K6TPS. The editorial reviews the history of the organization of the ARRL and its Board of Directors, and recalls K. B. Warner's timeless admonition: "A.R.R.L. members everywhere should give deep consideration to the choice of their new directors and choose men [most ARRL members were men in Warner's day—*Ed*] not merely for their ability to represent the division but for their executive ability, vision and wisdom—men who will in all things act for the greatest good of our organization."

K6TPS tells how you can generate your own electrical power in the lead article and cover story, "Energy Crisis." Alvin Bernard, WA2JTN, describes "A Complete 2-Meter FM Transmitter." Richard Briggs, W1BVL, tells about the "Construction and Use of Long Helical Coils for Antenna Loading," information applicable to home-station 160-meter antennas. Robert Myers, W1FBY, and Doug DeMaw, W1CER, describe "The HW-40 Micro Beam," a helically wound 2-element 40-meter Yagi. Charles Townsend, WA4DCN, discusses "A Versatile Scope for the Radio Amateur," a homebrew project.—*Al Brogdon, W1AB* QST

Contest Corral

Edited by **George Fremin III, K5TR***

FEEDBACK

Because of more extensive log checking and new handling routines in the Contest Branch, results from all ARRL contests will be appearing one month later than in the past. You can find the tentative publication schedule for 1999 contest results at **http://www.arrl.org/contests/cal1999.html.**

In the **1998 ARRL International DX CW Contest**, results in the October 1998, *QST*, the operator for **FM5DN** should have been listed as **YT6A** and the operator for **FM5CD** should have been listed as **YT6T**.

In the **1998 Field Day** results in the December 1998 *QST*, the Federation of Amateur Radio Operator's call sign was listed as N9BGL. The call should read **K9BGL.** The call for the Huntington County ARS should have been listed as **K9HC**. The **WF2V** entry should have listed **LJBC** as the club's name. The listing for **KK8M** should be **USECA** for the club name. The entry category for **W8AL** should have read 2A.

VE3OIL was omitted from the **1997 10-Meter Contest** results as a Single Op with a score of 8,400 points.

In the **1998 June VHF QSO Party**, **K7XD** should have been listed as a limited multiop from the Oregon section. The additional operators at K7CW should include **KB7DQH, N7EPD** and **WA7UQV**.

W1AW Qualifying Runs are 10 PM EST Friday, February 5, and 4 PM EST Monday, February 22. The **West Coast Qualifying Run** will be at 9 PM PST on Wednesday, February 3. Check the W1AW schedule for details.

February
6-8

North American Sprint, Phone, sponsored by *NCJ*, 0000-0400Z Feb 7 (local time, Feb 6); CW is 0000-0400Z Feb 14 (local time, Feb 13). Sprints are separate. 80, 40, 20 only. North American stations work everyone; others work NA stations only. Exchange other station's call, your call, serial no., name, and state/province/DXCC country. Work stations once per band. QSY rule: Stations calling CQ, QRZ, etc, may only work one station in response to that call; they must then move at least 1 kHz before working another station or 5 kHz before soliciting another call. Once you are required to QSY, you may not make a new QSO on the previous frequency until you have made a contact at least 1 or 5 kHz (as required) away. Team competition. Awards. Electronic entries accepted. Send CW logs to Mark Obermann, AG9A, 6713 Forestview Ln, Niles, IL 60714; **cwsprint@contesting.com**; phone logs go to Rick Niswander, Box 2701, Greenville, NC 27836; **niswanderf@mail.ecu.edu**, no later than 30 days after the end of the contest. See the Web site at **http://www.vramp.net/~ncj/**.

Minnesota QSO Party, sponsored by the Twin City FM Club, 1800Z Feb 6 to 0600Z Feb 7. 160 80 40 20 15 10 6 meters. Single op low power (150 W or less), single op high power, single op Novice/Tech, multi op single transmitter. Exchange serial number and QTH, Minnesota stations send serial number and county. Multipliers are Minnesota counties (87 max) all bands; for Minnesota stations multiplier is Minnesota counties plus states/provinces on all bands. Score one point for SSB, two points for CW, TCFMC Club station W0EF is 10 points per contact. Final score is QSO points times total multiplier. Awards. Send logs by March 15th to Twin City FM Club, Attn: MNQSO Logs, PO Box 580555, Minneapolis, MN 58055; **webmaster@rossiya.net**. For more information on the Web see **http://www.rossiya.net/mnqso.htm**.

Delaware QSO Party, from 1700Z Feb 6 until 0500Z Feb 7, 1300Z Feb 7 to 0100Z Feb 8. Exchange RS(T), and QTH (county for DE stations; state/province/DXCC country for others). CW 1.825 3.550 7.050 14.050 21.050 28.050; Phone 1.860 3.960 7.260 14.260 21.360 28.360, Novice & Technician frequencies: 25 kHz above the subband edge. Only one class for all stations. Count one point per phone QSO, two points per CW/RTTY/digital QSO. No multipliers. Awards. Contest Chairman FSARC, Inc, PO Box 1050, Newark, DE 19715; **qsoparty@fsarc.org**.

Vermont QSO Party, sponsored by the Central Vermont Amateur Radio Club, 0000Z Feb 6 to 2400Z Feb 7. Stations may work any 24-hour period during the 48 hours. Down times must be a six-hour minimum. 160 80 40 20 15 10 meters plus VHF/UHF. Classes: Single operator, multioperator, club, QRP (5 W CW, 10 W SSB), Mobile. Work stations once per band and mode (CW and RTTY/digital modes are separate). Vermont stations send RST and county/state; others send RST plus state/province/DXCC country. Frequencies: CW—40 kHz up from bottom of the band. 20 kHz up from the bottom of the Novice subbands. SSB in the first 25 kHz of the General portion of each band, entire Novice 10-meter phone band. VHF—50.200, 144.200, 146.49, 146.69. No repeater contacts. VT stations count one point per phone contact, two for CW, RTTY or other digital modes. A station may be worked up to four times per band (different modes). Multiply by number of VT counties, states, provinces, countries, or W1BD. Multipliers count only once regardless of the number of bands they might be worked. Other stations count one point per VT phone QSO, 2 per VT CW, RTTY, etc. Multiply by number of VT counties plus W1BD. There will be two special stations worth 5000 points each—W1OFW/M and W1B. A station may be worked up to 4 times per band (different modes). Awards. Send logs postmarked by March 1 to: Central Vermont ARC/Vermont QSO Party, PO Box 674, Montpelier, VT 05601.

New Hampshire QSO Party, Sponsored by the NHARA, 0000Z Feb 6 to 2400Z Feb 7. Operate any 24 hours. Off-times must be a minimum of 15 minutes. 160 80 40 20 15 10 meters plus VHF/UHF. Classes: Single Transmitter QRP (less than 10 W), Low Power (150 W or less) and High Power (more than 150 W), Multi Transmitter QRP, Low Power and High Power. New Hampshire stations send RST, county and state, Others send RST state/province/country. Use of repeaters is not allowed. Use of spotting nets, DX clusters, etc is not allowed. Stations may be worked once per band per mode. Count one point per phone QSO, two points per digital QSO, five points per phone QSO with a NH bonus station, 10 points per digital QSO with a NH bonus station. (Bonus stations: W1FGM, W1BKE, W1FZ, W1WQM, N1FD, K1NCR). Awards. Send logs by March 31 to NHARA, PO Box 119, Goffstown, NH 03045. For information on the Web, see **http://www.nh.arrl.org**.

FYBO Winter QRP Field Day, sponsored by the Arizona ScQRPions, 1400Z Feb 6 to 0200Z Feb 7. QRP only. CW and phone. 160 80 40 20 15 10 , standard QRP calling freqs. For Novice portion of bands, suggest 3.710, 7.110, 21.110, 28.110 MHz. Work stations once per band. Exchange: RS (T), state/province/DXCC country, first name, power output, and temperature (Fahrenheit) at operator's position. Indoor stations must report indoor temperature. Example: "RST 579 AZ Joe 2W 58F." Novices sign with /N, Techs sign with /T. Categories: Single Op, Multi Op (single xcvr), Novice/Tech. Send logs by Mar 7 to Joe Gervais, AB7TT, PO Box 322, Peoria, AZ 85380; **vole@primenet.com**. There's more information on the Web at **http://www.extremezone.com/~ki7mn/**.

Ten Ten International Net Winter Phone QSO Party, from 0000Z Feb 6 until 2400Z Feb 7. Contacts must be made on phone on 10 meters only. Exchange call/name/state and 10-10 number if member. Score one point per QSO with nonmembers, two points per QSO with members and three points per QSO with DX members. Final score is total points. Send logs by Feb 20 to Golden Bear Chapter, c/o Ralph Fontaine, KD4GW, 3880 Walnut Dr, Rescue, CA 95672-9316.

YL-OM Contest, CW, sponsored by YLRL, 1400Z Feb 6 to 0200Z Feb 8. (Phone: 1400Z, Feb 13 to 0200Z, Feb 15.) All licensed men and women operators throughout the world are invited to participate. Men call "CQ-YL" and women call "CQ-OM." Participants may work only 24 hours of the 36 hours in each contest. Operating breaks must be indicated in the log. Exchange call signs, QSO number, RS(T), ARRL section, VE province, or country. Entries in log must also show time, band, and date. Scoring: phone and CW will be scored as separate contests. Submit separate logs for each contest. Score each band separately. One point is earned for each different station worked on each band; women count only men and men count only women. Add together the QSO points earned for each band and multiply the number of QSOs by the total number of different ARRL sections, VE provinces, and countries worked. Contestants using 100 W or less on CW and 200 W PEP or less on SSB at all times may multiply the results by 1.5 (the low power multiplier). The maximum power output that may be used at any time during the contest is 750 W on CW and 1500 W PEP on SSB. All logs must show your ARRL section, province, or country to qualify for awards. Logs must also state the power output used and the operating breaks taken. If you have 200 or more QSOs, submit a separate log for each band and submit a dupe sheet. Remember to file separate logs for each contest. Logs must show claimed score. Send logs to Cleo Bracket, K0JFO, 810 Towne Square Dr, Fremont, NE 68025. For more information see the YLRL Web site at **http://home.earthlink.net/~tenmtryl/ylrl/**.

Spring Classic Radio Exchange, CW and phone, Sponsored by *CX Newsletter*. 0000Z Feb 7 to 0400Z Feb 8. 80 40 20 15 10 meters. Exchange name, RST, QTH, receiver and transmitter type (home-brewers send final amplifier tube or transistor). Work stations once per band, mode and equipment combination. Nonparticipants may be worked for credit. Score is total QSOs multiplied by the total number of different receivers plus transmitters plus QTHs worked on each band and mode. Multiply that by CX multiplier—the total age, in years, of all receivers and transmitters used, three QSOs minimum per unit (transceiver ×2; homebrew ×25, unless older). Send logs to Allan Stephen, 106 Bobolink Dr, Richmond, KY 40475; **modsteph@acs.eku.edu**.

12-14

North American Sprint, CW, see Feb 6-8.

YL-OM Contest, phone, see Feb 6-8.

WorldWide RTTY WPX Contest, 0000Z Feb 13 to 2400Z Feb 14. Sponsored by the *New RTTY Journal*. Single op one signal, high/low (<150 W) power, all band; single op single band; multi-single (10 min rule); multi-multi. Single ops operate 30 hours max; multi operate full 48 hours. 80 40 20 15 10 meters. Use of spotting nets or PacketCluster is allowed for all classes. Exchange RST and serial no. starting

*RR1, Box 322
Johnson City, TX 78636
k5tr@arrl.org

with 001. Score one point per QSO with your own country, two points per QSO with your own continent, and three points per QSO with different continents. QSOs on 3.5 and 7 MHz are worth double. Multipliers are prefixes; final score is QSO points × multipliers. Awards. Send logs postmarked within 30 days to Eddie Schneider, W6/G0AZT, 1826 Van Ness, San Pablo, CA 94806. Logs can be e-mailed to **edlyn@global.california.com**.

PACC Contest, sponsored by the Vereniging voor Experimenteel Radio-Onderzoek in the Netherlands, 1200Z Feb13 until 1200Z Feb 14. 160 80 40 20 15 10 meters, CW and SSB, no SSB QSOs on 160 meters. Single op or multiop. Send RS(T) and serial number, PA/PB/PI stations also send province. Score one point per QSO, work PA/PB/PI stations only, once per band regardless of mode. Final score is QSOs × provinces worked (max 12 per band). Awards. Send log by Mar 31 to Hans P. Timmerman, PA3EBT, Nieuweweg 21, 4031 MN Ingen, Netherlands. You'll find complete PACC Contest rules on the Web at **http://www.veron.nl/veron/awards.htm#PACCtest**.

20-21

ARRL International DX Contest, CW. See December 1998 *QST* page 97.

26-28

CQ WW 160-meter SSB Contest. See January *QST* page 84.

REF French Contest, phone. See January *QST* page 84.

UBA Contest, CW. See January *QST* page 84.

YL International QSO Party, phone. See January *QST* page 84.

RSGB 7 MHz Contest, sponsored by the RSGB, from 1500Z Feb 27 until 0900Z Feb 28. CW only. 7.000-7.030. Single operator and multiop-operator. Exchange RST and serial no. UK stations also exchange three-letter county code. Non-UK stations work only UK stations and vice versa. North American stations score 15 points/QSO. Multipliers are UK counties. Final score is QSO points × multipliers. Awards. Send logs postmarked within 16 days to RSGB HF Contest Committee, c/o S V Knowles, G3UFY, 77 Bensham Manor Rd, Thornton Heath, Surrey, CR7 7AF, England.

CQC Winter QRP QSO Party, sponsored by the Colorado QRP Club, from 2200Z Feb 28 until 0359Z Mar 1. Single band, multiband, and Novice/Tech. QRP only. Exchange RS(T), state/province/DXCC country, first name and CQC number or power output. CW 1.825 3.560 3.710 7.040 7.110 14.060 21.060 21.110 28.060 28.110; phone 1.910 3.985 7.285 14.285 21.385 28.385. Score 6pts/4 pts/CW QSO with member/nonmember; score 3 pts/2pts/phone QSO w/member/nonmember. Final score is QSO pts states/provinces/DXCC countries number of first names worked, one/letter of the alphabet, 26 max. One thousand bonus points for working W0CQC. Awards. Send logs to Colorado QRP Club, PO Box 371883, Denver, CO 80237-1883; **contest@cqc.org**. See the Colorado QRP Club site on the Web at **http://www.mtechnologies.com/cqc/**.

North Carolina QSO Party, sponsored by the Alamance ARC, from 1200-2400Z Feb 27 and 1200-2400Z Feb 28. NC stations work everyone, others work NC stations only. Work stations once per band and mode. Work mobiles again as they change county lines. Exchange call sign, serial number, and NC county, state, province, or DXCC country. CW: 3.540, 3.740, 7.040, 7.140, 14.040, 21.040, 21.140, 28.040, 28.140; phone: 3.860, 7.260, 14.260, 21.360, 28.360; All VHF/UHF frequencies. No repeater or crossband/mode QSOs. Score one point per phone QSO, two points per CW QSO, three points per NC mobile QSO (either mode). NC stations multiply QSO points × NC counties, states, provinces and DXCC countries; others × NC counties worked (max 100). Add 100 bonus points for working both Cherokee and Dare counties, and 100 points for working W4NC or K4EG, after all other score calculations. 100 bonus points for county from where at least 1 QSO was worked. Awards. Send logs (SASE for results) by April 1 to NC QSO Party, c/o K4EG, Box 3064, Burlington, NC 27215. See the Alamance Web site at **http://www.netpath.net/~n4mio/qsoparty.htm**. QST

Special Events

Edited by ***George Fremin III, K5TR****

Houghton, MI: Husky Amateur Radio Club, W8C, 1200Z **Feb 3** to 1200Z **Feb 5**, 77th Winter Carnival at Michigan Tech University, 3.984 7.246 14.256 21.336. Certificate. Husky ARC—W8YY, Electrical Eng. Dept, MTU, Houghton, MI 49931.

Saranac Lake, NY: Black Fly Amateur Radio Club, KB2WWK, 2300Z **Feb 5** to 1800Z **Feb 14**, operating from the Saranac Lake Winter Carnival, 3.932 7.243, 14.272 28.425. Certificate. Albert Newman, Lake Simond Rd, Tupper Lake, NY 12986.

Jericho, VT: Jericho Historical Society, W1B, 1400Z **Feb 6** to 2300Z **Feb 7**, celebrating the 134th Birthday of Wilson A "Snowflake" Bentley, 3.870 14.250 21.250 28.415. Certificate, John R. Fowler, 385 VT Route 15, Jericho, VT 05465-2044.

Hodgenville, KY: N4CBR and Friends, K4L, 1300Z **Feb 12** to 2100Z **Feb 13.** Operating from the Abraham Lincoln Birthplace National Historic Site, 7.230 14.260 21.360 28.460. Certificate. Harry Dence, N4CBR, 2929 Cedarcrest Dr, Lexington, KY 40517.

Romance, AR: Metropolitan Amateur Radio Club, N5RLJ, 1500 to 2100Z **Feb 13**, 9th annual St. Valentine's Day at Romance, Arkansas, 7.265 14.265 21.350 28.465. Certificate. David Flake, 2043 Dean Martin Dr, Cabot, AR 72023.

Decatur, IL: CENOIS Amateur Radio Club, K9HGX, 1400 to 2200Z **Feb 13**, commemorating Abe Lincoln's birthday, 7.245 28.485. Certificate. CENOIS ARC, PO Box 4595, Decatur, IL 62525.

Rapid City, SD: Dakota QCWA Chapter 102, W0DAK, 0000Z **Feb 13** to 0000Z **Feb 14**, commemorating the 22nd anniversary of the QCWA Chapter, 80-10 meters CW and SSB. QSL. Chapter 102 QCWA, 118 E Van Buren, Rapid City, SD 57701-1056.

Mount Vernon, VA: Mount Vernon Amateur Radio Club, K4US, 1600Z **Feb 13** to 2100Z **Feb 14**, commemorating George Washington's birthday, 7.240 10.110 18.080 14.240. Certificate. Mount Vernon ARC, PO Box 7324, Alexandria, VA 22307.

New Orleans, LA: Jefferson Amateur Radio Club, W5GAD, 1800Z **Feb 13** to 2400Z **Feb 16**, JARC celebrates Mardi Gras 1999, 7.260 14.260 21.360 28.360. Certificate. Jefferson ARC, PO Box 73665, Metairie, LA 70033.

Brainerd, MN: Brainerd Area Amateur Radio Club (BAARC), W0UJ, 1500Z **Feb 27** to 03002 **Mar 1**, celebrating the dedication of the BAARC station, 7.250 14.250 21.350 28.450. Certificate. BARRC, PO Box 801, Brainerd, MN 56401.

Special Events Announcements: You can submit your special event information on-line at **http://www.arrl.org/contests/spevform.html**. Submissions must be received no later than the 1st of the second month preceding the publication date; ie, a special event listing for **Feb** *QST* would have to be received by **Dec 1**. Submissions may also be mailed to George Fremin III, K5TR, at the address shown below, or e-mailed to **events@arrl.org**.

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. QST

*RR1, Box 322
Johnson City, TX 78636
k5tr@arrl.org

Strays

I would like to get in touch with...

◊…hams who are interested in geography. I am third-year student at the University of Tirgu Mures (geography-history section) in Romania. Please contact Stefan Samu, YO6OBH, R-4225 Reghin, Romania; **isamu@netsoft.ro**.

◊…anyone who was associated with the W2USA radio club at the 1939 World's Fair. E-mail George Young, KZ1H, at **kz1h@hotmail.com**.

◊…anyone who has information about the history of the W7PHO Family Hour DX net and its late founder, Bill Bennett. Anecdotes, log extracts and photos welcome. Stephen Stuntz, K6FS, 164 Oak Court, Menlo Park, CA 94025-2837; **s.stuntz@genie.com**.

Lost Logs

◊ Last October I operated as special-event station W2V to commemorate Henry Hudson's landing at Verplanck Point on the Hudson River. While waiting for the QSL cards to be printed we had a serious house fire and my logging computer suffered heavy water damage, as did most of my shack. By this time I had also received quite a few cards with requests for my QSL. Most of these were also ruined. I would like to get cards out to those who still want them and I apologize for this unfortunate situation. Please e-mail your contact information (time, date, frequency, etc) to **wa2mzx@ix.netcom.com**, or by postal mail to: Ray Cerbone, WA2MZX, Box 625, Verplanck, NY 10596

Free Logging Software

◊ I've developed *Amateur Contact Log 1.0* as a service to the ham community. In addition to general logging functions, this program also tracks your Worked All States, county hunters and DXCC award progress. Included is a database of all the counties and countries currently required for these awards. The program will also query by band, mode, or power level so you can easily track these accomplishments by individual and multiple criteria. *Amateur Contact Log* is designed to run on PCs using *Windows 95* or *98*. You can download *Amateur Contact Log 1.0* on the Web at: **http://members.aol.com/snkdavis/page1.html**. Enjoy! Scott, N3FPJ.

Next Stray

Section News

*Edited by **Steve Ewald, WV1X** • Assistant Field Services Manager*

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WB0JJX, e-mail: WB0JJX@arrl.org—It is not as big as the one in New York, and it is not as prestigious as the one in Boston. But it's just as long. I am talking about the Delaware Marathon. Delaware hams once again provided safety communications for this event that was held on December 6 in Middleton. Unseasonable warm weather contributed to several incidences of dehydration, and other medical issues during the grueling event. Amateur communications was instrumental in alerting the medical teams to these medical problems and getting aid to the participants as quickly as possible. Many thanks to N3FRO for planning the portion of the operation and to the rest of the hams who gave of their time to assist on this event. Delaware Traffic nets, DTN meets at 18:30 local time M-F on 3905 kHz. DEPN meets at 18:00 local time Sat on 3905 kHz. Traffic (Nov) DTN QNI 138 QTC 20 in 21 sess., DEPN QNI 31. QTC 6 in 4 sess. K3JL 52. 73 Randall.

EASTERN PENNSYLVANIA: SM, Allen R. Breiner, W3TI—SEC: WB3FPL. STM: W3KOD. OOC: W3DZI. SGL: KI6NJ. TC: N3HTZ. ASMs: K3TX, WY3K, WB3FQY, N3KYZ. Congrats to N3YSI newly appointed as ORS. 1999 Officers for Marple Newtown Amateur Radio Club are N3FXR President, W3JG Vice-Pres, N3WAX and N3SEV Secretaries, W3JS Treasurer. Radio communications for the Bensalem Pride Day were provided by Penn-Wireless Association members; N3YYM, N3FEL, N3VJH, N3VOW and N3JJZ. They also have a Science Net Wednesdays at 8 PM on 145.250 MHz. The topic for October was changed from "The Galaxy and the Plants" to music. The Phil-Mont Mobile Radio Club is celebrating their 50th anniversary serving Amateur Radio and has been renewed as a Special Service Club. Members of the Mobile Sixers Radio Club are gearing up on 6 meters in anticipation of the forth-coming Sun Spots. The following Chester County ARES/RACES members provided communications for the Upper Mainline "Y" 10 K Run. They also used their new closed loop FAX system during the Peach Bottom Power Plant exercise. Operators involved were; WB3GCK, N3KKL, WA3CQT, N3SAM, N3MYP, KE3HG, KC3XL, KB3DDU, WB3LGG, N4SEN, LA3CIM, KE3MN, N3MEL, N3HLJ, W3QT, WB3ITC, KB3DU, KD3OK and N3LRA. The Emmaus Halloween parade brought forth the following DLARC members to provide communications; W3ZF, N3ULW, KE3AW, N3EBH, WA3KIF, W3TDF, N3OLH, N3ZSR, N3QZT, KD3TI, KE3DZ, N3XRL, WA1LLD, NS3L. The Mobile Communications Field Support project for the southern Pennsylvania Amateur Radio Club was completed just in time for an initial test during the Peach Bottom Nuclear Power Plant emergency preparedness drill. EC: WB3FQY and KI6NJ reports the results were very successful. Members of the Tamaqua Wireless Association, KB3ABY, WA3WGG, W3ZHW, W3TI, and W3ZRQ, volunteered a few hours of community service to the Tamaqua Chamber of Commerce. They replaced more than 2000 bulbs and repaired 223 Christmas decorations which are displayed throughout the Boroughs business district during the holidays. The 1999 Hamfest season begins with the Harrisburg Valentine Fest on February 13. Nominations in the Atlantic Division are now open for "Amateur of the Year," "Grand Ole Ham," and "Technical Achievement" awards. Nominating forms are available from Vice Director Bernard Fuller, N3EFN, 17668 Price Road, Saegertown, PA 16433. They must be returned to the same address by the April 1 deadline. A number of our active county Emergency Coordinators report having held a successful Simulated Emergency Test during October and November. The deadline for returning the SET report forms was January 29,1999. Even though your county did not hold a SET, complete the forms and return them ASAP. ECs are required to provide an occasional report for us to update our files. Spring is right around the corner, and antenna work could require some tower climbing. "Play it Safe." Never do any tower work alone. Always have one or more observers on the ground. And above all, wear a safety belt. Tfc: W3KOD 818, N3DRM 630, W3HK 304, N3EFW 232, W3IVS 219, NR9K 98, N3YSI 91, N3IRN 80, N3AT 63, N3HR 56, W3IPX 53, WA3EHD 40, W3JKX 40, N3SIN 36, N3KYZ 32, W3DP 22, AD3X 22, N3DCG 12, W3TI 11, KA3LVP 9, K3TX 7, W3BNR 6, KB3DCT 6, W3ZQN 6, WA3CKA 5, W3NNL 5, W3TWV 4, W3SD 3, WB3GCK 1. Net reports EPA 314, PTTN 164, PFN 145, EPAEP&TN 139, MARCTN 21, D6ARES 10, SEPTN 8, LCARES 6, SCESN 4, D8ARES 4.

MARYLAND/DC: SM, Bill Howard, WB3V, wb3v@erols.com—MDC Section Web homepage www.erols.com/wb3v/mdc/. Please visit the MDC home page for all the latest links, information and more nets! ALLE EC KO4UU reports 13 members, 5 nets on 146.88 and 1 drill. GARR EC N3KAT reports 12 members, and 4 nets on 147.105. Activity has slowed considerably since the SET, but they are trying to maintain readiness for the winter weather in the mountains. STMA EC N3RVX reports 25 members, 3 nets on 146.64 with liaison to MEPN and packet**.** MUSEUM OF RADIO PLANNED: Under an agreement soon to be completed with the City of Bowie, Maryland, South Bowie's Harmel House will become the new home base of the Washington metropolitan area's Radio History Society and a museum devoted to the history of the early days of radio and TV. In a presentation to the City Council in October, members of the organization said they foresee a facility which will feature extensive permanent and changing exhibits, offer education programs for schools and other organizations, and become a major attraction for radio history enthusiasts. Radio and television personality, Ed Walker, N3HFT, who provided sound bytes for our repeater, is on the Board of Directors of the Radio History Society and is very enthusiastic about the pending museum. The society said that there is a possibility to provide free after school or weekend classes in elementary electronics or programs to help young people obtain their Amateur Radio licenses. The museum is expected to be up and running in six months and is located at the intersection of Mitchellville and Mount Oak roads in Bowie, in close proximity to the Baysox baseball stadium, which will be the new site of the FARFEST 1999 formerly held in Gaithersburg, MD. Members interested in assisting the Radio History Society are urged to contact B.C. Belanger, via email address: bcbelanger@aol.com or by telephone 301-258-0708 for further information. (provided by Murray Green, K3BEQ). This museum will join the Historical Radio and Electronics Museum in Linthicum, MD, for a display of early electronics. 73, Bill and with the nets: NET/NET MGR/QND/QTC/QNI: MSN/KC3Y/30/58/317, MEPN/KE3OX/30/74/676, MDD/WJ3K/59/203/621, MDD TOP BRASS/KJ3E/236/K3JL/125/AA3GV/154, BTN/AA3LN/30/35/287, SMN/KE3OX/2/1/10, Tfc: KJ3E 166, AA3GV 147, KB3AMO 135, W3YVQ 101, N3XPK 93, N3WKE 74, KC3Y 52, N3DE 52, KE3OX 45, K3USO 42, KO4A 42, N3WK 35, WJ3K 33, N3ZKP 26, N3EGF 15, KG6TU 6, WA3GYW 5, WA1QAA 4, KE3FL 2, PSHR: W3YVQ 149, N3XPK 148, AA3GV 144, N3WKE 134, KJ3E 131, KG6TU 126, N3WK 122, KB3AMO 109, N3ZKP 101, KE3OX 100, KC3Y 97, WJ3K 90, KO4A 90, WA1QAA 74.

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. Web site: <http://www.northnet.org/nnyham>, Web master Rick, WZ2T. Go there for detail info on 1999 NNY QSO Party, Feb 6-7, sponsored this year by NFARS. I plan HF time on Saturday, then 2 m Rover Sunday. Several other parties that weekend; the bands should be active. Heard some rumblings of rejuvenating the Empire State QSO Party—stay tuned. Club Officers, CVARC: N2JKG, WA1KMO, KC2ALG, KB2WXE, WA2RLW. Special recognition of Al, KB2LML @ CVARC banquet. November BBS Reports, B/P/T: KA2JXI 1881/449/60, KD2AJ 1682/615/54. Net Reports, QNI/QTC/QND: BFSN 243/21/27, BILL'S GERITOL 251/0/21, CARRIER 562/ 7/30, CVARCCPN 56/0/8, CVARCSN 50/0/5, CVARES 27/6/4, MVARC 36/0/4, NDN 308/6/30, NNYARES 254/7/30, Q NET 454/5/30, SIRR 818/47/30, W2UXC SWAP 22/0/3. 73, Les, WA2AEA

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA) e-mail: ka2ykn@arrl.org—I am pleased to announce I am your Section Manager for 2 more years. Thanks to all who have supported me during my first term and the election. The tremendous support was very heartwarming. I will try to serve SNJ the very best I can. Look forward to visiting more clubs this year. To any club not affiliated with ARRL, consider the benefits given to affiliated clubs. When disaster strikes, SNJ hams answer the call. Gloucester County's WA2USI gathered radio equipment to send to Honduras while others ran phone patches. Ocean County's N2WFU and WA2RFN went to Texas to provide communications and Red Cross field assistance during the floods. A calendar quote says, "Knowing someone knows is healing in and of itself." Hudson Valley Direction Finding Assn site, **http://www.frontier.net/~n2ki**. Amateur Enforcement Line: 202-418-1184. Traffic report for Nov. 1998: WB2UVB 175, AA2SV 111, K2UL-4 104, K2UL 72, M2VQA 46, KB2RTZ 40, KA2CQX 21, N2WFN 14, W2AZ 6, N2FET 4, N2AYK 3, KB2VSR, KB2YBM, N2ZMI, KB2CDB, KB2HJJ, N2FHJ, N2FHK, N2SOE each station had 1. SJVN every night at 2230 local time, on 147.345/R. Several locals have become weather spotters recently, thanks to NWS for the instruction. Contact WB2UVB if interested.

WESTERN NEW YORK: SM, William Thompson, W2MTA — WNY Web: **http://www.dreamscape.com/phaedrus/WNY** CLUB NEWS: Utica ARC reports the 1999 Boilermaker Road Race, which features 10,000 runners and is sponsored by the National Distance Running Hall of Fame, has been dedicated to NA2Q, recent Silent Key and past president of UARC. The Chautauqua County AFMA renewed as Special Service Club. Ham-of-the-Year Award: GRAM KB2UQZ; Skyline KB2LUV. CLUB OFFICERS: Allegany Highlands KW2J K3QBU N2WDS K2UOB NG2O; Drumlins W2TRW N2ZVN N2MKT KB2WPO; Rochester VHF Group N2ULL K2DH WY2Z WA2ZNC W2EV KB2VGH N2KG; STARS KB2YJ KD2QV WB2IJW KB2ESM N2TEZ. Field Day Results: 1A/197 W2BC#2@, AA2AD#60, KC2AOZ#139, W2ZJ#143; 2A-BTY/28 W2SEX#3@, W2LZ#5@; 2A/565 W2RA#27, WF2V#111, WB2ELW #131@, W2CM#132, N2Y?#189, NS9E#252@, W2RCX #337@, W2CXV#434, K2GL#436, KG2NT#463, N2PRS #542, N2IED#561; 3A/332 W2RDX#5@, W2XRX #87, K2IWR#141@, K2HE#242@, WA2AAZ#250@; 3A Commercial/16 W2PE#3@, AB2DY#16; 4A/130 W2MO#91@; 7A/12 KV2W#@; 1B1Op/53 KV2X#47; 1B2Op/18 K2SH #3@, NM2A#10@; 1C Mobile/42 KB2PLW#28, N2JYA#29, K2QR#33; 1D/173 N2CU#6, W2EZ#61, N2LQQ#69; 1E/99 W2RW#23, KE2VB#24. [@ Denotes SM MSG] SILENT KEYS: WNY lost ASM W2IEG, formerly SCM in Vermont before WWII. OARC and OCARC lost NC2C, dependable supporter and SKYWARN control for many years. WNYDXA and RTTY lost a real DXer with passing of WB2CJL.

Net	QNI	QSP	QND
Early Bird-FM	510	000	21
NYS RACES-SSB	089	010	05
NYS RACES-CW	023	005	05
#NYS/M-CW	209	118	30
CHN-SSB 3925	182	056	30
#WDN/M-FM	447	087	30
#NY PHONE-SSB	222	437	30
#NYPON-SSB	334	229	30
ESS-CW 3590	353	109	30
NYSPT&EN-SB	329	052	030
#OCTEN/E-FM	1213	260	030
VHF THIN-FM	012	000	001

Net	QNI	QSP	QND
#STAR-FM	442	027	29
#WDN/E-FM	469	101	30
#NYS/E-CW	333	239	30
OARCN-FM	040	005	04
TIGARDS-FM	034	005	05
BRVSN-FM	206	007	30
STTHN-FM	049	007	09
#CNYTN-FM	404	027	30
#OCTEN/L-FM	612	241	30
#WDN/L-FM	461	048	30
#NYS/L-CW	258	201	30
[# Signifies NTS Net]			

* Denotes Public Service Honor Roll. Traffic (Nov.): N2LTC*1691, KF1L*801, KA2ZNZ*661, KA2GJV*501, W2MTA*389, WB2IJH*362, K2BCL*361, NN2H*306, NY2V*228, WB2QIX*204, W2FR*155, N2CCN*130, W2PII *117, AF2K*89, KB2WII*64, N2OJI*61, N2IKR*59, KG2D*53, KB2UQZ*45, N2JRS*44, KB2VVD*44, AA2ED*61, N2WDS*61, KB2ETO*37, KB2TIY 22, W4BNY*19. K2DN*19, KB2QIK 18, KG2OY*17, KC2BYA*15, WA2GUP*15, W2RH 12, WA2UKX*2. (Sept) N2OJI (66). (Oct) N2OJI 46, KC2BYA 21. DATALINK RX/TX: K2DN 2/0, KA2GJV 62/8, NY2V 4/18, N2LTC 521/164. BPL: KA2GJV, KA2ZNZ, KF1L, N2LTC. I see one of us Thompson boys made it with the FCC. If you have a case to be reported try 202-418-1184. Just be sure that you've got it right! Here's one to note — Rochester Amateur Radio Association, with five associated clubs in Rochester area, has been an Amateur Radio institution for 67 years, the largest Amateur Radio Service Club in New York State and among the top 10 in the nation. Only Radio Amateurs of Western New York, with some 76 years of ARRL affiliation can surpass RARA in longevity here in WNY. Hello you Valentines, here comes Spring! 73.

WESTERN PENNSYLVANIA: SM, Bill Edgar, N3LLR—ASM: N3MSE. ACC: N3SJR. ASM-ARES: WB3KGT. SEC: N3SRJ. ASM-Packet: KE3ED. ASM-Youth & Education: KE3EE. PIC: W3CG. STM: N3WAV. TC/OOC: WR4W. DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: N3NIA. DEC-S1: KA3HUK. DEC-S2: KB3AQA. This month, I've asked Bob Livrone, N3WAV, our Section Traffic Manager, to write up an article about the National Traffic System. The NTS is a system of traffic nets and relays used to move traffic (messages) across the country and even to and from foreign countries. Passing traffic is as old as Amateur Radio itself. The American Radio Relay League (ARRL) was founded by Hiram Percy Maxim (W1AW) as a way of passing messages by way of a series of relays. Although e-mail has taken a lot of traffic out of the system, it is still alive and quite active. There are many areas in the Western PA Section that are not represented by traffic handlers. We are looking for hams to get involved in handling traffic. Currently there are 5 NTS traffic nets in Western PA: Western PA Phone and Traffic Net-1800L Every Day 3.983 MHz (covers all of WPA) Western PA CW Traffic Net 1830L Every Day 3.585 MHz (covers all of WPA) Erie Area Mailbag Traffic and Info Net 1900L MF-146.70 MHz (covers NW PA) Western PA 2 Meter Traffic Net 2000L Every Day 146.88- MHz (covers SW PA) Northwestern PA 2 meter Traffic Net-2100L Every Day 145.13 (covers NW PA). In addition, there is the following independent net: Pennsylvania Phone Net-1730L Every Day-3.958 MHz (covers all of PA). Handling traffic is not hard. The leaders and members of each net will help you take, send, and originate traffic. Most amateurs pick up the system by simply listening for several nets. Please monitor one or more of these nets and see if you might enjoy traffic handling. Also, the nets are very friendly. Even when no traffic is passed, there is lots of other information and conversation. How about starting a net yourself? The Centre County area could use a net of their own. Also, the Southeastern district (Somerset, Bedford, etc) could use a net. I would be glad to help you get a net started. I'll be looking forward to hearing you on the traffic nets! 73, de Bob, N3WAV, STM. Tfc: N3COR 148, N3ON 125, W3OKN 92,WA3UNX 124, N3ON 74, W3NGO 60, AA3ML 4, AD4XV 3, WB8KPE 76, W3GJ 41, N3KB 54, N3WAV 84, N3IBT 6, WA3QNT 28, KC3NY 48, N3PBD 17, K3JHT 6, N3RDV 32, WA3QNT 21, N3HBB 11. PSHR: N3WAV 133, W3OKN 128, N3KB 71.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. SGL: WA9AQN. ACC: N9KP. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. Congratulations to the North Shore RC for achieving the ARRL Special Service Club status. The York RC has given an award to Elmhurst Fire Chief John Fennell in appreciation for his successful effort to incorporate amateurs into the city's emergency preparedness plan. The Wheaton Community Radio Amateurs has given Gordon West, WB6NOA, an honorary membership in the club. West was in Chicago during October and attended a WCRA meeting where he received the honor. St Clair Co EC WA9TZL reports that ARES members participated in the

Continued on page 100.

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(Near Disneyland)
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Janet, KL7MF, Mgr.

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Marv, K6VIV, Mgr.
Victory Blvd. at Buena Vista
1 mi. west I-5

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Mark, WI7YN, Mgr.
I-880 at 23rd Ave. ramp

SAN DIEGO, CA
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Tom, KM6K, Mgr.
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Bob, N9GG, Mgr.
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from Hwy. 5 & 217

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- 100W • 12V DC • DDS
- Gen. Cov. Rx, 100 mem.
- Optional Ext. Auto • Tuners Available

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FT-1000MP HF Transceiver

- Enhanced Digital Signal Processing
- Dual RX
- Collins SSB filter built-in
- 100W, Power supply built-in

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FT-100 HF/6M/2M/70CM Transceiver

- Compact Transceiver w/detachable front panel
- Rx 100kHz to 970mHz (cell blocked)
- Tx 100W 160-6M, 50w 2M, 20W 70CM
- Built-in DSP, Vox, CW keyer
- 300 Memories

Call Now For Low Pricing!

FT-11R/41R

2M 440mHz

- 150 Mem. Channels
- 1.5W standard
- 5W option
- Alpha-numeric display
- Compact & back lit keypad

Call For Low Price!

VX-1R

2M/440 Sub-Mini HT

- 290 Memory Channels
- .5W output
- Receives 76-999mHz plus AM BCB (Cell Band Blocked)
- Lithium Ion Battery

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FT-50RD

2M/440mHz Compact HT

- DVR, Decode, Paging Built-in
- Alpha numeric display
- Wide Band receive
- Battery Saver
- 112 Memories
- Mil-Spec
- HiSpeed scanning

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Ultimate Base Station, HF, VHF, UHF

- 100w HF/6M, 50w 2M/430 mHz
- DSP • Full Duplex Cross-band
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FT-3000M

- 2M 70W Mobile • Wide Band RX
- AM Aircraft RX • Dual Watch
- 9600 Baud Compatible • Alpha Numeric Display

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FT-920 HF+6M Transceiver

- 100w 160-6M, 12VDC
- Built-in DVR, CW Memory Keyer
- DSP, Auto-Notch • 99 Memories
- Computer controllable, CAT System

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FT-8100R 2M/440 Mobile

- Ultra Compact • 50w/35w 2m/440
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- Backlit mic • Remotable front panel w/opt. YSK-8100

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Proven Performance Mobile or Base

- All mode HF/6M/2M
- 0.03-200 MHz all mode
- All mode HF/6M/2M/70cm
- 50W on 2M, 20W on 440 MHz
- Tone squelch (CTCSS decode) (COMING MARCH 1999)

$100 Mfg. Coupon, (MKII only), valid 1/1/99 - 3/31/99

DSP standard in 706MKII ver. 15, and 706MKIIG

IC-746 All Mode 160M-2M

BUILT-IN TUNER

Great HF Performance

- 100W output for all bands
- IF-DSP+ twin pass band tuning (PBT)
- Large, multi-function LCD with band scope
- Versatile filter combinations (3 filter slots)
- Memory keyer and more

IC-756 All Mode Transceiver

DUAL WATCH

- HF + 6 meters
- 4.9 inch multi-function LCD
- IF-DSP for Tx & Rx (front panel user adjustable)
- Twin PBT & adjustable noise blanker
- Vox & QSK
- Memory keyer

EXTREME VALUE

IC-2100H 2M Mobile Transceiver

- Cool dual display
- 55 watts
- Superior intermod rejection
- Backlit remote control mic

IC-207H Dual Band Mobile Transceiver

- 2M/440 MHz
- Wide band rx (includes airband)
- 9600 BPS packet ready
- 45W VHF (2M), 35W UHF (440 MHz)
- CTCSS encode/decode
- 4 power settings per band

$30 Coupon, valid 12/15/98 - 3/31/99

IC-2710H Dual Band Mobile Transceiver

- 2M/440 MHz
- 50W VHF/35W UHF
- 220 memories
- PC programmable
- High speed scanning
- RF attenuator

IC-T2H 2 Meter Single Bander

- 6 watts of power @ 9.6 V DC
- 45 memory channels
- Tone squelch (CTCSS encode/decode) standard, with pocket beep and tone scan
- 10 weather channels
- Meets mil spec 810 C/D/E for shock and vibration
- "Intuitive" help function

EXTREME PERFORMANCE

IC-Q7A Dual Band Transceiver

- 2M/440 MHz transceiver
- Wide band receiver - 30 to 1300 MHz**
- 200 memory channels
- Ultra compact
- Monitor function
- Large built-in speaker, 100 mW audio
- Tone squelch with pocket beep
- Multiple scan modes including band, VFO, priority, program

IC-R2 AM, FM, WFM Receiver

- Wide band coverage: .5 -1300 MHz **
- 400 memory channels
- High scan speed (30 channels/sec)
- Small - compact design
- Excellent audio
- Uses 2 AA alkaline or Ni-Cd batteries
- PC programmable

IC-PCR1000†† & IC-PCR100

PC-Controlled Receivers

- AM/FM/WFM/CW/SSB
- Freq: 10 kHz-1.3 GHz **
- 1000 memories/file (files limited by disk space)
- 3 display panel screens
- Optional DSP available

AM/FM/WFM •
Freq: 10 kHz-1.3 GHz ** •
1000 memories/file • (files limited by disk space)
2 display panel screens •

IC-T7H* 6W, Dual Band Transceiver

- Designed for Easy Operation!
- 2 M/440 MHz
- 9 DTMF memories
- 70 memories
- Great audio
- CTCSS encode/decode
- Auto repeater

IC-W32A Dual Band Transceiver

- 2M/440 MHz
- 5W @ 13.5 V
- Crossband operation
- 200 memories w/alpha naming
- CTCSS encode/decode
- Backlit keys & display
- PC programmable

$20 Coupon, valid 12/15/98 - 3/31/99

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NEW KAM Plus features 128K RAM, EPROM space for 1 MB, on-board clock, expanded personal mailbox and Pactor! And G-TOR!Operating modes include CW/RTTY/ASCII AMTOR/PACKET/PACTOR/ WEFAX Terminal programs available for PC, Commodore and Macintosh computers.

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KPC-3 Plus/KPC-9612 Plus

A high-performance, low power TNC, for new and experienced users. Features dual level command set with 23 and 130 commands, respectively. Battery backed 128K RAM expandable to 512K. PBBS includes two-way forwarding, message header editing, remote sysop access and KA-NODE.

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Detailed illuminated map shows time, time zone, sun position and day of the week at a glance for any place in the world.Continuously moving - areas of day and night change as you watch.• Mounts easily on wall. Size: 34 1/2" x 22 1/2".

Reg $1295. SALE $999.95

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AT-201HP 2M Handheld

- 40 memories + CALL channel
- Wide receive 130-180 MHz
- Built-in CTCSS enc./dec.
- Full-sized, backlit keypad
- 5 watts RF output

NEW!

$30. Coupon AT-600HP

AT-600HP 2M/440 Handheld

- Wide receive from 100-174, 340-480, and 850-985 MHz (cellular blocked)
- Dual receive • 200 memory channels
- 6 character alphanumeric display
- Crosband repeat • Auto repeater shift
- CTCSS enc./dec. • CTCSS tone scan

$20. Coupon AR-146

(AR-446 also shown)

AR-146 2M Mobile

- 3 select. pwr. settings (5/10/50w)
- 40 memories plus a CALL channel
- Built-in CTCSS encode/decode
- Wide receive cov. 130-180 MHz

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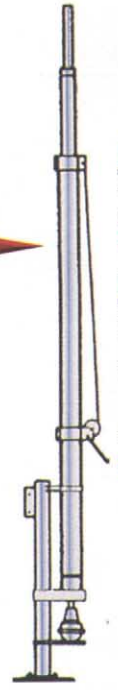
VHF/UHF Solid State Amplifiers

Contemporary design, quality and a 1 year warranty on parts and labor. 1 year on the RF Final transistors.Most amplifiers have GaAsFET receive pre-amps and high SWR shutdown protection

US TOWER



Shown with Optional Rotor Base

MA-40

40' Tubular Tower

REG. $809

SALE $679.95

MA-550

55' Tubular Tower
Handles 10 sq.ft. at 50mph
Pleases neighbors with tubular streamlined look

Reg.$1369

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55' Freestanding Crank-Up
Handles 18 sq. ft. @ 50 mph
No guying required
Extra-strength const.
Can add raising and motor drive acces.

Towers Rated to EIA Specifications
Other Models at Great Prices!

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Alinco DJ-S11T or DJ-S41T
Hurry - Limited Quantities Available!

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ALINCO

DR-605TQ 2M/440 Dual Band Mobile

- 50W 2M, 35W 440
- Built-in Duplexer
- 9600 Baud ready
- 50 Memory chanels
- RX Range 136-174mHz/420-470mHz
- CTCSS built in

NEW!

Call For Low Pricing!

DJ-C5T

- 2M/440 Tx + Rx
- Extended Rx VHF/UHF
- Built-in Enc./Dec.
- 300 MW Tx output
- 50 Mems. + Scanning
- Built-in Lithium-Ion battery
- Complete w/fast charger

Call For Low Price!

DJ-S41T/DJ-S11T

440 Tiny HT 2Mtr Tiny HT

- 340 mw
- 21 memories
- Uses 3 "AA" Batteries
- Encode built-in
- Pivot antenna
- Less than 5" high and 2 1/4" wide (DJ-S41T)

(DJ-S41T shown)

Now 100w 6m DX-70TH

DX-70T HF Transceiver

- 100W 160-10 Mtrs • 10W 6M, Gencov. Rx
- Full QSK, 100 Mems. • Compact, Remotable
- Dual VFO, 12VDC • 6.2 lbs.

Now In Stock! New Low Price!

COMET

SMA-501 Dual Band

Dual band "Miracle Baby" style antenna, with a male SMA connector.

Shown on the popular FT-50R by Yaesu. The antenna is only 1.75 inches tall, and exhibits surprising performance.

NEW!

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SBB-1/SBB-1NMO 2M/70cm

Dual band Mobile Antenna with flexible whip..

The perfect antenna for high profile vehicles. The heavy-duty whip bends to enter garages, drive-thrus, etc.

Available with a PL-259 connector (SBB-1), or an NMO connector (SBB-1NMO).

Very Flexible!

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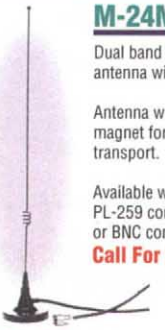

M-24M/M-24B

Dual band 2M/70cm mag mount antenna with 12' RG-58/U coax.

Antenna whip unscrews from the magnet for easy storage and transport.

Available with a soldered-on PL-259 connector (M-24M), or BNC connector (M-24B).

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CA-HV

40 /15/10/6/2 Meter moile antenna
20/17 meter optional

Designed for use with the ICOM IC-706, and ALINCO DX-70. The CA-HV is tuned for constant operation on 6-2M. To operate HF, simply screw on 1 or 2 HF coils for quad-band operation!! The CA-HV is easy to mount on a standard trunk lip, hatch-back etc. type of mount. It folds over, too.

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TH-D7A 2M/440

- 2M/440 Dual Band
- Built-in 1200/9600 Baud TNC
- APRS Compatible
- DX Packet Cluster Monitor
- 200 Mems., CTCSS
- VC-H1 Messaging Control

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VC-H1

Visual Communicator

Compatible w/all FM VHF/UHF • Transceivers + HF SSB Send/Rec Digital Images • (32 seconds) for download Store pictures in memory • 1.8" Color TFT LCD Display • Built-in speaker + mic • Download to PC • (with special software)

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TH-G71A 2m/440

- 2m/440 Dual Band HT
- 200 Mems • PC Programmable
- 6w 2m, 5.5w UHF @13.8 VDC
- Alphanumeric Display
- CTCSS Built It • Backlit Keypad

NEW!

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5w High Power Also Avail.

TH-22AT

- Ultra Compact
- 2M HT, 5W optional
- 40 memories
- Encode Built-In

TS-870S HF Transceiver

- DSP in I.F. Stage! • 100W, 12V DC
- Dual mode noise reduction
- Digital Filtering (no opt. filters req.)
- Built-in RS232,Windows software incl.

NEW!

TM-261A 2M Mobile

- 50W + Mid and Low • Mil-Spec
- 61 Memory Chanels
- Alpha Numeric Function
- Dual Menu, DTMF Memory
- Backlit mic & built-in encode

TS-570DG/TS-570SG DSP Enhanced

- 100w HF, (100w on 6M TS-570SG only)
- QSK, CW Auto Tune • Autotuner incl 6M
- DSP • Large LCD Display • Elect. Keyer
- RCP2 Radio Control Program Compatible

NEW!

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TS-50S/TS60S HF Trans. • 6M

- TS-50S - World's smallest HF trans.
- 100W out, (90W TS-60S, 50MHz only)
- SSB, CW, AM, FM, • 12V Gen. Cov. RX,
- 6.4 lbs., 7.16 x 2.4 x 9.32"
- 105 db dynamic range, 100 Mems.
- Opt. ext. ant. tuners available (TS-50S only)

Call For Special Low Price!

NEW!

TM-V7A 2M/440Mhz

- 50W/35W • 280 Mems • Visual Scan
- Alpha Numeric • Enc/Dec & Duplexer Built-in
- Computer Programmable • 9600 Baud Ready
- Cool-blue Reversible LCD • Backlit Mic

Call Now For Low Price!

Limited Time!

FREE 2M/440 Duplexer

TM742AD 2M/440Mhz

- Optional 3rd band available • Back-lit mic
- Up to 303 memories • 101 per band
- PL Encode Built in • Detachable front panel

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FRS

TH-22AT
2 meters

TH-G71A
2 meters & 440 MHz

TH-D7A
2 meters & 440 MHz w/TNC

TH-79AKSS
2 meters & 440 MHz

VC-H1
Visual Communicator

TM-261A/461A
2 meters/440 MHz

TM-331A
220 MHz

TM-G707
2 meters & 440 MHz

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Mid-America Airport Disaster Exercise last year. In addition to the EC, participants included KB9FQR, N9STL, N9HH, KB9JYA, W9RQR, WB9IGB, KA9DUL, WA9IUF, N9HZD, KB9FNU, N9BPK, N9NOC, KB9SIA, KB9PAU and the Scott Composite ARS. The team handled traffic between the disaster scene, staging area, and local hospitals. In October, ARES teams from Madison and surrounding counties responded to a train derailment involving 25 cars. Some of the cars contained sulphuric acid, requiring the evacuation of 200 area residents. A total of 15 amateurs were directly involved in the activation and numerous others were alerted for possible assignment. New officers for the Starved Rock RC are pres KC9NL, vp N9PLJ, sec KF9NZ, trea WB9VLW. The Fox River Radio League is considering plans to mark their 75th anniversary this year. They are also hoping to find photos, newspaper clippings and other items from the early years of the club. Contact W9GIG if you can help. Thirteen members of the Kishwaukee ARC provided communications for the annual pumpkin parade. The group used packet and APRS to track the parade's progress. The Six Meter Club of Chicago reports that information on Amateur Radio activities in the Chicago area are available on the Info Line (708) 535-AHAM. The SMCC also has an info line at (708) 442-4961. The new officers for the SMCC are pres W9CEJ, vp WA9FIH, sec WA9RJJ, trea AK9Y. Tfc: W9HLX 108, WA9SLT 46, WB9TVD 33, NC9T 20, W9FIF 8, WA9RUM 7. ISN via WB9TVD QNI-257, QTC 100, Sessions 30. 9RN report via AF9FA for cycle one/two: IL checkins-17/23, sessions-26/29, total checkins-152/200, tfc: 78/119, time-315/440, average 3.0/4.1, rate 0.25/0.27. Ninth Region C4 report for Nov via W9FC-traffic 303—sessions 60—time 405 min—avg 5.05—rate .748—percent rep 96%——QNI—ILN K9CNP KF9ME NS9F. W9VEY Memorial Net via K9AXS 7 with 252 check-ins.

INDIANA: SM, Peggy Coulter, W9JUJ—SEC: K9ZBM. ASEC: WA9ZCE. STM: AA9HN. OOC: KA9RNY. SGL: WA9VQO. TC: W9MWY. BM:,KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys 11/16, Junior Tibbett, KA9OGD, Kingman; 11/29, Orville J. Creason, KA9ZBT, Markleville; 12/3, David "Bill" Jones, N9SYE, Fort Wayne; They will be missed. I want to thank all clubs that send me their newsletter. It is appreciated. If you don't send me your newsletter would appreciate it if you would. Congratulations to Randy Waldeck, N9STQ, named amateur of the year for Whitley Co ARC. He has coordinated the siren tests in Columbia City, that has kept the police dept informed on any malfunctioning sirens throughout the city for the benefit of warning the local citizens in time of emergencies. He has held various offices with the club, helped in teaching Amateur Radio classes. Is involved with all the Whitley Co nets and served as net control many times. Has agreed to take over the newsletter editor for the coming year. With all of that he is married with three children and a new arrival expected early in 1999. Randy, can we find you another job? If you want info on the Indiana Repeater Council you can contact Jay Jackson, KA9QIG. If you need his address or phone nr contact me and I will give it to you. Please mark your calendar for Sept 11, 1999. The third annual IRCC Bison Stampede. You don't want to miss it. I am giving you advance warning. To get more info contact IRCC Bison Stampede, 24237 C.R. 24, Elkhart, IN 46517 or e-mail N9I@juno.com. 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	2902	559	1738	90
QIN	3656	1430/0000	195	101	647	48
ICN	3705	2315	106	69	485	26
IWN	3910	310	2126	—	300	30
IWN VHF Bloomington		474	—	450	30	
IWN VHF Kokomo		745	—	150	30	
IWN VHF Northeast		959	—	600	30	
Hoosier VHF nets(8 nets)		424	32	624	33	

D9RN QTC 197 in 55 sessions. 9RN QTC 303 in 60 sessions IN represented by KO9D, N9PF, K9PUI, N9HZ, WB9UYU, WA9QCF, AA9HN, and W9FC. Tfc: W9FC 385, K9GBR 185, KO9D 180, W9ZY 137, W9UEM 102, WB9QPA 101, N9ZZD 84, WA9QCF 58, AB9AA 57, KA9EIV 53, W9JUJ 48, N9PF 45, N9TA 43, KA9NPU 40, AA9HN 29, KA9QWC 22, N9WNH 22, W9BRW 20, K8LEN 15, KA9RPZ 14, K9DIY 10, W9CSJ 10, N9HZ 8, W9EHY 6, WB9NCE 4, N9AJM 3, AB9A 3, N9JAI 3, K9OUP 1.

WISCONSIN: SM, Roy A. Pedersen, K9FHI—BWN 3985 0600 W9RCW. BEN 3985 1200 KE9VU. WSBN 3985 1715 WB9WHQ.WNN 3723 1800 KB9OCZ. WSSN 3645 1830 N9BDL. WIN-E 3662 1900 WB9ICH. WIN-L 3662 2200 W9UW. 9RN needs more Wisconsin stations to go to CAN and to be net controls, lets have more cooperation. New ham Eau Claire area KB9PTX. 9R c4 has W9UW, K9LGU, N9KHD, W9CBE, W9YCV and N9CK checkins. The FCC is cracking down on those who are interfering or using obscene language. Sorry to report the following Silent Keys: W9VLK, KB9PO, KA9FOQ. 1999 club officers for Eau Claire ARC are as follows: pres, KG9MK, v pres: KB9SDF, sec: KB9RBM, trea: KG9MV, Directors AA9UK, KG9OKM, W9NW, editor newsletter KG9MV and their new club call W9EAU. Effective January 1, 1999, your new SEC will be Stan Kaplan WB9RQR, thanks to John WB9SMM for his many years of service. Be sure to support Stan in his new venture. New officers for Green Fox ARC as follows: pres KB9WC, v pres N9HAD, sec: N9TYU, tres: N9TXS. N9MNA XYL of KC9NN is in hospital as a result of a fall, she has several broken bones, best wishes for a speedy recovery. K9PQ is now AF9FA, KA9DQQ is now N9QQ. Wisconsin QSO party scheduled for March 14, 1999. I hope everyone partakes of this event. Lots and lots of fun. Eau Claire ARC meets on 146.91 at 8:30 PM local time. New officers for Mancorad ARC as follows: pres. W6BSF, v pres N9QFY, treas: W9NPX sec: KB9GOY. Thought for the Day. It is impossible to be a participant in the march of time and not get a few blisters. Tfc: K9JPS 1047, K9GU 644, W9IHW 641, K9RTB 533, W9CBE 529, WB9YPY 486, W9YCV 150, AF9FA 136, N9CK 80, KA9KLZ 72, N9BDL 69, KG9B 63, AG9G 56, KE9VU 55, W9UW 51, K9LGU 43, WB9ICH 41, KA9FVX 34, K9HDF 30, KA9BHL 29, K9FHI 20, N9JIY 20, W9ODV 18, WD9FLJ 10, W9PVD 6, K9UTQ 3.

DAKOTA DIVISION

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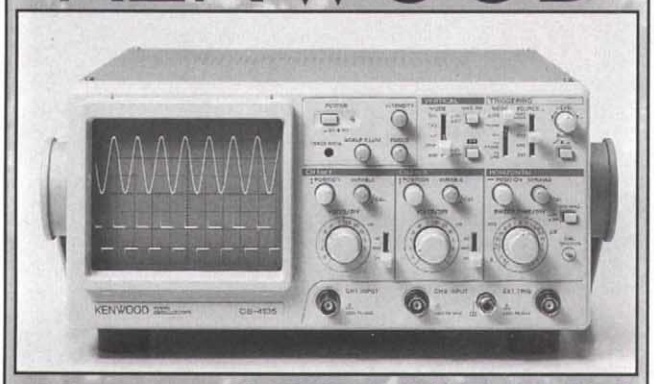

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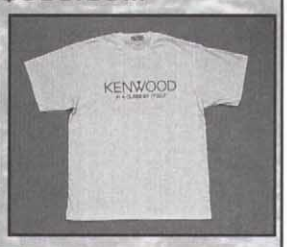

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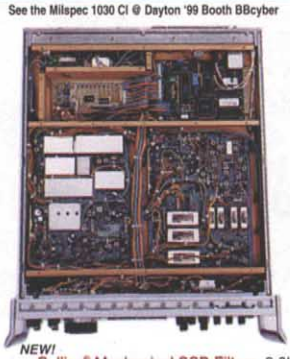

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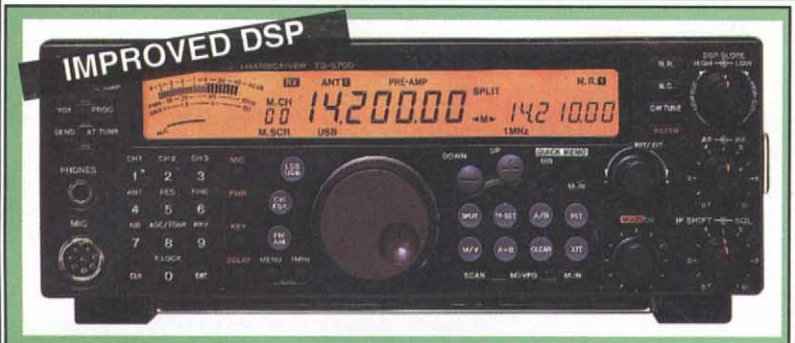

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ever bugs it may bring in our world with the Y2K issues. The holidays are over and our New Year's resolutions perhaps broken. I hope not...we all need goals, and if New Year's is a way to make or meet those goals...so be it. I may be going out on a limb here, but it appears there is no Mid-Winter Madness this year. Be sure to watch for other upcoming hamfests this spring including Rochester in April (a great fest) and TwinsLAN Tailgate in June just to name a few. These folks work hard to provide the opportunity ...and it's your attendance that makes it a success. If you have equipment you are not making good use of, perhaps someone else can. If you've never involved yourself in the plans and preps for a hamfest, you cannot appreciate the effort these folks put forth in creating the environment for us hams to converge to buy and sell. Lots of work behind the scenes gives us that opportunity. Not to mention the fair prices for hamfest tickets that the sponsors try to give us. Sometimes it's a hard trade-off finding a location that gives plenty of room for tables, easily accessible with adequate parking for everyone. Sometimes there are parking fees that are often beyond the control of the club hosting the hamfest. The bottom line is hamfest committees do their best within their resources to provide an environment that will make the most people happy. Support our hobby/service and attend hamfests. Buy the food from the vendor(s) authorized to sell at the hamfest. Buy a few raffle tickets at a chance to win a few door prizes. Have a little fun! That's really what it's all about. Enough said. I've finally gotten myself educated enough to figure out how to make a Web page. If you're poking around on the Web, give my current Web site a look-see. **http://www.pclink.com/rwendel**. 73 de N0FKU. Station Activity Reports: WB0WNJ, W0LAW, WO0A, KB0AII, WA0TFC, W0HPD, W0GRW, W7HH, K0WPK, KN9U, W3FAF, KB0AIJ, KA0IZA, KB0OHI, WD0GUF, K0OGI, N0JP.

NORTH DAKOTA: SM, Bill Kurtti, WC0M—Fargo Hamfest Mar 14, Red River Fairgrounds In West Fargo Large Flee Market, Ham Vendors & much more. Bismarck Hamfest Feb 27, Ham Vendors, Flee Market & Hamfest location to be announced. I attended the Totton Trail Swap meet which was well attended with a good assortment for sale. The Dickinson Christmas Party was also held at the Elks, Anyone needing testing in the Dickinson area contact either K0UB or N0DK. Enjoyed the article on rabbit hunting in the FORX newsletter made me wonder if the rabbit thought he was bait for a Snipe Hunt. FORX members installed a tower for the Red Cross. RRRA members plan new repeater at Grandin. This will provide communications along Interstate 94 extending close to Grand Forks. Congratulations to W0LHS on 66 years of hams activity. Can anyone in ND beat Bill's record? Let's have a contest Let me know if you can or if you know of someone that can beat Bill's record. Tfc: N0RDJ 2. HF Nets: Sess/QNI/QTC. Goose River 1895 kHz 8:30AM Sun 5/69/1. DATA 29/687/12. WX Nets: 46/184/60. Storm Net: 3937 kHz (continues during storms only). If conditions bad on 3937, try 7232 kHz.

SOUTH DAKOTA: SM, R.L. Cory, W0YMB—ARRL Executive board has given final approval to LARK at Watertown, to hold the 1999 Dakota Division Convention on Aug 6-8, so make plans now to attend. A Wouff Hong ceremony will be put on by W9NT at midnight on Saturday night. This can only be done at a division convention, so don't miss it. Dakota chapter 102 QCWA for North and South Dakota will operate their special events station on Feb 14-15. They will use their club call sign W0DAK and will work all bands. Pierre ARC added a tone of 146.2 to their repeater that is on 145.350. Their new officers are president AA0LY, vp is KC0GD, sec is N0IME and treas N0NPO. Activities dir is KA0SFV. South Dakota Nets have increased checkins after having fallen in August and September. The South Dakota Novice Net had the biggest come back. All of the nets would like to have more checkins, so jump in to keep up on your CW – for slow speed, check into the Novice Net on 3700 kHz at 7 PM on Sunday, and for faster speed, the South Dakota CW Net meets on Mon thru Fri on 3650 kHz at 7 PM CST. The Net Control Station will respond at your checkin speed on either net. Give it a try its fun. Total traffic report for November 917.

DELTA DIVISION

ARKANSAS: SM, Roger Gray, N5QS, e-mail **n5qs@arrl.org**— It is with great sadness that I must announce that Joe Johnson, W5QFU, our Section Traffic Manager, became a Silent Key Saturday, December 12, 1998. He was a real booster for the ARRL and for traffic handling. We will miss Joe very much. The new year is on us, and it is time to plan our goals for the future. Over the last 2 years, my primary goal has been to improve emergency communications in the section. I believe we have been very successful. Our SEC, Terry Busby, KC5ARS, has done an excellent job of continuing the work started by Kenny Thompson, KG5KS, started 2 years ago to rebuild our EC system around the state. Please work with your local EC and DEC. If you don't know who they are, check the Web page at **http://www.ualr.edu/~ham2/ec.htm**. I plan to add a list (or a link to a list) of traffic and emergency training nets to this page by the time this is printed. It is also time to plan for the School Club Roundup in February. This is a very good opportunity to take advantage of the band conditions that have been opening up over the last few months and expose the schools to our hobby. I just attended a severe storm spotter class last week and was very surprised that the entire format of the class has changed since the last one I attended. I highly recommend that you find a class and attend it if you haven't in the past couple of years. Tfc: K7ZQR 76, K5BOC 47, AB5SG 27, AB5ZU 25, AB5AU 23, W5HDN 11, KA5MGL 10, KC5UEW 6.

LOUISIANA: SM, Lionel A "Al" Oubre, K5DPG, e-mail **k5dpg@arrl.org**—Web page **www.aisp.net/k5dpg**. ASM: KB5CX, K5MC. ACC: KA5IJU. BM: K5ARH. TC: KE5FZ. SEC: N5MYH. OOC: WB5CXJ. PRC: KB5QVI. STM: KG5GE. NM LTN: WB5ZED. NM LCW: W4DLZ. As you can see, the LSN is no longer in service. The QNIs have fallen to just a few each night. Thanks to Wads and Doug, KK5WG, for serving as NM and ANM. This was the first CW net to be activated in this section in many years. It has accomplished its mission of training new CW traffic net members for the section. Remember that the LCW meets each night at 1845 CST/CDT on 3673 kHz, and the NCS will adjust the net speed so that everyone can participate. Why not dust off the key or keyer and join in on the fun of CW. Everyone is reminded of the ARES Blood Group at Our Lady of the Lake Hospital in Baton Rouge. Contact **nv5a@aol.com** or **kc5blq@hotmail.com** when you donate blood. Upcoming hamfests are: Hammond Jan 16, Lafayette March 13-14. Go out and support our area hamfest events. 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 November 1998: LTN LTN QNI 394 QTC 176 in 30 sessions, LCW QNI 195 QTC 20 in 28 sessions. PSHR: KG5GE 107, WA5WBZ 112, K5WOD 114, K5IQZ 121, K5MC 122, K5DPG 139, WB5ZED 166. Tfc: WB5ZED 250, K5IQZ 122, K5MC 78, KG5GE 35, K5DPG 15, WA5WBZ 8, K5WOD 7, N0KWA 6.

TENNESSEE: SM, O.D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU. OOC: AD4LO. TC: KB4LJV. HCARA is new and is growing fast in weather watching with KE4CES handling the publicity. This club is alive. Tri-County ARC/West had W9FZW, N4PIK, KD4VAL, KC4DWB, KC4TJZ & KB4CJS at its Nov 98 meeting in McKenzie. JCARA reported that the attendance at the Grey Hamfest was slightly lower than 1997, but was considered successful. NARC elected new officers at the Nov meeting. Jim Edwards, K4IHI, pres; Larry Franklin, KC4ZOA, VP, Frank Atchley, WB4DXW, treas; Willie Porter, KB4BLL, sec and Board Members Paul Anderson, N4BHO, Butch Humphreys, KE4TQO, Chuck Johnson, N4JUD, and Jim Arnold, KF4OAL. Thanks to Susanne Rogers, KE4SWZ, Steven Rogers, KD4LNJ, David Hoffman, KE4FGW, Bill Schenkel, N4NTX, Dale Bryant, KF4VBC, and to Cindy, KE4LLH, for getting the group together and to Harold, KD4HFO, for using the 145.39 repeater for the Diabetes Association's Rivewalk Event. MS Bike Tour-150 miler & APRS supporters as reported by Tom Cash, K4ZQX, were: KJ4RC, K4IOQ, N4MKG, KC4ZAG, WA4ZUD, KD4EHC, KE4DGW, KB4QBO, KR4SL, KB4AJW, AD4F, KE4CTQ, KE4QOF, KE4AIK, N4NWD, K4CMY, KF4KFZ, W4LAW and KE4FGW. DARC is getting organized for its largest public service event of the year, "the Memphis Marathon." This event takes place every December and requires such enormous effort that Delta club members must spend lots of time planning in order to make it a success. Net sess/QTC/QNI: TEPN 25/124/2595; TSCWN 26/5/82; TMPN 30/25/2289; TCWN 29/51/272; TEMPN 21/36/685. Tfc: NZ4O 350, WB4GIJ 121, N4PU 75, WA4HKU 72, WA4FMR 61, KA5KDB 48, WB4DYJ 44, W4SQE 26, W4SYE 19, WD4JJ 15, WA4GLS 11, WA4GZZ 9, W4HZD KI4V 6, W4PSN 4, W4IKK 2.

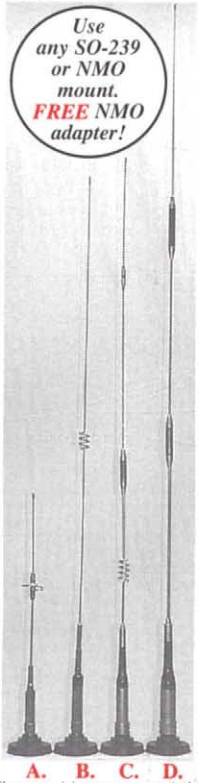
MISSISSIPPI: SM, Malcolm Keown, W5XX—ASM: AB5YY. ACC: N5JGK. BM: W5EPW. STM: KD5P. NM: AB5YY, KB5W, N4VHX, N5YNY, KI5UK, KB5WJJ, KB5IXI, K5XU. I trust Santa Claus brought all the deserving new ham gear, and that all of you had a great Christmas with your families. Congratulations to the HARC for being fourth in the USA in Field Day Class 2A and VARC being eleventh in Class 3A. Good Show! AMSAT Symposium Chairman K5NRK passes along kudos to KC5DNY, AB5WF, K5IMT, N5ZJV, WB5SXK, N5PF, KC5DNX, W5XX, N5EZX, N5QDE, KM5GE, N5JGK, KJ5XQ, AB5ZE, KC5OSM, W5AV, and KD5ALJ for making it all happen at the 16th Annual Meeting in Vicksburg. First up on your 1999 hamfest agenda is the Capital City Hamfest and ARRL State Convention, January 29-30. Contact AB5WF for details. See you there! OO Report: W5UBG. Net reports: sessions/QNI/QTC. MSPN: 30/2578/43, MTN: 30/160/104, MSN: 30/997/1, PBRA: 30/848/0, Jackson Co ARES: 30/421/24; MSSN: 21/142/3, MLEN: 5/106/0, MBHN: 5/28/0, Stone Co ARES 5/55/0, MCARA: 4/40/0, LARC: 4/63/0. PSHR: KB5W 147, N5XGI 141, W5XX 76. Traffic: KB5W 451, N5XGI 39, K5VV 20, W5XX 3.

GREAT LAKES DIVISION

KENTUCKY: SM, Bill Uschan, KC4MIS—With the New Year started we need to make a good and prosperous year for Amateur Radio. Remember the Greater Cincinnati Hamfest is February 27-28, 1999 at the Cincinnati Gardens. Try to attend one of the many informative forums held at the Hamfest. The Cave City Hamfest is March 13, 1999, at Cave City. The Murray State University Amateur Radio Club Hamfest will be held on April 17, 1999. On July 31, 1999, the Bowling Green Hamfest is scheduled. On August 22, 1999 the Bluegrass Amateur Radio Society Hamfest, held in Lexington this year instead of Frankfort, is set. Then on September 11-12, 1999, the ARRL State Convention in Louisville will be held. I am not sure as of yet on the location and as soon as I receive this info I will pass it on. As more dates become available I will post them. Although it is just January its time to start scheduling your "SKYWARN" classes for the onslaught of Spring and the severe storm season. Tornadoes can occur in any given month, depending on conditions. Of course, winter isn't over yet and from January on weather changes will be occurring. If ARCs in the section will e-mail me, **kc4mis@arrl.org**, with information on severe weather classes, time and date, I will try and get them in the Section News. It is with deep regret that we mention that Ray Sisk, WA4GSB, became a SK on December 2, 1998. Roy resided in Madisonville, KY. Tfc: KA4AVX 68, W4ET 16, AE4NW 27, KO4OL 72, KD4PWK 39, WA4SWF 4, KF4RBK 2, KU4UO 34, K4YKI 10, WB4ZDU 11.

MICHIGAN: SM, Dick Mondro, W8FQT **w8fqt@arrl.org**—ASM: Roger Edwards, WB8WJV **wb8wjv@centuryinter.net**. ASM: John LaRock, K8XD **k8xd@voyager.net**. ASM: John Freeman **kb8zdx@voyager.net**. SEC: Deborah Kirkbride, KA8YKK **ka8ykk@concentric.net**. STM: Jim Wades WB8SIW **wb8siw@aol.com**. ACC: Sandra Mondro, KG8HM **smondro@mich.com**. OOC: Donald Sefcik, N8NJE **fdsmith@tir.com**. PIC: James (Erv) Bates, W8ERV **kb8tnq@voyager.net**. SGL: Ed Hude, WA8QJE **edhude@juno.com**. TC: Dave Smith, W8YZ **dsmith@smithassoc.com**. VHF/UHF Net Manager: Ray Knuth, KB8ZYY. Section Newsletter Editor: Dave Colangelo, KB8RJI **dcolangelo@ameritech.net**. QRV Bulletin Editor: Mike Pearsall, N8MP **n8mp@concentric.net**. I am always happy to announce new folks accepting section appointments, but before I do that I want to thank our outgoing Section Traffic Manger (STM), Dale Cryderman, KA9EIZ, for the many years of service he has given to our section. Dale also serves as Net Manager for the Michigan Traffic Net (MITN) and has always provided us with representation in the 8th Region Nets of the National Traffic System (NTS). Dale has always found a way to keep our nets running flawlessly, so please join me in thanking him for his exemplary service. I would also like to thank John LaRock, K8XD, for his service as an Official Observer and Assistant Section Manager, Youth Activities. John has had to give up his volunteer work to spend more time with his job and family. It was a difficult decision for him to make, but obviously the right one for him at this time. I would also like to thank his wife Mary, KC8FCX, for being supportive of his League activities. I am proud to announce

MFJ *RuffRider*™ High Gain Mobile Antennas



Shown on mini mag mounts, not included.

Each MFJ RuffRider™ mobile antenna comes with MFJ's unique 90 degree "fold-over" feature -- lets you pull into your garage without knocking your antenna over!

MFJ's heavy duty bases are extremely strong to handle super rugged rides and day-to-day highway abuse.

MFJ's *RuffRider*™ High Gain dual band 144/440 MHz mobile antenna series is for the serious mobile ham who demands the highest quality, premium products at reasonable prices.

They feature the finest quality construction using precision machined components. *RuffRiders*™ battle the elements, handle rugged rides and day-to-day highway abuse.

Stacked elements with high-Q phasing coils give you outstanding gain. Stay in solid contact!

Phased Radiators

Phased radiators flattens the radiation pattern and concentrates your power to give you *super gain.*

High-Q phasing coils are housed in weather proof high-tech plastic insulation. They're attached to stainless steel stacked radiators by solid metal end sections.

Heavy Duty Base

Rigid, heavy duty solid metal base reduces SWR flutter due to wind vibration. Two Allen set screws securely fastens radiator.

Specially treated center pin provides excellent electrical connection.

Quickly screws off -- helps prevents theft of your expensive rig.

Use SO-239 or NMO Mounts

RuffRiders™ have a PL-259 base mount for quick installation to your heavy duty SO-239 magnet, trunk/hatch, gutter or mirror mount.

A *free* NMO adapter is included for use with an NMO mount.

MFJ mounts are recommended.

All MFJ *RuffRiders*™ are dual band 144/440 MHz antennas and factory tuned for SWR less than 1.5:1 and have 50 Ohm impedance.

MFJ's *No Matter What*™ Warranty

All *RuffRider*™s are covered by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your antenna for one full year.

Choose from several different length and gain antennas . . .

A. ***RuffRider Junior*™.** Premium, short 16½" antenna fits in any garage on any auto. ¼ Wave on 2 Meters, ½ Wave, gain on 440 MHz. 100 Watts. No fold-over.
MFJ-1402 **$34.95** add s/h

B. ***RuffRider High Power*™.** Just 40" long handles full *200 Watts.* Great for high power mobile amp. ½ Wave, gain on 2 Meters, ⅝ Wave, gain on 440 MHz.
MFJ-1412 **$49.95** add s/h

C. ***RuffRider High Gain*™.** 41½" long antenna gives extra gain with little height increase. Handles 150 Watts. ½ Wave, gain on 2 Meters, ⅝ Wave, gain on 440 MHz.
MFJ-1422 **$49.95** add s/h

D. ***RuffRider Hyper Gain*™.** 62½" brute gives a whopping gain on ⅞ Wave 2 Meters, ⅝ Wave, gain on 440 MHz. Our highest gain antenna. Handles 150 Watts.
MFJ-1432 **$69.95** add s/h

144/440 MHz Antenna Tuner with built-in SWR/Wattmeter
Covers 136 to 175 MHz. Handles 150 Watts. Compact 4x2½x1¼". *New!* MFJ-922 **$79.95**

MFJ *RuffRider*™ super heavy duty Antenna Mounts

Trunk/Hatchback *Lip* Mount

MFJ-345 **$34.95** add s/h

MFJ's *RuffRider*™ super heavy duty solid steel Trunk/Hatchback *Lip* Mount mounts to any lip on your vehicle.

Extra-wide *four* inch lip and large reinforcing tabs on each side safely distributes the load over your vehicle's lip.

Two large set screws on each end of the mounting lip locks your mount in place. A scratch-proof rubber guard protects your vehicle's finish.

Secures large VHF, UHF and medium size HF antennas even at highway speeds.

Mounts on lips at any angle. Two axis of rotation lets you position your antenna vertically, horizontally or at any desired angle. Serrated swivel joints locks securely in place with huge 3/8 inch set screw.

Has SO-239 base mount. Use adapter for NMO. Includes low loss coax with PL-259 connector, Allen wrenches and protection caps for SO-239 and locking screw, One year MFJ *No Matter What*™ limited warranty.

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.

Mirror/Luggage *Pipe Clamp* Mount

MFJ-340 **$34.95** add s/h

MFJ's *RuffRider*™ Mirror/Luggage *Pipe Clamp* Mount mounts on support rod of mirror, luggage rack or spare tire carrier of your truck, van, RV or SUV. Mounts on any horizontal, vertical or angled rod or pipe up to 5/8 inches in diameter.

Secures VHF, UHF and medium size HF antennas even at highway speeds.

Two axis of rotation lets you position your antenna to any desired angle. Serrated swivel joints locks securely in place with huge 3/8 inch set screw.

Convenient *Thumb and Finger* turn knob makes fold-over operation quick and easy. Locks in twelve positions.

Fold down your antenna at night when pulling into your garage and quickly put it back up to its operating position in the morning.

Has SO-239 base mount. Use adapter for NMO. Includes low loss coax with PL-259 connector, Allen wrenches and protection caps for SO-239 base mount and locking screw, MFJ's famous One year *No Matter What*™ limited warranty.

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.

MFJ's *MaxStrength*™ Hi-Flux Antenna Magnet Mounts

MFJ's *MaxStrength*™ high-flux magnet mounts give you maximum pull strength -- your antenna stays on top of your vehicle at highway speeds.

MFJ-333 **$14.95** add s/h

MFJ-335 **$19.95** add s/h

Base is *Euro-style*, black poly or chrome finish with a Mylar protective undersheet.

MFJ magnet mounts come with 17 feet of tough RG-58 coax with a PL-259 connector. Easily reaches operating position.

Choose your favorite antenna to go with these fabulous low-profile mounts for outstanding mobile performance.

MFJ-333 BS/BM, $14.95. Light to medium duty magnet mount. Low profile 3.5 inch diameter black base weighs 1½ lbs. For small to medium size antennas.

MFJ-335 BS/BM, $19.95. Medium to heavy duty magnet mount. Super strong 5 inch diameter *chrome* base weighs a husky 2½ pounds. For medium to large size antennas. It's perfect for MFJ's *RuffRider*™ High Gain mobile antennas.

Order BS for SO-239 connector.
Order BM for NMO connector.

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MFJ . . . the world leader in ham radio accessories!

the appointment of John Freeman, KB8ZDX, as Assistant Section Manager, Education and Training and Jim Wades, WB8SIW, as Section Traffic Manager. John has been serving our section in the ARES program for many years as Emergency Coordinator for Arenac County and as Assistant District Emergency Coordinator in District 3. Jim has been serving the section as Net Manager of QMN, The Michigan Net, our only CW Traffic Net and has been very actively involved with training programs for the National Weather Service for many years. Please join me in congratulating both John and Jim as our newest members of the Michigan Section Staff. Traffic reports for November 1998: W8RTN 234, N8FPN 189, WX8Y 183, WB8SIW 174, KB8ZYY 151, K8GA 115, AA8PI 102, K8LJG 93, KC8GMT 71, K8GXV 64, KB8HGM 62, WA8DHB 57, N8TDE 53, WI8K 49, W8RNQ 39, K3UWO 36, K8AI 34, K8UPE 30, K8XD 26, WR8F 26, N8OSC 19, AA8SN 19, K8ZJU 15, N8RGF 10, KC8FXF 6, W8YIQ 6, KA8LAR 6, W8YZ 5, NJ8R 2. (reports by 5th of the month please) Please support the following Section Traffic Nets: November NTS Net Reports.

Net	QNI	QTC	Sess	NM	Freq	Time	Day
QMN	797	259	60	WB8SIW	3.663	6:30&10 PM	Daily
MACS	288	65	30	W8RNQ	3.953	11 AM	Daily (1 PM Sun.)
MITN	475	177	30	KA9EIZ	3.952	7 PM	Daily
UPN	1401	57	35	WA8DHB	3.921	5 PM	Daily (Noon Sun.)
GLETN	604	64	30	VE3SCY	3.932	9 PM	Daily
SEMTN	300	94	30	WI8K	145.330	10:15 PM	Daily
WSSBN		NO REPORT			3.935	7 PM	Daily
ARAHH	42	08	04	KC8DAJ	145.130	8 PM	Wed
NCN	86	20	13	WD7G	146.940	7:30 PM	M-F
TATN	248	10	23	KC8FXF	147.300	9:30 PM	Daily

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12)—Ohio has welcomed its new SGL, Jeff Ferriell. K8ZDA, who is a professor of law at Capital University School of Law (his office is about 850 yards from the State Capitol building). Many of you know Jeff for his work heading communications in June for the annual Great Ohio Bicycle Adventure (GOBA) which involves some 22 counties. By accepting the responsibility for SGL, Jeff will keep close tabs on Ohio legislation regarding towers and other ham radio concerns. For 1999, we have been spotlighting lesser known station appointments (Jan., TCs; March PIOs; April, ORS; May, Affiliated Clubs). This month, let's spotlight LGLs who help Jeff and Ohio hams by keeping up on what local city councils, boards of zoning appeals and county commissioners may be doing as to ham radio laws. If this sounds like a contribution you'd like to make by keeping track on your local lawmakers, give Jeff (see above listing of e-mail addresses) or me a request for Local Government Liaison appointment. Great time to remind Ohio hams to check out the Web Page of the Division and also Ohio Section. Available at **http://facops.albion.edu/arrl/** on the Internet. 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. It is to your advantage to spread the news around. Worth mentioning that Mahoning Valley ARA (Youngstown) had US Congressman James Traficant (D-17th) in for a meeting last year. Bet he learned more than the hams. Great idea; invite your congressman (state senator or representative) for a meeting. Need help? I'll give it; let me know. By now you know of a U.S. postage increase; remember the QSL bureaus need more coins and possibly newsletter editors...Miami Valley FM Assoc. new officers are president, KD4GCX; veep, N8UR; sec,KC8GYW; tres, KB8SRQ; directors, KE8TQ and KC8HWV....Congrats to Pat Foster, KC8KZH as GCARA (Cincinnati) Ham of Year and also to Bob Grenell, W8RHR, as Elmer of the Year....Not only did the Central Ohio ARES have 98 hams working the 1998 Columbus Marathon but had nine hams from the Queen City Emergency Net on hand to observe as QCEN will be doing the same in Cincinnati this year. Frank Piper, KI8GW, Columbus, authored (on page 6) the public service article for *Worldradio* last December...Remember the Great Lakes Division Convention Feb 27-28 in Cincinnati and its banquet, Saturday night. Also ARRL Night Feb 26 at Dayton ARA. Other hamfests, Northern Ohio ARS, Feb. 7 at Lorain, Cuyahoga Falls ARC at Feb.28 and Teays ARC, Feb. 28 at Circleville de K8QOE.

Net	QNI	QTC	QTR	Sess	Time	Freq	Mgr
BN (E)	165	97	297	30	1845	3.577	WD8KFN
BN (L)	213	126	449	30	2200	3.577	NY8V
BNR	133	28	973	29	1800	3.605	W8LDQ
OSN	139	29	483	30	1810	3.708	WB8KQJ
OSSBN	1990	594	2421	90	1847, 1030,1615,1845	3.9725	KF8DO
OH Section ARES Net					1700 Sn	3.875	WD8MPV

Tfc: WD8KFN 290, W8PBX 240, NS8C 180, N8FWA 164, KD8HB 162, W8STX 158, KF8DO 138, W8RG 117, N8RRB 111, WA8HED 102, K8OUA 100, WA8SSI 92, N8DD 88, KA8FCC 82, N8CW 81, N8TNV 78, N8RRB 76, KB8TIA 73, WA8EYQ 71, K8WOQ 53, KB8VYB 51, KD9K 45, WB8FSV 43, NY8V 38, KC8DWN 35, K8JA 33, N8VES 32, KB8PIU 31, N8UEG 31, KB8UEY 31, WD8KBW 29, K3RC 27, WD8MIO 26, K8QIP 26, W8LDQ 25, K8IG 24, KI8O 24, WB8HHZ 24, KC8HTP 21, KB9GGA 21, W8BO 20, KB8SIA 17, N8GOB 16, N8YXL 15, WB8KWD 15, WD8JAW 15, K8LQM 14, KC8FWU 14, KF8FE 13, W8GAC 13, KB9KSR 12, N8YWX 9, AA8XS 8, W2INO 6, KB8SBK 6, KC8KYP 5, W8GDQ 5, KC8HFV 4, KE8FK 4, K8WC 1.

HUDSON DIVISION

EASTERN NEW YORK: SM, Rob Leiden, KR2L (**@WA2UMX** or **bleiden1@nycap.rr.com**)—STM: Pete Cecere, N2YJZ. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. SGL: Phil Bradway, KB2HQ. 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 (November 1998) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 31/6 CDN 391/167 ESS 353/218 HVN 531/280 NYPHONE 222/907 NYPON 334/459 NYS/E 333/496 NYS/M 209/245 NYS/L 258/412 SDN 343/171. Section News: Welcome to new PIC John, WA2QCY, and thanks to Jim, WA2UMH, for his efforts on behalf of ENY. Congrats yet again to N2YJZ for BPL (I've lost count how many times this is!) Remember to keep your emergency gear ready at all times, especially in the car! The ENY Convention is coming in April at Beacon. This year will be better than ever! OOC

MFJ 1.8-170 MHz SWR Analyzer™

Reads complex impedance . . . Super easy-to-use

***New** MFJ-259B reads antenna SWR . . . Complex RF Impedance: Resistance(R) and Reactance(X) or Magnitude(Z) and Phase(degrees) . . . Coax cable loss(dB) . . . Coax cable length and Distance to fault . . . Return Loss . . . Reflection Coefficient . . . Inductance . . . Capacitance . . . Battery Voltage. LCD digital readout . . . covers 1.8-170 MHz . . . built-in frequency counter . . . side-by-side meters . . . Ni-Cad charger circuit . . . battery saver . . . low battery warning . . . easy access battery panel . . . smooth reduction drive tuning . . .*

***The** world's most popular SWR analyzer just got incredibly better and gives you more value than ever!*

MFJ-259B gives you a complete picture of your antenna's performance. You can read antenna SWR and Complex Impedance from 1.8 to 170 MHz.

You can read Complex Impedance as series resistance and reactance (R+jX) or as magnitude (Z) and phase (degrees).

You can determine velocity factor, coax cable loss in dB, length of coax and distance to a short or open in feet.

You can read SWR, return loss and reflection coefficient at any frequency simultaneously at a single glance.

You can also read inductance in uH and capacitance in pF at RF frequencies.

Large easy-to-read two line LCD screen and side-by-side meters clearly display your information.

It has built-in frequency counter, Ni-Cad charger circuit, battery saver, low battery warning, easy access battery panel and smooth reduction drive tuning.

Super easy to use! Just set the bandswitch and tune the dial -- just like your transceiver. SWR and Complex Impedance are displayed instantly!

Here's what you can do

Find your antenna's true resonant frequency. Trim dipoles and verticals.

Adjust your Yagi, quad, loop and other antennas, change antenna spacing and height and watch SWR, resistance and reactance change instantly. You'll know exactly what to do by simply watching the display.

Perfectly tune critical HF mobile antennas in seconds for super DX -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on one band, or analyze multiband performance over the entire spectrum 1.8-170 MHz!

Check SWR outside the ham bands without violating FCC rules.

Take the guesswork out of building and adjusting matching networks and baluns.

Accurately measure distance to a short or open in a failed coax. Measure length of a roll of coax, coax loss, velocity factor and impedance.

Measure inductance and capacitance. Troubleshoot and measure resonant frequency and approximate Q of traps, stubs, transmission lines, RF chokes, tuned circuits and baluns.

Adjust your antenna tuner for a perfect 1:1 match without creating QRM.

And this is only the beginning! The MFJ-259B is a complete ham radio test station including -- frequency counter, RF signal generator, *SWR Analyzer*™, RF Resistance and Reactance Analyzer, Coax Analyzer, Capacitance and Inductance Meter and much more!

Call your dealer for your best price!

MFJ-259B **$249.95**

Call or write for *Free* Manual

MFJ's comprehensive instruction manual is packed with useful applications -- all explained in simple language you can understand.

Take it anywhere

Fully portable, take it anywhere -- remote sites, up towers, on DX-peditions. It uses 10 AA or Ni-Cad batteries (not included) or 110 VAC with MFJ-1315, $14.95. Its rugged all metal cabinet is a compact 4x2x6¾ inches.

How good is the MFJ-259B?

MFJ *SWR Analyzers*™ work so good, many antenna manufacturers use them in their lab and on the production line -- saving thousands of dollars in instrumentation costs! Used worldwide by professionals everywhere.

More MFJ *SWR Analyzers*™

MFJ-249B, $229.95. Like MFJ-259B, but reads SWR, true impedance magnitude and frequency only on LCD. No meters.

MFJ-209, $129.95. Like MFJ-249B but reads SWR only on meter and has no LCD or frequency counter.

MFJ-219B, $99.95. UHF *SWR Analyzer*™ covers 420-450 MHz. Jack for external frequency counter. 7½x2½x2¼ inches. Use two 9 volt batteries or 110 VAC with MFJ-1312B, $12.95. *Free* "N" to SO-239 adapter.

SWR Analyzer Accessories

Dip Meter Adapter

MFJ-66, $19.95. Plug a dip meter coupling coil into your MFJ *SWR Analyzer*™ and turn it into a sensitive and accurate bandswitched dip meter. Save time and take the guesswork out of winding coils and determining resonant frequency of tuned circuits and Q of coils. Set of two coils cover 1.8-170 MHz depending on your *SWR Analyzer*™.

Genuine MFJ Carrying Case

MFJ-29C, $24.95. Tote your MFJ-259B anywhere with this *genuine* MFJ custom carrying case. Has back pocket with security cover for carrying dip coils, adaptors and accessories.

Made of special foam-filled fabric, the MFJ-29C cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

Has clear protective window for frequency display and cutouts for knobs and connectors so you can use your MFJ *SWR Analyzer*™ without taking it out of your case. *Look for the MFJ logo for genuine authenticity!*

MFJ-99, $54.85. Accessory Package for MFJ-259/B/249/B/209. Includes *genuine* MFJ-29C carrying case, MFJ-66 dip meter adapter, MFJ-1315 110 VAC adapter. ***Save $5!***

New! ***Tunable Measurement Filter***™

MFJ-731, $89.95. *Exclusive* MFJ tunable RF filter allows accurate SWR and impedance measurements 1.8 to 30 MHz in presence of strong RF fields. Has virtually no effect on measurements. Works with all SWR Analyzers.

MFJ *No Matter What*™ warranty

MFJ will repair or replace (at our option) your MFJ *SWR Analyzer*™ for one full year.

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MFJ-224 **$159.95**

MFJ 2 Meter *FM SignalAnalyzer*™

Measure signal strength over 60 dB range, check and set FM deviation, measure antenna gain, beamwidth, front-to-back ratio, sidelobes, feedline loss in dB. Plot field strength patterns, position antennas, measure preamp gain, detect feedline faults, track down hidden transmitters, tune transmitters and filters. Plug in scope to analyze modulation wave forms, measure audio distortion, noise and instantaneous peak deviation. Covers 143.5 to 148.5 MHz. Headphone jack, battery check function. Uses 9V battery. 4x2½x6¾ in.

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Tech Help: (601) 323-0549

More hams use MFJ SWR Analyzers™ than any others in the world!

Hal and STM Pete have been speaking about their programs. Let them know if you want to hear more at your club's next meeting. Let me know if you'd like an SM visit as well, and I'll do my best to oblige. 73 de Rob KR2L. PSHR:N2YJZ 192, N2JBA 177, WB2ZCM 142, K2CSS 132, W2JHO 119, K2BPT 118, W2AKT 101, KB2YUR 75 Tfc: N2YJZ 660, N2JBA 92, W2JHO 76, K2CSS 64, WB2ZCM 46, K2BTP 43, WB2IIV 21, KB2YUR 20, W2AKT 17, W2CJO 17, N2AWI 14.

NEW YORK CITY/LONG ISLAND: SM, George Tranos, N2GA—ASM: KA2D, N2JIX, K2YEW, KB2SCS, KD2YA. SGL: W2UFO. SEC: KA2D. ACC: K2EJ. PIC: N2RBU. TC: K2LJH. BM: KG2M. OOC: N2JIX. STM: WA2YOW. Congratulations to new club officers for 1999 for Wantagh ARC: Pres, Sid, K2LJH; VP, Arnold, W2OEJ; Treas Herman, W2TLC; Sec Bill, N2RRX; for Great South Bay ARC: Pres, Phil, N2MUN; VP, Dave, N2UHR; Treas, Tom, N2MIG; Rec Sec, Pete, N2GBM; Cor Sec Lenore, N2KYP; for Order of Boiled Owls: Pres, Jeff, K2KV; VP, Mel, KS2G; Treas, Andy K2LE; Sec, Bill, NA2M; for LIMARC: Pres, Rob, N2JIX; VP Ray, WA2CNJ; Treas, Rick, W2RHB. Sec, Diane, K2DO. Congratulations and thanks to Don, N2QHV, and the Peconic ARC for heading off an anti-amateur tower law in Southold Town. Congratulations to Mid Island ARC for their first successful hamfest held in November in Patchogue. Please send in your annual club 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 66th St. Call Hotline 212-456-5224 for exact dates & times, Jerry Cudmore, K2JRC. Grumman ARC (W5YI) 2nd Tues 5 PM. Northrop-Grumman Plant 5 S Oyster Bay Rd via, Hazel St Bethpage, NY. Bob Wexelbaum, W2ILP, 516-499-2214, LIMARC, 2nd Sat 9 AM NY Inst of Tech, 400 Bldg Rm 409, Northern Blvd. Old Westbury, Al Bender, W2QZ, 516-623-6449. East Village ARC, 2nd Friday 7 PM, Laguardia HS, Amsterdam Ave and West 65 Street, Manhattan. Robina Asti, KD2IZ, 212-838-5995. Great South Bay ARC, 4th Sun 12 PM, Babylon Town Hall, ARES/RACES Rm 200 E Sunrise Hwy N Lindenhurst, Michael Grant, N2OX, 516-736-9126. Hellenic ARA: 4th Tues 6:30 PM; Pontion Society, 31-25 23rd Ave, Astoria, NY, George Anastasiadis, KF2PG, 516-937-0775. Larkfield ARC: 3rd Sat 9 AM, Huntington Town Hall, 100 Main St, Huntington, NY, Joe Coffield, W2DDZ, 516-266-3192, Columbia U VE Team: 3rd Mon 6:30 PM, Watson Lab 6th.floor 612 W 115th St NY, Alan Crosswell, N2YGK, 212-854-3754 PARC: exams held every three months at Southold School Oaklawn Ave, Southold, NY, on next to last Friday of the month.6:30 PM all classes of licenses. For info contact Ralph Williams/N3BT 516-323-3646. Mid-Island ARC, Last Tue. 7 PM, Brookhaven Rec Ctr, 20 Wireless Rd, Centereach, NY. Mike Christopher, KG2M, 516-736-9126. Report all changes to N2GA before the 12th of the month. Tfc: WB2GTG 411, N2AKZ 183, W2RJL 148, KB2KLH 116, KC2ACL 104, KB2GEK 56, N2XOJ 56, WA2YOW 30, N2EXU 22, AA2NX 14.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL @ n0jl@arrl.org—ASM: N0LDD. SEC: NA0R. ACC: N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. TC: W0DIA. SEITS has completed the series on repeater audio with a discussion of modulation systems... or from FM to PM (and usually in the PM). DMRAA marks 52 years of Operation Santa Claus. UU5JK was in DSM and visited W0ULV. The QRP bunch are fox hunting again. Listen on 7.040 MHz. I'm not sure who the officers for MPARC are for next year! Donna, I am a HAM. I understand CALL SIGNS! I think they are N0PKH, KA0FBK, KA0FBL, and Donna. Sorry, Donna. I had to do that. The calls N0WK and K0RBK are being heard in southern Iowa. Congrats to N0MA, WN0G, W0GQ, KI0DS, NY0E, W0AK, WB0T, KE0UI, WB0SNL, and N0NI who led Iowa in their own categories during FD. Also, N0RKX, N0KXW, N0MVB, N0WBA, N0LEM, N0MVC, WB0RMT, KC0EBK, and AB0BU were involved in the Palo power plant evacuation drill. These were all in the Marshalltown area. I don't have word of others who may have been involved. TSARC-N continues to make improvements to their comm van. It now has electric heat! 1999 officers for SARA are KC0AXK, KI0KO, N0EUM, and KA0KUA. For CIRAS they are WB0RMT, N0KXW, N0MVC, and N0MXK. N0RKX, WB0RMT, KB0MGH, and N0MVC did October Fest. K0AL made some comments in "Bandspread" concerning the license structure situation. Tfc: N0JL 36. 73 and CUL de N0JL.

KANSAS: SM, Orlan Q. Cook, W0OYH— ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. SGL: Marshall Reese, AA0GL. Hi gang, remember when an ARRL State Convention ran all day Saturday and Sunday? Remember the Saturday night banquets of several hundreds people? Remember the "The Royal Order of the Wouff Hong" initiation ceremony at the strike of midnight? Remember the hospitality rooms full of hams chatting until almost sun up? The Wichita hams from 5 clubs who put on the state convention say this was last one. A year ago, they rented the large downtown Convention Center. They had to dig into their pockets to pay for it. This year they held it in a "dance hall." No better. Today, when the doors open it is a rush for the swap tables and by noon the floor is empty just like a flea market. We used to have lots of public service meetings. Now we have "special interest groups" who emerge from their meetings to run off home after 2 hours, after driving half way across the state. I don't know how you feel, but I feel like my best friend died. We have time to change. Let's all think on this. Maybe Salina could hold the next State Convention with some help and support from the ham community. Oct Nets: sessions/QNI/QTC, KSBN 31/994/94,KPN 22/270/118 KMWN 31/647/533,KWN 31/849/466,CSTN 27/1798/102 QKS 61/312/51 QKS-SS 8/16/2. Clubs: Coffeyville 4/80/0, Ind. 5/85/0, Parsons 4/40/0. SEC 8/274/7 with KB0AMY AA0IQ N0UXQ KB0WEQ KF4LM WD0DMV.TEN report 288 msgs 62 sessions KS stns 68% with AA0FO KX0I K0PY NB0Z WB0ZNY. BBS reports: W1AW bulletins/personal/NTS, AA0HJ 60/522/0, N0OBM 35/604/5, NX0R 31/487/0. Tfc: N0KJ 510, K0PY 83, WB0ZNY 66, W0OYH 44, K0RY 30, KB0DTI 24, KX0I 19, NB0Z 13, W0WWR 8, K0BJ 9.

MISSOURI: SM, Roger Volk, K0GOB—ACC: Keith, WE0G. ASM: Karen, N0TDW. ASM: Tom, KI0JO. OOC: Mike, N0QBF. PIC: Dennis, AA0A. SGL: Ern, KD0UD. BM: Open. SEC: Fred, WA0US. STM: Tom, KI0JO. TC: Mac, K4CHS.

MFJ TUNERS

MFJ-989C *Legal Limit* Antenna Tuner

MFJ uses super heavy duty components to make the world's finest legal limit tuner

MFJ uses super heavy duty components -- roller inductor, variable capacitors, antenna switch and balun -- to build the world's most popular high power antenna tuner.

MFJ-989C

$359.95

The rugged world famous MFJ-989C handles 3 KW PEP SSB amplifier input power (1500 Watts PEP SSB output power). Covers 1.8 to 30 MHz, including MARS and WARC bands.

MFJ's *AirCore*™ roller inductor, new *gear-driven* turns counter and weighted spinner knob gives you exact inductance control for absolute minimum SWR.

You can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax, random wire or balanced lines.

You get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-Needle SWR/Wattmeter, massive transmitting variable capacitors, ceramic antenna switch, built-in dummy load, *TrueCurrent*™ Balun, *scratch-proof* Lexan front panel -- all in a sleek compact cabinet (10¾Wx4½Hx15D in).

MFJ AirCore™ Roller Inductor gives high-Q, low loss, high efficiency and high power handling.

MFJ's exclusive *Self-Resonance Killer*™ keeps damaging self-resonances away from your operating frequency.

Large, self-cleaning wiping contact gives good low-resistance connection. Solid 1/4 inch brass shaft, self-align bearings give smooth non-binding rotation.

MFJ *No Matter What*™ Warranty

MFJ will repair or replace your MFJ-989C (at our option) *no matter what* for one year.

More hams use MFJ tuners than all other tuners in the world!

MFJ-986 Two knob *Differential-T*™

MFJ-986

$329.95

Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10¾Wx4½Hx15 in.

MFJ-962D *compact* Tuner for Amps

MFJ-962D

$269.95

A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10¾x4½x10⅞ in.

MFJ-969 300W *Roller Inductor* Tuner

MFJ-969

$189.95

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

MFJ-949E *deluxe* 300 Watt Tuner

MFJ-949E

$149.95

More *hams use MFJ-949s than any other antenna tuner in the world!* Handles 300 Watts. Full 1.8 to 30 MHz coverage, 48 position *Precision48*™ inductor, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E *super value* Tuner

MFJ-941E

$119.95

The *most for your money!* Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10½Wx2½Hx7D in.

MFJ-945E HF+6 Meter *mobile* Tuner

MFJ-945E

$109.95

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $4.95,** mobile mount.

MFJ-971 *portable/QRP* Tuner

MFJ-971

$99.95

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6½x2½ inches.

MFJ-901B *smallest* Versa Tuner

MFJ-901B

$79.95

MFJ's smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-16010 *random* wire Tuner

MFJ-16010

$49.95

Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 *6 Meter* Tuners

MFJ-906

$79.95

MFJ-906 has lighted Cross-Needle SWR/Wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $49.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 VHF/UHF Tuners

MFJ-921 or MFJ-924

$69.95

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

MFJ-922 144/440 MHz Tuner

MFJ-922

$79.95

Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-931 *artificial* RF Ground

MFJ-931

$79.95

Creates artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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By now all of you know that Charles, KE0K, was elected to a two-year term as SM for MO. If you have not done so already, be sure to delete me from your mailing list and send your club newsletters to Charles so that he can report your activities in future columns. His e-mail address is **ke0k@bigfoot.com**. New officers for the SMARC for next year are: pres: Bruce, N9TTN; vp: Ed, KB0GSV; sec: Fred, KI0ET; and treas: Jude, KE0YZ. For the KARC, new officers are: pres: Bob, K9JAO; vp: Connie, WD0CSY; sec: Caty, N0ORO; and treas: Harvey, WB0QKE. Thanks to these hams and to the other volunteers who serve as officers of their local clubs. The position of SM is a demanding one as "the buck stops here" as far as section matters are concerned. The SMs do not report to the directors as some people believe. Basically, SMs are independent individuals who are elected directly by their constituents. Fortunately, there are lots of support people that assist the SM in carrying out his duties. First, there are the resources at ARRL Headquarters. The knowledgeable staff is always ready to assist the SM in addressing the issue of the day. Next, there are the skills of the section staff listed at the top of this column. Each of these volunteers handles a specific portion of the workload of the SM. Finally, there are the hundreds of members who offer support to the SM in good times and bad. The names of these individuals are not recorded in public records, but they exist. Thanks to everyone who has made my term as SM so rewarding. Jean and I will miss the daily interaction with our ham friends around the section. Nets: MOTRAN 30/724/137, WB4RDV; STLRPTR 5/145/22, WA0IVY; PAULREVERE 5/475/0, N0IWA; MON1&2 60/151/104, W0WFF; WAARCI 5/133/0, KB8DQB; WJACKCOARES 4/27/0, K0UAA; CARL 3/28/0, KC0MV; AUDRAINARC 4/28/1, WB0SEN; HARC 4/178/0, N0YLF; QCWA35 4/86/0, K0YML; ROLLABB 29/291/8, NA0V; SWMOWARN 4/75/10, N0UAM. Tfc: KI0JO 784, KE0K 126, KG0IV 53.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASMs: W0KVM, N0MT, WB0ULH, WY0F & WB0YWO. It is with deep regret to inform you of the passing of Al Reed, W0OWR. He was a longtime member of the Lincoln ARC. The AK-SAR-BEN ARC is the recipient of an ICOM repeater thanks to the generosity of the Douglas County EMA. The repeater is due to be installed in early 1999. Mark your calendars for the Nebraska State Convention to be held in Norfolk March 5-7. For further information, contact N0VLX. Be sure to check my Web page for the latest information on Midwest/Dakota Division Conventions and Hamfests. That address is: **http://members.aol.com/NEBSM/ke0xq.htm**. With the "Change of Command" happening in many clubs due to elections, be sure to let me, the ACC (KC0DA) and ARRL HQ know of these changes so we can update our records. On December 4, Brian Smith, KB0QXF, received a Bronze Medal awarded by NOAA for his work in public education on severe weather safety. The Bronze Medal is the 3rd highest award given by NOAA. Congratulations Brian! I want to wish each and every one a Happy New Year. Net reports: Lincoln/Logan ARES: QNI 233, QTC 2 and 17 sessions. NMPN: QNI 1255, QTC 10 & 30 sessions. NE Storm Net: QNI 909, QTC 10 & 30 sessions. NE 40M Net: QNI 129, QTC 8 & 18 sessions. NE CW Net: QNI 150, QTC 8 & 19 sessions. W0IRZ Memorial Net: QNI 15 & 1 session. NCHN QNI 360, QTC 22 & 30 Sessions. Tfc: K0PTK 112, KE0XQ 30, W0AP 13, WC0O 12, WY0F 8, K0OAL 6, N0CQI 4, KA0EKR 2, KA0DOC 2, AA0KQ 2, WA0ZCN 2, W0UJI 2. PSHR: KA0DBK 91, KB0YTM 12.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—I had the privilege for the second time in my tenure as SM to deliver a plaque to a club that has been affiliated with the ARRL for 50 years. Director Tom Frenaye, K1KI, and I attended the Christmas party at The Meriden ARC at which the plaque was presented. As you all know, clubs go through various cycles of activity so 50 years of ARRL affiliation is certainly a milestone for any club. So congrats once again MARC members! It was fun to hear Tom read some items from 1948 *QST*. Each year, this group recognizes the Volunteer of the Year and the Elmer of the Year. MARC members showed their appreciation for their president Bill, W1KKF, by awarding to him the Volunteer of the Year certificate. His name and call is added to a plaque showing previous winners. For the third year in a row, Joel, N1JEO, received the Elmer of the Year Award. Thanks for your time Joel—Elmers are real important in this hobby. Any of you have time to do some Elmering? Why not try it—it's rewarding to see your student do well in the hobby! Congrats to Barb, K1EIR, for her top recognition by the Lower Naugatuck Valley Chapter of The American Red Cross. A luncheon and annual meeting took place at which she was presented with the Clara Barton Medal, the highest award given to volunteers! K1EIR previously chaired many major committees and programs including chair of volunteers and served as Chapter Chairperson for several years. Congrats, Barb! Speaking of volunteers, I am looking for leaders in the ARES program. So, do not hesitate to either suggest an op who might be able to help or let me know that you can lend a hand. The New Year is upon us—a good time to be thinking about doing something new and different. Be adventurous! Net sess/QNI/QTC/NM: WESCON 30/349/118/KA1GWE; NVTN 30/208/72/K1STM; RASON E/L 30/30, 147/238, 32/48, WA4QXT; CPN 30/249/124/N1DIO; CN25/96/47/N1AEH; BEARS of Manchester 30/432/309/NM1K. Tfc: NM1K 1880, KA1VEC 519, KA1GWE 264, WA4QXT 211, K1STM 171, N1VXP 130, KE1AI 53.

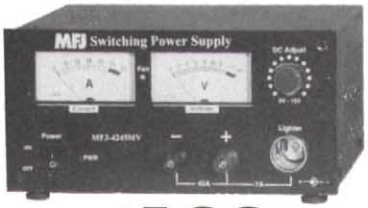
EASTERN MASSACHUSETTS: SM, Larry Ober, W1MW—ASMs: WA1IDA, KB1BCF, N1GTB, N1UGA, N1SGL. ACC: N1AKG. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SEC: W3EVE: K3HI. STM: WA1TBY. TC: W5SVU. EMA ARRL: voice: 978-567-0942. Packet bulletins: ARRL@EMABBS. e-mail: **w1mw@arrl.org**. e-mail list: **ema-arrl@netcom.com**. Web: **http://www.qsl.net/ema-arrl**. Your SM is resettled at his new QTH and trying to get the new "stealth" antennas deployed. There's a substantial amount of mail still to be claimed at the PO box, so news remains light. All the club newsletters should be on hand for next month's Section News. It is becoming more difficult to service my Acton PO box from the new QTH. The box is maintained primarily as a permanent *Callbook* address. I would appreciate it if club newsletters could be mailed directly to my home address: 113 5C Brigham St., Hudson, MA 01749. The Boston ARC received a gift of a 70cm Repeater from ELI, Inc. (aka Eli Heffron & Sons). The Norwood ARC will be holding an equipment auction at their December meeting. The Southeastern Massachusetts ARA is going through lease negotiations and permission for an increased height

MFJ *Switching* Power Supplies

Power your HF transceiver, 2 Meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!

No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

NEW!



MFJ-4225MV 25 Amp **$149.95** Add s/h

MFJ-4245MV 45 Amp **$199.95** Add s/h

MFJ's new adjustable voltage switching power supplies do it all! You can power your HF transceiver or 2-Meter/440 MHz mobile or base and accessories.

MFJ's *MightyLites*™ are so lightweight and small you can carry them in the palm of your hand! Take them with you anywhere.

No more picking up and hauling around heavy, bulky power supplies that can give you a painful backache, pulled muscle or hernia.

MFJ's 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp version is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

No RF hash!

These babies are clean . . .

Your buddies won't hear *any* RF hash on your signal! *You* won't hear any in your receiver either!

Some competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

These super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

Low ripple . . . Highly Regulated

Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

Fully Protected

You won't burn up these power supplies! They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Easily replaceable fuse.

MightyLites™ . . . Mighty Features

MFJ *MightyLites*™ feature a front-panel voltage control. It lets you vary the output voltage from 9 to 15 Volts DC and gives you a highly regulated voltage output.

You get an easy access front-panel with five-way binding posts for heavy duty use and a cigarette lighter socket for mobile accessories. The MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Large 3 inch dual meters are brightly illuminated to make it easy to monitor load voltage and current.

A *whisper quiet* internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D inches.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D inches.

MFJ No Matter What™ Warranty

MightyLites™ are covered by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your power supply for one full year.

MFJ 35/30 Amp *Adjustable* Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

NEW!

MFJ-4035MV **$149.95** Add s/h

MFJ's heavy duty conventional power supply is excellent for powering your HF or 2 Meter/440 MHz transceiver and accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for shack accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾ inches.

Your MFJ-4035MV is protected by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your power supply for one full year.

MFJ *High Current* Multiple DC Power Outlets

Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

MFJ-1118 **$69.95** Add s/h

MFJ-1118, $69.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. It lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC power supply.

Two pairs of *super* heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total. "ON" LED.

Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with an "ON" LED indicator.

Built-in 0-25 VDC voltmeter. You get 6 feet of super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs.

Heavy duty aluminum construction. 12½x2¾x2½ inches.

MFJ-1116 **$44.95** Add s/h

MFJ-1116, $44.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112 **$29.95** Add s/h

MFJ-1112, $29.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

Free MFJ Catalog

Nearest dealer/Orders . . . 800-647-1800

http://www.mfjenterprises.com **FAX: (601) 323-6551**

• 1 year *No Matter What*™ warranty • 30 day money back guarantee (less s&h) on orders from MFJ • **Add s/h**

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(180 ft.) tower. The Acton-Boxborough ARC is holding a Yankee Swap night at the December meeting. I wish everyone a joyous holiday season and a healthy and prosperous new year. 73 de W1MW. Tfc: WA1TBY 450, W2EAG 282, N1LKJ 233, NZ1D 206, K1BZD 156, WA1FNM 112, W1ON 98, K1SEC 97, N1TDF 71, N1LAH 63, WA1NPO 60, WA1LPM 49, N1IST 49, NG1A 47, KB1EB 47, N1SGL 41, K8SH 41, N1AJJ 27, KA1VAX 22, N1XQC 21, KD1LE 18, N1TPU 10, N1VUX 6.

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. Congratulations to the Narraguagus Bay ARC for having Congressman John Baldacci as a special guest, so he could plead our case to save our share of the radio spectrum. Many scientists and engineers who paved the way to new and higher frequencies were hams themselves, and so are the future radio spectrum pioneers who are on the air now. So don't wait for a contest to do weak signal work; get on the VHF and UHF bands now—become part of the saving force by using these bands. Without more use, the bands will be sold. Although it's only Feb, plans for Field Day should start to warm you all. (Hopefully we can forgo the water wings this year!) To help promote ham radio, consider operating from a public place. Shopping malls work wel—you will have thousands pass by and many will stop to ask what you are doing. Out of those, you will find a few new recruits. The number of young new hams is not keeping pace with the older generation passing. We must look to get more young people involved. Looking forward to seeing everyone Feb 13 at Crystal Falls Hamfest. Look for the special event call: W1F. Also the State Convention on Mar. 19-20, at Lewiston Ramada Conference Ctr. Tfc: NX1A 224, W1KX 95, W1JTH 64, AF1L 46, W1LIC 34, KA1RFD 25, N1HYF 24, W1QU 22, KA2ZKM 20, W1JX 16, WA1YNZ 9. 73, Bill, N1KAT.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK—ASMs: W1NH, N3CLZ, N1FIL, N1KIM. TC: WA1HOG. STM: WA1JVV. PIC: KA1GOZ. OOC: W1GTA. SGL: K1KM. BM: KH6GR. ACC: NA1E. SEC: N3CLZ. **www.nh.arrl.org** Pleased to announce a new service for ARRL affiliated clubs to save significant dollars of their treasury. Club newsletters can be a large part of your budget. Send us your newsletter in a Microsoft Publisher or Word format with scanned photos and we will put it up on the NH Web page in Adobe Acrobat Format. Your club members can print a copy or read your color newsletter on line. The club can print a limited amount of copies for those members without Internet capability. Cost to clubs—free! Contact Reese at **n1kim@nh.arrl.org**. Is your ISP BIT-NET? If so, you can have a "nh.arrl" specific e-mail address (ie, **n1fik@nh.arrl.org**). Send me your current e-mail address and call sign. Again - free! Sad to report that Frank Pariseau, KX1T, became a Silent Key in November. Women Radio Operators of NE (WRONE) new club officers: pres, Dawn, K1TQY; vp: Henry, KA1JVN, sec: Gail, N1TXJ, member: Sandy KA1TLP. Open to all YLs in NE. CVFMA new officers: pres, N1NCT; vp: N1SJK; sec: WB1GXM tres: N1SCV. NCARC new officers: pres: Mort, KH6GR, vp: Ernie, WB1GAN, tres: Tom, WA1JVV, sec: Louise, N1OSK. Reports are that Cannon Mtn, 449.875, has a new antenna and is playing very well. Gotta get more space. 73. Net sess/QNI/QTC: GSFM: 30/229/61; GSPN 35/145/32; TSEN 4/52/3; VTNH 30/196/142. Tfc: W1PEX 933, K1TQY 319, WA1JVV 115, N1CPX 101, K1ZO 41, W1ALE 38, KA1OTN 34, AE1T 33, WB1GXM 22, KH6GR 7.

RHODE ISLAND: SM, Rick Fairweather, K1KYI, e-mail **k1kyi@juno.com**—ASM: N1JFY. ACC: AA1CE. STM: KA1JXH. SEC: N1JMA. OOC: W1AOM. TC: KA1EGY. BM: KA1BNO. SGL: NN1K. SEC N1JMA has appointed two new DECs for the section. Mike, N1YKH, will be in charge of the Providence County for ARES, and Bill, KA1EZF, will perform the same function for Kent County. Anyone interested in helping the ARES program in these two counties should contact them. A good place to do that is on the weekly ARES/SKYWARN net which rotates between the 146.70, 147.165, and 146.76 repeaters on Wed nites at 8:30. After well over 20 years, and with great sadness, the Washington County ARA has voted to disband. WA1HAH who owns the club's repeater will continue to keep it on the air at his own expense serving the hams in the South County area and supporting the ARES/SKYWARN program in Washington County. Even such sad news as this has a positive note. The club's treasury will be donated to children's charities such as the Make-a-Wish Foundation and to the Washington Lodge of Masons who provided the club with a meeting place at no charge for many years. You folks who belong to clubs take note. You should take an active part and not rely on the same few people to do all the work. The Newport County RC has new officers for '99: pres. N1NEZ; v pres. N1HYA; sec. W1CG; treas. W1IIC. Nine members of the Pawtuxet Valley ARC recently took some search and rescue training at the W. Warwick EOC and only 3 weeks later were called up to help with a mission in town. Tfc: KA1JXH 58, PSHR 121.

VERMONT: SM, Bob DeVarney, WE1U—ASMs KA1YLN, N1RJF, N1PDL, W1AD, KD1R. STM: KT1Q. SEC: KA1YLN. I am looking for help filling several appointments, including TC, PIC, and other positions including OO, and TS on the local level. If you are interested, please contact me. There will be a joint ARES/SKYWARN training session in Burlington in January, stay tuned for more info. Sessions/Checkins/Traffic: Vermont/New Hampshire Net (VTNH) 30/196/142. Vermont Phone Emergency Net (VPEN) 5/39/3; Green Mountain Net 25/719/49. Tri-State FM Emergency Net (Keene) 4/52/3. Windham County ARES Net 1/3/0. PSHR: KT1Q 163; N1DHT 113. Tfc: KT1Q 515*; N1DHT 221; KA1YLN 9* BPL. Vermont had 98% on 1RN/2 (FRN) 73 de WE1U.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD @ K1UGM—ASM: N1LZC. ASM: (Digital) KD1SM. STM: W1SJV. EC: K1CSG. OOC: WT1W. The holiday season is over. Hope Santa brought all a few new toys. This solar cycle is gaining ground rapidly. I was talking with some people, and they said they didn't realize the bands were in as good shape as they are. If you haven't been on the air recently, give it a try! You will be amazed how propagation has improved. Congrats to Ralph, KD1SM, and his crew. He demonstrated ham radio to a local Cub Scout troop. They were so interested that a scheduled half-hour demonstration went almost an hour and a half. Don't tell me that the computer age has taken over the youth. Our hobby still presents a great fascination. Both VHF (Repeater) and HF operation were shown. As a result of this demo, we may get

MFJ *tunable* super DSP filter

Only MFJ gives you tunable and programmable "brick wall" DSP filters

U.S. Patent D374,010

MFJ-784B

$249.95

NEW!

MFJ's *tunable* super DSP filter automatically eliminates heterodynes, reduces noise and interference *simultaneously* on SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX, weak signal VHF, EME, satellite.

You get MFJ's *tunable* FIR linear phase filters that minimize ringing, prevent data errors and have "brick wall" filter response with up to 57dB attenuation 75 Hz away.

***Only* MFJ gives you 5 *tunable* DSP filters. You can *tune* each lowpass, highpass, notch, and bandpass filter including optimized SSB and CW filters. You can *vary* the bandwidth to pinpoint and eliminate interference.**

***Only* MFJ gives you 5 *factory* pre-set filters and 10 *programmable* pre-set filters that you can customize. Instantly remove QRM with a turn of a switch!**

MFJ's *automatic notch* filter searches for and eliminates *multiple* heterodynes.

You also get MFJ's advanced *adaptive noise reduction*. It silences background noise and QRN so much that SSB signals sound like FM.

The *automatic* notch and *adaptive* noise reduction can be used with *all* relevant tunable pre-set filters.

***Automatic gain control* (AGC) keeps audio level constant during signal fade.**

Tunable bandpass filters

Narrow band signals like CW and RTTY jump out of QRM when you switch in MFJ's exclusive *tunable* FIR bandpass filters.

You can tune the center frequency from 300 to 3400 Hz, and vary the bandwidth from 30 Hz to 2100 Hz -- from super-tight CW filters to wide razor-sharp Data filters.

You can use two tunable filters together. For example, tune one to mark, one to space and set bandwidth tight for a super sharp RTTY filter.

Tunable highpass/lowpass filters

You can tune the lower cutoff frequency 200 to 2200 Hz and the upper cutoff frequency 1400 to 3400 Hz. This lets you create *custom* filters for Voice, Data and other modes.

Signals just 75 Hz away literally disappear -- they are reduced 57 dB!

Automatic notch filter

MFJ's automatic notch filter searches for and eliminates multiple heterodynes in milli-seconds. It's so fast, that even *interfering* CW and RTTY signals can also be eliminated.

You can *selectively* remove unwanted tones using the two *manually tunable* notch filters --an MFJ exclusive. Knock out unwanted CW stations while you're on CW.

Adaptive Noise Reduction

Noise reduction works in all filter modes and on all random noise -- white noise, static, impulse, ignition noise, power line noise, hiss.

The LMS algorithm gives you up to 20 dB of noise reduction. Noise reduction is adjustable to prevent signal distortion.

15 *pre-set* filters -- factory set or you custom program

You can select from 15 *pre-set* filters. Use for SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any mode.

If you don't like our pre-set filters, you can program your own -- *an MFJ exclusive!* Save center frequency/bandwidth, lowpass/highpass cutoffs, auto/manual notch, noise reduction -- all filter settings -- in 10 *programmable* filters.

Plus more . . .

A push-button bypasses your filter -- lets you hear the *entire* unfiltered signal.

2½ watt amplifier, volume control, input level control, speaker jack, PTT sense line, line level output. 9½x2½x6 inches.

Plugs between your transceiver or receiver and external speaker or headphones. Use 12 VDC or 110 VAC with MFJ-1315, $14.95. Cable Pack, MFJ-5184, $7.95, includes receiver cable, DC cable, 2 open-end TNC cables.

New Features

MFJ's exclusive tunable *Spotting Tone*™ -- accurately tunes even the narrowest CW filter.

MFJ's exclusive *Adaptive Tuning*™ -- tuning rate automatically becomes finer as you narrow bandwidth -- makes narrow filters easy-to-use.

MFJ's exclusive *FilterTalk*™ -- sends precise filter settings in Morse code.

Has automatic notch with *variable* aggressiveness, new quieter 2½ watt audio amplifier, new speaker switch keeps phones always active.

Manual and automatic notch can be used together. Noise reduction, automatic notch and tunable manual notch can be used when a custom filter you saved in memory is selected.

You get an accurate easy-to-use input level indicator, improved manual notch in the CW mode, adjustable line level output, more Mark-Space frequencies and baud rates for data filters and auto- matic bypass during transmit for monitoring CW sidetone, voice or data by sensing the PTT line.

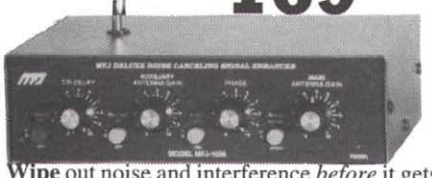
Firmware Upgrade

For MFJ-784, order **MFJ-55, $29.95.** Gives you most features of the MFJ-784B.

NEW! 60 dB Null *wipes out* noise and interference

MFJ-1026

$169.95



Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise-- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker because interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequencies from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network*. You can combine two antennas to give you various directional patterns. You can null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312B, $12.95. 6½x1½x6¼ inches.

MFJ-1025, $149.95. Like MFJ-1026 less built-in active antenna, use external antenna.

Add DSP to *any* Multimode

MFJ-781

$129.95

Add "brick wall" DSP filtering to *any* TNC or multi-mode data controller.

Copy signals buried in noise and QRM.

Under severe QRM, DSP greatly improves copy of Packet, AMTOR, PACTOR, GTOR, Clover, RTTY, SSTV, WeFAX, FAX, CW -- nearly any digital mode. Automatic gain control, ON/OFF/Bypass switch. Plugs between transceiver and multi-mode. Uses 10-16 VDC or 110 VAC with MFJ-1312B, $12.95. 4½x2½x5in.

DSP for your MFJ-1278/B

MFJ-780

$99.95

Plug a MFJ-780 "brick wall" DSP filter into your MFJ-1278/B multi-mode and you won't believe your eyes when you see solid copy from signals completely buried in QRM! MFJ-1278/B *automatically* selects the correct DSP filter for Packet, AMTOR, Pactor, RTTY, ASCII, FAX, Color SSTV, Navtex or CW.

Plug in a MFJ-780 and copy signals that other multi-modes can't. Some soldering needed.

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a few new hams in our ranks. I was looking in *QST*, and all the section clubs were active during Field Day last June. It seems like the 3 transmitter category is the most popular. You all did very well. Now is the time to get organized for next June. It is not too early. Tfc: W1ZPB 111, KD1SM 3, N1ISB 11, W1SJV 22, W1UD 183.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB—SEC: NL7DL. DEC: KL7JBV. DEC: WL7GK. TC: AL7CE. TS: KL7CC. ASM: WL7BJ, KL5T, KL7RS. Snipet Net 3.920 daily 1900 AST; Bush Net 7.087 daily 2000 AST; Motley Group 3.933 daily 2100 AST; Alaska-Pacific Net 14.292 M-F 0830 AST. February is get involved month. MARA club runs Junior Iditarod; Arctic ARC Yukon Quest; and Anchorage ARC has Fur Rondy dog and car races. In March, Ken Delp, KL7FO, manages Iditarod communications. Iditarod trail phone 907-376-5153. PSHR: KL5T 165, AL7N 75.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—SEC: WA5ZAY. STM: W7GB. OOC: KB7HDX. SGL: WB7UEU. TC: N7TOF. We would like to remember Division Director Mary Lou Brown, NM7N, who died of a heart attack on December 3, 1998, on her way home from a DXpedition in Australia. She did her director job very well by keeping us informed regularly of current issues, by her club visitations, and her smiling face was always seen at most hamfests in the division. She was a good friend and she will be missed by many hams. I wish Greg Milnes, W7AGQ, the best in assuming the division directorship. In its November newsletter the National Weather Service thanked the hams in E WA for their professional and courteous assistance in the severe weather warning process during the summer of 1998. STM Don, W7GB, is happier now with improved solar conditions making life a bit easier on the nets with traffic handling. Net activity (for Nov): WSN: QNI 827, Tec 355; Noontime Net: QNI 8222, Tec 369; WARTS: QNI 3410, Tec 207. FTC: K7GXZ 262, W7GB 251, K7BFL 98, KA7EKL 90, and KK7T 38. PSHR: W7GB 138, K7GXZ 126.

IDAHO: SM, M.P. Elliott, KF7ZQ — OOC: N7HGV. SEC: AA7VR. STM: W7GHT. It's 1999 and time to plan those spring projects. Don't forget about Field Day! Idaho's 1998 club winners were NA7ID (SW Idaho Contest Club) and N7PI (Pocatello Club). Field Day Awards will be given in 1999, so plan early! DECs and ECs are reminded to send reports to the SEC of emergency activities. W7GHT achieved BPL level twice during the winter of 1998—congratulations, Bill! Club front: The Pocatello club carried on the tradition of providing communications for the local Christmas Lights Parade. The Voice of Idaho Club continues to get ham classes into several area middle and high schools. The Idaho Section would like to express its condolence to the family of Mary Lou Brown, NM7N. Mary Lou's hard work on our behalf will be greatly missed. 73, Mike, KF7ZQ. Tfc: W7GHT 637, KB7GZU 111, WB7VYH 71, and N7MPS 46. PSHR: W7GHT 126, WB7VYH 92, and N7MPS 81. Net (Sess/QNI/QTC/ Mgr.): FARM - 30/2196/36/ N7OGR; NWTN - 30/1312/82/ KC7RNT; IDACD 21/563/22/ K7UBC; IMN 30/377/526/ N7MPS.

MONTANA: SM, Darrell Thomas, N7KOR—The South East Montana Amateur Radio Club of Miles City, Montana, is the proud sponsor of the Washington Middle School Amateur Radio Club. They have been involved with working with the youth at the school, holding classes and helping them with fund raising projects in order to get some equipment on the air. The WMSARC is now off and running in grand style. The have received their club call sign, KD7DFL. A recent class at the school resulted in additional hams joining the ranks. Congratulations to both organizations. Keep up the good work. I would like to echo my earlier plea for any club or individual amateur in the Montana Section with items of interest for this column to please let me know. Any info should be addressed to N7KOR. Address, phone number and e-mail address are listed in the Section Manager listing in *QST*. Net QNI/QTC/NM MSN 138/0 W7OW; MTN 1886/95 N7AIK; IMN 377/526 WB7VYH. PSHR: N7AIK 143.

OREGON: SM, Bill Sawders, K7ZM—ASM: KF7KE— ASM: KG7OK. ASM: N7QQU. STM: WA7EES. SEC: WB7NML. PIO: KC7YN. SGL: KA7KSK. STC: AB7HB. OOC: NB7J. Most of us are still getting over the loss of our distinguished Northwest Director, Mary Lou Brown, NM7N. She will truly be missed by us all. Vice Director Greg Milnes, W7AGQ, assumes the director's position. Best of luck, Greg!! Also assuming a new position is newly appointed Section Technical Coordinator, Bernard Fineberg, AB7HB. He is a former STC from the EWA Section, and will be a great asset to our section. Welcome aboard, Bernard! The state's largest hamfair takes place Saturday, February 20 at Rickreall, west of Salem. I hope everybody can make it. History will be made August 6-14 when the first-ever IARU Region 2 Amateur Radio Direction Finding Championships come to Portland. The effort will need our help to be a success. Contact WX6S for details on how you can help. New officers at the McMinnville Amateur Radio Club: president, Bob, KC7YN; vp, Jack, N7UQS; and secretary, Ken, KC6PFQ. At the Umpqua Valley ARC, it's president, Jim, AB7NC; 1st vp Norm, W0QOT; 2nd vp, Steve, KB7WDP; treasurer Ed, KC7UFZ; and secretary, Russ, W7DUR. At the Central Oregon DX Club, new officers include Ron, K9QAM as president. Dick, K4XU, vice president; and A.J., WA7AJ, the new secretary-treasurer. Good luck to all the newly elected officers!! Are you an ARRL volunteer appointee? If so, please check into the new ARRL Oregon Section Management Net, held every Saturday morning at 8 AM local time, on 3980 kHz. If you can't check in, at least tune in and listen for special announcements and QSTs from various Oregon section personnel. This is a directed net, and visitors are welcome to check in at the end of the regular roll call. What a great way to keep in touch! Bill, K7ZM. NTS traffic totals for November: WA7EES 249, K7NLM 229, W7VSE 153, K6AGD 81, N7DRP 79, W7ODG 69, KC7NYR 33, KC7ZZB 22.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—Number one traffic handler in the Northwest is George Thomas, K7BDU, of Chehalis. George now has an additional role as Net Manager of the Seventh Region Net, Cycle 2, of the ARRL National Traffic System. The Seventh Region encompasses Alaska, Idaho, Montana, Oregon, Eastern Washington, Western Washington, Albert, and British Columbia. The role for George is to guide the exchange of traffic among the sections in the region, to put out-of-region traffic in the hands of stations designated to handle it, and to distribute traffic coming to the region. W7TVA gave traffic talks to several clubs during 1998 and K7BFL pro-

MFJ-1270C *VHF/HF* Packet TNC

The world's most reliable TNC! Many work 24 hours-a-day for years without a single failure

MFJ-1270C Packet TNC has a world-wide reputation as *the most reliable TNC in the world!*

Thousands are dedicated as digipeaters, nodes, BBS and used in all kinds of commercial applications working 24 hours a day -- many work for years without a single failure.

Fully TAPR TNC-2 Compatible

All software and hardware designed for the TAPR TNC-2 standard works with the MFJ-1270C without modification, including NETROM, theNET, X1J, Rose Switch and many others.

VHF and HF Operation

Get high performance VHF *and* HF modems as standard equipment -- doubles your fun. True DCD circuit drastically reduces sensitivity to noise and dramatically increases completed QSOs.

MFJ-1270C **$119.95**

KISS Interface and MFJ Host Mode

MFJ's KISS interface lets you run TCP/IP. MYSYS and MFJ's Host Mode™ makes it easy to write efficient application programs.

MFJ Anti-Collision™ Technology

MFJ *Anti-Collision*™ technology prevents packet collisions and improves performance on busy channels.

Enhanced Personal Mailbox

Enhanced *EasyMail*™ uses your call-sign for your mailbox. Your mailbox stays on while you operate. Auto forward or reverse forward mail.

Plus much, much more!

32K RAM, IC sockets for easy service. 256K ROM, speaker jack, lithium battery backup, RS-232 and TTL serial ports, radio cable (you add a connector for your radio), *Fast-Start*™ manual, much more!

2400 & 9600 Baud MFJ-1270Cs

MFJ-1270CT, $149.95. All the features of MFJ-1270C plus built-in 2400 baud modem.

MFJ-1270CQ, $239.95. All the features of MFJ-1270C plus built-in 9600 Baud G3RUH modem.

MFJ-52, $29.95. TNC2 Deviation Meter Board. TheNet X-1J Node and users can check transceiver packet FM deviation, temperature and voltage.

MFJ *PacketOnly*™ transceivers

MFJ-8621 **$119.95**

Runs all data rates from 1200 to 9600 Baud

Why tie up your expensive 2 Meter rig on a single packet channel? For an incredibly low $119.95, you can enjoy dedicated high performance packet from 1200 to 9600 baud on 2 Meters, 24 hours a day!

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TNC ACCESSORIES

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Switch between your TNC or Mic by pushing a button!

Switch between your microphone and TNC by pushing a button!

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You won't have to unplug your microphone and plug in your TNC *everytime* you want to work packet or other digital modes.

Just plug these pre-wired cables into your rig's microphone connector and into your TNC and you're ready to go -- no more hard-to-find connectors and wiring up cables.

Works with HF, VHF and UHF radios with 8 pin mic connectors -- including Kenwood, ICOM, Yaesu, Alinco, Radio Shack, Standard and others. *For radios with 8-pin RJ-45 modular telephone jack, select the new "M" models.*

Plug-in jumpers let you quickly set-up for virtually any radio. Factory set for Kenwood and Alinco. Includes easy-to-follow instructions. Has audio-in and speaker jacks. 3¼x1¼x4 inches.

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MFJ-1272BYH/1272MYH, $39.95, for KAM HF Port.

Pre-wired Radio-to-TNC cables . . . $14.95

Radios \ TNC Type	All MFJ TNCs and Multimodes	KAM VHF[6]/ KAM HF[7]/ KPC3[3]/ KPC9612[8]	PK-232	PK900/PK96/ PK12/DSP232 /PacComm/ other TNC-2 compatibles
Alinco[9]/Stdrd HT	MFJ-5022	MFJ-5022YV	MFJ-5022X	MFJ-5022
Icom[1]/Yaesu/ Radio ShackHTs	MFJ-5024	MFJ-5024YV	MFJ-5024X	MFJ-5024B
Kenwood[2] HTs	MFJ-5026	MFJ-5026YV	MFJ-5026X	MFJ-5026
Yaesu 8-pin	MFJ-5080	MFJ-5080YV MFJ-5080YH	MFJ-5080X	MFJ-5080Z
Icom[3] 8-pin	MFJ-5084	MFJ-5084YV MFJ-5084YH	MFJ-5084X	MFJ-5084Z
Kenwood/Alinco 8-pin	MFJ-5086	MFJ-5086YV MFJ-5086YH	MFJ-5086X	MFJ-5086Z
Yaesu 8-pin modular	MFJ-5080M	MFJ-5080MYV	MFJ-5080MX	MFJ-5080MZ
Icom[4] 8-pin modular	MFJ-5084M	MFJ-5084MYV	MFJ-5084MX	MFJ-5084MZ
Kenwood 8-pin modular	MFJ-5086	MFJ-5086MYV	MFJ-5086MX	MFJ-5086MZ
Radio Shack 8-pin modular	MFJ-5088M	MFJ-5088MYV	MFJ-5088MX	MFJ-5088M

1. does not include IC-W2A
2. does not include 2500
3. does not include 25A, 255A
4. does not include IC-100H, IC-2700H
5. YV for KAM VHF port, YH for KAM HF port. Other Kantronics use YV models
6. YV for KP9612 1200 baud port
7. YH models for KPC9612 9600 baud port
8. Excludes DJ-100, 120T, 200, 500

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moted a successful Holiday Traffic Contest. In Cowlitz Co, EC Randy, NU7D, reports via SEC N7NVP that Sam, KC7EPD, responded with the Comm-Van to assist a SAR mission for an overdue 81-year-old hunter who was located just before their arrival. The failure of a public safety repeater in the north end of the county caused NU7D Randy's team to be activated for back-up communications. Participating N7CEN, N7CFA and KC7EPD. In San Juan Co, EC Dick Morrison, K7KFM, has been relieved by Chuck Lindenberg, W7BXH. Thank you, Dick, for all your hard work. King Co. ARES is undergoing restructuring by first defining the role of ARES, the customers and agencies served and then establishing plans and procedures to meet communication goals. Clark County ARES Info Net logged a QNI of 137 and QTC 4 for November while the Puget Sound Tfc System logged a QNI of 29 with 29 sessions. Reporting 500 points or more for BPL K7BDU with a total of 1058. Other tfc: N7AJ 45, N7PIP 53, K7CLL 9, KD7ME 85, W7TVA 320, N7YSS 77, K7SUQ 18, W7ZIW 272, K7MQF 150, N7NWP 113, W7LG 112, KA7TTY 12 and K7YOH 31.

PACIFIC DIVISION

EAST BAY: SM, Bob Vallio, W6RGG—ASMs: W6ZF, KF6RCO. SEC: N4OGL. DECs: WA6TGF/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6USW/Solano County, N6UOW/Training, KE6HCI/Administration, KE6NVU/Finance, W6CPO/Technical Services. STM: K6APW. OOC: W6NKF. TS: KF6NY. The Alameda County Emgy Svcs (ACES) Net is held Tuesdays at 8 PM on 147.240, 444.200 (107.2), 147.120, 224.740, 441.125 (100.0) & 145.43 (100.0). Check out the EB WWW Page at **http://www.pdarrl.org/ebsec/**. Webmaster is KB6MP. Oakland ARES (ORCA) installed a digipeater to improve their comms for the Oakland Regatta. CCCC welcomes new member AI6M. LARK members who provided comms fo the Hekaton Bicycle Ride were WB6ETY, AB6TJ, KD6DRU, WN6WTV, N6FQQ, KE6PXW and KQ6DI. VVRC members providing comms for the Monticello Bike Race were KE6IFC, WB6FIS, KF6KFP, KD6JSB, KF6HCE, WH6AB, K6HEW and KF6HCG. NALCO ARES/RACES members who participated in the County-wide SET were AB6WF, KF6OBQ, WA6CCF, N6LFW, WA2UNP, KD6WZY, KE6UHX, K6APW, KG6YT and W6WTI. MDARC member KT6X was named as the Concord Police Department's Volunteer of the Year. Congrats, Dick. EBARC was presented with a plaque commemorating their 50 years of being an ARRL Affiliated Club. The club welcomes new member W8JSN. SARS mourns the loss of N6ELV. November tfc: W6DOB 902, WB6UZX 26. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7 PM; NCN2-Slow Session/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Bob Davis, K7IY—ASM: Jan Welsh, NK7N. SEC: N7JEH. TC: NW7O. ACC: N7FFP. STM/SGL: N7CPP. PIC: WW7E. OOC: N7ELV. Greetings to the Nevada Section. At this mid-winter point, many Club activities slow to a crawl with more emphasis on planning rather than doing. Most all of the entry level classes and test sessions are complete and there are many newly licensed hams in our ranks, but many have not been added as local club members or ARRL members. I believe we should not miss out on this opportune time to ask these new hams to join our clubs and organizations. Most reports indicate that the major repeater systems are up and running so far and the maintenance last year has paid off. All of the reports have been filed from the SETs of last fall, all with varying degrees of success. One of the most positive being the Elko operation, with strong support and flawless performance. Also, be advised that the 444.950 repeater now requires a PL of 100.0. Many "Elmers" are still required to work "one on one" with new hams to help them upgrade. Please help if you can. Saturday mornings at 8:30 is the time, 3965 is the place. The Nevada Section HF ARES Net welcomes all to check in. Don't forget the RARA Net at 7:30 AM also on 3965. Make plans to get active with your local club this spring. Thanks and 73, Bob, K7IY. Tfc: N7CPP 6, W7TC 2.

PACIFIC: SM, Ron Phillips, AH6HN—It is with deep regret that I note the passing of Mr. Douglas A. Embrey, KH6JFV, on November 6, 1998, and of Thomas S. Hori, KH6OS, on November 18 1998 as reported by Lee Wical, KH6BZF. We all will miss them. Maui ARC held its General club meeting and the last for the year on Wednesday, Nov 11, 1998 at the Civil Defense Conference Room, Maui County Building. The 1999 officers are: president - Jonathan Starr, KH6X; vice pres-Dennis Niles, KH6XT; secretary Robert Murdoch, KH7FX; treasurer-John Hultquist, Jr, K6GSS; Directors-Satoshi Manabe, WH6CTO; Jayson Kohama, WH6BXK; and Randal Leval, AH6GR. Good news: The FCC issued KH6LG as a club call to the Hawaii Chapter QCWA with KH7M as call trustee!! Good luck, Jim. Warren Munroe, KH6WM, reports the KH6WO HF beacon furnished by NCDXF (Northern Cal DX Foundation) has been moved to Aiea Heights. Managers will be Warren, KH6WM, and John, K1ER. Dennis Carvalho, KH7H. SEC has appointed Fred Fortin, KH7CR, as a new EC. Congratulations Fred, I know you will do a great job. Corky Kirk, W6ORS, reports an 8100 mile trip on the mainland with a stop at HQ to meet some of ARRL folks. Hope you let them know about our late delivery of *QST*. So far only 7 comments on the FCC NPRM Docket # 98-143 have been posted from the section. Aloha, Mahalo, and 73.

SACRAMENTO VALLEY: SM, Jettie Hill, W6RFF— I hope that this New Year will be dryer than the last couple of years. The ARES/RACES groups should be practicing their procedures and training. In my visits to clubs, I find they are all having trouble filling their officer positions. Do your part and help out! Several clubs working on ideas to raise funds for the clubs. As the cost of postage and printing goes up, the dues will not cover all the club's expenses. Sacramento ARC had an interesting program. Several members spoke on different phases of ham radio and they invited non-hams to attend. Yuban Stutter ARC is again looking for a permanent meeting place and they are planning a swap meet for the 2nd Saturday in March. North Hills RC will hold their annual Ham Swap on May 23 at Bell Vista High School. I enjoyed a visit with the Tahoe ARA club and WA6EWV has been their president for many years. New hams from Nevada County ARC exams are KF6TQU, KF6TQT and KF6QTS, and KF6TAR is a new member. Rudi, HB9DU, continues to publish easy electronic projects in the Nacre's newsletter. 1999 is the 60th anniversary of the Golden Empire ARS. They may put on hamlets to celebrate the occasion. I enjoyed a visit to the GEARS meeting in Nov. The Shasta ARES group was called out when an earthquake struck Redding area, but

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Lets you use coax from your antenna tuner to the MFJ-912 mounted outside your ham shack. The MFJ-912 converts the unbalanced coax to a balanced transmission line (ladder line). Provides same function as an internal balun except it is located away from tuner. Giant 2 core balun wound with *Teflon*® wire connected to high voltage ceramic feedthru insulators. Handles full legal power with ease. 3¼x2¼x7 inches.

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Creates artifical RF ground that eliminates or reduces RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding.

Greatly improves your signal if you're using a random wire or longwire antenna with an ineffective ground.

Electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire.

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Throw this *tiny* MFJ 20 Meter CW Transceiver in a corner of your briefcase and enjoy DXing and ragchewing wherever you go. You get a high performance superhet receiver, crystal filter, RIT, AGC, vernier tuning, sidetone, speaker, up to 5 watts output, semi/full break-in, much more. *Free* manual. See *free* MFJ catalog for 40, 30, 17, 15 Meter versions, keyer, audio filter, power pack, tuner, antennas.

Super *Active* Antenna

"World Radio TV Handbook" says MFJ-1024 is a "first rate easy-to- operate active antenna...quiet...excellent dynamic range...good gain... low noise...broad frequency coverage... excellent choice."

Mount it outdoors away from electrical noise for maximum signal, minimum noise. Covers 50 KHz - 30 MHz.

Receives strong, clear signals from all over the world. 20 dB attenuator, gain control, ON LED. Switch two receivers and aux. or active antenna. 6x3x5 in. Remote has 54 inch whip, 50 ft. coax. 3x2x4 in. 12 VDC or 110 VAC with MFJ-1312, $12.95.

$129.95 MFJ-1024

Cross-Needle SWR Meter

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Peak/ average Cross-Needle SWR/ Wattmeter. Shows SWR, forward/ reflected power in 2000/500 & 200/50 watt ranges. 1.8-60 MHz.

Mechanical zero. SO-239 connectors. Lamp uses 12 VDC or 110 VAC with MFJ-1312, $12.95.

MFJ Coax Antenna Switches

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$21.95 MFJ-1702B

$59.95 MFJ-1704

Select any of several antennas from your operating desk with these MFJ coax switches. They feature mounting holes and automatic grounding of unused terminals. One year *"No Matter What™"* unconditional warranty.

MFJ-1701, $39.95. 6 position antenna switch. SO-239 connectors. 50-75 Ohm loads. 2 KW PEP, 1 KW CW. 10x3x1½ inches. DC-60 MHz.

MFJ-1702B, $21.95. 2 positions plus new Center Ground. 2.5 KW PEP, 1 KW CW. Insertion loss below .2 dB. 50 dB isolation at 450 MHz. 50 Ohm. 3x2x2 inches. **MFJ-1702BN, $31.95**, N-Connectors, DC-1.1 GHz.

MFJ-1704, $59.95. 4 position cavity switch with lighning surge protection. Center ground. 2.5 KW PEP, 1 KW CW. 50 dB isolation at 500 MHz. 50 Ohm. 6¼x4¼x1¼ inches. **MFJ-1704N, $69.95**, N-connectors. All have MFJ's famous *"No Matter What™"* 1 year unconditional warranty.

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Suppress TVI, RFI, telephone and other interference by reducing unwanted harmonics going to your antenna. 9 poles, MFJ's exclusive *Teflon® Dielectric Technology™* capacitors, hi-Q inductors, ground plane shielding, RF tight cabinet gives excellent TVI/ RFI protection. *Full legal power* 1.8-30 MHz. Mounting tabs. **MFJ-702, $24.95.** 200 Watts Low Pass TVI filter. 1.5-30 MHz.

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Use your computer and transceiver to receive, display and transmit *brilliant full color* news photos and incredible WeFAX weather maps with all 16 gray levels. Also receive/transmit RTTY, ASCII and CW.

Animate weather maps. Display 10 global pictures simultaneously. Zoom any part of picture or map. Manager lists over 900 FAX stations. Automatic picture capture and save.

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Iambic keying, speed (8-50 wpm), weight, tone, volume controls. Automatic keyer or semi-automatic ("bug")/tune mode. RF proof. 4⅛x2⅝x5½ in.

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MFJ's exclusive *ShieldBreaker™* high pass filter effectively suppresses annoying TVI! Wipe out TVI caused by broadcast, commercial, two-way, amateur and CB radios operating below 30 MHz. Use between cable/ antenna and TV/VCR. For 75 ohm cable or 300 ohm twin lead.

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MFJ-108B dual clock has separate UTC and local time displays. Huge 5/8 inch LCD digits are easy-to -see. Brushed aluminum frame.

MFJ-112 shows hour/minute/ second, day, month, date, year at any QTH on *world map*. 12 or 24 hour display. Daylight saving time feature.

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Covers 2 Meters and 220 MHz. 30 and 300 Watt scales. Relative field strength 1-250 MHz, SWR above 14 MHz. 4½x2¼x3 in.

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Earphone jack, tone and volume controls, speaker. Adjustable key. Sturdy. 8½x2¼x3¾ in.

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2 pairs of 30 amp 5-way binding posts separately fused for rigs. 6 switched, fused pairs for accessories. DC voltmeter, "on" LED, RF bypassed, 6 ft. of 8 guage power cable. 12½x2¾x2½ inches.

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was soon released. Sierra Foothills members helped out with the annual Roseville Holiday Parade. The comment period is over to reply to the FCC license structure proposal. All we can do now, I guess, is to wait for the slow wheels of the government to turn. Maybe by mid year we will know what is going to happen. Enjoy the New Year. Check out the Sacramento Valley Section Web site.73.

SAN FRANCISCO: SM, John Wallack, W6TLK—ASMs: N6KM, KE6EAQ. OOC: KD6VWD. PIC: N6BWS. SEC: WB6TMS. TC: N1AL. WA6TVQ, DEC, reports that 45 Humboldt County ARES members participated in a successful simulated emergency test. He thanks KC6IGY and the 4 area ECs, KM6TE, KE6JQW, KE6UME and KE6FEF, for their hard work in developing a realistic drill. The MedNet operated from 5 hospitals on both voice and packet. Many thanks to all Humboldt County ARES members for your time and dedication to emergency service in your community. KN6ZU reports that 12 hams were utilized to provide mobile communications for the Redwood Marathon in an area not reliably covered by any other service. Once again, Amateur Radio saved the day. N7LMX reports that 20 Willits ARS members enjoyed the 300th Coffee Klatch and are already looking forward to the 400th! A big congratulations to K6WC for his First Place, single operator, high power CW award for the SF Section in the 1998 ARRL International DX Contest. Not bad for operating from a mobile home park. Traffic: W6JCG, ORS, 55.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN—ASM: Mike Siegel, KI6PR. ASM, John Lee, K6YK. ASM, Pat Fennacy, W6YEP. SEC: Kent LeBarts, K6IN. OOC: Victor Magana, AA6AH. I am writing this issue of the Section News in December so, I hope all of you get exactly the ham equipment you always wanted but, more importantly I hope the Holiday Season gave you all pause to appreciate the opportunity of being with family and friends. News has it that the Lake Isabella Amateur Radio Club won a first place trophy for their float entry in the Lake Isabella Christmas Parade, congratulations. I want to express my personal appreciation to Rex Emerson, KE6ZOC, who webmasters the Pacific Division SJV Web page. Rex, thanks for your help. On October 28, 1998, Fred Johnson, KD6ELK, and Bob Ramos, N6SDD, with members of the Kings Amateur Radio Club coordinated and participated in the Emergency Medical Services Tabletop Exercise with the office of the National Weather Service in Handford. The Turlock Amateur Radio Club participated in the City of Turlock's Christmas Parade, another fine community service activity. TARC also has a new Web page you might want to surf on the Internet. The address of the new Web page is: **http://www.w6bxn.org**. The Web page is by Carl Wheeler, KE6FOA, who, incidentally, produced by Web page at **http://www.elite.net/~w7wn**. Thanks, Carl, for your talent and efforts. Vanity call applications are taking from 3 to 4 weeks to process but, the process is so easy via FCC online application. Details are available on the ARRL Web page under vanity call signs.

ROANOKE DIVISION

NORTH CAROLINA: SM, W. Reed Whitten, AB4W— Section Web site **http: //www.ncarrl.org**. An "Amateur Radio in North Carolina" meeting was held at the Greensboro Hamfest by your section officials. The audience involvement format at our hamfest forums continues to draw a good crowd. The goal is to invite ALL amateurs to be involved in the section's activities. Whether young or old, newly licensed or not, DXer, contester, experimenter, ragchewer, etc; we need YOU! Your communications and other skills may be essential during an emergency. (And Emergency Communications is a primary goal of your ARRL Field Organization.) But, your effectiveness is limited if you volunteer during the emergency. Your EC must already know about you before the emergency and you need to be familiar with emergency communications procedures. Similarly, relief agencies must already know the capabilities of the Amateur Radio Service. At the meeting, Pat, KE4WZY, Area 6 DEC stressed the need for personal contact, ie, ECs should personally ask individuals to be involved in ARES and hams should ask to be included in activities (ARES, club, net, etc). Don't wait for the other guy—ASK. No active EC in your county? Help up find one. Offer to share the responsibility. The Charlotte Hamfest (Mar 13-14) is the Roanoke Division Convention. John Covington, W4CC, your Affiliated Club Coordinator, and past president of the Mecklenburg ARS is lining up forums. A special Public Service Conference for the Carolinas & Virginias will be held on Saturday. Speakers from emergency relief agencies will discuss their experiences using Amateur Radio. The audience will include both agency personnel (Em. Mgt., NWS, Red Cross, Salvation Army, etc) and amateurs. Discussion will be encouraged. We hope to learn more about their needs and how we can contribute more to the relief operations while they learn more about our capabilities and how to better use Amateur Radio. Plan to attend this interesting conference and invite representatives from your local agencies to join us. (See Jan *QST*, p. 70 for a report on similar meetings.) Thanks to all who participated in SET and to all who helped with the NTS holiday traffic. Winston-Salem FIRSTfest Jan 23, Elkin Hamfest Feb 21, Charlotte Hamfest Mar 13-14. NOV TRAFFIC: W4EAT 429, AB4E 315, K4IWW 274, KI4YV 141, KE4JHJ 122, K4AIF 94, AC4DV 81, W4IRE 74, W3HL 59, W2CS 47, KE4AHC 36, AB4W 35, WA4SRD 30, KF4OZF 25, W4CC 20, KF4PUX 18, WA2EDN 18, KB4FWL 12, KT4CD 11, WD4MRD 11, NT4K 10, KF4VDW 9, N2JLE 6, N4YXU 5, W4DYW 5, KF4PAK 4, KB4USN 2, KE4YMA 2.

SOUTH CAROLINA: SM, Les Shattuck, K4NK—I am writing this column in Newington, CT, at League Headquarters. I am here for a training seminar to better allow me to serve South Carolina amateurs. One of the perks is a tour of the HQ building and a chance to operate W1AW. It was great to meet the friendly staff and see the faces we had been talking to on the phone for so long. I hope to come home with a lot of new info. Back on the home front, I enjoyed both the foothills ARC and the Keeoway-Toxaway ARC Christmas meeting. Also a great time at the Blueridge ARS meeting and party. I wish I could have attended all the festivities and get to wish you all greetings. By the time this column comes out, the Union and Greenwood clubs will have had their Hamfest, of course we will be there at our ARRL table to meet you. By popular demand, my XYL Joyce, N2PTW, will be selling ARRL pins, patches and decals. We will have them at the hamfest table, but you may contact her by phone or e-mail and she will supply your needs. I would like to put out a call to all clubs to consider one of your members to be a PIO

Expanding to better serve you!

Here is our new Union, Missouri facility, southwest of St. Louis.

This plant will relieve the backlog of amateur products.

What a great, but hectic year! During 1998, it was impossible to keep up with the amateur demand due to prior, unexpected commercial orders, existing contracts, and world conditions.

To our amateur customers, we apologize for the delays and lack of amateur products! However, since we use the same quality material on our amateur products as we use on our commercial line, we were obligated to complete our prior, and priority orders.

Special thanks **to those customers who patiently waited during our backorder delays!**

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When we expanded in 1992, we thought that this expansion would solve our space and production problems, however, from 1992 to 1996 our total business tripled.

In March of 1998, we purchased two, 5 acre sites in Union, Missouri. One of these sites houses our new building, which we are staffing with new employees and equipment to better serve you.

We are in the process of building another antenna range just east of the new plant, which will be used for new product development and special testing.

We will have several towers, including a 50 foot high 16' x 16' platform tower.

This 40,000 square foot production and storage facility will also house the "new design department" for the amateur lines.

We are excited about this new facility and working in the Union community!

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	SSB	**1,000 w**
	RTTY	**250 w**
	AM/FM	**250 w**
Turning Radius:		**8' 9"**
Longest Element::		**16.8'**
Sq.Ft.:		**2.5sq.ft.**
Wind load:(@ *80 M.P.H.*)		**38 lbs.**
Assembled Wt.:		**10 lbs.**
Mast Size:		**1-1/2"**
Coax: (Mosley)		**RG-8/RG-213**
Boom:		**1.25" x .058" x 6'**
Tubing: (Drawn)		**6061T6/6063T832**
Warranty: 2 Years		
Shipping: UPS/Oversize		
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	15M	Call
	17M	
	20M	
	40M	
Front to Back: (Avg.)		Call
Power:	CW	2.5 k w
	SSB	5.0 k w
	RTTY/**AMTOR**	**800 w**
	AM/FM	**800 w**
Turning Radius:		**32.5 ft.**
Longest Element::		**43.75 ft.**
Sq.Ft.:		**32 sq.ft.**
Wind load:(@ *80 M.P.H.*)		**609 lbs.**
Assembled Wt.:		**215 lbs.**
Mast Size:		**2 or 3" Heavy**
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(public information officer). I will be happy to ship info on any appointments. Tfc: WW4SC 182, KA4LRM 86, W4DRF 82, KT4SJ 80, KT4FP 39, WA4UGD 34, WD4BUH 23, W4CQB 14, K4GDL 8, WT4F 4. PSHR winners: WW4SC, KT4SJ, KA4LRM. Thanks to all.

VIRGINIA: SM, Lynn Gahagan, AF4CD—ASM: W4TLM. SEC: K4EC. SGL: KK4IY. TC: W3ERD. OOC: KR4UQ. PIC: W2MG. Hello everyone. By the time you get to read this, the holidays will be over and just maybe winter will finally be upon us. Many areas of our state have been very dry and as I write this it is raining here in the Chesapeake area. I would like to remind everyone of our section level nets that meets three times a month. The Old Dominion Emergency Net. This net meets on the first and third Mondays of each month at 6:30 PM local time 3.947 MHz and also on the last Wednesday of the month at 8:45 PM. I would like to see more of the DECs and ASECs to be more supportive of this net. My hat is off to all of the regulars that are faithful participants. One commented at one of the sessions that he was getting to know just about all of the people that checked in by name and call. On the net others have brought news of the different activities that take place in their areas. I am pleased to have all of the people check in to this net, but I must say that the reason the net continues being called is because of our ASM, W4TLM. For this net to continue we must have others to step up and help call the net. Will some of you please give a hand in helping us out? I am pleased to announce that I have appointed WA4DOX as Net Manager for the VNE and the VNL. These two nets are our main CW NTS nets. Obie states that the regulars must realize that we need to be more conscientious in "manning" the nets or we will face hardships. I am sure that Obie will get things turned around. John, WD4MIS, has been taking most of the NCS slack for the month of November and Casey, K4MTX, has been an almost daily liaison with the VSBN and 4RN. Obie is also the NM for the VTTN, a CW training net at VA Tech. Just a little reminder for the ones that send me their SAR, ORS and monthly traffic net reports, try to get them to me as soon as you can. Since the section does not have a STM, I must take care of this also. This makes quite a load on me at the first of the month and not much time to get it all ready to send to the League. Please try to get reports to me by the 5th of the month. If you have news you would like to share with everyone please give me a call or e-mail me. This news column is for all of us. My information is on page 12 in *QST*. 73 de AF4CD. Tfc: K4DOR 848, KR4MU 236, K4MTX 232, W3BBQ 187, WA4DOX 126, WB4ZNB 124, N4ABM 118, KE4PAP 109, K4YVX 106, W4CAC 93, KE4AZL 91, K0IBS 79, AA4AT 75, AF4CD 56, W4YE 52, KF4FXT 50, WA4JFW 14, KC8GUK 14, K4ISM 12, WB2KQG 12, W4JLS 11, W4HU 8, W4TZC 7, KE4NYY 7, KB4CAU 7, W4HDW 5, WA8AHV 4, K4JM 1.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Tim Armagost, WB0TUB— ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. Thanks to Bob, AE0B, for his service as Section TC. Bob has stepped down and we hope to see the position filled soon. Congrats to Marshall, AG0X, on his election as Rocky Mountain Division Vice Director. Section PIC Erik, W0ERX, has the 1998 ARRL educational videotapes on a vast array of Amateur Radio related subjects which can be borrowed by clubs in the section. Call him at 303-751-4605 if your club is interested in a presentation. Since hanging a replica of my call-sign license plate in my office, I've been approached by several hams who knew nothing about the local Amateur Radio scene but wanted to get involved: one old-timer who just moved to town, and a couple of brand new hams. How easy is it for new hams to find your club, your repeater or your net? What great ideas do you have for advertising your group? Let me know and I'll pass them along. Tim, WB0TUB, held a cabinet meeting in late November. One topic discussed was how to ensure our ham shacks, and especially Official Emergency Stations will not be affected by any Year 2000 problems. A committee headed by SEC Mike, N5LPZ, will investigate and rollout a certification program. 73, de N0WPA. NTS traffic totals: W5JCV 311, K0TER 154, W0QOB 140, N00UOD 36. CAWN: W0WPD 875, N0JUS 472, W0GGP 467, N0DKK 433, K0YFK 428, AA0ZR 415, W0LVI 388, K0HBZ 323, N0FCR 308, WB0VET 225, KI0ND 166.

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 meets daily on 3939 @ 0100 UTC and handled 189 msgs with 1149 checkins. New Mexico Breakfast Club meets daily on 3939 @ 6:30 AM and handled 210 msgs with 1049 checkins. Yucca 2-mtr Net 78/18 handled 15 msgs with 736 checkins. Caravan Club 2-mtr Net, 66/06 handled with 62 checkins. SCAT Net, 66/06 handled 15 msgs with 584 checkins. Four Corners Net handled 26 msgs with 402 checkins. GARS Net handled 5 msgs with 36 checkins. QCWA Net with 17 checkins. Rusty's Net with 122 msgs and 769 checkins. We all enjoyed a great hamfest in Socorro on November 7. Nice crowd and good tailgate. The weather was good and all reported a good time. Tnx to all who made the Hamfest so pleasant! Also enjoyed a great visit to the Eastern NM ARC on November 10. On November 28, had a very nice visit to the Santa Fe ARC for their "early" morning breakfast. Enjoyed renewing old friendships and meeting all the new club members. Was good to visit with NV5T, and W5ZSL after the meeting. The visit to the Pecos National Monument was a real pleasure. So very sorry to report the passing of Dr. William K. Douglas, N5OBT, (Old Burnt Toast). He was the first Astronauts Flight Surgeon and had been invited down to be with John Glenn for his historic 2nd flight. "Dr. Bill" became ill on his way back to ABQ. We will all miss him deeply! We also lost another old-timer with the passing of KC5MQN at the age of 93! 73, W5PDY.

UTAH: SM, Jim Rudnicki, NZ7T—Greetings. Antenna Ordinances! Reporting on Kaysville City: Contrary to what we had been advised, the Kaysville City Planning Commission was actually requesting a change to R-1 Zoning that would restrict amateur antennas at 30 feet. At my request the planning commission has tabled the issue until Jan 14, '99 and until then I will be working with the zoning commissioner to establish language that protects your rights. Once again, stay tuned! In the Utah Statehouse, Rep. Becker has introduced legislation to prohibit cell phone use while driving. This bill is already in committee and liable to be sent to the State House

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floor for debate. This bill COULD end up preventing Amateurs from communicating by radio while driving. Our PIO Lon Stuart, WM7E, started a mailing campaign, and I will also contact Rep Becker to ensure he does not restrict the use of Amateur Radios in motor vehicles. This spring, nominations will be open for section manager for the term starting July 1. The deadline for nominations is: March 5, and ballots will be mailed April 1st. Interested? Want to get involved? Now is the time to stand up and throw your hat in the ring. UARC 1999 officers: Gary Openshaw, KC7AWU is the new president; Maurine Strenkenfinger, K7HOZ, Exec VP; Gordon Smith, K7HFV-VP; Chuck Johnson, WA7JOS, is the Treasurer, and Russ Smith, KC7ZDZ, is the Secty. 73 de NZ7T.

WYOMING: SM, Bob Williams, N7LKH—The Field Day scores have been published. In the WY Section, they include: N7WSC-234, K9PIG/7-320, Rock Springs ARC-800, Ft Caspar ARC-1078, Jackson Hole Area ARC-1104, Sheridan RAL-2182, Cement Ridge FDG-2218, Cedar Mountain ARC-2262, University ARC-2882 and the winner of the WY Section Field Day Plaque is Campbell County ARC with the whopping total of 7206 points. Congratulations to Jay, W7CW, and his crew for a very good job. The plaque is being engraved and should be presented by the time you read this. It is coming up on that time of year when the Wyoming Section Ham of the Year nominations should start coming into your friendly WY Section Manager. The selection from them must be made in time for the Rocky Mountain Division Director to get the plaque made for presentation at the State Hamfest over Memorial Day weekend. The nominations should contain the name of the nominee, a story about how he/she is so wonderful and the name of the one doing the nomination. Send them to me at home. The PSHR report is NN7H-128 and the BPL report is NN7H 146.

SOUTHEASTERN DIVISION

ALABAMA: SM, Scott Johnston, N4YYQ—To start with, just a little reminder: be sure to wish your special someone a Happy Valentine's Day! Yep, it's February already, and hopefully spring won't be too far off. As we go through 1999, let's not slack off from being weather conscious. Mother Nature has a way of surprising us unexpectedly at times. That's more than enough reason for all of us to always be aware of the weather. We can fine-tune our readiness by continuing our participation in nets, traffic handling, and serving as NCSs. Attend weather spotter's classes even if we've attended before. There's always something else we can grasp and learn. Let's be prepared by keeping batteries charged for our radios and our flashlights. Keep extra water stored, first aid supplies, and other necessities that would be needed. Making a checklist of what would be needed will come in handy. Then we can check the list and gather things and have them on hand. Stay prepared! Our Ham of the Month for December 1998 is a YL. Lisa Wallace, KF4C, from Tuscaloosa is to be commended for all of her outstanding work in her Amateur Radio activities. Lisa, keep up the good work. We're proud of you. Till next month. 73, Scott, N4YYQ. Tfc: WB4GM 328, W4PIM 255, AC4CS 129, W4CKS 127, WA4GQS 118, W4ZJY 101, N4ZNO 93, N4YYQ 90, AF4HE 84, AE4WP 55, KU4IJ 41, KD4PDQ 38, KL7Q 35, W4ZBA 26, KC4RNF 24, W4DGH 15, W4XI 12, WB4TVY 4, KE4OLE 0.

GEORGIA: SM: Sandy Donahue, W4RU—ASM/So Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. SEC: Tom Rogers, KR4OL. STM: Dick Baxter, K5TF. SGL: Charles Griffin, WB4UVW. TC: Eddie Kosobucki, K4JNL. ACC: Bob Lear, K4SZ. PIC: Chuck Calmbacher, AD4JU. If you are suffering from cabin fever and can't wait for the hamfest season to begin, then rest assured...it will start. The Inaugural Hamfest in Georgia is Feb 27 in Dalton. If you can't wait until then, head down to Florida where the Tropical Hamboree is Feb 6-7 in Miami. Kennehoochee ARC new officers are: Chairman K4BKD, Vice-chair KF4OEG, Sec K4TYJ, Treas N4TZM. Their hamfest is March 20, and they are celebrating their 50th anniversary. Gwinnett ARS at their Christmas party named Mike and Susan Swiderski, K4HBI-AF4FO as GARS Hams of the Year. Congrats Susan and Mike. Our annual ARES conference Jan 16 at the GA State Police Training Center in Forsyth was very well attended. Thanks once again to SEC Tom Rogers, KR4OL, for organizing this event. Lowery Rouse, KM4Z, EC for Gwinnett County was named Ham of the Year for several years of superb ARES leadership. Way to go Lowery! Southeastern DX Club officers: Pres K4PI; V.P. AD4J; Sec N4XMX; Treas NK4U. No traffic totals this month. 73, Sandy.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP, ASM-APRS, WY8O, ASM- Youth, KO4TT, ACC: WA4B. OOC: WB4GHU. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. During the month of November, the State Emergency Operating Center requested amateur operators to provide assistance to the state station. It was unknown as to the affect the meteor shows would have on communications. In the event the showers would have an adverse affect, ham radio would be requested to fill the need for emergency communications. The DECs in the section were notified to be on the alert and assist where and when needed. It turned out that no threat occurred, and we are all thankful. The other major activity in the month was the Tampa meeting. The ARRL Field Services Manager, Rick Palm, conducted a meeting including John Fleming as speaker, from the Sate EOC. The Red Cross, and others who normally receive ham support during emergencies, also spoke as to their need for radio communication. The Div of Forestry spoke on the wildfires and the need for better communication and the possible use of Amateur Radio to assist. The reception by all attending was very good, and informative. Everyone expressed the need for the continuing of Amateur Radio during the incoming years, notwithstanding the advanced technology and information some of the agencies utilized. Now the holidays are over, it should not cause us to become complacent. The forecast by Dr. Gray is that we will experience more hurricanes in the year of 1999 with the Atlantic and Gulf areas being prepared for these storms. Hopefully, you will read this before the Orlando Hamcation as we are planning a different presentation for the forums. The ARRL Northern Florida Section Forum will include all of the ARRL programs with the Staff present. This will be from 1 to 3 PM. This will permit anyone interested in the programs to ask questions and answers will be available at the meeting. 73, Rudy. Tfc: KE4OAV 449, KE4PRB 277, KF4GUA 149, AD4DO 145, W5MEN 106, AF4GF 101, KK4ND 101, KS4FB 69, KF4TQX 64, KF4NFP 97, KS4DW 49, AD4BL 48, KC4FL 42, N4ORZ 29, KF4TM 27, W4KIX 26, K4JHS 23, WB2IMO 22, WD4IIO

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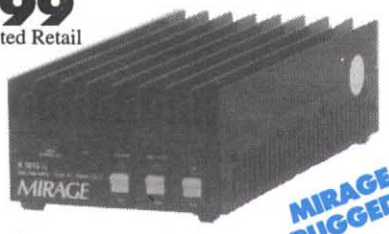
Turn your mobile, base or handheld into 160 Watt powerhouses and talk further, longer, clearer . . . All modes: FM, SSB, CW . . . Superb GaAsFET preamp . . . Overdrive, high SWR, Over-temperature protection . . . Remote controllable . . .

B-5016-G
$299
Suggested Retail



Power Curve -- typical B-5016-G output power								
Watts Out	130	135	140	145	150	155	160	165
Watts In	20	25	30	35	40	45	50	55

The MIRAGE B-5016-G gives you 160 watts of brute power for 50 watts input on all modes -- FM, SSB or CW!

Ideal for 20 to 60 watt 2 Meter mobile or base. *Power Curve* chart shows typical output power.

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. *We know of one that has been in constant use since 1979!*

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's *Therm-O-Guard*™.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive switching with remote external keying.

RC-1B, $45, Remote Control. On/Off, pre-amp On/Off, selects SSB/FM. With 18-ft cable.

Draws 17-22 amps at 13.8 VDC. 12x3x5½ in.

More 160 Watt, 2 Meter Amplifiers . . .

B-2516-G, $299. For 10 to 35 watt mobile or base stations. 160 watts out for 25 watts in.

B-1016-G, $379. MIRAGE's most popular *dual purpose* HT *or* mobile/base amplifier. 160 watts out/10 W in. For 0.2-15 watt transceivers.

B-1016-G Great for ICOM IC-706!

B-215-G, $379. MIRAGE's most popular *handheld* amp. 150 watts out/2 watts in; 160 watts out/3½ W in. For 0.25 to 5 watt handhelds.

100 Watts for 2 Meter HTs

B-310-G
$199
Suggested Retail

Power Curve -- typical B-310-G output power							
Watts Out	25	50	75	95	100	100+	100+
Watts In	¼	½	1	2	4	6	8

- *100 Watts out with all handhelds up to 8 watts*
- *All modes: FM, SSB, CW*
- *Great for ICOM IC-706*
- *15 dB low noise GaAsFET preamp*
- *Reverse polarity protection/SWR Protection*
- *FREE mobile bracket* • *Auto T/R switch*
- *FREE handheld BNC to B-310-G cable*
- *Ultra-compact 4³/₄x1³/₄x7³/₄ inches, 2½ pounds*
- *One year MIRAGE warranty*

***Boost** your 2 Meter handheld to 100 Watts!* Ultra-compact all mode B-310-G amp is perfect for *all* handhelds up to 8 watts and multimode SSB/CW /FM 2 Meter rigs. *Great for ICOM IC-706!*

35 Watts for 2 Meter HTs

B-34-G
$89.95
Suggested Retail

Power Curve -- typical B-34-G output power								
Watts Out	18	30	33	35+	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7	8

- *35 Watts Output on 2 Meters*
- *All modes: FM, SSB, CW*
- *18 dB GaAsFET preamp*
- *Reverse polarity protection*
- *Includes mobile bracket*
- *Auto RF sense T/R switch*
- *Custom heatsink, runs cool*
- *Works with handhelds up to 8 watts*
- *One year MIRAGE warranty*

MIRAGE RUGGED!

35 watts, FM only . . . $69.95

B-34, $69.95. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3¹/₈x1³/₄x4¹/₄ inches.

MIRAGE Dual Band 144/440 MHz Amp

BD-35
$159.95
Suggested Retail

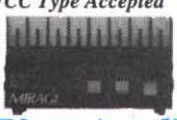
Power Curve -- typical BD-35 output power							
Watts Out (2Meters)	30	40	45	45+	45+	45+	45+
Watts Out (440 MHz)	16	26	32	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7

- *45 Watts on 2 Meters/35W on 440 MHz*
- *Auto Band Selection* • *Auto T/R switch*
- *Full Duplex Operation* • *5x1³/₄x5 inches*
- *FREE mobile bracket* • *"On Air" LEDs*
- *Single Connector for dual band radios and antennas*
- *Reverse polarity protection*
- *Works with all FM handhelds to 7 watts*
- *One year MIRAGE warranty*

Add this Mirage *dual band* amp and boost your handheld to a *powerful* mobile or base -- 45 watts on 2 Meters or 35 watts on 440 MHz! **Mirage's** exclusive *FullDuplexAmp*™ lets you talk on one band and listen on the other band at the same time -- *just like a telephone conversation.* (Requires compatible HT).

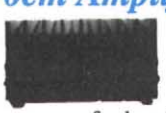
6 Meter Amplifier

FCC Type Accepted



The A-1015-G, $389, is the *world's most popular* all mode FM/SSB/CW 6 Meter amplifier. 150 watts out for 10 in. For 1 to 15 watt transceivers.

70cm Amplifiers (420-450 MHz)



D-3010-N, $365, -- 100 W out/30 in. For 5 to 45 watt *mobile/base*. **D-1010-N, $395**, 100 W out/10 in. *Dual purpose* -- for handhelds or mobile/base. **D-26-N, $269**, 60 W out/2 in, for *handhelds*.

Amateur TV Amps

Industry standard ATV amps -- **D-1010-ATVN, $414**, 82 watts PEP out / 10 in. **D-100-ATVN, $414**, 82 watts PEP out/2 in. (without sync compression).

Remote Control Head for Amps

RC-1; $45, remote controls most MIRAGE amps. Power On/Off, preamp On/Off, switch for SSB/FM. 18 foot cable (longer available). 1³/₄x3³/₄x2½ inches.

Repeater Amps

11 models -- continuous duty all modeFM/SSB/CW repeater amps for 6, 2, 1 1/4 Meters, 70cm, 450 MHz ATV.

Low noise GaAsFET preamps

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

1¼ Meter Amps (223-225 MHz)

Choose from 10 models -- 20 to 220 watts out for 2 to 50 watts in, $129 to $655.

Commercial Amps ($199 to $395)

FCC Type Accepted

Commercial amps for 150 - 174, 450-470 MHz and VHF marine bands, 70 -130 watts out.

Accurate SWR/Wattmeters

Read SWR directly andForward/ Reverse, Peak/Average power. Remote Coupler. 1.8-30, 50-200, 420-450, 1260-1300 MHz band models.

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20, AB4PG 20, N4JAQ 15, W8IM 15, N1RT 14, N4GMU 14, KF4WUZ 12, WB9GIU 11, KB4DCR 7, KU4LY 7, WX4J 4, WA4EYU 2.

SOUTHERN FLORIDA: SM, Kevin "KB" Bunin, K4PG, 561-496-5257—ASM/STM: KA4FZI 941-574-3467. ASM For Youth Activities: WB9SHT, 561-336-5608. SEC: W4SS. 561-967-1477. Asst SECs: WB2WPA, 941-775-2397, KD4GR 954-778-0775. TC: KI4T, 954-791-4275. BM: KE4WU 941-465-8176. PIC: WA4ATF, 813-733-9441. OOC: WB4GHU 941-665-6708. ACC: W3BLW 813-541-2895. SGL: KC4N 904- 385-5924. Pkt Mgr: KB4VOL@N4EXO. The Public Service Conference at the Tampa Hamfest was well attended. Rick Palm, K1CE, and Manny Papandreas, W4SS, along with the other DECs, Gary Arnold, WB2WPA, and ECs, including Neil Lauritzen, KA3DBK, did a great job. The VEC test session was a great success. 31 tests to 29 candidates, 5 passed Technician, 4 passed Tech Plus, 1 passed General, 4 passed Advanced, and 1 passed Amateur Extra. Total 15 new hams added to our ranks (K4GG). Florida Gulfcoast ARC received approval for next year's hamfest in Tampa on November 20-21, 1999. Miami Hamfest of the Americas is next on Feb 6 and 7 (W4WYR). Englewood ARC will hold their hamfest March 13 (W4VV). SARA Club Hamfest Saturday, February 20. If you are travelling North to Disney, the Orlando Hamcation is Feb 12, 13, 14. ECs send your monthly reports to David Smith, KE4UEI@gate.net. Jerry Eichhorn, WB4WDK, EC, Highlands County, has a perfect record of sending EC reports. Thanks, Jerry. Florida Contesters is a new ARRL Affiliated Club. FC should show well in the 10-Meter Contest (W4OX, Co-President). Lighthouse ARC has applied for ARRL affiliation. Florida Repeater Council District 3 Director, KD4DJX, Karen Power, appeared at the Vero Beach ARC meeting. 45 persons were in attendance and all were interested in promoting Amateur Radio by getting more people licensed and involved. Florida Contest Club elected new officers: W4OX, President; KX4WW, Vice President; K4LQ, Secretary. Hollywood ARC reports Evelyn Wunch, KD4OVG, is a Silent Key (KE4ESV, WA4ZPX). New club newsletters received: FCC Monitor (K4FCC), Southwest Florida Traffic Net (K4FQU). Send me your club news! Norm Ward, K4RBR can be found in the Highlands County ARC. The Tampa ARC newsletter, QRM, reports Warren Rachels, WA4UQL, upgraded to Amateur Extra. TARC has a Web page maintained by KT4JJ, but no address was published (W4DUG). KC4SUS, Tom Glaze, is now K4SUS! WB4WBK reports ARES and the Highlands ARC covered the Avon Park Christmas Parade with over 70 different groups in the parade. Volunteers included: K4ZNB, K4RBR, KI4XM, KD4QDD, KE4WU, KD4CQG, WB4WDK, AF4HZ, KT4WX, KB4BEV, and WA4DXD (from EC report). The South Florida ARES Net (SFAN), Saturday mornings 8 AM (KD4GR) or right after the ARRL Information Net (AIN) 3.940 MHz, 7:30 AM (WA4ATF). Send a Station Activity Report (SAR) each month, no matter how small you think it may be! 73 de K4PG. Tfc: WA9VND 864, KF4VEX (Club) 766, K4FQU 554, KA2YZM 530, AB4XK 474, KA4FZI 422, W7AMM 407, K4SCL 385, KB4WBY 288, KC4ZHF 280, KD4HGU 190, AA4HT 180, AA4BM 180, KD4GR 144, WA4EIC 128, K4PG 124, WB4PAM 122, KD4JMV 94, W4DL 93, KJ4N 89, W4DWN 70, K4RBR 55, WA4CSQ 46, KT4XK 35, W6VIF 33, K2GNZ 30, AA4WJ 22, WD4NJM 17, K4ENA 15, KE4WBI 15, K9EHP 6, K3KT 4.

VIRGIN ISLANDS: SM, John Ellis, NP2B, S Croix— ASM: Drew, NP2E, St Thomas. ASM: Mal, NP2L, St John. SEC: Vic, WP2P, St Croix. PIC: Lou, KV4JC, St Croix. ACC: Debbie, NP2DJ, St Thomas. NM: Bob VP2VI/W0DX, Tortola. The VI appeared to be well represented in the ARRL Sweepstakes. Stations heard were NP2E, NP2W, WP2Z and even SM made a clean sweep. St Croix ARC has new officers. President is Bill, NP2EF; VP is Chuck, WP2AAA; secretary Al, KP2CF; and treasurer is Bob, KP2CG. Congratulations, gents. Good to see Gil and Judy, KP2U and NP2IE back on island for a while. Work progressing on relocating the KP2SJ repeater on St John from the clinic to Bordeaux Mtn. The cavities were sent back to WACOM for adjustment. They appeared to be the cause of the sensitivity problem. Four St Croix hams provided communication for the half marathon which was run from Christiansted to Frederiksted. those participating were Matt, NP2FK; Bob, KV4IH; Bob, KP2CG; and Vic, WP2P. Tony, NP2HJ, upgraded to Extra. Good to see Chuck, WP2AAA, back on island recovering from a double hip replacement job up in NYC. 73, John NP2B.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—The fall hamfest is over and except for a few minor rain drops and the morning cold weather (I finally took off my coat about 0900 hrs), it turned out very good. The Superstition ARC is to be commended for their excellent work. The East Valley ARC held their annual Pearl Harbor special station event. Due to business travel, I did not have access to a radio so I did not make contact, but I hope you did. Also the Central Arizona DX Club did a good job on the Myrmir DX Expedition. I was not able to get through the pileups, but I did hear them on 20 meters, 15 meters, and 10 meters. The 10-Meter SSB Contest on December 11 and 12 was a great success. I was invited to join the IBM Club at their field location but due to work and a sick wife I was confined to home and used my station to make a few contacts. This time of year we start planning for our community support. Are you prepared? I worked the Tucson El Tour in November as a rest stop communicator and I made a few errors that need to be addressed. I arrived with only two (2) batteries for my hand-held that were not even fully charged. So, after four (4) hours I was confined to my vehicle mounted radio. A good battery fully charged will last about 3 hours. Another mistake was to not use my vehicle radio in the cross band mode to allow for lower transmitting power for my hand-held. This method will extend hand-held battery usage. We Amateur Radio operators should be ready to use our services to support emergency communication. Whether it is VHF/UHF or just HF. Are you ready with equipment and operating knowledge? My Arizona club listing needs to be updated so please send me the latest information on address and a point-of-contact person with telephone number. I do receive some newsletters and I use the information printed. We have over 55 clubs here in Arizona. The 1999 DX Convention will be held at the City of Fresno (California) Holiday Inn downtown (telephone number 209-268-1000) on April 9-11, 1999. This is an excellent event with many classes on the latest equipment, passed and present DX activity, good operating procedures for contesting. It is not too late to make hotel reservations. The Southwest Division Convention for 1999 will be held in

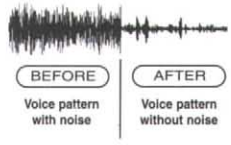
Innovative Products Eliminate QRN for the Clearest QSOs!

Introductory Prices to QST Readers

Noise Cancellation Technologies, Inc. (NCT) is the leader in Active Wave Management—the electronic manipulation of sound and signal waves to reduce noise, improve signal-to-noise ratios and enhance sound quality. NCT products feature innovative technologies to improve the clarity and intelligibility of QSOs, thus enhancing your enjoyment of ham radio.

ClearSpeech™ Products

ClearSpeech DSP-based noise filtering products incorporate NCT's proprietary ClearSpeech algorithm to clean QRN from received speech transmissions. This breakthrough technology removes up to 95% of stationary or constant noise from signal containing noise and speech. The algorithm is adaptive—as background noise changes, it continues to cancel the noise for consistent performance. The products deliver excellent performance for CW, SSB and FM, and eliminate heterodynes from AM stations.—Plus, they greatly improve receiver performance of older radios.



ClearSpeech™-Speaker

$109

This easy-to-use DSP speaker activates automatically and filters background noise, static and other interference.
Reg. $149

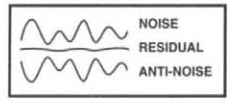
ClearSpeech™-Line

$99

This DSP filter delivers the same level of performance as the ClearSpeech-Speaker. Simply connect in front of your existing amplified speaker.
Reg. $129

Active Noise Reduction (ANR) Headsets

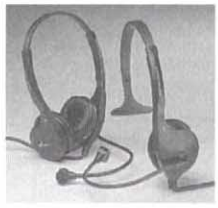
NCT is the leading supplier of high-performance ANR headsets for consumer, commercial and industrial use. ANR is the electronic coupling of a noise wave with its exact mirror image to cancel the noise. A microphone in each earpiece of the headset senses background noise at the user's ear. That information is sent to an electronic controller where an "anti-noise" wave is generated and coupled with the offensive noise to cancel it. NCT headsets cancel up to 80% of low frequency background noise.



ANR technology is particularly effective against low frequency noise generated by heating and cooling systems, computers and fans which is a scientifically-proven masker of speech and other sounds. This "upward spread of masking" phenomenon makes it difficult to decipher the meaning of speech because the soft consonant sounds that carry the meaning of speech are buried in the noise. NCT's ANR headsets connect easily to your radio for clear, intelligible QSOs.

NoiseBuster® Headset

This comfortable, lightweight headset, available in monaural (NB-TM) and binaural (NB-TB) styles, is the most affordable ANR headset on the market today. It features ANR and a high-quality noise canceling boom microphone. Runs for 100 hours on two AAA batteries.



NB-TM $69 **Reg. $89**

NB-TB $79 **Reg. $109**

NB-EX $49 **Reg. $69** *(listen only)*

ProActive™ 1500 Headset

$89

This commercial-grade open-back headset is comfortable and durable. It features ANR and a noise canceling boom microphone. Comes complete with Ni-Cd battery module and charger.
Reg. $119

ProActive™ 3000 Series Headsets

These closed-back earmuffs are comfortable and durable . They provide a combination of ANR and passive noise control for the utmost intelligibility of incoming communications in noisy environments. They also feature a noise canceling boom microphone. Available in both over-the-head (PA-3500) and behind-the-head (PA-3600) styles. Comes complete with Ni-Cd battery module and charger.

PA-3500/PA-3600 $169 **Reg. $229**

PA-3000 $139 **Reg. $189** *earmuff (listen only)*

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October on the first weekend (01-03) in Long Beach, California, on the *Queen Mary*. 73. ATN QNI 1015, QTC 115, Sess 30; ACN QNI 277, QTC 232, Sess 30. Tfc: K7VVC 684, AB7NK 390, W7EP 109, W7UQQ 54, KD7CKV 31.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF—Propagation is excellent and QRM is increasing. Oh! well, it is just like one farmer said, "if the crop is good the price is down." You just can't have everything at the same time. Ten meters has been fun the past few weeks, plenty of DX and good rag chewing also. Our retired engineer and OOC, W6UPN, Joe, has done such a great job that he now has time for Internet jokes again. If you ask Joe for the latest jokes, he will fill your screen with oldies and goodies. A local XYL advises, don't ask & don't tell some of those jokes.– AD0A, Jerry reports a traffic total of 155 for November, and W6SX, Hank reports a traffic total of 39. Gary, N6DCS, reported in from his location up north. He is active on the very high end of 40 meters as well as e-mail. **www.ghavlu@hq.tcfarm.com**. According to Jim, K6OUE, who wrote in the TRW, *Crosstalk*, that the Naval Postgraduate School in Monterey, is involved in a long range "Spread Spectrum" satellite training and building program. This educational project is named PANSAT and it will provide Amateur store-and-forward packet communication employing direct-sequence modulation in the 70 cm amateur band. "NPS" will provide documentation for communicating with PANSAT in about two months **<www.sp.nps.navy.mil/pansat/>** PANSAT operates on a center frequency of 436.5 MHz. PANSAT is in low earth orbit with an inclination of about 28 degrees. The launch was from the latest 1998 space shuttle. Vy 73 de Phineas, W6BF.

SANTA BARBARA: SM & STM, Rob Griffin, K6YR, 805-543-3346 & **k6yr@arrl.org**—SEC: Jennifer Roe, AA6MX. AAC: Michael Atmore, KE6DKU. BM: (vacancy). OOC: Tom Perkins, KD6BXM. PIC: Jeff Reinhardt, AA6JR. TC: Warren Glenn, KM6RZ. ASMs, Doc Gmelin, W6ZRJ & Don Milbury, W6YN. DECs: SB - Rick Laird, KB5OO; SLO – Jack Hunter, KD6HHG, & Ven - Dave Gilmore, AA6VH. Congratulations to the 1999 VARC Officers & Directors: Prexy, John White, KB6LJL; VP, Stewart Stone, KD4OSO; Secy, Warren Dale, KF6BXN; Treas, Ralph Lovell, KE6KSX & Dirs, Rob Austin, KA6GSU & Jack, AD6AD. League HQ is reorganizing a bit to consolidate Field Services & Education departments. FCC expects to drop the Form 610 for the more univeral Form 605 by April '99. ARRL has a new WWW site for youth networking & making skeds: **http://www.arrl.org/ead/youthskeds/** Clubs, please pass along this info in your newsletters. The Poinsettia Slow Speed Net meets Tues & Thurs at 2030 local on/near 7129 kHz. You are encouraged to join the "Lightning Slingers" by Net Maestro, Dick, W6BKY. SBARC did another great communications support for the Nov 7 Santa Barbara Newspress Half Marathon. New SBARC officers include: Marvin Johnston, KE6HTS and Exec VP Hubert Stamps, KC6NAH. Others elected to the board are: K7AMI WA6VNN, KF6DI, WA6MBZ, KF6HHX, KE6UGY, W6HOZ, N6OLT, WA6IDZ, WD6ESU & K6PDQ. Congrats to you all! Check out the Santa Barbara Section Web Site: **qsl.net/arrlsb SCN/**SB: 9 P on 147.00+ (131.8), 224.90- (131.8) & 448.875- (100). PSHR/Tfc: K6YR 206/186, W6ZRJ -/40, KE6MIW 108/ & KE6GFV 107/.

SAN DIEGO: SM, Tuck Miller, K6ZEC, 619-475-7333—Congratulations go to Duncan Campbell, KF6ILA, newly elected president of the Amateur Radio Club of El Cajon, and to Harry Hodges, WA6YOO, for being re-elected to yet another year at the helm of the Escondido Amateur Radio Society. You might remember Harry as former Section Manager of San Diego. Harry loves to keep involved in ham activities. Duncan is a chief in Uncle Sam's Canoe Club, so leadership is no stranger. "Shorty," K6JSI, will be the featured speaker for SOBARS in February, and he will be speaking on ham radio and cable TV frequencies. Congrats go to Sid Burnett, K6KSI, originally licensed around 1922 for being selected as Ham of the Year for SOBARS. Time is drawing nigh for the International DX Convention to be held in Fresno, CA this year. Hotel rooms are going fast. For more details or Web site info, drop me a note at **k6zec@arrl.org**. A quick response is promised. George, KO6BU, puts out Red Cross training schedules each week on the ARES section net, Sunday nite, 7 PM, 146.265, plus offset, and a 107.2 pl is now required!! I mention this as I know at least George reads this column. Since February is the month of lovers, we should not forget our spouses for "allowing" us to pursue our hobby, and our service to our community. I know without my YL's support, it would be extremely difficult to maintain a somewhat busy schedule. Put your *QST* down for just a minute or so, and let your spouse know how much they mean to you. I love you Evelyn, N6EVE. Traffic Totals: KT6A 1084, KD6YJB 563, WA6ODQ 480, K7DCG 170, KD6IVF 28, KF6NQG 16. BPL: KT6A 1084, KD6YJB 563. PSHR: WA6ODQ 160 (3 public service events) KT6A 145, KD6YJB 89. 73, Tuck, K6ZEC.

WEST GULF DIVISION

NORTH TEXAS: SM, Don Thomas, KA1CWM—SEC: K5UPN. STM: KC5OZT. TC: W5CWO. BM: KB5YAM. SGL: N5GAR. OOC: WB5UDA. ASMs: K5RE, W5IWE, KG5VX, W5FB, KX5K, KK5QA, KK5NA. **http://www.lsic.net/net/ntexas.html**. By the time each of you read this article you will have gotten through all of the holidays and well into the spirit of 1999. Just think of the hamfests that will be in full swing. Before we know it we will be able to purchase all of that new ham gear. I'm really looking forward to the good things that will be going on in the section during 1999. There are many new club presidents and officers that are just taking office and we wish them all the best in fulfilling their new positions. I would again offer and pledge the cooperation of all of the new North Texas Section Staff. The names of the staff members and e-mail addresses can be found on the section Web page **http://www.lsic.net/net/ntexas.html**. In addition please be sure you submit your name, call sign and e-mail address to **ntx-news@juno.com** so you can be put on the distribution list for the Section Newsletter. All clubs should complete the ARRL Annual Report or update their report anytime there is a change. This can now be done on line by accessing the report at **http://www.arrl.org.field/club/clubsearch.phtm**. Please pay particular attention in reporting the number of club members, the number of licensed voting members and the number of ARRL members when completing your report. By keeping your Affiliated Club information updated will assure that the club will be receiving updated information from the League. Another very active Web page is the new ARRL Member's Only Page. This

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page has lots of information which all ARRL members can access. We are looking forward to the completion of the section traffic brochure and the starting of the section traffic training classes for those that are interested in traffic handling. November traffic: SAR—K5AO 173, K5MXQ 111, KB5TCH 107, KC5QGI 79, KC5QZZ 72, N5JZ 67, WA5I 54, KC5OZT 48, KD5AHW 35, KC5PNM 23, AC5Z 23, KB5YAM 4, N8QVT 1. Nets—Net/QNI / QTC / QTR (min.) / Sessions—TTN/ 777 / 127 / 1822 / 30; TEX/ 253 / 100 / 588 / 59; DFW early/ 230 / 88 / 298 / 30; DFW late/ 173 / 68 / 270 / 30.

OKLAHOMA: SM, Coy Day, N5OK—This being my last time to submit the section news, I want to thank you for supporting me in my successful bid for the Vice Director position. Thanks also to those of you that have taken time to submit the latest happenings for posting here. I'm very proud to announce that one of our ASMs, Charlie Calhoun, Jr., K5TT, of Owasso was selected to serve as our SM. I'm confident that you will support Charlie every bit as much as you have me. Congrats to RCWA for their excellent operation of Special Event Station, W5R, at the Will Rogers Museum in Claremore. Watch for Bill, N5LU, who is building a 5-element beam for 10 meters. Kudos to Mel, K5KXL, for all the work he is doing in support of Courage Center/Handi Hams. Kudos also to Frank, N5FM, who served as a net control with the Salvation Army SATERN net in support of the relief effort for Honduras. Bill, K5WG, has retired from the Tulsa Fire Dept and is now an instructor at the Tulsa Community College. Terry, K5HP, says he enjoyed the contest this last weekend and was surprised at the number of spots that came through the packet system. The walls are up on the Stillwater ARC club station in the Red Cross building. HF and VHF equipment is in place along with a beam and tower. The club also purchased a travel trailer for emergency use in the local area. Tfc: N5IKN 666, KF5A 622, WB5NKC 507, K5GBN 297, KE5JE 91, WB5NKD 76, WA5OUV 75, AB5RV 57, KC5VOG 46, W5REC 33, W5VBD 28.

SOUTH TEXAS: SM, E. Ray Taylor, N5NAV—ASMs: AE5ED, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, WA5TUM, KB5AWM, WA5JYK, K5PFE, and K5SBU. STM: WD5GKH. SEC: K5DG. ACC: N5WSW. PIC: KA5WSS. TC: KJ5YN. BM:W5KLV. OOC: W5JAM. SGL: KM5HY. January was the opening of a bright new year. It's really hard to realize we are almost into the next century. I was just reminiscing over the last 65+ years at how things have changed in my lifetime. Things are moving so much faster, and technology changes almost over night. Remember the slide rule, then calculator, and then came the computer. The computer has taken over our lives and people are worried about the year 2000 and what will happen when the computer sets us back to the first of this century. Just imagine the old horse-drawn buckboard with a "bug catcher" or "screwdriver antenna" and a 2-meter antenna going down the street. What will people think? All this because we allowed the computer to take over our lives. Let's get back to sending traffic by radio and give life back to the traffic nets where it should be. If we can get the hams back on the radio instead of the Internet, they will be trained and ready for the emergencies such as the ones we have just been through. There won't be the lack of net control stations, so we can have more rest. You will also have a good feeling because of your participation, being able to help others when they are in need. That's what ham radio is really all about. I did fail to mention one young man who gave 60 to 80 hours at the Corpus Christi Weather Station, giving us river risings and crests during the floods of South Texas. Thanks to Benny, KC5YLA, for the fine job. Mike, N5YWA, had to leave the weather station in New Braunfels, late Saturday night, because he got word that his house was threatened. He just got out in time as the water made it impossible to get into or out of the New Braunfels Weather Station. I do want to thank Neil Martin, WA5SFR, EC of Bexar County, for the excellent write up in the *San Antonio Express* newspaper, in regards to ham radio operations, during the floods of South Texas. So far that is the only media coverage I've seen or heard about. This should have had major coverage in newspapers, TV, and radio. Maybe we will have some coverage in *QST* soon. This event made Jarrell look like a picnic. Just the fact there was no other communications, for the agencies served, except for ham radio. Don Lamont, WD5AAH, is still working with the state recovery and assessment team, and stated he hoped to be home in February. Again, let me thank all the hams who worked so tirelessly, in the floods. It will be months before we are back to some what near normal. I want to congratulate the new hams that have upgraded and joined the ranks on HF. I know you will enjoy your new privileges. It seems that this emergency encouraged several to upgrade. Let me encourage you to join ARRL and reap the benefits. Several have asked me to come to their town and conduct training. I'm going to try to do that soon. I do conduct a training period on the Texas Traffic Net on 3873 at 7 PM, on Monday, Tuesday, Thursday, and Friday. Record the sessions as I do cover things fast but thorough. Become involved. 73. Tfc: W5YQZ 696, W5KLV 453, W5SEG 319, N5NAV 272, KA5KLU 175, W5SHN 160, AE5ED 138, W5ZX 93, W4RRX 86, KD5GM 68, W5GKH 61, N5OUJ 58, K5UCQ 53, W5ZIN 47, WA5FXQ 45, KD5CRX 44, WA5AA 15, N5JUU 9, N5LF 7, N5HK 4, KG5CX 2.

WEST TEXAS: SM, Charlie Royall, WB5T, 915-944-0469, **cnroyall@wcc.net**—ASMs: Cley, K5TRW. Ron, KB5HGM. Jerome, K5IS. Fred, W6VPI. Sandy,W5MVJ. SEC: Alex, N5LRH. OOC: John, KO5D. New Appts: Raymond Bethel, N5RMO. DEC, Dist 3: Frank Dedon, N5WT, OBM. 1998 brought many changes to the section. Superb ARRL growth, lots of new hams, and 2 clubs started newsletters. Tnx to all instructors and VEs! Lubbock led with more new licensees than any other city in the section. Volunteerism was exceptional from ARRL Affiliated Clubs, with recognition to the non-affiliated club from Big Spring for their community involvement. Tnx to those newsletter editors who provided space for an SM column. My first year has been more productive than I dreamed possible. All field appointees worked hard to bring this about. If you have an appointee in your area, shake their hand and say thanks! Welcome 12 new hams: J. Blackwell, KD5FLA; J. Sandidge, KD5FLB; R. Patel, KD5FLC; R. Casey, KD5FLF; K. Wells, KD5FLH; R. Matheny, KD5FLD; P. Quimby, KD5FLG; F. Jenkins, KD5FLZ; N. Langford, KD5FLI; I. Gonzalez, KD5FLT; and B. Rosser, KD5FKZ, with 6 from Lubbock. Thanks to Barney Boone, KJ5AE, for his service while West Gulf Vice Director. Barney, good luck and congratulations on your upcoming marriage! Welcome to Coy M. Day, N5OK, OK SM, and new West Gulf Vice Director.

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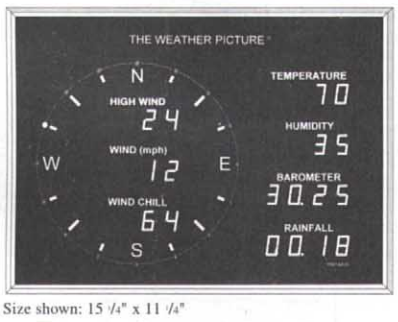

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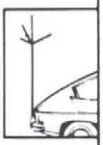

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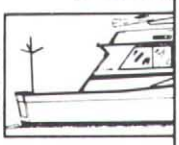

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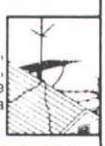

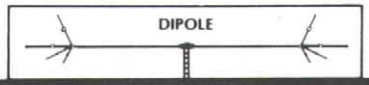

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4) Send ads to: the ARRL, 225 Main St., Newington, CT 06111 ATTN: Ham Ads. Or via fax 860-594-0259 or e-mail: hamads@arrl.org Payment must be included with ads (check or any major credit card accepted).

5) Closing date for Ham-Ads is the 15th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received January 16th through February 15th will appear in April *QST*. If the 15th falls on a weekend or holiday, the Ham-Ad deadline is the previous working day. Please contact Robin Micket, N1WAL at 860-594-0231 for further information.

6) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A last name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in *QST* advertising.

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INTERNATIONAL DX CONVENTION: Fresno, CA. April 9-11, 1999. Pre-registration, Gordon, W6NW. http://www.amateur-radio.org/ncdxc

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MARCO: Medical Amateur Radio Council, operates daily and Sunday nets. Medically-oriented amateurs (physicians, dentists, veterinarians, nurses, therapists, etc.) invited to join. For information write: MARCO, Box 73, Acme, PA 15610.

ORLANDO HamCationsm and Computer Show, Feb 12-14, Central Florida Fairgrounds. ARRL North Florida Section. Commercial areas feature over 200 vendors and swap area includes over 400 tables, tailgating, forums, testing, overnight RV parking with electricity and water. Commercial information, Tim Starr, 407-850-9258. Email: ae4nj@aol.com, visit our web page at www.oarc.org or send SASE to: Orlando HamCationsm, PO Box 547811, Orlando, FL 32854.

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TELEGRAPH: PERERA'S COLLECTOR'S GUIDE: $12 ppd. Artifax, Box 88-Q, Maynard, MA 01754. http://home.fiam.net/tfrench/artifax.htm

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RG213/U STRD BC MIL-SPEC NC/DB/UV JACKET 1.2 dB/2500WATTS @ 30MHz	.36/FT	.34/FT	.32/FT
RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz..	.34/FT	.32/FT	.30/FT
RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz	.15/FT	.13/FT	.12/FT
RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS@ 30MHz	.15/FT	.13/FT	.11/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.17/FT	.15/FT	.13/FT
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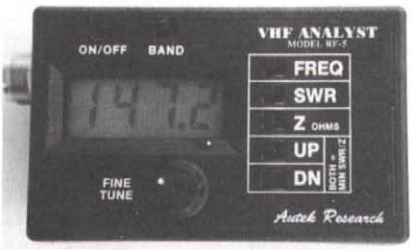

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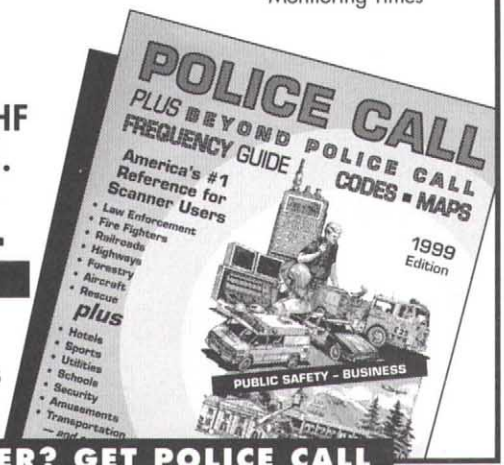

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HARRIS RF 131-122
EXCITER

It features digital tuning with remote control capability in the 2-30MHz. Modes of operation are U/LSB, compatable AM, CW, and ISB.
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HARRIS RF 601A
ANTENNA COUPLER GROUP

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This receiver meets MIL-STD-188C. This unit *has it all* starting with 1Hz tuning resolution over the entire bandwidth, AGC time constant and BFO offset. The following full compliment of Collins mechanical filters are included: 3.2kHz, USB/LSB/ISB, 16kHz FM, 1.0&0.3kHz CW, 16/6 and 3.2kHz AM. AGC modes are: data/slow/med/fast, in addition it's fully remote controllable via RS-232 or RS-422. All RF-590's are fully checked, burned-in and guaranteed for 30 days.
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RECEIVER

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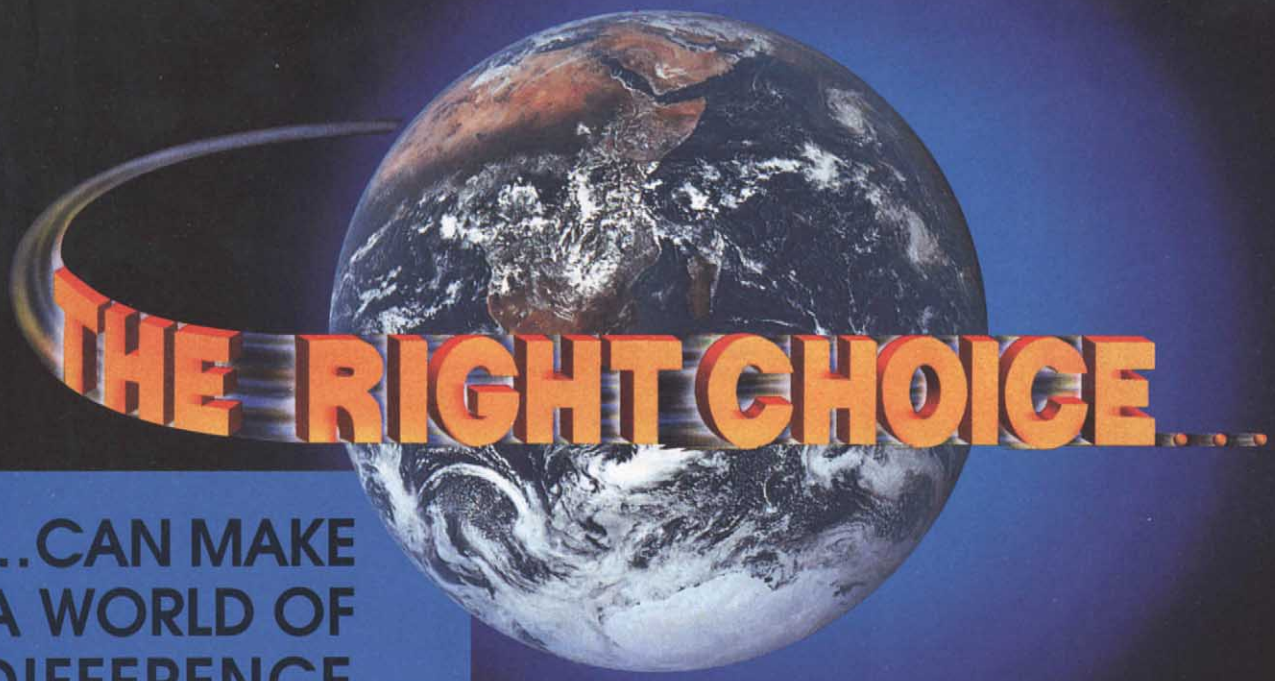

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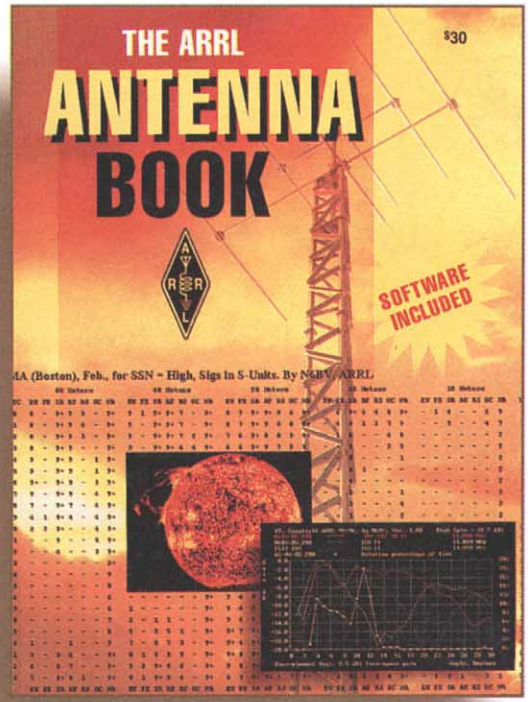

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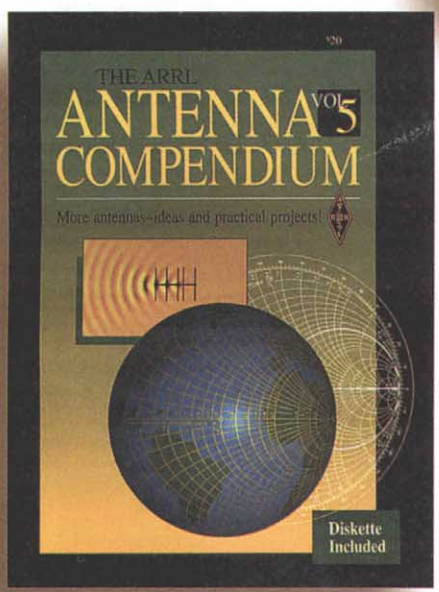

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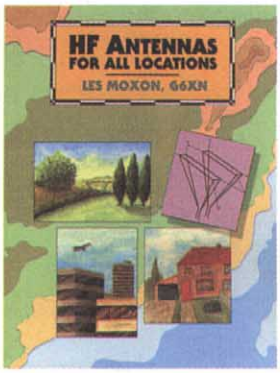

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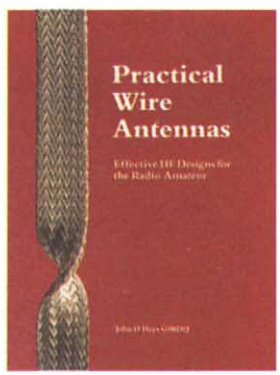

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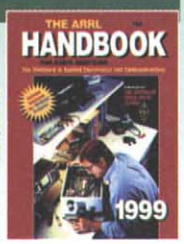

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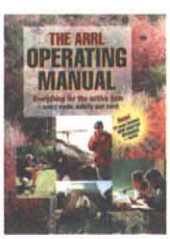

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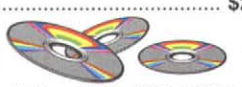

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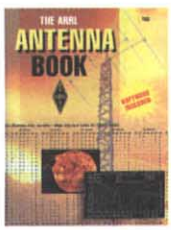

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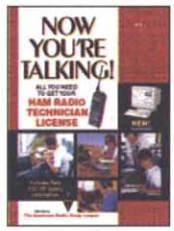

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- Tiny 2m and 70cm FM HT
- 120 Memory Channels
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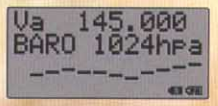

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Meet Kenwood's new TH-D7A, an FM dual-band (144MHz/440MHz) handheld transceiver equipped with a TNC and all the features needed for easy amateur radio data communications — and especially APRS.

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**

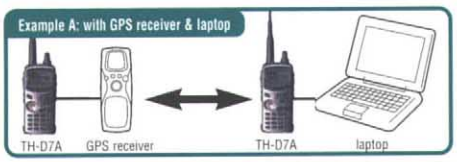
Visual Communicator Control

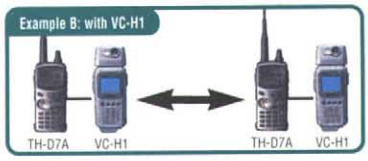
- **Text superimpose function**
  Add your call sign, RSV reports, comments, etc.
- **VC-H1 shutter**
  Command a connected VC-H1 to initiate transmission
- **Fast FM**
  Send an image in just 14 secs (approx).
- **SSTV transmission mode selection (9 modes)**

- **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.





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