Official Journal of
ARRL
The national association for AMATEUR RADIO

QST

devoted entirely to
AMATEUR RADIO

August 2001

QST reviews

- Yaesu FT-7100M dual-band mobile transceiver
- Ameritron ALS-600 HF amplifier

Kingman Reef 2000

Build a beacon for PSK31

Homebrew the "WBR" receiver

Make some Moxons for the LEO satellites

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FOØAAA
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OVER 26,000 QSO'S

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Just listen to the guys who actually used them - they know better than anyone what the power of 32 bit IF-DSP technology can do for ham radio. In fact several members were so impressed that they bought '756PROs for their own ham shacks. "It just doesn't get any better than this" - says Glenn Johnson, WØGJ. Is it any wonder - the world's top DX'ers choose ICOM.

IC-756PRO. Push digital to new levels.

HF/6M • 100W • All Mode • Triple Conversion Rx • Dual Watch • 32 Bit IF-DSP • Front Panel Adjustable Noise Reduction • Audio Peak Filter • Auto & Manual Notch Filter • Twin Passband Tuning • 5" TFT Color Display Shows Operating Conditions and Spectrum Scope • CW Memory Keyer • VOX • Auto Antenna Tuner • PC Controllable with Optional ICOM Software

"I was particularly impressed with the '756PRO's front end resistance to overloading. I never heard intermod noises or de-sensing even with the huge pileups we generated. Several times I listened carefully for such problems but they simply weren't there. On CW, once I had picked out a station, I could run the selectivity down to 50Hz and hear ONLY the station I wanted. I have worked pileups from several DX'peditions and have never encountered a radio that held up so well." - FOØAAA member Mike Goode, N9NS.

"All seven of the'756PROs worked flawlessly. We ran RTTY perhaps more than 50% duty cycle, and the radios never even got warm at maximum output. The digital filter controls were so easy to adjust and switch...a contestor's dream! We had seven radios, most of the time with three modes at once on any given band. There was NO interstation interference. All of our antennas (except for the 160M & 80M verticals) were within a 75 meter circle."
- A52A member Glenn Johnson, WØGJ

"Just back from K5K, Kingman Reef. The IC-756PROs again performed flawlessly and were a factor in our breaking 80,000 QSOs. I was a participant in FOØAAA, A52A and now K5K, all in 2000, and your radios made a combined 237,000 QSOs. You must be very proud to have your wonderful radios used by these DX'peditions that are now ranked as 3 of the top 6 Dx'peditions in terms of QSOs in the history of our hobby." - K5K member, Bob Allphin, K4UEE*

Limited time offer. See dealer for details.

*As of 1/1/01

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SAVE $150 IC-706MKIIG

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"With the addition of yet another band (70 cm), more power on 2 meters and the incremental improvements made with each new version of this popular transceiver, perhaps the '706 has reached its zenith. There's not much left to improve."
-*QST*, July, 1999

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"An impressive transceiver for HF, 50 MHz and 144 MHz work. With loads of those features desirable to the serious HF operator *and* all modes at 100W on both 6 and 2 meters, the IC-746 is a fine choice in a mid-priced rig."
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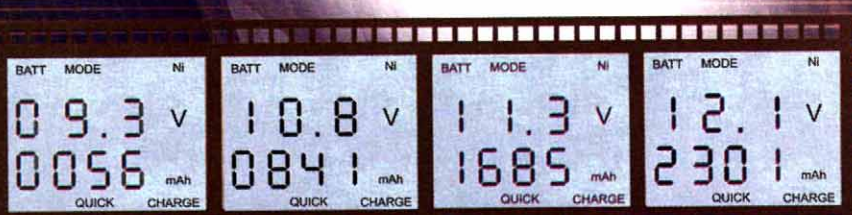
- **Support 1.2V to 14.4V (1 to 12 cells) for NiMH & NiCD and 3.6V to 14.4V for Lithium Ion.**
- **Light weight travel switching AC adapter and car kit included.**

New Battery for FT-817



MH-FNB-72 Ultra high capacity 1700mAh 9.6V NiMH battery pack for Yaesu FT-817. Also includes a "rapid charging cable" that will enable you to charge the battery pack in around 3 hours using MH-C777, MH-C777PLUS, or MH-C888.

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The worlds first VIDEO scanner • Tunes in to everything but cell phones • Wireless video monitor – excellent tool for surveillance

The sky's the limit.

"It [IC-R3] is perfect for general monitoring or testing purposes in the shack as well as portable and mobile ATV applications such as R/C, finding downed balloons and rockets and public service events. This receiver is also very handy for repeater owners to track down interference from legal and illegal Part 15 transmitters or other services too. It does surprisingly well for viewing in bright sun light too."

-Tom O'Hara, W6ORG, of PC Electronics in *Amateur Television Quarterly* -Spring 2001

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

-*QST*, 2/01

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World's First Audio/Video Scanner!

Never before has this much excitement been in the palm of your hand. The IC-R3 brings you more than the usual audio you get from an ordinary scanner. Wide tuning range allows you to see and hear the excitement behind the scenes. Large easy to read color display for frequency settings and video reception. All in a compact easy to carry package.

Whether you're a hobbyist wishing to go beyond regular voice communications or a professional who does wireless video security or counter-surveillance - nothing else comes close to the 'R3 in price or versatility. Clearly, the IC-R3 represents a quantum leap in monitoring technology.

Here are just a few of the many video signals to monitor.

- **420-440, 902-928 & 1240-1300 MHz:** Amateur TV frequencies
- **902-928 MHz:** Part 15 video equipment; "VCR Rabbits™" & wireless security cameras
- **2150-2162 MHz:** Omni-directional transmission of point to multipoint video signals

Frequencies courtesy of Scanning USA, Feb. 2001 -Something new to monitor, by Tom Filecco

SAVE $75 IC-R3

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0.5-2450 MHz† • 450 Memory Channels with Alphanumeric Names • CTCSS with Tone Scan • 4 Level Attenuator • Telescoping Antenna with BNC Connector • Four Way Action Joystick • Lithium Ion Power • *and* a 2" Color TFT Display with Video/Audio Output

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†Cellular frequencies blocked; unblocked versions available to FCC approved users. 2380 116th Ave NE, Bellevue, WA 98004 • 425-454-8155. The ICOM logo is a registered trademark of ICOM, Inc. All specifications are subject to change without notice or obligation. R3QST501

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News and Features

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QST Workbench

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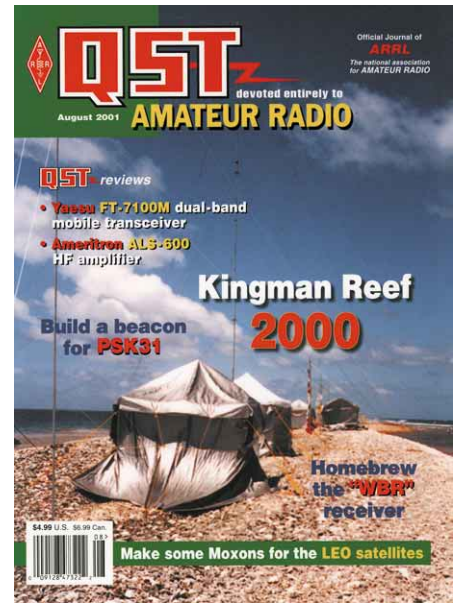
Operating

Departments



Our Cover:
This month's cover highlights the 2000 DXpedition to Kingman Reef. The crew crowded onto a narrow spit of coral and stayed long enough to make almost 81,000 contacts. See the story on page 47.

US & Possessions: Membership in the ARRL, including a one year subscription to *QST*, is available to individuals at $39. Age 65 and over, with proof of age, $34. Licensed radio amateurs age 21 and under and the eldest licensee in the household may qualify for the following rates: Age 12 and under, $8.50 and age 13 through 21, $16. Life Membership, including a subscription to *QST* is available at $975.* Age 65 and over, $850.* Membership and *QST* cannot be separated. Fifty percent of dues is allocated to *QST*, the balance for membership. Subscription rate for libraries and institutions is $39 per year. Single copies $5.

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Affordable Multi-Mode 6 Meters

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

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

We have the answer.

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

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

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

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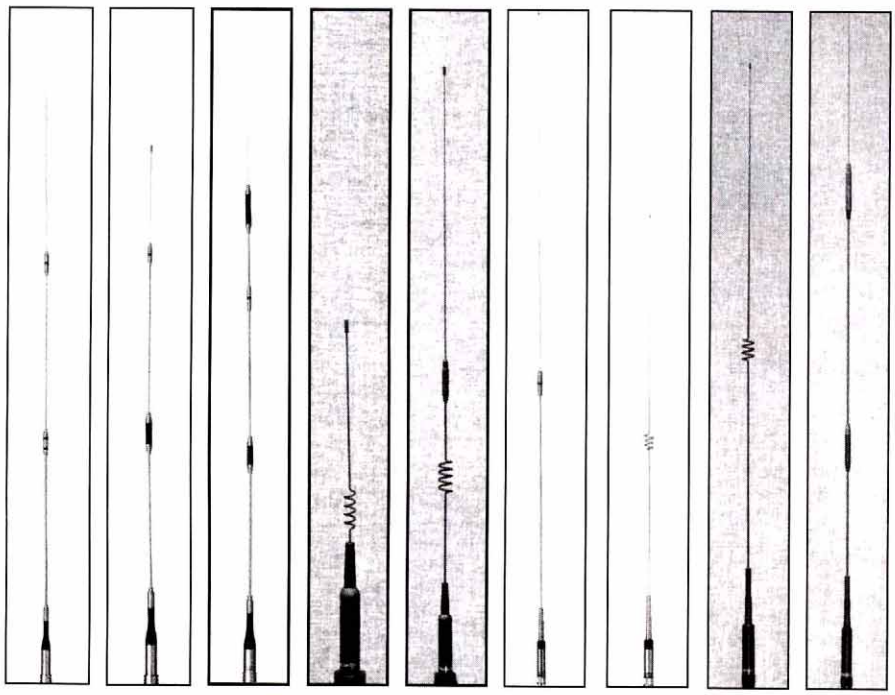


SG2000HD | SG7500A SG7500NMO | SG7900A | NR72BNMO | NR73BNMO | NR2C | NR770HA NR770HB | NR770HNMO NR770HBNMO | CR627B CR627BNMO

HV7A Mobile Antenna System

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

Optional Loading Coils

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

Recommended Antenna Mounts: K400C or K600M

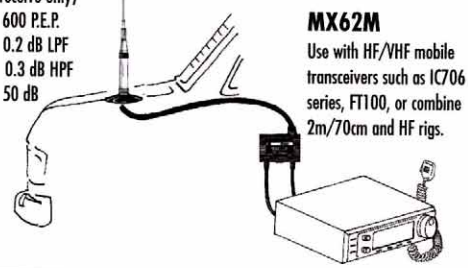
MX62M Duplexer

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

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

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

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



MX62M

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

SPECIAL FEATURES:

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

FOLD-OVER

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

MODEL	BAND (MHz)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
NR72BNMO*6	2m/70cm	100	NMO	13.8	1/4λ, 1/2λ
NR73BNMO	2m/70cm	100	NMO	33.5	1/2λ, 1-5/8λ
NR770HA7	2m/70cm	200	UHF	40.2	1/2λ, 2-5/8λ
NR770HNMO8	2m/70cm	200	NMO	38.2	1/2λ, 2-5/8λ
NR770RA	2m/70cm	200	UHF	38.6	1/2λ, 2-5/8λ
SG7000A*6	2m/70cm	100	UHF	18.5	1/4λ, 6/8λ
SG7500A	2m/70cm	150	UHF	40.6	1/2λ, 2-5/8λ
SG7500NMO	2m/70cm	150	NMO	41.0	1/2λ, 2-5/8λ
SG7900A*	2m/70cm	150	UHF	62.2	7/8λ, 3-5/8λ

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

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

1/4λ rated in dBi.

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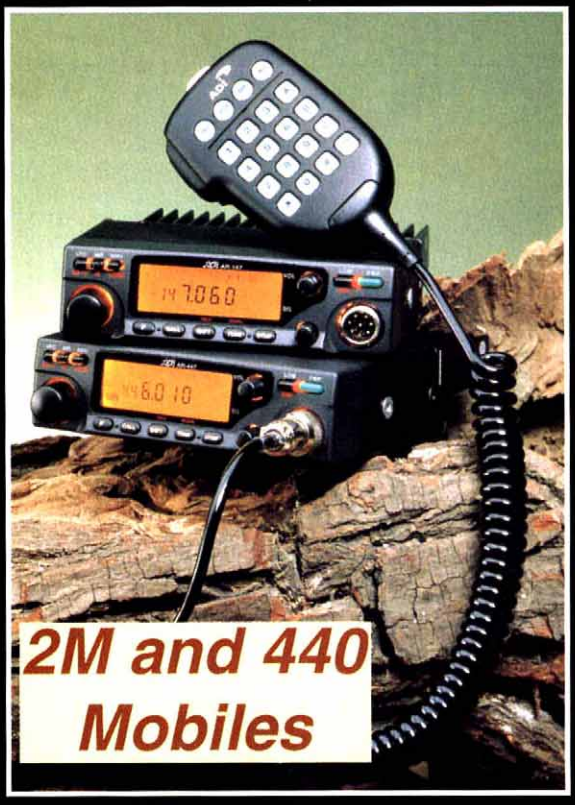

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"IT SEEMS TO US..."

Whither Shortwave Broadcasting?

Radio broadcasting was a latecomer compared to Amateur Radio, but shortwave (SW) broadcasting is almost as old as broadcasting itself. Also called high-frequency (HF) broadcasting, it has two great strengths: it reaches people in isolated locations and it defies political boundaries.

HF broadcasting came into its own as a propaganda medium in the tense years leading up to World War II and flourished during the Cold War. Those of us who grew up learning in school to "duck and cover" during air raid drills could go home and hear the propaganda war played out by Radio Moscow and other stations from the opposite side of the Iron Curtain. Our counterparts on that side did much the same, tuning to Radio Free Europe, Radio Liberty, the Voice of America, and the BBC when they could hear them through the jamming. It was the stuff of spy novels, brought to life in our bedrooms.

Shortwave listening (SWLing) was a common intermediate step between discovering the magic of radio and obtaining an amateur license. Many never saw the necessity for a transmitting license, finding plenty to keep them enthralled just by listening. Many who did get a license maintained a serious interest in SWLing, developing esoteric specialties (for example, collecting Indonesian tropical broadcasters) that require a knowledge of propagation surpassing that of an Honor Roll DXer.

That, as they say, was then—and this is now. The Cold War is over. The major international broadcasters now reach a larger share of their audiences through local stations and the Internet than by shortwave. For example, in Prague you can now hear the BBC on an FM radio—a far cry from 1968. Streaming brings perfect digital audio to your computer, 24 hours a day, from a multitude of sources and in dozens of languages. Many cable systems carry international radio broadcasting channels. Digital sound broadcasting by satellite is beginning to catch on. Nor are broadcasters and their audiences limited to audio. Want to see TV news from around the world? You can get it by satellite, complete with English interpretation. Want the news from a German perspective? Every night you can watch a highly polished newscast delivered in perfect English courtesy of Deutsche Welle.

The Gulf War may have been the last international crisis in which HF broadcasting played a major role in keeping people informed. By contrast, during the more recent crisis in Yugoslavia it was possible to find representatives of every conceivable point of view, official and otherwise, on the Web.

Big news in May was that the venerable BBC had decided to drop its shortwave broadcasts to North America, Australia, New Zealand, and the Pacific Islands effective July 1. Service is being shut down on nine frequencies to North America and on four to the Pacific. "The Beeb" will still be heard here via transmitters intended for Central and South America and Asia, but we are no longer a target area. This made the headlines because the BBC is so highly respected, but in reality it is simply the latest in a string of shortwave service curtailments over the past decade. Cost is the dominant factor: Big HF transmitters are expensive to maintain and operate.

With this backdrop you may wonder: Why are broadcasters looking for more spectrum between 4 and 10 MHz? Why is 40 meters such a problem? If they are already losing HF listeners, why are they spending money to develop a digital system for HF that will require listeners to buy new receivers?

Taking the last question first, there is a huge question mark hanging over HF digital broadcasting. Broadcasters are hedging their bets. They want to rewrite rules that now require them to abandon double-sideband AM no later than 2015. They want to be free to use both AM and digital for the foreseeable future. In other words, they want to abandon the quest for spectrum efficiency that was mandated by the 1992 World Administrative Radio Conference. Whether they will be allowed to do so is one of the questions that will be answered at the 2003 World Radiocommunication Conference.

Whether they see their future as digital or AM, some broadcasters place a premium on the spectrum between 4 and 10 MHz. With fewer political barriers to worry about they are changing their transmitter placement strategy. In some cases, transmitters that are located in what used to be "enemy territory" are now available for lease! For reliability they want to use transmitters that are one ionospheric hop from their target audience, and for that the frequencies below 10 MHz are ideal. Even with the service cutbacks the stated requirements for broadcasting channels below 10 MHz still exceed their allocations.

Internet streaming is coming much more slowly to some parts of the world than to others. In most countries, Internet service is not available for a flat monthly fee and heavy use is prohibitively expensive. Some countries continue to limit their citizens' access to certain Internet content.

The Cold War is over but there remain regional tensions in many parts of the world. Even the BBC is adamant that it remains committed to shortwave to reach audiences in the Middle East, The Gulf, and Asia.

HF broadcasting has one unique feature that means it will never be entirely written off by those responsible for foreign policy. Unlike any other means of reaching a distant audience, there is no "gatekeeper." The friendly administration that allows your program to be aired on a local FM station today may be gone tomorrow. Internet and telephone connections can be cut. Even satellite feeds can be disrupted.

HF remains the medium of last resort. Of course, if you're a ham you knew that!
—*David Sumner, K1ZZ*

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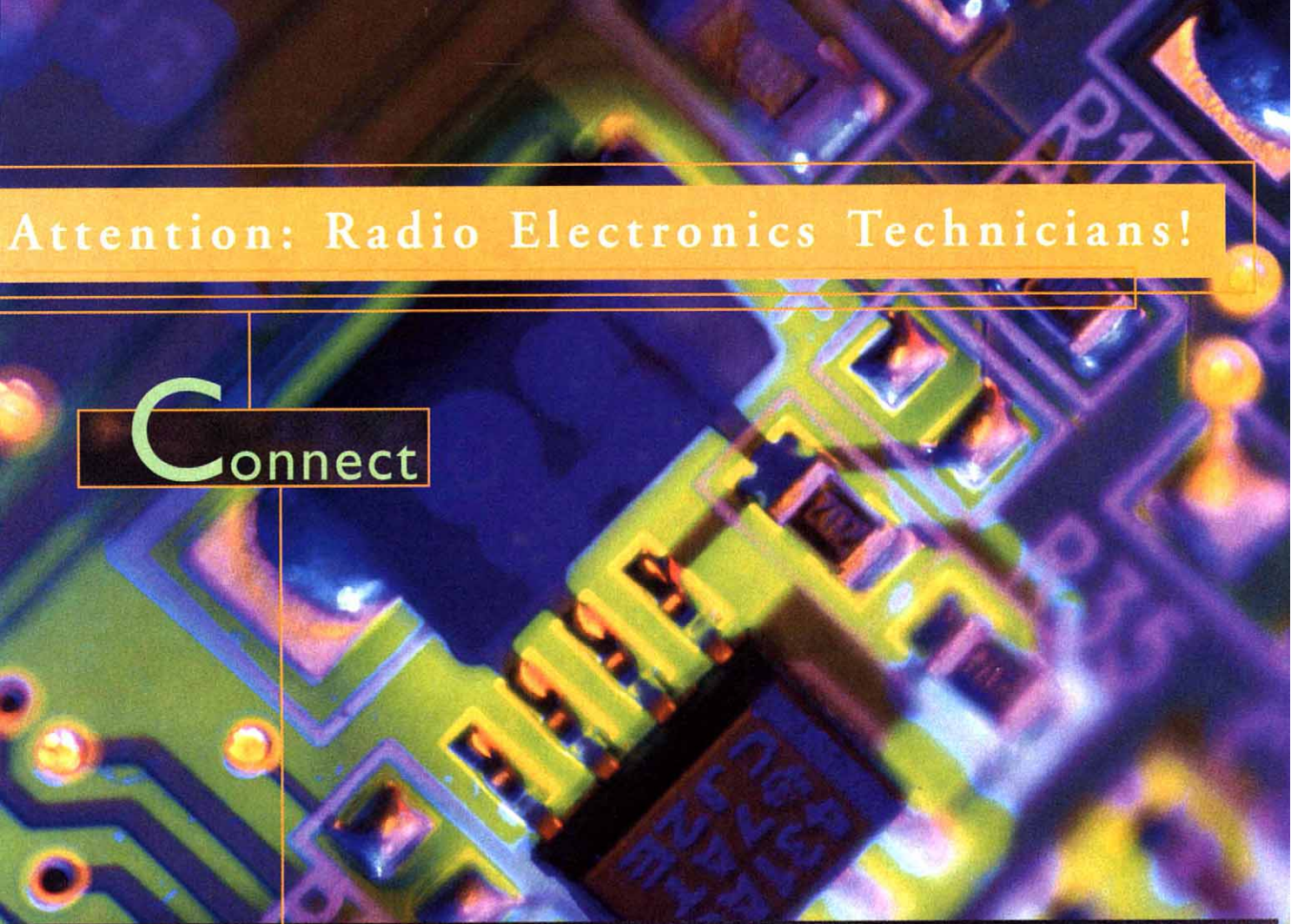

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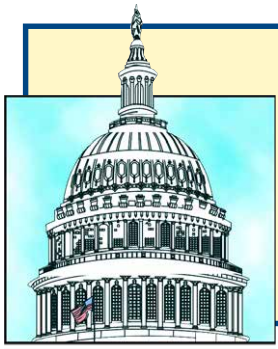

DC Currents

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 Makes a Federal Case of Driving with a Mobile Phone

After a year or two of unsuccessful attempts by state legislatures to rein in the driving habits of citizens who try to drive and talk on the mobile phone at the same time, the United States Congress has finally stepped into the picture.

Step one was the introduction into the US Senate of S.927, the *Mobile Telephone Driving Safety Act of 2001* by Senator Jon Corzine (D-NJ). Step two was the introduction of HR.1837, entitled the *Call Responsibly and Stay Healthy Act of 2001* (acronym *CRASH*), in the House of Representatives by Congressman Gary Ackerman (NY-D-5th). While the two pieces of legislation differ slightly in wording, their purpose is the same: to direct the US Secretary of Transportation to withhold federal highway funds from any state that permits its citizens to use hand-held mobile telephones while operating motor vehicles. The threat to withhold funds has been used before in other federal highway legislation; for example, to strong-arm states into falling in line on issues such as age 21 drinking laws and blood alcohol content laws. The Federal Highway Administration provides millions of dollars each year to states for the purpose of improving the nation's highway transportation system.

No action has yet been taken in either the Senate or House version of the legislation and, with the recent shift in power in the Senate, no clear prediction is yet possible. ARRL has reviewed both S.927 and HR.1837 and does not believe either bill in its current form poses much risk to amateur mobile operation. However, there is no way to predict how the bill that survives might be amended as it wends its way through the Congressional process nor, supposing it passes, how individual state legislatures will implement what they perceive to be the intent of Congress. While such legislation has passed at the local level in several counties or municipalities, so far none has passed at the state level. One potential problem for the Amateur Radio community and other mobile radio users is that neither federal bill fully defines what is meant by "mobile telephone." Presumably, both bills refer to mobile telephone devices (like cellular or PCS) that connect to the public switched telephone network, but they offer scant guidance so far. Only Senator Corzine's floor statement upon introduction of his bill, in which he notes that the bill's purpose is "to restrict the use of cell phones while operating a motor vehicle" provides any clear suggestion that the legislation (at least the Senate version) refers solely to cellular telephones.

Justification for such legislation remains contentious. While the *New England Journal of Medicine*'s conclusion that "use of cellular telephones in motor vehicles is associated with a quadrupling of the risks of a collision during the brief period of a call" has so far been definitive, newly emerging data suggests that perhaps cell phones aren't as big a distraction as previously thought. A study conducted for the American Automobile Association by the University of North Carolina Highway Safety Research Center, reported in the *Washington Post*, indicates that the major source of driver distraction leading to accidents appears to be "things outside the car" (29.4%) followed by such mundane tasks as "adjusting radio, CD, etc" (11.4%), and "other occupants" (10.9%). Cell phones as a cause of accidents were rated at 1.5%. However, the study's author conceded that some drivers involved in crashes might be embarrassed or otherwise reluctant to report cell phone usage, thus skewing the data.

Indications are that the wireless industry is likely to oppose both S.927 and HR.1837 vigorously. The Cellular Telecommunications and Internet Association (CTIA) says it believes "that public awareness on the issue of distracted driving is of paramount importance." "Unfortunately," says CTIA, "both legislative proposals put forth today fail to address the issues of education, data collection, and the strict enforcement of existing laws that prohibit unsafe driving due to driver inattention or distraction." The statement, on the CTIA Web site at **www.wow-com.com/news/press/body.cfm?record_id=947** goes on to note that "common sense can't be legislated."

New FCC Commissioners Now In Office

The US Senate confirmed President George W. Bush's three nominees for seats on the Federal Communications Commission. The confirmation sustained the three to two member Republican majority on the regulatory panel.

New faces on the commission are Republicans Kevin Martin and Kathleen Abernathy. Martin has been a White House aide, an aide to FCC Commissioner Harold Furchtgott-Roth and deputy general counsel of the Bush campaign, and has worked for Independent Counsel Kenneth Starr. Abernathy was a telecommunications attorney for several large telecommunications companies and law firms, and former advisor to FCC Commissioner James Quello. Martin's term expires June 2006, and Abernathy's June 2005. Republican FCC Chairman Michael K. Powell also was confirmed for a new five-year term. Powell was nominated to the Commission by President Clinton in 1997 and has served since then. During the same proceeding, Democrat Michael Copps, a former aide to Senator Ernest Hollings of South Carolina, was confirmed by the Senate. Copps was a lawyer in private and corporate practice before serving in the Clinton Administration's Commerce Department. Confirmation vote by the full Senate of the new Commissioners and Chairman followed a 17-0 vote by the Senate Commerce Committee. Still remaining on the panel is Democrat Commissioner Gloria Tristani, who was appointed by President Clinton in 1997 and serves until the end of this year.

With control of the Senate turning over from Republican to Democrat following

the departure of Vermont Senator Jeffords, Senator Ernest "Fritz" Hollings (D-SC) becomes Chairman of the Senate Commerce Committee. Senator Daniel Inouye (D-HI) becomes Chairman of the Senate Communications Subcommittee, where most federal telecommunications legislation is either blessed for passage or condemned for defeat in the Senate, and which has jurisdiction over the FCC and its activities. Senator Hollings replaces Arizona Republican Senator John McCain, and Senator Inouye replaces Montana Senator Conrad Burns.

In reporting a move that might signal improving relationships between the House side of Capitol Hill and the FCC, *Broadcasting & Cable* magazine recently noted that Reps. Billy Tauzin (R-LA-3rd) and Fred Upton (R-MI-6th) toured the new FCC offices for the first time ever. Tauzin is the former Chairman of the House Telecommunications Subcommittee and was recently elevated to Chairman of the House Commerce Committee. He has been a persistent critic of the FCC. Upton is the new Chairman of the Telecommunications Subcommittee, and so far has been more laid back than his predecessor in going after the Commission.

Spectrum Bill Begins to Attract Cosponsors

♦ The Amateur Radio Spectrum Protection Act (S.549 in the Senate and HR.817 in the House) has begun slowly to gain momentum. However, all bets are off whether or not that momentum can help to overcome the inertia of a Congress that, when faced with small telecommunications bills, tends to fall flat on its face without taking any further action. The House bill is almost perfectly balanced politically, with 11 Republicans, eight Democrats and one Independent, but the Senate bill currently has six Republicans and only one Democrat. What the cosponsor balance will mean in the wake of the unexpected shift in the Senate balance of power with the departure from the Republican Party of Vermont Senator James Jeffords remains to be seen. The bill, which has so far been nonpartisan and largely noncontroversial, would require the FCC to provide "equivalent replacement spectrum" if any Amateur Radio spectrum was to be reallocated to another service. Currently, the FCC can reallocate portions of Amateur Radio bands with few constraints other than the burdens of the regulatory process (in which ARRL has more often than not successfully challenged such reallocation).

The ARRL's visits on Capitol Hill suggest that many of the cosponsors we have gathered so far were motivated by the cards, letters and phone calls of ARRL members around the US to their Senators and Representatives. If you are an ARRL member, it is not too late to write. For more background information and a sample letter, visit the ARRL Web site at **www.arrl.org/govrelations/arspa.html**.

Amateur Radio Spectrum Protection Act Cosponsors

In addition to the original sponsor, Florida Republican Congressman Michael Bilirakis, HR.817, the House bill, also currently has 20 cosponsors. The Representatives signed onto the bill are:

Rep. John E. Baldacci (D-ME-2nd)
Rep. Tammy Baldwin (D-WI-2nd)
Rep. David E. Bonior (D-MI-10th)
Rep. Dan Burton (R-IN-6th)
Rep. John Conyers, Jr (D-MI-14th)
Rep. John T. Doolittle (R-CA-4th)
Rep. Paul E. Gillmor (R-OH-5th)
Rep. Virgil H. Goode, Jr (I-VA-5th)
Rep. Doc Hastings (R-WA-4th)
Rep. Johnny Isakson (R-GA-6th)
Rep. William L. Jenkins (R-TN-1st)
Rep. Walter B. Jones, Jr (R-NC-3rd)
Rep. Mike McIntyre (D-NC-7th)
Rep. Gary G. Miller (R-CA-41st)
Rep. George R. Nethercutt, Jr (R-WA-5th)
Rep. Charles W. Stenholm (D-TX-17th)
Rep. Ted Strickland (D-OH-6th)
Rep. Lee Terry (R-NE-2nd)
Rep. Karen L. Thurman (D-FL-5th)
Rep. Patrick J. Tiberi (R-OH-12th)

In addition to the original sponsor, Idaho Senator Michael Crapo, current sponsors of S.549 include:

Daniel K. Akaka (D-HI)
Thad Cochran (R-MS)
Susan M. Collins (R-ME)
Larry E. Craig (R-ID)
Jesse Helms (R-NC)
Bob Smith (R-NH)
Olympia J. Snowe (R-ME)

Media Hits

• *Channels*, the house magazine for ComNet Ericsson, features an article on school children using Amateur Radio to communicate with crewmembers aboard the International Space Station (ISS). The article says ComNet Ericsson donated some of the UHF/VHF radios used aboard the spacecraft for Amateur Radio communication. It cites NASA, ARRL and the Radio Amateur Satellite Corporation (AMSAT), and gives the ARRL Web site address for more information.

• *The Daily Jeffersonian* of Cambridge, Ohio reports on activities of the Cambridge Amateur Radio Association (CARA) and features a nice, lively picture of about a dozen junior high school students clustered intently around a ham rig. According to the caption, CARA members had been conducting an all-day seminar on ham radio. According to Jim Houser, WA8JIM, who sent us the article, CARA also spent the following weekend providing support to a safety break at one of the local highway rest areas, thus also providing support for one of the best definitions known of "public relations," that is, "good works publicly recognized."

• The gamut of Amateur Radio activities seems to be covered in a story that appeared in the *Northwest Florida Daily News*, published in Fort Walton Beach, Florida. However, the focus was on the capacity for emergency communication. Featured was a color photo of Walton County Emergency Management Coordinator Bill Bishop, N4EMA and Hoss Roberson, NX4I. Also mentioned was Robert Robbins, K3HNO.

• *The Daily Oklahoman*, published in Oklahoma City, Oklahoma recently explored the history of Morse code from its halcyon days when telegraph wires were just about the only reliable communication between Oklahoma City and the outside world, up to today's continuing popularity with Amateur Radio operators. The article names Harold Blum, W5VVU, Margaret Fish, WA5RLP, Melissa Rasmussen, KM5R and Dan Miller, K3UFG. Miller is an Education Coordinator at ARRL Headquarters.

• Musician Joe Walsh, WB6ACU, received favorable publicity in the *LA Times* for his Amateur Radio and Internet hobbies. In the article, Walsh discussed how he got into ham radio nearly 30 years ago, talked about how much fun he was still having with his radios (apparently a lot!) and gave a nice plug to *ARRLWeb* for nonham readers to check things out. During his long music career, guitarist Walsh has been a member of such influential rock groups as the Eagles and the James Gang.

AMERITRON . . . 800 Watts . . . $799

Ameritron gives you four 811A tubes, 800 Watts and far better quality -- for less money than the competitor's 3 tube 600 watt unit . . . Why settle for less power, less quality and pay more money?

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$799
Suggested Retail

AL-811
$649
Suggested Retail

Only the Ameritron AL-811H gives you four *fully neutralized* 811A transmitting tubes. You get absolute stability and superb performance on higher bands that can't be matched by un-neutralized tubes.

Ameritron mounts the 811A tubes vertically -- not horizontally -- to prevent hot tube elements from sagging and shorting out. Others, using *potentially damaging horizontal mounting*, require special 811A tubes to retard sagging and shorting.

A quiet, powerful computer grade blower draws in plenty of cool air. It *pressurizes* the cabinet and efficiently cools your 811A tubes. Our air flow is so quiet, you'll hardly know it's there--unlike noisy, poorly chosen blowers.

You also get efficient full size heavy duty tank coils, full height computer grade capacitors, heavy duty high silicon core power transformer, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual meters, QSK compatibility with QSK-5 plus much more.

AL-811 has three 811A tubes and gives 600 Watts ouptut for only $649.

Near Legal Limit ™ Amplifier

AL-572
$1395
Suggested Retail

New class of *Near Legal Limit*™ amplifier gives you 1300 Watt PEP SSB power output for *65%* of price of a full legal limit amp! Four rugged and powerful 572B tubes. Instant 3-second warm-up, plugs into 120 VAC. Compact 8½Hx 15½Dx14½W in. 160-15 Meters. 1000 Watt CW output. Tuned input, instantaneous RF Bias, dynamic ALC, parasitic killer, inrush protection, two lighted cross-needle meters, multi-voltage transformer.

HF Linears with Eimac 3CX800A7

AL-800H
$2495
Two tubes, 1500 W plus

AL-800
$1695
Single tube, 1250 Watts

These HF linears with *Eimac*® 3CX800A7 tubes cover 160-15 Meters including WARC bands. Adjustable slug tuned input circuit, grid protection, front panel ALC control, vernier reduction drives, heavy duty 32 lb. grain oriented silicone steel core transformer and high capacitance computer grade filter capacitors. Multi-voltage operation, dual illuminated cross-needle meters.

AL-80B . . . Desktop Killowatt 3-500ZG Amplifier

Ameritron's AL-80B kilowatt output desktop linear amplifier can double your average SSB power output with high level RF processing using Ameritron's exclusive *Dynamic ALC*™!

You get cooler operation because the AL-80B's exclusive *Instantaneous RF Bias*™ completely turns off the 3-500ZG tube between words and dots and dashes. It saves hundreds of watts wasted as heat for cooler operation and longer component life.

You get a full kilowatt PEP output from a whisper quiet desktop linear. It's a compact 8½Hx14Dx15½ inches and plugs into your nearest 120 VAC outlet. Covers 160 to 15 Meters, including WARC and MARS (user modified for 10/12 Meters with license).

You get 850 Watts output on CW, 500 Watts output on RTTY, an extra heavy duty power supply, genuine AMPEREX 3-500ZG tube, nearly 70% efficiency, tuned input, Pi/Pi-L output, inrush current protection, multi-voltage transformer, dual Cross-Needle meters, QSK compatability, two-year warranty, plus much, much more!

AL-80B
$1299
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Made in the U.S.A.

AMERITRON offers the best selection of legal limit amplifiers

AMERITRON's legal limit amplifiers use a super heavy duty Hypersil® power transformer capable of 2500 Watts!

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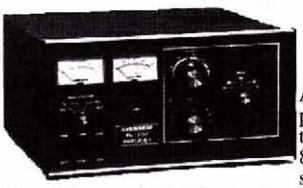
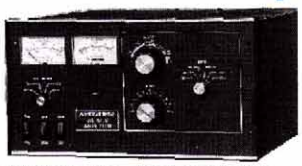


AL-1500
$2945
Suggested Retail

Ameritron's super powerful amplifier uses the herculean *Eimac*® 8877 ceramic tube. It's so powerful that 65 watts drive gives you the full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.

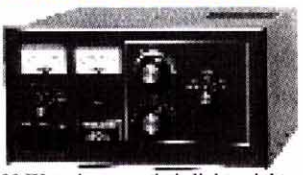
Ameritron's 3CX1200A7 linear Amp



AL-1200
$2495
Suggested Retail

Get ham radio's toughest tube with the Ameritron AL-1200 -- the EimacR 3cx1200A7. It has a 50 Watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 Watts PEP two tone output for a half hour.

Ameritron's dual 3-500 linear



AL-82
$2395
Suggested Retail

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

AMERITRON no tune Solid State Amplifiers

ALS-500M 500 Watt Mobile Amp

AL-500M
$799
Suggested Retail

Ideal Mobile amplifier uses 13.8 VDC mobile electrical system, very compact 31/2x9x15 inches, extremely quiet, 500 Watts output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm-up, no tubes, SWR protected.

ALS-600 Base 600 Watt Amp

AL-600
$1299
Suggested Retail

No tuning, no fuss, no worries -- just turn it on and operate. Includes AC power supply, 600 Watts output, continuous 1.5 to 22 MHz coverage, instant bandswitching, fully SWR protected, extremely quiet, very compact. Amp is 6x9½x12 inches.

AMERITRON brings you the finest high power accessories!

RCS-8V Remote Coax Switch . . . $149

Replace 5 coax feedlines with a single coax. 1.2 SWR at 250 MHz. Useable to 450 MHz. 1 kW at 150 MHz. **RCS-4, $139**. 4 position remote HF switch.

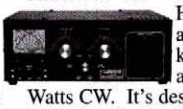
ADL-1500 Dummy Load with oil . . . $59.95

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

ICP-120/240 Inrush Current Protector . . . $79

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

ATR-20 (1.2kW) Antenna Tuner . . . $459



Handles a full 1.2 kW SSB and 600 Watts CW. It's designed to safely handle the full legal SSB power of the AL-811/811H/80B/ALS-500M/ALS-600 and others.

ARB-702 (I,K,Y) amp-to-radio interface . . . $39.95

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

QSK-5 Pin Diode T/R Switch . . . $349

Self-contained, connects externally to most HF amps. Handles 2.5 kW PEP, 2 kW CW. Six times faster than vacuum relay. 6x4x9½ in.

ATP-100 Tuning Pulser lets you safely tune your amplifier . . . $49.95 Pulse tuning lets you safely tune up your amplifier for full power output and best linearity. Keeps average power to low safe level to prevent overheating, tube damage, power supply stress and premature component failure.

ADL-2500 Fan cooled 2500W dry dummy load ...$199.95 Whisper quiet fan. Handles any legal limit amplifier -- 2500 Watts average power for 1 minute on, ten off. 300 Watts continuous. SWR below 1.25 to 30 MHz and SWR below 1.4 to 60 MHz.

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Self-supporting -- no guys required . . . Remarkable DX performance -- low angle radiation, omnidirectional . . . Handles 1500 Watts . . . Low SWR . . . Automatic band switching . . . Aircraft quality aluminum tubing . . . Stainless steel hardware . . . Recessed SO-239 connector . . . Two year limited Warranty . . .

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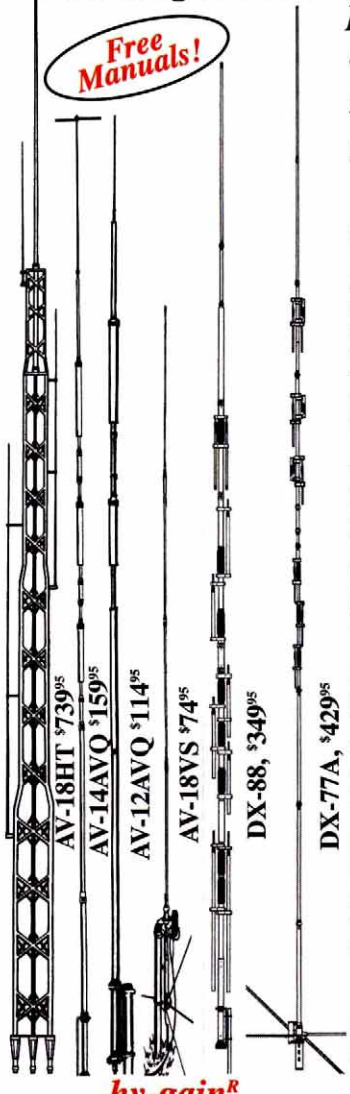


hy-gain[R] Classics

All hy-gain multi-band vertical antennas are entirely self supporting -- no guys required.

They offer remarkable DX performance with their extremely low angle of radiation and omnidirectional pattern.

All handle 1500 Watts PEP SSB, have low SWR, automatic bandswitching (except AV-18VS) and include a 12-inch heavy duty mast support bracket (except AV-18HT).

Heavy duty, slotted, tapered swaged, aircraft quality aluminum tubing with full circumference compression clamps is used for radiators. Includes all stainless steel hardware. Recessed SO-239 prevents moisture damage. Hy-gain verticals go up easily with just hand tools and their cost is surprisingly low. Two year limited warranty.

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

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

The 24 foot tower is all rugged, hot-dip galvanized steel and all hardware is iridited for corrosion resistance. Special tilt-over hinged base for easy raising and lowering.

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

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

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

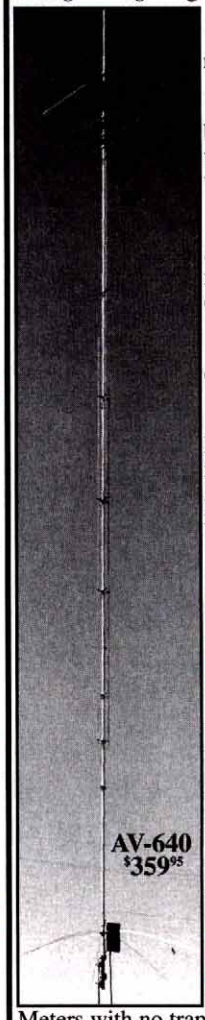
DX-88, $349.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs. All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: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

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

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

hy-gain[R] PATRIOT

Hy-Gain's new **PATRIOT** HF verticals are the best built, best performing and best priced multiband verticals available today. For exciting DX make full use of your sunspot cycle with the **PATRIOT's** *low 17 degree angle* signal.



No ground or radials needed
Effective counterpoise replaces radials and ground.

Automatic bandswitching
Single coax cable feed. Each band is individually tunable. Extra wide VSWR bandwidth. End fed with broadband matching unit.

Sleek and low-profile
Low 2.5 sq. ft. wind surface area. Small area required for mounting. Mounts easily on decks, roofs and patios.

Full legal limit
Handles 1500 Watts key down continuous for two minutes.

Built-to-last
High wind survival of 80 mph. Broadband matching unit made from all *Teflon*[R] insulated wire. Aircraft quality aluminum tubing, stainless steel hardware.

hy-gain[R] warranty
Two year limited warranty. All replacement parts in stock.

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

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

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Who says hams don't build their own circuit components? Don Moler, N8BKR (above), is putting the last turn on a massive loading coil for his 1750-meter vertical antenna. With assistance provided by his neighbor (left), Don is building the huge antenna for the band between 160 and 190 kHz, the spectrum inhabited by low-frequency experimenters known as *Lowfers*. You'll find plenty of Lowfer information on-line at the Long Wave Club of America Web site at **www.lwca.org**.

Top cop! The Bowling Green, Kentucky Police Department honored Tim Robinson, KF4MGU, as Police Officer of the Year. Tim is an active amateur and a member of the Kentucky Colonels Amateur Radio Club.

We know Amateur Radio airline pilots occasionally call CQ from their flight decks, but could this be taking it too far? Giovanni Bini, I5JHW, spotted this unusually marked Alitalia MD-88 while returning from a DXpedition in Tunisia.

Forty years in the making. In August 1963, Zed Freeman, K0NNN, worked K0WWW. After receiving the QSL, Zed wondered if it would be possible to contact and QSL his way through the entire alphabet of triple-lettered call sign suffixes. In December 2000 his ambitious suffix alphabet from AAA to ZZZ was complete when he worked N1PPP.

CQ DX—*mobile*. Mike DiPersio, KC2Q, hunts DX while making regular trips up and down the East Coast with his Hustler multiband vertical (below). The control head of his ICOM IC-706 transceiver (right) mounts unobtrusively on the top of the dash. And when Mike stops for the night, the mobile antenna quickly becomes stationary on the hotel balcony (bottom)!

THOMAS BABB, KF4JKQ

50 years of membership. ARRL Roanoke Division Director Dennis Bodson, W4PWF, presents a 50-year membership plaque to Al Leonard, W4RXG, at the Raleigh Hamfest as Roanoke Division Vice Director Leslie Shattuck, K4NK, looks on.

THOMAS B. STELMAK, KD7Q

One hobby leads to another… Former ARRL Montana Section Manager Les Belyea, N7AIK, recently retired and decided it was time to take up a second hobby—restoring old farm machinery. Les couldn't resist adding his call sign to this renovated 1964 swather.

Time for radio. Dr Dave Borenstein, KA2HTV (seated), visited Ghana on a medical mission early this year. Despite the hectic schedule, Dr Borenstein found the time to obtain a license as 9G5DR and operate from the home of Kofi Jackson, 9G1AJ (standing).

JOHN HALLEY—*THE ATHENS MESSENGER*

An active Centenarian. Fritz Heffken, W8CRS, turned 100 years old this year, yet he is still on the air regularly from his home in Athens, Ohio. Fritz has been a long-time member of the Athens County Amateur Radio Association.

"Can" do! Phil Caubarreaux, KB5EKD, opted to build a 20-A, 13.8-V dc power supply into a paint can (top). The heat sinks mount on the opposite side from the meter and connection posts (bottom).

QRPers meet in Newington. Last March, members of the New England QRP Club gathered for their winter meeting at ARRL Headquarters station, W1AW. Low-power enthusiasts are among the most active homebrewers in Amateur Radio today. As their banner states: "The Excitement Is Building."

Simultaneous Reception

VHF/VHF | UHF/UHF | VHF/UHF

A New Dual-Band Engineering Milestone:

Introducing the Dual Band Mobile for the 21st Century's Active Ham!

The Yaesu Engineering Team has done it again! The exciting new FT-7100M Dual Band Mobile brings you the ruggedness and operating ease of our single-band mobiles, and the convenience of remote-head mounting capability (optional YSK-7100 Separation Kit required), in an all-new 144/430 MHz Dual Band design!

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Rugged, reliable, and versatile, the FT-7100M provides the highest cost-performance available among Dual Band FM Mobiles. See your Yaesu Dealer today for a test drive!

FEATURES

- Frequency Range: TX 144-148, 430-450 MHz RX 108-137 MHz (AM), 137-180 MHz, 320-480 MHz, 810-999.99 MHz (Cellular blocked)
- VHF/UHF, VHF/VHF, and UHF/UHF Dual Receive operation*
- Channel Steps: 5/10/12.5/15/20/25/50 kHz/step
- Power Output: 50 Watts (144 MHz) 35 Watts (430 MHz)
- Power Amplifier Type: 2SK3478 Power MOS FET
- Efficient Cooling System: Direct-flow heat-sink and thermostatically-controlled fan
- 262 Memory Channels: 120 "regular" memories, 5 pairs of band limit memories, and one "HOME" channel on each band
- Alpha-Numeric Memory Labels: 6 Characters on lower display field, 5 Characters on upper
- Smart Search™ Automatic Memory Loading System
- 50 CTCSS Encode/Decode Tones
- 104 DCS Encode/Decode Codes
- CTCSS and DCS Search
- ARTS™ (Auto-Range Transponder System)
- Automatic Repeater Shift (ARS)
- DTMF Microphone (U.S. version): Includes 16-memory Auto-dialer, and Direct Frequency Entry
- Band Scanning, Band-Limit Scanning, and Memory Scanning
- Three Priority Channel Modes: VFO, Memory, and Home Channel Priority
- RF Squelch: Opens at user-defined signal level
- Tx Time-Out Timer (TOT)
- Automatic Power-Off (APO)
- 1200/9600 bps Packet Compatible
- Battery Voltage Meter
- Compact Size: 5.8" x 1.9" x 6.9" WHD
- Large (0.9" x 2.3") Liquid Crystal Display
- Cloning Capability: To other FT-7100M Transceivers
- Optional YSK-7100 Separation Kit
- Optional CT-39A Packet Cable

*Simultaneous reception on two different Frequencies, in-band or Cross-Band. Cross-band Repeater Function not available.

144/430 MHz FM Dual Band Mobile Transceiver

FT-7100M

Actual Size

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I. Interlocked Digital Bandwidth Tracking System (IDBT)

II. Variable RF Front-End Filter (VRF)

III. 200 Watts of Transmitter Power Output

IV. Class-A SSB Operation

V. Multi-Function Shuttle Jog Tuning/ Control Ring

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HF 200 W All-Mode Transceiver

MARK-V FT-1000MP

For Elite-Class Amateur Radio Operators...

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VSPC (Variable Side Pressure Control)

APPLICABLE TRANSCEIVERS

MARK-V FT-1000MP, FT-1000/-1000D*, FT-990*, FT-920, FT-900, FT-847, FT-840*, FT-817

* The FT-1000/-1000D/-990/-840 do not support the illumination of the TX LED during transmission.

Ultra-High-Fidelity Desktop Microphone

MD-200A8X

Expand Your DX Horizons With The FTV-1000 50 MHz Transverter!

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200 W 50 MHz Transverter

FTV-1000

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CORRESPONDENCE

Your opinions count! Send your letters to "Correspondence," ARRL, 225 Main St, Newington, CT 06111.
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We read every letter received, but we can only publish a few each month. We reserve the right to edit your letter for clarity, and to fit the available page space. Of course, the publishers of *QST* assume no responsibility for statements made by correspondents.

THE MISUSE OF RST

♦ I'm frustrated with the continued misuse of the RST signal-reporting system. On phone operations I seldom hear any reports that are not 5-9, especially during a contest. How many times do you hear, "You're 5-9, but I didn't get your name and there is heavy interference"? On CW I constantly get "RRR" on a return transmission and an RST report of 599 only to hear soon thereafter that "copy is a bit rough."

Do folks think they are offending others with anything less than a 599 RST? There are lots of 599s issued that truly don't warrant those reports!

The Tone part of the RST is also misused, in my observation. Maybe with all the commercial gear that now proliferates our bands, there are so few non-pure dc notes that we don't know what a chirp sounds like anymore. Regardless of the fact that lots of hams today wouldn't know what to do about a chirp if they had one, it seems to me that many people don't know the differences in note tone.

While we're at it, let's return to the regular use of "DE" between call signs when operating CW. It seems like many amateurs are opting to drop the "DE" for some unknown reason.—*John Shorb, W3FSA, Bethel, Maine*

HELICOPTER OPERATIONS

♦ I was pleasantly surprised to see an article about helicopter operations in the May 2001 *QST* "Public Service" column. The article is well written and provides a good source of safety information for operating around a helicopter. However, I am concerned with one particular piece of information that has the potential to cause problems. The author recommends the use of "highway safety flares" as one method of marking a landing zone at night.

This can be extremely dangerous, as some (perhaps all, I'm not sure) helicopters normally vent fuel out onto the ground via a small flexible hose on the underside of the fuselage. If a pilot were to land on top of a flare, this could ignite the fuel and cause a catastrophe. The reference books I have read recommend using flares cautiously, making sure they are secured, and only using them at the edges of the landing zone (LZ) perimeter. However, rather than have to worry about flares coming loose, being too close and so on, I would recommend an alternate method that is just as effective and does not pose the risk of fire that flares do: vehicle headlights. Parking vehicles on the edges of a perimeter, facing in, with headlights on will do a fine job of illuminating the LZ for a pilot. This gets easier with several vehicles, but even with two you can arrange the position of the cars so that the headlight beams intersect, forming an **X**.

I have been involved in Emergency Medical Services for 18 years, both as a Paramedic and RN, and I have flown on 200 EMS helicopter missions in four years as a flight nurse. We were taught, and we teach others at safety demos, that no open flames of any kind (or lit cigarettes!) are to be within 200 feet of our aircraft. The venting of the fuel is normal and occurs when the aircraft is being shut down; it may go unnoticed with all the wind and noise of the rotors until the aircraft has been shut off. Eventually a spot of fuel about 6 to 12 inches in diameter will form on the ground under the venting tube. I recall numerous occasions where well-intentioned ground personnel urgently made us aware that our aircraft was "leaking fuel" and needed maintenance.

On the subject of lighting, any lights that are on at an LZ at night should be pointing at the ground, or directly illuminating hazards (tree limbs, power lines) that the pilot is to avoid. Otherwise, keep lights out of the sky, as they can negatively affect the pilot's vision. This includes waving flashlights at the aircraft, and also means shutting off light bars (especially strobes) on vehicles once the aircraft is nearby and has found your LZ. Lastly, if a human is going to "flag down" the helicopter at night, he or she should position themselves so that the aircraft will be approaching into the wind if possible. Hold a flashlight in each hand and extend arms fully upright. Once the aircraft has found you and is on approach, secure the flashlights, put your arms down, and back away from the LZ. Observe the pilot for any signals he may give you. Beware of rotor wash!

The author is absolutely correct to state that only trained personnel should approach "hot" aircraft. This includes approaching as the aircraft is winding down. Be aware that rotor blades are very flexible (more so once power is removed) and can dip low enough to separate you from your head! Wait until the aircraft is completely secured and the pilot waves you forward before approaching. If you are called upon to approach while the aircraft is running, stay crouched down, keep your arms lower than your head, and secure any loose items. Maintain direct eye contact with the pilot at all times.—*Andy Craig, K3NP, Charlotte, North Carolina*

DON'T CHANGE THE POWER LIMIT

♦ W6ZU seems to have lost sight of the purpose of the Amateur Radio Service, as it is defined in Part 97. The primary purpose is to provide emergency communications in times of disasters. In such circumstances it may be that lives and property depend on the ability of amateurs to establish reliable communication links, which may, in turn, be facilitated by the ability to crank out a robust signal.

I should point out that the legal power limit is not 1500 W. *It is the lowest power level below 1500 W consistent with maintaining the contact.* If the contact can be carried out at 25 W, then 25 W is the legal power level. The vast majority of hams keep power levels low and only run higher power when conditions warrant.

I won't comment on the energy conservation argument other than to note that there is not much of a burden imposed on the power grid by amateur amplifiers. Asking West Coast amateurs to turn off their linear amplifiers will not make a dent in the current power shortages.

Just for the sake of clarity, I note that I do not own an amplifier, nor do I ever run anything much above 150 W. Usually I'm at or near QRP levels on any bands I run on. For my own operations a 400 W limit would have no effect at all. That said, I am certainly not in favor of cutting down the potential effectiveness of Amateur Radio in providing emergency communications by imposing more stringent power restrictions than are already in effect.

Good amateur practice already dictates the use of the lowest effective power levels. I'm inclined to think that the vast majority of hams adhere to that standard, so further regulation in this area is at best unnecessary and at worst could lead to a diminution of our ability to serve when the need arises.—*Bruce Moyer, KI8GR, Lincoln Park, Michigan*

♦ I am writing in response to the letter in the May 2001 issue of *QST* by Wesley Wiley, W6ZU, asking the ARRL petition the FCC to lower the legal power limit from 1500 to 400 W. I strongly object to this proposal on at least two grounds.

First of all, I pay for my power. It's not free. If hams want to conserve power, let them turn their radios down to 400 W as Mr Wiley suggests, but I reject the idea that all hams must bow to such a reduction by rule of law. Again, I will gladly pay whatever price I can afford for all the power I use in my household. Energy is priced according to supply and demand like any other product. If I don't mind paying an exorbitant price to run 1500 W, why shouldn't I be able to do so? Attitudes like Mr Wiley's are dangerous in that they give the government the freedom to restrict other areas of our lives that are "incorrect" according to the opinions of others.

Secondly, the notion that lower output keeps the peace in the neighborhood is flawed. Hams need to understand the vast majority of RFI cases are not their fault. Most hams just assume guilt and so allow their neighbors to control their operating practices. Educating the neighbors, explaining the laws and working with them to solve their problems, is the preferred solution.

The only restrictions that the FCC should put on power output should be based on safety—the safety of the operators using the equipment and safety for those who may come in contact with the antennas.—*Jon Ogden, NA9D, Algonquin, Illinois*

MORE ON RESTRICTIVE COVENANTS

♦ I enjoyed the OpEd piece that appeared in April 2001 *QST* concerning the problem of restrictive covenants. I also used to dismiss the problems of covenants as people just not doing their homework when buying property. The OpEd hit a resonance with me because I think restrictive covenants may be the number-one threat to Amateur Radio in the long term.

It is interesting to note that the Direct Broadcast Satellite folks figured this out and dealt with it. If they had not gotten the ruling from the FCC protecting the use of small dish antennas, their industry would not be flourishing. And do these dishes decrease the value of real estate? I don't think so.

A similar accommodation should be applied to Amateur Radio antennas. It may not be reasonable to have the FCC offer blanket protection for HF monoband beams on 50-foot towers, but at the very least they should protect small installations. This could take the form of some maximum antenna dimension and/or maximum height above an existing building. I know this idea could be very divisive for the amateur community, but it would still be the right thing to do for the amateur service.—*Bob Witte, KB0CY, Monument, Colorado*

♦ I'd like to comment on W7II's OpEd piece in April *QST*, in which he was responding to my letter published in "Correspondence" opposing the League's position on restrictive covenants.

First, I never suggested that hams who live in areas with such restrictions should live with the restriction and "never voice opposition." In fact, I suggested the exact opposite. I suggested that where one chooses to live is a personal choice, that one must be aware of any restrictions before making a purchase, and that hams could certainly make an effort to gather support to modify condominium by-laws and other restrictions if they so chose.

And, speaking as president of my condominium association, my larger point was that restrictive covenants, condo by-laws and other such rules serve a very useful purpose, and that Federal preemption was not the answer.

However, based on W7II's comments, and those of WB4GCS published in the February "Correspondence," I've learned that there are areas in this country where such restrictions may be the norm. This is not the case here in the New York metropolitan area where I live, or in other areas of the Northeast with which I am familiar. And while I have a hard time believing that such restrictions are so widespread that we should be looking for Federal help, I will accept that premise at face value in hope of suggesting a workable compromise.

Rather than have blanket Federal preemption of all restrictive covenants and by-laws, I would suggest such preemption only when a certain percentage of property within a defined geographic area is governed by such limitations. That geographic area could be defined by municipal boundaries, county lines, or other such geographic definitions as are appropriate. Likewise, the appropriate threshold percentage would also need to be discussed. I am merely suggesting a concept, not the complete package.

People who choose to purchase a home in this community voluntarily do so, and have the responsibility to understand those issues prior to purchase. If they don't like the restrictions, they can go elsewhere, or attempt to gather support for change following their purchase. Conceding that some hams may live in areas with less choice, however, I believe my suggestion should be fully explored and debated, and that a workable compromise could be easily developed.—*Art Malatzky, WB2WFJ, Valley Cottage, New York* QST

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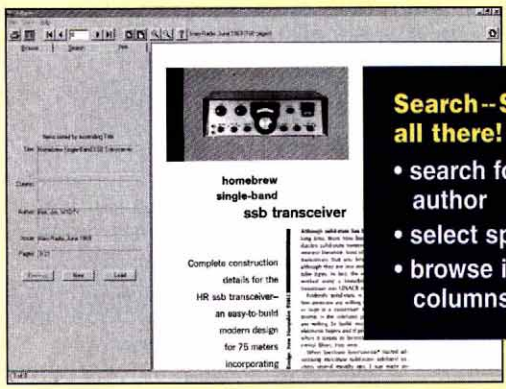

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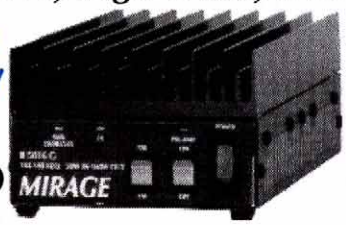

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- *All modes: FM, SSB, CW*
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Power Curve -- typical B-34-G output power							
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Watts In	1	2	3	4	5	6	8

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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/35 Watts on 440 MHz*
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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).

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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.

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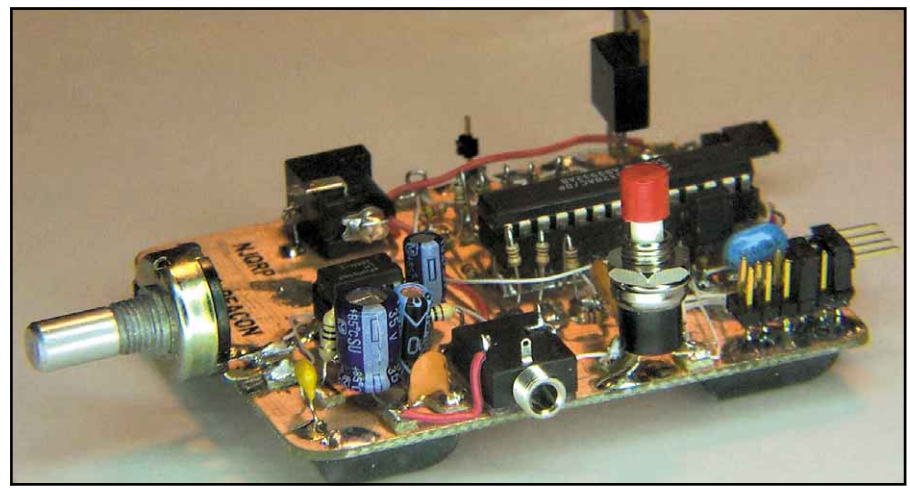
A conventional PC typically provides the relatively intensive computing power required for PSK31 modulation and demodulation. With this beacon project, however, the PSK31 modulation computations have been designed to fit into a small PIC-like microcontroller that can serve as the basis for the "transmit half" of a standalone PSK31 controller.

A fast and inexpensive microcontroller is programmed to generate an audio data stream using the PSK31 algorithms. The data-driven audio waveform is fed to an amplifier IC that drives a speaker and *voila*, the familiar and melodious PSK31 warble is heard! When presented as input to a PSK31 receiving system such as *DigiPan*, these modulated audio tones are decoded and the programmed beacon string is displayed.

A keyboard or data terminal may also serve as the input of real-time textual data to the PSK31 audio beacon. A standard RS-232 serial interface is provided in the hardware and software to allow a more dynamic "signal generator" use of the project. The project can be electrically connected to the input of an SSB transceiver to create an RF PSK31 beacon for brief tests.

This project is also ideally suited for groups wishing to have some "audio beacon" fun during meetings. A number of club members would operate their audio beacons while someone attempts successful copy of the beacon strings while sitting at a microphone-equipped laptop running *DigiPan* software.

Construction is simple and straightforward, and you'll have immediate feedback on how your beacon works when you plug in a 9-V battery and speaker.



Beacon Features

- Single-chip implementation of PSK31 encoding and audio waveform generation.
- An on-board audio amplifier sufficient to drive a speaker for group activities.
- A low-level output suitable for interfacing to an SSB transceiver.
- A Scenix SX28 RISC microcontroller operating at 50 MHz with a 20-ns instruction cycle time. This provides computing power necessary for accurate implementation of the PSK31 modulation algorithm. The SX chip is similar to Microchip's popular PIC microcontroller, containing the same software instruction set but operating more than 40 times faster.
- The SX28 microcontroller is programmed with a unique beacon string. It can also accept real-time text input from an RS-232 serial interface.
- Configuration jumpers provide for selection of three base carrier frequencies (500 Hz, 1 kHz or 2 kHz), and choice of 16 sub-variations around the selected base frequency. This allows the user to operate the beacon on any of 48 distinct audio frequencies.
- Continuous loop or single-pass operation.
- Open source code for custom modification of the beacon string and/or software operation.
- Construction may be done Manhattan-style (a form of ugly-style construction) for freedom of desired implementation. A printed circuit board is also available for this project.

Typical Beacon String

The current version of the beacon software is programmed to transmit two types of data in sequence:

(1) Idle Stream—Upon transmit initiation, the beacon sends a series of 64 zeros to allow the PSK31 receiving system and decoder to synchronize for the data reception that follows. In some PSK31 applications this idle stream time allows the decoding software to measure signal "IMD," an indication of energy present in adjacent sidebands and somewhat of a figure of merit for the received signal.

(2) Data String—Immediately following the idle stream of zeros, the beacon begins sending the data string that will ultimately be displayed on the receiving side of the communications channel. This is the custom-programmed sequence

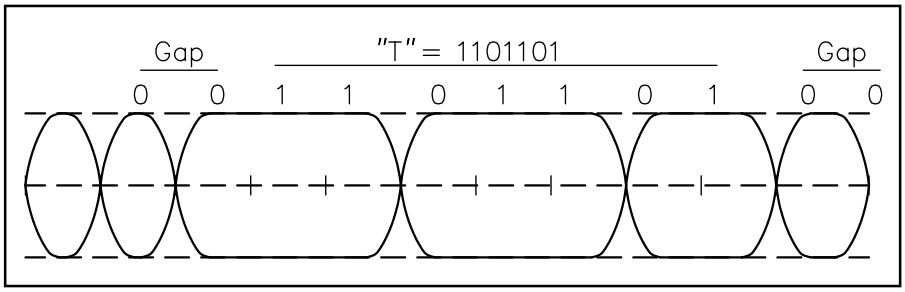


Figure 1—This represents 15 cycles of the 500-Hz carrier constituting a 31-ms bit-processing window. The sequence of characters processed were two sequential zeros—the first being encoded in the phase reversal seen at the zero-power point on the left, and the second on the right.

of ASCII characters. The data string may be of any length, and is limited only by available memory.

What Can You Do with a PSK31 Audio Beacon?

As I mentioned, the beacon may be used as the basis for a fun group "contest" activity for your club. All contestants would turn their beacons on and gather around a laptop running *DigiPan* software. Laptops generally have built-in microphones that would be used to decode the audio PSK31 tones "in the air" ... and with over 100 beacons warbling simultaneously, there will certainly be audio tones in the air!

Recall that each beacon's microcontroller can be customized with a call sign and can also operate on slightly different frequencies. One beacon may have its tones centered at 978 Hz, while another may have its tones at 1050 Hz.

Imagine a bunch of club members amassed around a table with an operator sitting at the laptop. The idea is to see how many beacons the operator can copy within a specified period of time. Factors involved in successful reception include the settings of the audio amp, the type of speaker, the distance between the beacon and the laptop, adjacent QRM (other beaconers) and so on. "Points" are awarded to all beacons for the degree of solid copy captured during the time period. (You can see a photo of this excitement in the "Up Front" section of July *QST*. The photo was taken at the Atlanticon QRP convention in Maryland last spring.)

This all may sound complex, but it's really quite simple—build the beacon, turn it on and see how well it can be copied by *DigiPan*. Each contestant could actually do this during the test phase at home prior to the club event.

Putting the Beacon on the Air

Projects can be fun in a group setting, but the PSK31 audio beacon has lasting value for the individual PSK31 enthusiast. The audio tones generated by the beacon can be used to drive any SSB transceiver. This would allow you to easily put a beacon signal on the air for all the same reasons that CW beacons are used (studies of propagation, power levels, antenna characteristics, etc).

Special care must be exercised on two counts, however.

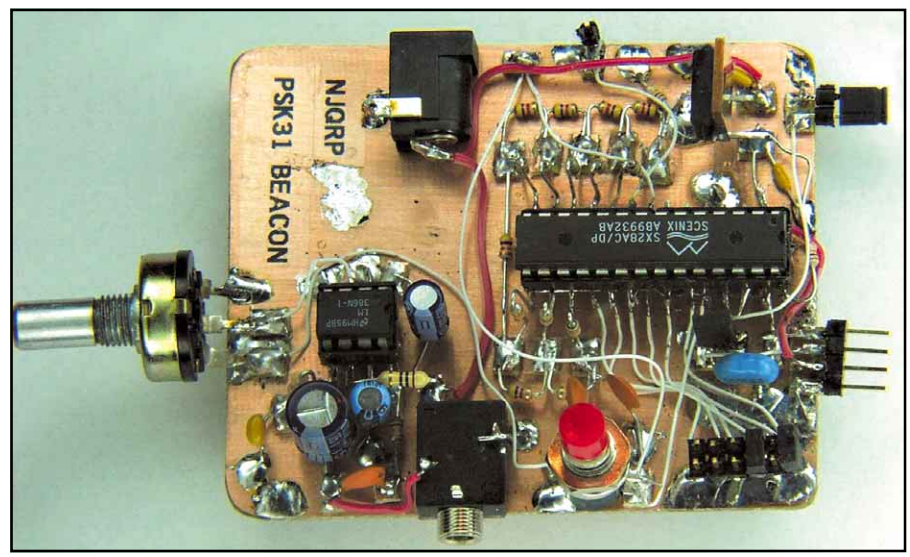
First, the audio level driving an SSB transmitter *must be extremely low* compared to the speaker output levels provided by the beacon kit. Most certainly, the LM386 audio amplifier output that drives the beacon's speaker should *not* be used when feeding a transmitter. You should take the output of the R-2R DAC and put it through a voltage divider pad (or potentiometer) to bring the 0-to-4.5-V sine wave signals down to the millivolt range required by an SSB transceiver. The lower the better! If the transmitter is overdriven, all sorts of problems occur with the transmitted RF spectrum—terrible intermodulation distortion (IMD) and interference to other signals up and down the band. You will quickly earn the wrath of others who will see your call sign and e-mail address transmitted over and over.

Secondly, even in the case of perfect signal quality, *never leave the beacon on for continuous, unattended operation*. Not only would this be illegal in most instances, it is also very poor amateur practice. This beacon is intended only for *brief* testing when used over the airwaves.

Circuit Description

Refer to the schematic shown in Figure 3. The kit provides a standard battery clip with which the user can connect a 9-V battery. Any dc voltage from about 9-12 V may be used since the 3-pin regulator VR1 drops the input voltage down to the required 5 V for the microcontroller. Current consumption of the beacon circuitry is nominally about 80 mA, so the regulator will naturally get a little warm. If an SX-Key programmer is connected to the beacon (allowing reprogrammability of the microcontroller), a TO220-packaged 1-A voltage regulator such as an LM7805 should be substituted due to the overall higher current demands of the programmer.

The Scenix SX28 microcontroller used in the beacon operates at 50 MHz clock rate, providing an instruction cycle time of 20 nanoseconds. This fast operation enables precise control of signal generation and phase reversals to produce stable and accurate carrier modulation at the audio baseband frequencies. A 50-MHz ceramic resonator is used with



Notice the potentiometer used for audio drive control into the LM386, the 1/8-inch jack used for the speaker output, the pin headers used for configuration, the coaxial dc power jack used for the dc input power, the real START pushbutton, and the 4-position pin header on the right used for the SX-Key programmer connection. This little board has lots of flexibility and is relatively self-contained.

the on-board oscillator to provide a fast and simple controller solution to the generation of PSK31 encoding.

There are numerous ways to generate a sine wave suitable for use in communications systems, and each has advantages and trade-offs. A discrete chip sine wave generator or a separate digital to analog converter (DAC) could have been used, but it was desired to keep both hardware complexity and cost to a minimum.

Another popular method used in generating a sine wave is to pulse width modulate (PWM) a square wave on an output bit of the microcontroller and then low pass filter the signal with an R/C network. This method requires too much use of precious interrupt time in the processor.

A simple technique was ultimately chosen to generate the carrier—the R-2R DAC. This digital-to-analog converter incorporates a ladder network of 16 resistors whose nodes are fed by an 8-bit parallel output port of the microcontroller. The values of the resistors in the network are 10 kΩ and 20 kΩ; hence the R-2R nomenclature. The cumulative weighting of these R-2R resistors in the ladder ultimately produces an output voltage at the top of the ladder corresponding to the desired analog voltage. Thus all the software needs to do is present the desired sine wave values in sequence to the output port at precise time intervals. When smoothed with a capacitor, the resultant waveform at the top of the resistive ladder is a clean sine wave.

The output of the R-2R DAC is ac coupled to the input of a common LM386 audio amplifier through a potentiometer to provide continuous adjustability of the audio volume.

The beacon is flexible thanks to the use of seven configuration jumpers that instruct the software to produce one of 48 distinct carrier frequencies that will ultimately be phase-modulated at 31 baud. Seven input pins of the SX microcontroller are used to read the status of these configuration jumpers. These input pins have weak internal pull-up resistors and float "high" when unconnected. However, when grounded by putting a jumper in place, the pin reads "low" and signals the software to take specific action in configuring the beacon's frequency and operation.

Carrier Frequency Selection

- Base Carrier Selection Jumpers—Two jumpers allow user to configure beacon carrier signal to any of three frequencies: 500 Hz, 1 kHz or 2 kHz.
- Carrier Offset Jumpers—Four additional jumpers allow user to select one of 16 closely spaced frequencies around the chosen base carrier.

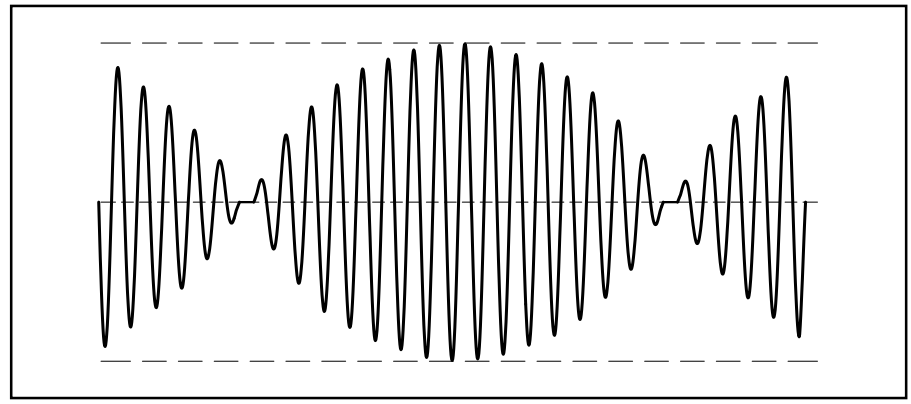


Figure 2—This is an illustration of what you'd probably see with an oscilloscope properly synchronized at the start of the PSK31 character sequence. Note the phase-shifts at the zero-power points, indicating a letter gap of two successive zeroes in the bitstream.

Transmission Mode

- Continuous transmit is selected by installing configuration jumper X5, thus instructing the beacon software to automatically restart the beacon transmit sequence (idle and pre-programmed data string).
- Single pass (one time) transmit is selected by removing the configuration jumper from X5. The transmit sequence is initiated by manual actuation of the **START** pushbutton, upon which the idle stream and pre-programmed data string are sent. The beacon stops transmitting at the end of the data string and awaits either another **START** pushbutton actuation.

Firmware Description

For this part of the discussion, we'll assume that the configuration jumpers are set to produce a 500-Hz carrier frequency, with a nominal interrupt variability of 4 (X2 jumper in place for an RTCC reload value of 197).

The PSK31 audio beacon firmware is completely interrupt-driven, based on the timeout settings of the real time clock (RTCC). The default setting of the RTCC counter produces an interrupt every 3.94 µs and the Interrupt Service Routine (ISR) counts two of these interrupts and then signals the presence of a 7.88 µs interval by setting the SYNC7US software flag. This flag is inspected in a tight loop at the main starting point of the program, and when detected as being set, the whole program sequence begins.

Every fourth time the 7.88 µs window

Bryan Williams, AA3WM, built his PSK31 Beacon kit into the shell of a flashlight, providing ultimate portability!

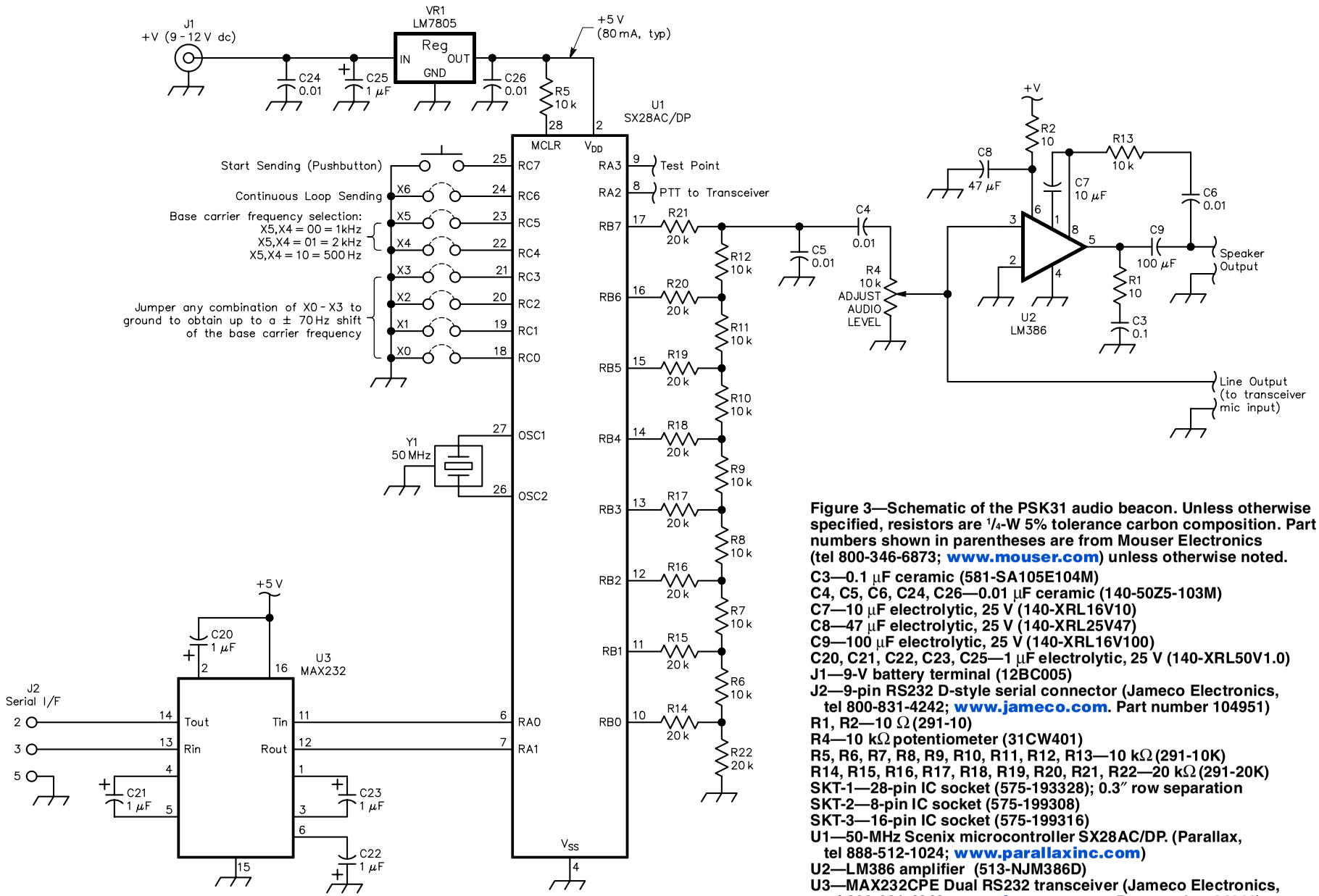


Figure 3—Schematic of the PSK31 audio beacon. Unless otherwise specified, resistors are 1/4-W 5% tolerance carbon composition. Part numbers shown in parentheses are from Mouser Electronics (tel 800-346-6873; www.mouser.com) unless otherwise noted.

C3—0.1 µF ceramic (581-SA105E104M)
C4, C5, C6, C24, C26—0.01 µF ceramic (140-50Z5-103M)
C7—10 µF electrolytic, 25 V (140-XRL16V10)
C8—47 µF electrolytic, 25 V (140-XRL25V47)
C9—100 µF electrolytic, 25 V (140-XRL16V100)
C20, C21, C22, C23, C25—1 µF electrolytic, 25 V (140-XRL50V1.0)
J1—9-V battery terminal (12BC005)
J2—9-pin RS232 D-style serial connector (Jameco Electronics, tel 800-831-4242; www.jameco.com. Part number 104951)
R1, R2—10 Ω (291-10)
R4—10 kΩ potentiometer (31CW401)
R5, R6, R7, R8, R9, R10, R11, R12, R13—10 kΩ (291-10K)
R14, R15, R16, R17, R18, R19, R20, R21, R22—20 kΩ (291-20K)
SKT-1—28-pin IC socket (575-193328); 0.3″ row separation
SKT-2—8-pin IC socket (575-199308)
SKT-3—16-pin IC socket (575-199316)
U1—50-MHz Scenix microcontroller SX28AC/DP. (Parallax, tel 888-512-1024; www.parallaxinc.com)
U2—LM386 amplifier (513-NJM386D)
U3—MAX232CPE Dual RS232 transceiver (Jameco Electronics, tel 800-831-4242; www.jameco.com. Part number 24811)
VR1—5-V voltage regulator, 1 A (511-L7805 ACV).
Y1—50-MHz Murata 250-05060 ceramic resonator (Parallax, tel 888-512-1024; www.parallaxinc.com)

starts (i.e., at the 31.25 µs boundaries), the software gets the next 8-bit value from the sine wave look-up table and outputs it to the DAC output port RB. When this process happens 64 times (i.e., when 64 instances of the 31.25-µs windows have occurred) a single sine wave will have been constructed within a 2-µs time period, creating a 500-Hz carrier.

The software keeps track of how many carrier cycles have been generated, and when the count reaches 15 (i.e., at the 31-ms interval), the PSK bit window is present and the PSK bit processing begins.

Actually, the recurring 31-ms window starts at mid-position of one bit cycle and goes to mid-position of the next bit cycle. It's done this way so the software can inspect the current/next bit relationship and command a zero-power phase reversal condition at the next end-bit time period, if required.

The bits constituting the PSK31 Varicode character being sequentially presented for modulation are inspected on a bit-by-bit basis at each 31ms bit-processing window. When a "1" is encountered, nothing is done in that window. The sine wave construction continues

However, when a "0" is encountered, the rules of PSK31 modulation state that a phase reversal must be forced in the carrier.

The processing gets a little more complicated at this point because we want to reduce the power of the carrier at the time of phase reversals. This action greatly reduces the glitch energy at the time of the reversals and makes the resultant tones much more spectrally clean.

A cosine wave look-up table is used to modulate (or "scale") the carrier wave, sample by sample at the 31.25-µs rate. The cosine table pointer is advanced as each cycle of the carrier is generated.

If the "next bit" of the Varicode character to be processed is a "0," the scaling process is turned on at mid-bit position and the remaining seven carrier cycles of waveform construction occurring in the bit-processing window get scaled per the cosine look-up table. This effectively brings the amplitude of those seven sine waves progressively down to zero, at which point the phase of the carrier is reversed (by changing to a different sine wave look-up table—one that is 180 degrees out of phase from the other one).

After the phase reversal, the carrier continues to be constructed at every 31.25-µs interval, and the cosine scaling is still engaged in sync with the carrier cycles. For the next seven cycles, the cosine look-up table routines scale up the carrier such that the carrier is back to full power (no scaling) by mid-bit position. All this can be more easily understood by considering the representation shown in Figure 2.

In Figure 1 we see 15 cycles of the 500-Hz carrier constituting a 31-ms bit-processing window. The sequence of characters processed were two sequential zeros—the first being encoded in the phase reversal seen at the zero-power point on the left, and the second on the right. These points are where the sine wave look-up tables are changed, resulting in the obvious phase reversals. It can also be seen that the cosine "scaling" of the carrier starts at mid position in the bit-processing window and proceeds to zero at the end of the cycle where the reversals occur. The power is then raised in the following seven cycles of the next window.

Using the PSK31 encoding algorithm for phase reversals (i.e., insert a phase reversal whenever encountering a "0" in the bit stream), we can begin to consider what a composite sequence of bits will look like for an entire character. In this example, we'll look at the letter "T", which has a Varicode equivalent bit pattern of 1101101. The illustration shown in Fig-

References

- Scenix programming tools, manuals, parts and other technical information:
Parallax—**www.parallaxinc.com**
Ubicom (formerly Scenix)—**www.ubicom.com**
SXTECH—**www.sxtech.com**
SX Forum—**www.sx-forum.com**

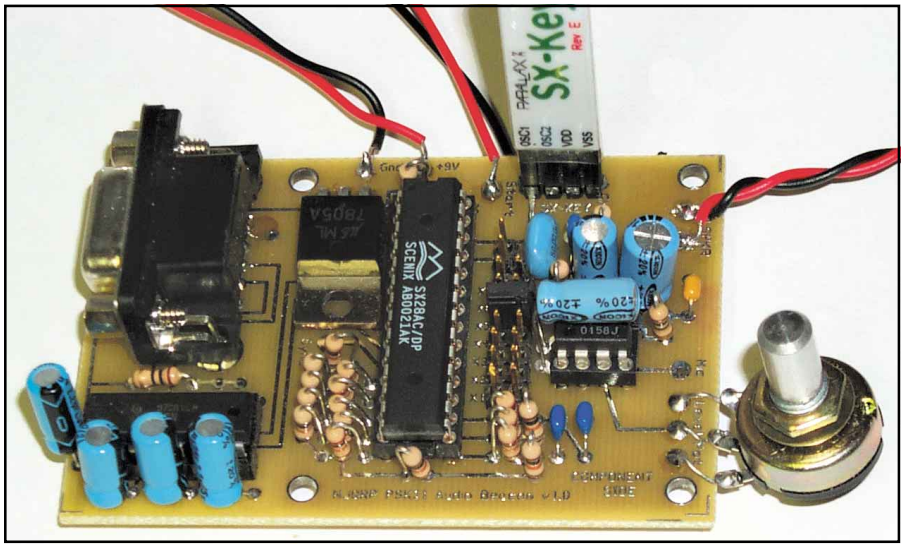
- PSK31 audio beacon kit Web site, containing the source code, manual revisions, kit notes, tips and techniques—**www/njqrp.org/psk31beacon/psk31beacon.html**. The source code is also available on *ARRLWeb* at **www.arrl.org/files/qst-binaries/** as audiopskv1.txt.

- A parts kit for the PSK31 audio beacon, including a printed circuit board, may be ordered from the NJQRP Club for $25. DX orders please add $3 for shipping. When ordering, please specify the desired text string (50 characters, maximum) for pre-programming of SX chip. Suggestion: call sign and e-mail address.

Checks and money orders must be payable to:
George Heron, N2APB
2419 Feather Mae Court
Forest Hill, MD 21050

PayPal electronic payments are also accepted (specify the payment as being made to **n2apb@amsat.org**).

- See the PSK31 Web site for a robust listing of PSK31-related articles, technology descriptions and more—**www.psk31.com**.



Here's one of the prototype PSK31 Beacon printed circuit boards in the process of being programmed with the "SX Key" cable connected to the development computer. Note the DB9 serial connector and MAX232 driver chip at the left of the board providing serial communication with the PC during Beacon use. An electrolytic capacitor is mounted in an unusual manner over the LM386 audio amp on the right—the final layout of the pcb brings this cap down to the board, as well as providing for a board-mounted audio-level potentiometer.

It's useful at this point to mention that two (or more) consecutive "zeros" constitute a letter gap, thus instructing the decoding engine on the receiving side to start another character processing cycle.

ure 1 represents what you'd probably see with an oscilloscope properly synchronized at the start of the character sequence.

It's useful at this point to mention that two (or more) consecutive "zeros" constitute a letter gap, thus instructing the decoding engine on the receiving side to start another character processing cycle.

In Figure 1, a letter gap of 0-0 starts off the "T" sequence of bits. Upon encountering each "0," the power level is brought down to zero and the phase is reversed. The power level is then raised back up to 100% by mid-next position, whereupon the "next bit" is inspected to see if another reversal will be needed.

Upon encountering the first "1", the algorithm dictates that no phase reversal occurs, so the power level remains at 100% (no cosine scaling). The same happens again upon encountering the second "1", but the next bit after that is a "0" and the power level is reduced in anticipation of the coming phase reversal.

Producing Different Frequency Carriers

The preceding discussion assumed a 500 Hz carrier and a core interrupt time of 3.94 µs. With a little software magic, some variability was placed into the program in order to produce two more base carrier frequencies, and 16 sub-variations around each base frequency.

The interrupt structure and timing is actually designed to produce a 2-kHz carrier as the highest base frequency, using a 7.88 µs sine wave construction. Then, based on the state of the configuration jumpers, we're able to sample at half-rates to get the 15.75-µs rate for 1 kHz carrier generation, and the 31.25 µs rate for 500-Hz carrier generation.

Achieving the 16 frequency variations around each of the three base carrier frequencies is accomplished by slightly varying the basic underlying interrupt timing mechanism.

The master 50-MHz oscillator internal to the microcontroller clocks the Real Time Clock Counter (RTCC). Interrupts are generated when the RTCC "rolls over" upon a countdown from a preset value, and the governing mechanism for interrupt timing is to preset the RTCC counter at the end of each interrupt cycle. The nominal value of the RTCC preset is "200", and we can go as much as ±8 counts before receiving systems lose synchronization with the master 31 baud system timing in the beacon.

Therefore, the RTCC variable is set to a value between 194 and 209 within the setRTCC routine based on the state of the configuration jumpers X0 through X3. These four bits give 16 different RTCC preset values that modify the basic system timing of the beacon, which results in an ability to more precisely position the base carriers within about ±60 Hz around their nominal values.

The last comment about the software design is that I make extensive use of the look-up table (LUT) capabilities of the SX microcontroller. Using the LUTs, we are able to easily generate two 64-point sine waves—a positive-going one SINETBP and a negative-going one (SINETBN)—and a 64-point half-cosine waveform (COSTBL). Using a pointer to travel through each table allows easy retrieval of the waveform values, which represent a 0-to-1 percentage of the 5 bit values represented in the tables.

Building the Beacon

There's really not too much to assembling this project ugly style—it's really just a couple of ICs and a handful of resistors and capacitors mounted on a small card. All you'll need to do is to assemble the circuits according to the schematic in Figure 3, plug the chips into the sockets, connect a dc power source and a speaker and the beacon should work. No alignment, no muss, no fuss!

The parts are all commonly available. If you don't want to track down your own components, you can buy the PSK31 audio beacon as a kit from the NJQRP Club. The kit includes a microcontroller preprogrammed with your call sign and e-mail address (if desired). If you want to load and configure the microcontroller yourself, the source code is also available from NJQRP. See the "References" sidebar.

Carefully inspect the wire connections, solder joint quality and component placement. Before inserting the ICs into their sockets, apply dc power and check that 5 V is present on pin 2 of the U1 socket. Also make sure that 9 V is present on pin 6 of the U2 socket.

Remove the dc power and carefully insert the ICs to their respective sockets, ensuring proper orientation of pin 1 of each IC. Apply dc power again and depress the **START** pushbutton (or place the **CONTINUOUS** jumper in place). You should hear a relatively loud PSK31 warble tone coming from the speaker for the duration of the beacon transmission. Volume may be lowered by adjusting the potentiometer. The acid test of your success will be to power up a computer running *DigiPan* or another PSK31 program and present the beacon audio as input to the computer. Many computers and most laptops have microphones that allow the tones to be "heard" by the program. Your beacon's warble should be visible on or around one of the base frequencies on the software display: 500 Hz, 1 kHz or 2 kHz. Place the cursor on that displayed signal and you should see your beacon's programmed sequence displayed in the text portion of the display. Experiment with the jumpers to see and hear the flexibility available in your beacon's frequency settings.

In Case of Trouble

If you had any problems in the checkout step, you should first recheck for proper voltages, proper IC orientations in the sockets and good solder joints. When the beacon is running, the Test Point will be a continuous 16 Hz square wave (31 ms high, 31 ms low) that can be seen as a voltage bouncing around between 2-to-3 V on a dc voltmeter. If you have an oscilloscope, you should see the PSK31 waveforms at the output of the DAC. You will also see a relatively constant 2.4-V reading at this same point when using a dc voltmeter. The PTT pad will be at 5 V during transmission and at 0 V when the beacon is stopped. Current consumption of the beacon is nominally about 80 mA.

Summary

Even if you haven't yet made the plunge into on-the-air PSK31 operation, this project gets you *in* the air with audio warbles that can be used for club fun as well as for test and alignment purposes on the workbench. As this project evolves, I hope to add a single-chip demodulator design to serve as a companion to this beacon modulator chip, which will then serve as a complete modem for a standalone PSK31 controller. *Special thanks are due to our club technical advisors Joe Everhart, N2CX and Dave Benson, NN1G, for their generous support during the development of this project.*

You can contact the author at 2419 Feather Mae Court, Forest Hill, MD 21050; **n2apb@amsat.org**.

By Dan Wissell, N1BYT

The WBR Receiver

Build this simple receiver and "bridge" the gap between regenerative and direct-conversion receivers!

Despite the well-known drawbacks of regenerative receivers, the elegance and simplicity of the regenerative detector is still appealing. I'm always looking for a better way to implement Armstrong's brilliant design, and with the introduction of the Optically Coupled Regenerative Receiver (OCR),[1] the major problems of the regenerative detector were overcome. The OCR receiver demonstrated the potential of this nearly 90-year-old design to hold its own as a simple all-mode receiver. The design is still quite complex, however, and relies on expensive, hard-to-find, electro-optical components with limited bandwidths.

The key to a simple regenerative receiver design is coupling the antenna directly to the oscillating detector. Anyone who has ever tried to couple an antenna directly to a regenerative detector has found that signals from dc to daylight show up everywhere on the tuning dial—and all at the same time! Overcoming this problem by isolating the antenna from the detector causes the design to become as complex, or more so, than that of a simple direct-conversion receiver. Because of this complexity factor, regenerative detectors have largely given way to other simpler circuits.

The future of Major Armstrong's namesake may be more open-ended, however, because a simple and effective solution to the coupling problem has been found. The method of coupling the antenna to the tank circuit described below is reminiscent of a Wheatstone Bridge circuit, and thus the receiver name, "Wheatstone Bridge Regenerative (WBR) Receiver." I'm reluctant to claim that this is a "new" detector design, even though an extensive search hasn't yielded anything similar. But with nearly 90 years of use, I'm sure every method of detector-antenna coupling has been tried at one time or another!

This WBR may very well be the ultimate simple, *high-performance* regenerative receiver. As an added plus, the design virtually eliminates the negative aspects of regenerative receivers such as antenna radiation, frequency pulling, microphonics and hand capacitance effects. A printed circuit board is available to speed construction of this project.[2]

Design Overview

The schematic of the WBR Receiver is shown in Figure 1. The basic circuitry is the same as that used in the OCR Receiver. The two most significant differences are the removal of the optocoupler from the oscillator, and the oscillator tank circuit configuration.

The highly stable Colpitts oscillator and infinite-impedance detector have been retained in this design. The major difference is that the oscillation is now controlled by directly varying the base current of Q1 (with R5 and related components) instead of using photons from the optocoupler LED.

The tank circuit is comprised of inductor L1, capacitors C7 and C8, along with tuning diode D1. This circuit is redrawn in Figure 2 to highlight the unusual component arrangement. C7, C8 and D1 have been omitted in Figure 2 for clarity. As shown, Figure 2 represents a classic Wheatstone Bridge circuit. Inductor L1 is center-tapped, with equal inductance on both sides of the tap. Capacitor C1 represents the oscillator and detector load capacitance. Balancing capacitor C2 is selected to match the value of capacitor C1. In this ideal case, the bridge is balanced and there is no voltage present at the center tap. The full oscillator voltage appears at nodes V1 and V2. Because no voltage is present at the center tap, it could be grounded—*or an antenna could be directly connected to this point without impacting the oscillator signal.*

In this design, the antenna is coupled to the center tap of L1 through an impedance represented by Z1. This is simply a one-inch length of wire connected to ground. The antenna is connected at the midpoint of Z1. This provides a low-impedance connection point for the antenna, as well as providing a dc ground for detector Q2 and tuning diode D1.

In practice, the bridge can't be perfectly balanced because the oscillator load capacitance changes as the level of regeneration is changed. Despite that, this arrangement still yields a *significant reduction* in oscillator voltage at the center tap of L1. Voltage measurements taken at 7 MHz show that the voltage present at the center tap of L1 is about 46 dB less than at nodes V1 and V2. The practical impact of this is good antenna isolation. When monitoring the oscillator signal from a WBR on a communications receiver, the WBR antenna can be removed and reconnected *with no perceptible change in the audio beat note from the communications receiver!* It turns out that if the oscillator coupling capacitance and the balancing

[1]Notes appear on page 37.

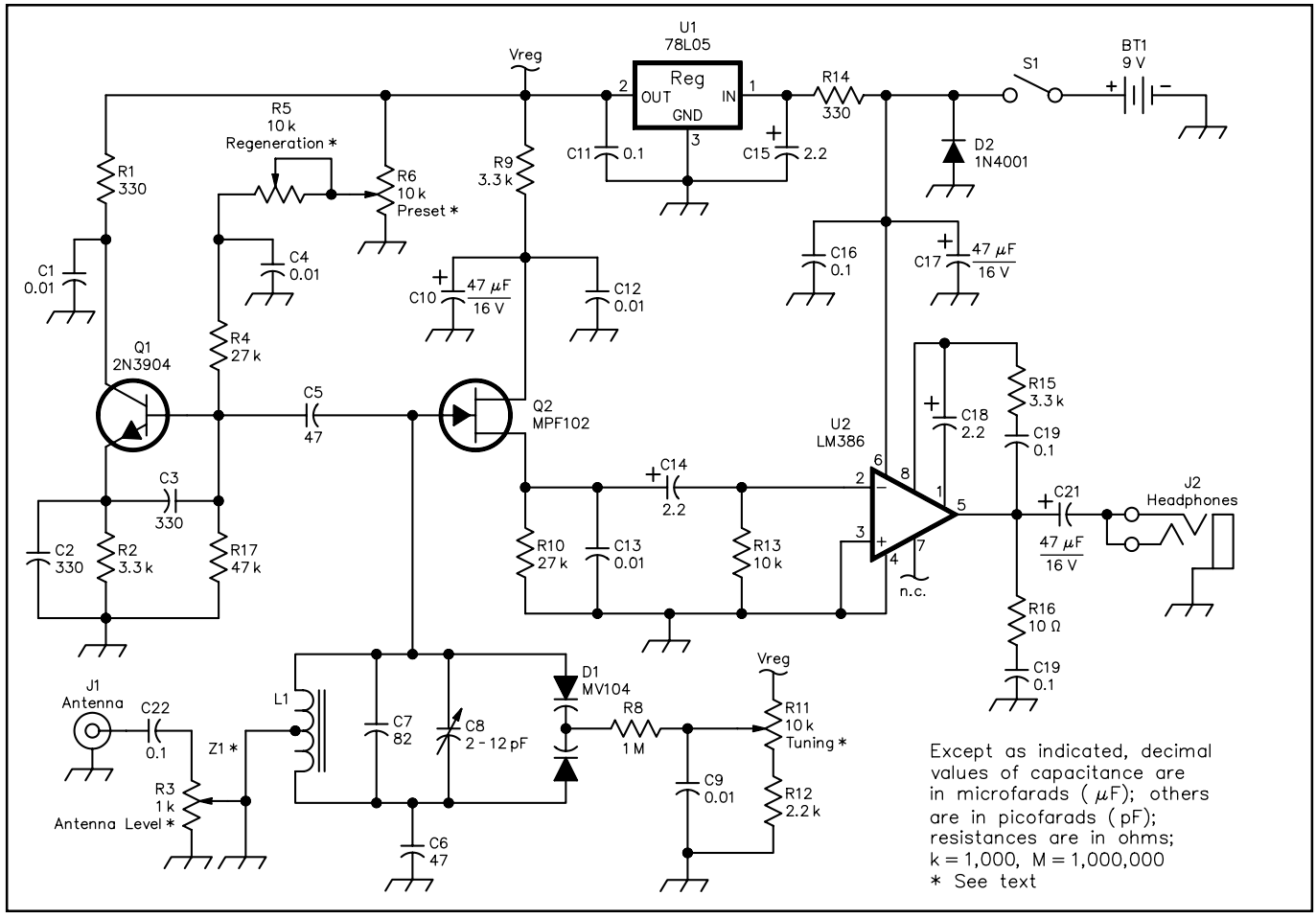


Figure 1—Schematic of the WBR receiver. Unless otherwise specified, resistors are 1/4-W 5% tolerance carbon composition.

C2, C3—330 pF, 5% NP0
C5, C6—47 pF, 5% NP0
C7—82 pF, 5% NP0
C8—2-12 pF NP0
C1, C4, C9, C12, C13, C19, C22—0.01 µF
C11, C16, C20—0.1 µF
C10, C17, C21—47-µF, 16-V electrolytic
D1—MV104
D2—1N4001
J2—Three-conductor phone jack, 1/8 inch.
L1—Approximately 3.7 µH: 28 turns of #22, center tapped, on T-68-6 core (yellow).
Q1—2N3819
Q2—MPF102
R1, R14—330 Ω
R2, R9, R15—3.3 kΩ
R3—1 kΩ linear-taper potentiometer. Panel mount.
R4, R10—27 kΩ
R5—10 kΩ linear-taper potentiometer. Panel mount.
R6—10 kΩ linear-taper potentiometer. Panel or PWB mount.
R7—47 kΩ
R8—1 MΩ
R11—10 kΩ, 10-turn potentiometer. Digi-Key # 3590S-1-103-ND.
R12—2.2 kΩ
R13—10 kΩ
R16—10 Ω
S1—SPST
U1—78L05
U2—LM386

capacitor (C5 and C6 in Figure 1) are matched, a good balance can be obtained. If the oscillator design is changed, the balancing capacitor may have to be made variable to null the circuit.

Diode D1, a voltage-variable capacitor (VVC), is used to tune the oscillator. A low-cost plastic 10-turn potentiometer is used as the main tuning control (R11). Resistor R12 is used to set the lower voltage limit at D1 to about 0.9 V, below which the capacitance change of D1 is quite small. Regulator U1 is used to provide a stable voltage source for D1, Q1 and Q2. Regeneration is controlled by R5, a single-turn, panel-mounted potentiometer. R6 is used as a "preset" for R5 and allows for smooth regeneration control.

To keep the overall design simple, only a single stage of audio amplification is used (U2). This provides adequate volume for headphone operation when using a simple 40-meter dipole antenna. Reducing the signal level applied to the detector via R3 controls the headphone volume. A 9-V battery supplies power for the WBR. A well-filtered bench supply in the 8- to 13.8-V range may also be used. Diode D2 is added as a safety measure. The receiver works well with dipole or random wire antennas and an earth ground.

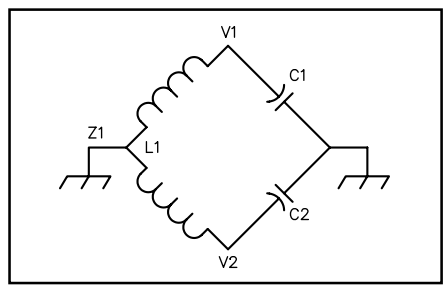


Figure 2— The tank circuit is comprised of inductor L1, capacitors C7 and C8, along with tuning diode D1.

Constructing a 40-Meter WBR Receiver

The caption of Figure 1 contains the parts list for a 40-meter version of the receiver. The parts are available from a variety of suppliers. With the given values, the receiver will tune the entire 40-meter band.

A printed-circuit board is available and contains most of the components, but the circuit is quite simple and lends itself to "dead-bug"-style construction on a bare copper PC board. The only critical part is the oscillator circuit. Note that

NP0 capacitors are used to enhance frequency stability. Short, direct leads should be used in this part of the receiver. Make the circuit as mechanically robust as possible to improve stability. I typically use high-value resistors as standoff supports for signal components. For power-related parts of the circuit I often use ceramic capacitors in the range of 0.01 to 0.1 µF as supports. This also adds additional power-supply bypassing.

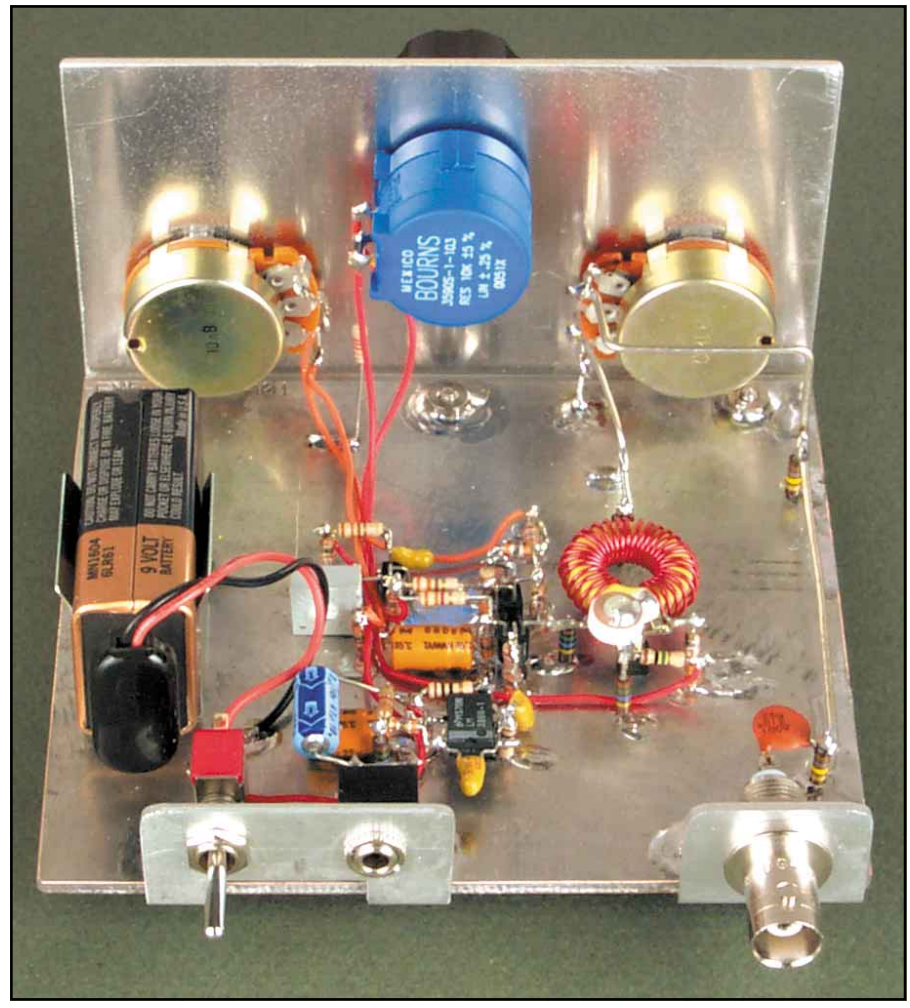
Inductor L1 is wound with #22 enamel wire. It's easy to create the center tap by using two separate windings. Start with two 15-inch lengths of wire. Wind the first 14 turns of L1, remembering that one pass through the center of the core is one "full" turn. Leave about 1 inch of wire for connections. The winding should fill about 40% of the core. Add the second 14 turns, as above, winding in the same direction as the first winding. The second winding should start next to one end of the first winding. Again, leave about 1 inch of wire for connections. Connect the end of the first winding to the start of the second to create the center tap.

As mentioned previously, Z1 is a one-inch length of #20 solid copper wire connected from the center tap of L1 to ground. The antenna connection is made at about the midpoint of Z1. While it's tempting to increase the amount of impedance at Z1, it's not a good idea because of the potential for detector overload, especially at 5 to 15 MHz, where strong AM stations dominate.

The regeneration preset control (R6) can be a small PWB-style unit or a standard panel-mount type. Because it's a "set and forget" control, it may be placed in any convenient location.

The hardware used for antenna connector J1 and switch S1 may be whatever the builder prefers. A fully enclosed case isn't required for good operation. My prototype WBR receivers are built as open breadboards and work well.

I have kept the complexity of the WBR design at a minimum to encourage builders to give it a try. For those wishing to add loudspeaker operation, however, or to increase the sensitivity of the receiver, I would recommend adding the audio preamp and volume control used in the OCR II receiver.[3] As presented, the basic oscillator will work up to about 18 MHz with D1 and C7 removed. The upper frequency is limited by the combination of capacitors C5 and C6. If desired, the frequency-dependent portion of the design (C7 and C8) can be scaled for other frequencies of interest in the lower HF region. The tuning voltage applied to D1 will need to be adjusted to provide the desired tuning range at other frequency ranges.



A rear view of the WBR receiver.

Checkout and Operation

Carefully check your work before applying power for the first time. Once everything has been checked, plug in headphones at J2 and apply power. Advance the regeneration control (R5) to about 75% of its maximum setting. Adjust the regeneration preset (R6) until a distinct increase in background noise is heard. This indicates that Q1 is oscillating and that the audio section is working. Varying the regeneration control should produce a smooth transition when going into and out of oscillation. The oscillator can now be set to the correct operating frequency. Set the main tuning (R5) potentiometer to its minimum setting. With the regeneration control set to the point of oscillation, adjust C8 while listening for the signal on your station receiver or a communications receiver set for CW reception at 7.00 MHz. You will probably need to connect a short wire from the antenna connector on your station receiver and place it near the WBR to receive a signal. Once the frequency has been set, connect an antenna to J1 and you're all set! If a station or communication receiver isn't available, connect an antenna and adjust C8 until the CW portion of the band is found. Continue setting C8 until the lower edge of CW subband can be determined. This is best done in the evening when there is plenty of CW activity.

Using the WBR receiver will take some practice if you've never used a regenerative receiver before. Maximum sensitivity is obtained in the area just before oscillation (for AM reception) and just at oscillation (for CW). For SSB reception, the best operating point is usually found at a point that's just a bit past the setting required for CW reception. You will get the "feel" of the receiver quickly. The interaction of the regeneration, gain and selectivity controls will become apparent.

Summary

The Wheatstone Bridge Regenerative Receiver works as well as its predecessor, the OCR. It has the added advantages of greater bandwidth, increased simplic-

This ultra-tight close-up illustrates the so-called "dead-bug construction" that the author used in this version of the WBR. As an alternative, a circuit board is available from FAR circuits.[2]

ity and a much lower cost. It virtually eliminates the negative aspects of the regenerative receivers that came before it. This simple receiver is well suited for beginners who would like to build a simple all-mode shortwave receiver. QRP ops and home-brewers in general will also be interested in the WBR. Given that the antenna is quite isolated from the oscillator, the WBR can be used as a simple receiver for transmitter-receiver operation. It could easily be paired with a simple crystal-controlled transmitter, creating a small, portable "trans-receiver."

Notes

[1]Daniel Wissell, N1BYT, "The OCR Receiver," Jun 1998 *QST*, pp 35-38.

[2]Circuit boards are available for $4 (plus $1.50 shipping and handling) from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118; tel 847-836-9148; **www.cl.ais.net/farcir/**.

[3]Daniel Wissell, N1BYT, "The OCR II Receiver," Sep 2000 *QST*, pp 35-38.

You can contact the author at 7 Notre Dame Rd, Acton, MA 01720-2108; **n1byt@arrl.net**.

QST

NEW BOOKS

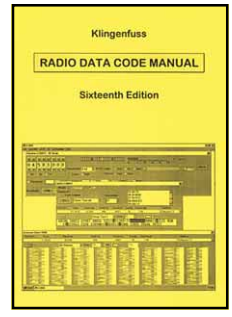
RADIO DATA CODE MANUAL

Published by Klingenfuss Publications, Hagenloher Str 14, D-72070 Tuebingen, Germany; tel 49-7071-62830; fax 49-7071-600849; **www.klingenfuss.org**. *Sixteenth edition, softcover, 9½×6½ inches, 788 pages with black and white illustrations. $32.80.*

Reviewed by Steve Ford, WB8IMY
QST *Editor*

The *Radio Data Code Manual* is a comprehensive reference aimed straight at the segment of our avocation that enjoys monitoring so-called utility stations—stations owned and operated by governments, military agencies, corporations and so on. In our increasingly digital communication environment, many of these services now use various digital formats to exchange information. From a monitoring station's point of view, untangling these signals, and the alphabet soup of abbreviations and acronyms carried in their transmissions, can be a daunting task.

Although the *Radio Data Code Manual* provides helpful descriptions of modulation and signaling schemes used by modes such as Piccolo and PACTOR II, that is not its primary purpose. Instead, the book concentrates on deciphering the actual information that is communicated by the individual services. For example, the *Radio Data Code Manual* offers an exhaustive list of aeronautical terms and abbreviations. You'll find 11,000 ICAO location indicators, 4300 addressee designators (organization symbols) and 1500 aircraft type designators.



The book spends quite a few pages on the *Unicode*—a standard data code for all commonly used languages (and some not-so-common languages) on the planet. The idea of the Unicode is to create a truly universal system for global electronic information exchange. The *Radio Data Code Manual* includes Unicode tables for 33 languages!

If you are tempted to go snooping outside the ham bands with your digital decoder, the *Radio Data Code Manual* is a vital reference that will make it possible for you to interpret the gibberish you often see on your monitor.

QST

Next New Books

NEW PRODUCTS

ALL BAND SSB/CW TRANSCEIVER KIT FROM KANGA

◊ Kanga US has added the Hands Electronics RTX-109 SSB/CW transceiver kit to its line of kit products.

The RTX-109 is an amateur band SSB/CW transceiver with a direct digital synthesis VFO with a display resolution of 1 Hz. The VFO uses the AD9850 DDS clocked at 100 MHz with phase locked narrow band voltage controlled oscillators covering the 1.8 to 28 MHz amateur bands.

The RTX-109 is available in QRP (up to 6 W out) or medium power (up to 20 W out) versions. Construction is in a modular form, allowing the builder on a budget to start with a basic receiver and build up to the full transceiver.

A high level doubly balanced mixer in the front end is intended to enable the RTX-109 to deal with high signal levels—such as those encountered on 40 meters at night in Europe. The IF module includes a crystal filter, passive receive audio filtering and SSM2166 transmit speech processor.

Spare band positions and TTL drivers are built into the control microprocessor to allow configuration for transverter driving. The master VFO display can be offset up to 4.5 GHz to give the actual frequency display of the resulting frequency rather than the drive IF frequency.

Price: RTX-109, $538 (6 W); $598 (20 W). Kanga US carries the entire line of Hands Electronics Kits. For further information contact Kanga US, 3521 Spring Lake Dr, Findlay, OH 45840; tel 419-423-4604; **kanga@mail.bright.net**; **www.bright.net/~kanga/**.

QST

Next New Products

By L. B. Cebik, W4RNL

A Simple Fixed Antenna for VHF/UHF Satellite Work

Explore the low-Earth orbiting amateur satellites with this effective antenna system.

When we are just getting interested in amateur satellite operation, the thought of investing in a complex azimuth-elevation rotator system to track satellites across the sky can stop us in our tracks. For starters, we need a simple, reliable, fixed antenna—or set of antennas—to see if we really want to pursue this aspect of Amateur Radio to its limit. We'll look at the basics of fixed antenna satellite work and develop a simple antenna system suited for the home workshop. There will be versions for both 145 and 435 MHz.

Turnstiles and Satellites

For more than decades, many fixed-position satellite antennas for VHF and UHF have used a version of the turnstile. The word "turnstile" actually refers to two different ideas. One is a particular antenna: two crossed dipoles fed 90° out of phase. The other is the principle of obtaining omnidirectional patterns by phasing almost any crossed antennas 90° out of phase. The first idea limits us to a single antenna. The second idea opens the door to adapting many possible antennas to omnidirectional work.

Figure 1 shows one general method of obtaining the 90° phase shift that we need for omnidirectional patterns. Note that the coax center conductor connects to only one of the two crossed elements. A $^1/_4$-λ section of transmission line that has the same characteristic impedance as the natural feed point impedance of the first antenna element alone connects one element to the next. The opposing ends of the two elements go to the braid at each end of the transmission line. If the elements happen to be dipoles, then a 70 to 75-Ω transmission line is ideal for the phasing line. However, the resulting impedance at the overall antenna feed point will be exactly half the impedance of one element alone. So we will obtain an impedance of about 35 Ω. For the dipole-based turnstile antenna, we'll either have to accept an SWR of about 1.4:1 or we'll have to use a matching section to bring the antenna to 50 Ω. A parallel set of RG-63 $^1/_4$-λ lines will yield about 43 Ω impedance, about right to bring the 35-Ω antenna impedance to 50 Ω for the main coax feed line. For all such systems, we must remember to account for the velocity factor of the transmission line, which will yield a line length that is shorter than a true quarter wavelength.

The dipole-based turnstile is popular for fixed-position satellite work. Figure 2 shows—on the left—one recommended system that has been in *The ARRL Antenna Book* since the 1970s. For 2 meters, a standard dipole-turnstile sits over a large screen that simulates ground. Spacing the elements from the screen by between $^1/_4$ and $^3/_8$ of a wavelength is recommended for the best pattern. For satellite operation, the object is to obtain as close to a dome-like pattern overhead as possible. The most desirable condition is to have the dome extend as far down toward the horizon as possible to let us communicate with satellites as long as possible during a pass.

The turnstile-and-screen system, while simple, is fairly bulky and prone to wind damage. However, the turnstile loses performance if we omit the screen. One way to reduce the bulk of our antenna is to find an antenna with its own reflector. However, it must have a good pattern for the desired goal of a transmitting and receiving dome in the sky. The dual Moxon rectangle array, shown in outline form on the right of Figure 2, offers some advantages over the traditional turnstile. First, it yields a somewhat better dome-like pattern. Second, it is relatively easy to build and compact to install.

Almost every fixed satellite antenna

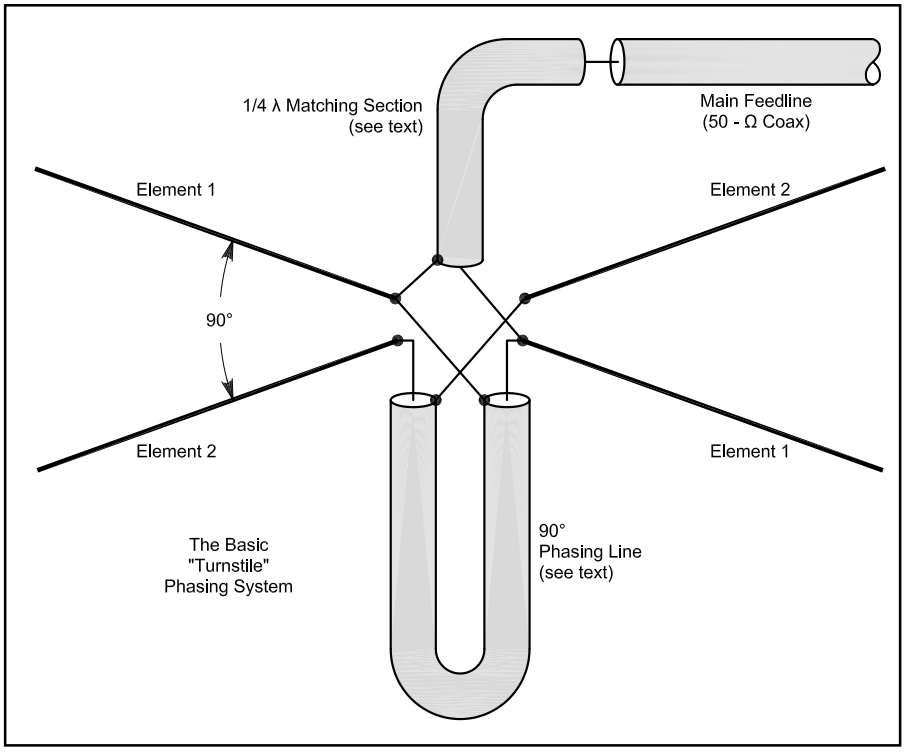


Figure 1—The basic turnstile phasing (and matching) system for any antenna set requiring a 90° phase shift between driven elements in proximity.

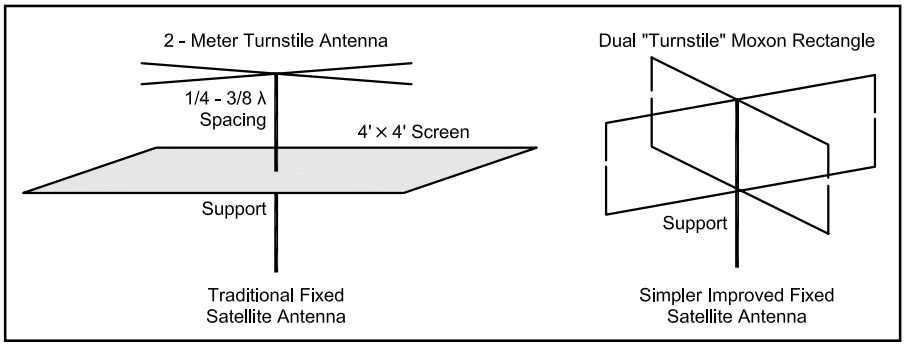


Figure 2—Alternative schemes for fixed-position satellite antennas: the traditional turnstile-and-screen and a pair of "turnstiled" Moxon rectangles.

shows deep nulls at lower angles, and the number of nulls increases as we raise the antenna too high, thus defeating the desire for communications when satellites are at low angles. Figure 3 shows the elevation patterns of a turnstile-and-screen and of a pair of Moxon rectangles when both are 2λ above the ground. A 1λ height will reduce the low angle ripples even more, if that height is feasible. However, the builder always has to balance the effects of height on the pattern against the effects of ground clutter that may block the horizon.

The elevation patterns show the considerably smoother pattern dome of the Moxon pair over the traditional turnstile. The middle of the turnstile dome has nearly 2 dB less gain than its peaks, while the top valleys are nearly 3 dB lower than the peaks. The peaks and valleys can make the difference between successful communications and broken-up transmissions. So, for the purpose of obtaining a good dome, the Moxon pair may be superior.

A reasonable suggestion offered to me was simply to add reflectors to a standard dipole turnstile and possibly obtain the same freedom from a grid or screen structure. Figure 4 shows the limitation of that solution. The result of placing reflectors behind the dipole turnstile is a pair of crossed 2-element Yagi beams fed 90° out of phase. The pattern is indeed circular and stronger than that of the Moxon pair. However, the beamwidth is reduced to only 56° at the half-power points. The antenna would make an excellent starter for a tracking AZ-EL rotator system, but it does not have the beamwidth for good fixed-position service.

The Moxon pair, with lower but smoother gain across the sky dome, offers the fixed-antenna user the chance to build a successful beginning satellite antenna. The pattern will be circular within under a 0.2-dB difference for 145.5 to 146.5 MHz, and within 0.5 dB for the entire 2-meter band. Since satellite work is concentrated in the 145.8 to 146.0 MHz region, the broadbanded antenna will prove fairly easy to build with success. A 435.6 MHz version, designed to cover the 435 to 436.2 MHz region of satellite activity will have an even larger bandwidth.

Like the dipole-based turnstile, the Moxons will be fed 90° out of phase with a $^1/_4$-λ phasing line of 50-Ω coaxial cable. The drivers will be connected just as shown in Figure 1. Since the natural feed-point impedance of a single Moxon rectangle of the design used here is 50 Ω, the pair will show a 25-Ω feed-point impedance. Paralleled $^1/_4$-λ sections of 70- to 75-Ω coaxial cable will transform the low impedance to a good match for the main 50-Ω coaxial line to the rig. In short, we have "turnstiled" the Moxon rectangles into a reasonable fixed-position satellite antenna.

Building the Moxon Pairs

The Moxon rectangle is a modification of the reflector-driver Yagi parasitic beam. However, instead of using linear elements, the driver and reflector are bent back toward each other. The coupling between the ends of the elements combined with the coupling between parallel sections of the elements combine to produce a pattern with a broad beamwidth. By carefully selecting the dimensions, we can obtain both good performance (meaning adequate gain and an excellent front-to-back ratio) and a 50-Ω feed point impedance.[1]

In fact, a single Moxon rectangle might be used on each band for reasonably adequate satellite service. When pointed straight up, the Moxon rectangle pattern is a very broad oval, although not a circle. The oval pattern also gives the Moxon another advantage over dipoles in a turnstile configuration. If the phasing-line between dipoles is not accurately cut, the normal turnstile near-circle pattern degrades into an oval fairly quickly be-

[1]See "Having a Field Day with the Moxon Rectangle," *QST*, June, 2000, pp 38-42, for further details on the operation of the Moxon rectangle, along with the references in the notes to that article. Also included in the notes is the source for a program to calculate the dimensions for a 50-Ω Moxon rectangle for any HF or VHF frequency using only the design frequency and the element diameter as inputs.

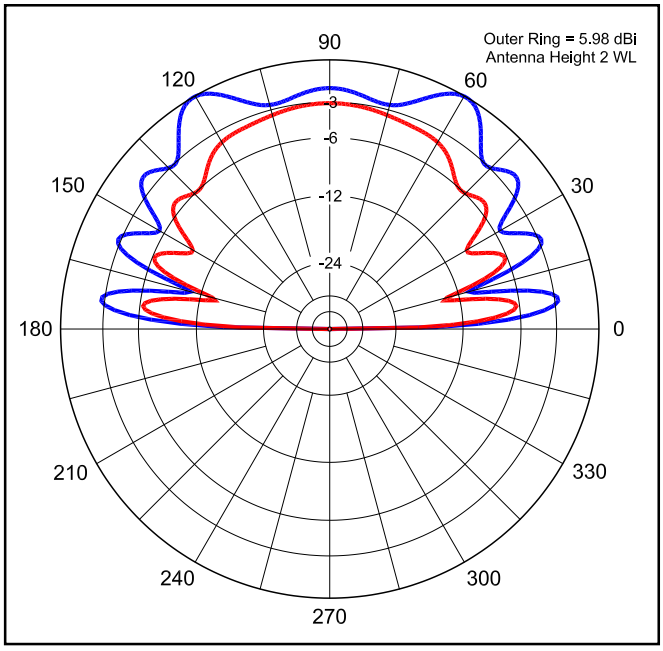


Figure 3—A comparison of elevation patterns for the turnstile-and-screen system (with $^3/_8\lambda$ wavelength spacing, shown in blue) and a Moxon pair (shown in red), both at 2λ height.

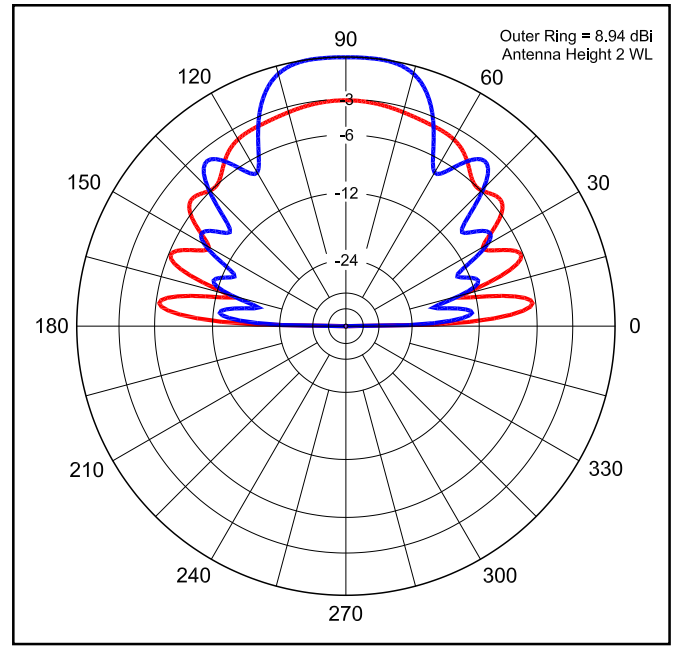


Figure 4—A comparison of elevation patterns for 2-element turnstiles (crossed 2-element Yagis, shown in blue) and a Moxon pair (shown in red), both at 2λ height.

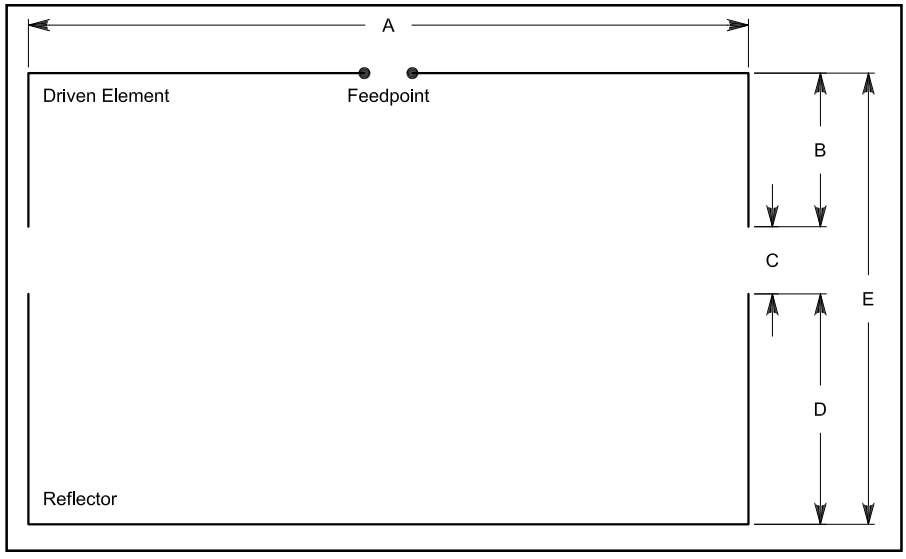


Figure 5—The basic dimensions of a Moxon rectangle. Two identical rectangles are required for each "turnstiled" pair.

Table 1
Dimensions for Moxon Rectangles for Satellite Use

Two are required for each antenna. The phase-line is 50-Ω coaxial cable and the matching line is parallel sections of 75-Ω coaxial cable. Low power cables less than 0.15 inches in outer diameter were used in the prototypes. See Figure 5 for letter references. All dimensions are in inches.

Dimension	*145.9 MHz*	*435.6 MHz*
A	29.05	9.72
B	3.81	1.25
C	1.40	0.49
D	5.59	1.88
E (B + C + D)	10.80	3.62
$^1/_4$ wavelength 0.66 velocity factor phasing and matching lines	20.22 13.35	6.77 4.47

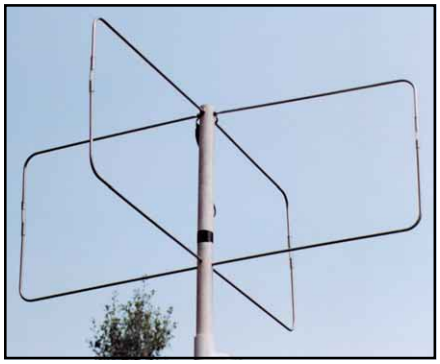
cause the initial single dipole pattern is a figure **8**. The single Moxon oval pattern allows both dimensional inaccuracies and phasing-line inaccuracies of considerable amounts before degrading from a nearly perfect circle.

Figure 5 shows the critical dimensions for a Moxon rectangle. The lettered references are keys to the dimensions in Table 1. The design frequencies for the two satellite antenna pairs are 145.9 MHz and 435.5 MHz, the centers of the satellite activity on these two bands. The 2-meter Moxon prototype uses $^3/_{16}$-inch diameter rod, while the 435 MHz version uses #12 AWG wire with a nominal 0.0808-inch diameter. (Single Moxons built to these dimensions would cover all of 2-meters and about 12 MHz of the 432 MHz band.) Going one small step up or down in element diameter will still produce a usable antenna, but major diameter changes will require that the dimensions be recalculated.

The reflectors are constructed from a single piece of wire or rod. I use a small tubing bender to create the corners. The rounding of the corners creates a slight excess of wire for the overall dimensions in the table. I normally arrange the curve so that the excess is split between the side-to-side dimension (A) and the reflector tail (D). Practicing on some scrap house wire may make the task go well the first time with the actual aluminum rod. The total reflector length should be A + (2 × D).

The driver consists of two pieces, since we'll split the element at its center for the feeding and phasing system. I usually make the pieces a bit longer before bending and trim them to size afterwards. The total length of the driver, including the open area for connections, should be A + (2 × B).

Perhaps the most critical dimension is



A close-up view of the 145.9 MHz rectangle pair.

the gap, C. I have found nylon tubing, available at hardware depots, to be very good to keep the rod ends aligned and correctly spaced. When everything has been tested and found correct, a little super-glue on the tubing ends and aluminum stands up to a lot of wind. I usually nick the aluminum just a little to let the glue settle in and lock the junction. For the UHF version, a short length of heat-shrink tubing provides a lock for the size of the gap and the alignment of the element tails.

It is one thing to make a single Moxon and another to make a working crossed pair. Figure 6 shows the general scheme that I used for the prototypes, using CPVC. (Standard schedule 40 or thinner PVC or fiberglass tubing can also be used.) The support stock is $^3/_4$ inch nominal. The reflectors go into slots at the bottom of the tube and are locked in two ways. Whether or not the two reflectors make contact at their center points makes no difference to performance, so I ran a very small sheet screw through both 2-meter reflectors to keep their relative positions firm. I soldered the centers of the 435-MHz reflectors. Then I added a coupling to the bottom of the CPVC to support the double reflector assembly and to connect the boom to a support mast. Cementing or pressure fitting the cap is a user option.

The feed point assemblies are attached to solder lugs. The phasing line is routed down one side of the support, while the matching section line is run down the other. Electrical tape holds them in place. For worse weather, the tape may be oversealed with butylate or other coatings. Likewise, the exposed ends of the coax sections and the contacts themselves should be sealed from the weather. The details can be seen—as built for the experimental prototypes in one of the photos—before sealing, since lumps of butylate or other coatings tend to obscure interesting details.

The overall assembly of the two antennas appears in the second photograph. The PVC from the support **T**s can go to a center Tee that also holds the main support for the two antennas. A series of adapters, made from miscellaneous PVC parts to fit over a standard length of TV mast. Alternatively, the antennas can be separately mounted about 10 feet apart. The 10-foot height of the assembly has proven adequate for general satellite reception,

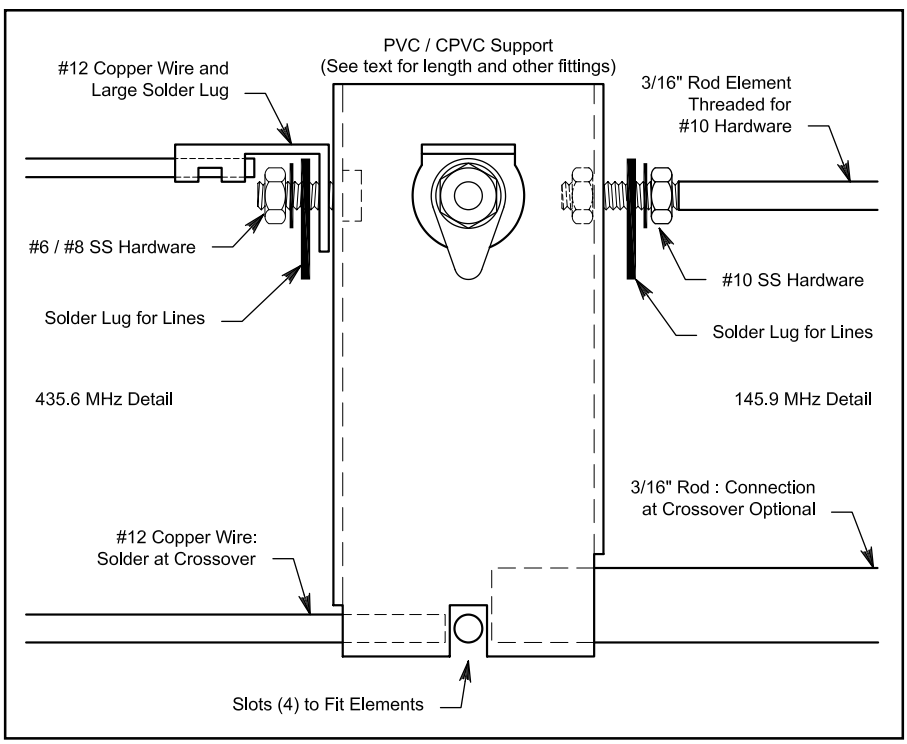
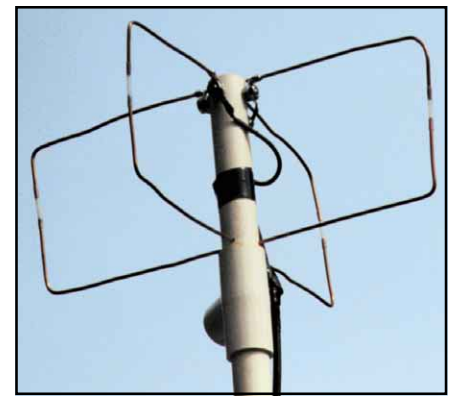


Figure 6—Some construction details for the Moxon pairs constructed as prototypes.



The 435-MHz Moxons.

although I live almost at the peak of a hill.

The antennas can be mounted on the same mast. However, for similar sky-dome patterns, they should each be the same number of wavelengths above ground. For example, if the 2-meter antenna is about two wavelengths up at about 14 feet or so, then the bottom of the 435-MHz antenna should be only about 4.5 feet above the ground. Placing the higher-frequency antenna below the 2-meter assembly will create some small irregularities in the desired dome pattern, but not serious enough to affect general operation.

There is no useful adjustment to these antennas except for making the gap between the drivers and reflectors as accurate as possible. Turnstile antennas show a very broad SWR curve. Across 2 meters, for example, the highest SWR is under 1.1:1. However, serious errors in the phasing line length can result in distortions to the desired circular pattern. There is no substitute for checking the lengths of the phasing line and the matching section several times before cutting. The correct length is from one junction to the next, including the portions of exposed cable interior.

These two little antennas will not compete with tracking AZ-EL rotating systems for horizon-to-horizon satellite activity. For satellite work, however, power is not always the problem (except for using too much) and modern receiver front-ends have enough sensitivity to make communication easy. So when the satellite reaches an angle of about 30° above the horizon, these antennas will give a very reasonable account of themselves. When you become so addicted to satellite communication that you invest in the complete tracking system, these antennas can be used as back-ups while parts of the complex system are down for maintenance!

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By Rick Lindquist, N1RL

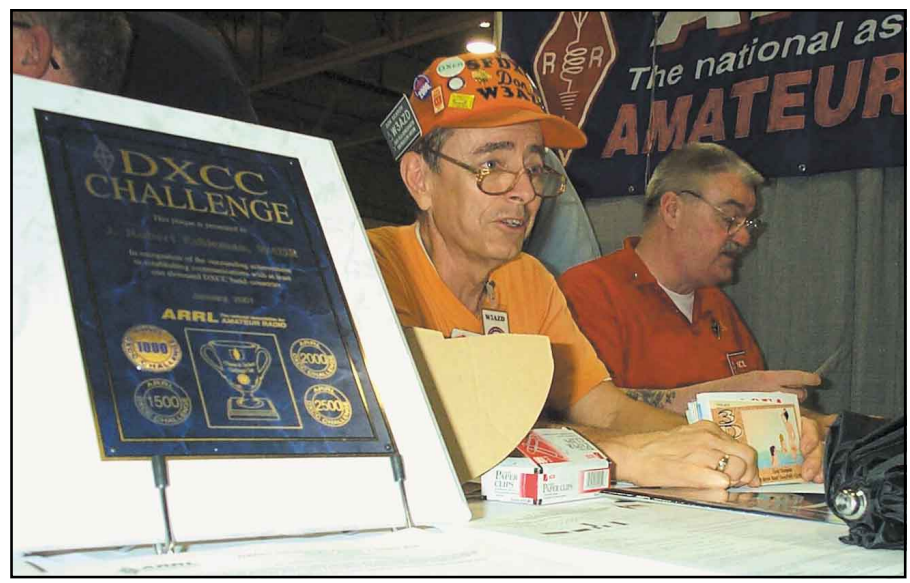
Dayton Hosts a Buoyant Crowd for its Big Five-Oh

Some rain, few new products and big smiles among a buying crowd epitomized the 50th Dayton Hamvention!

ARRL President Jim Haynie, W5JBP, works the Dayton crowd. ARRL Great Lakes Director George Race, WB8BGY (center), greets Ray Grenier, K9KHW, of AES.

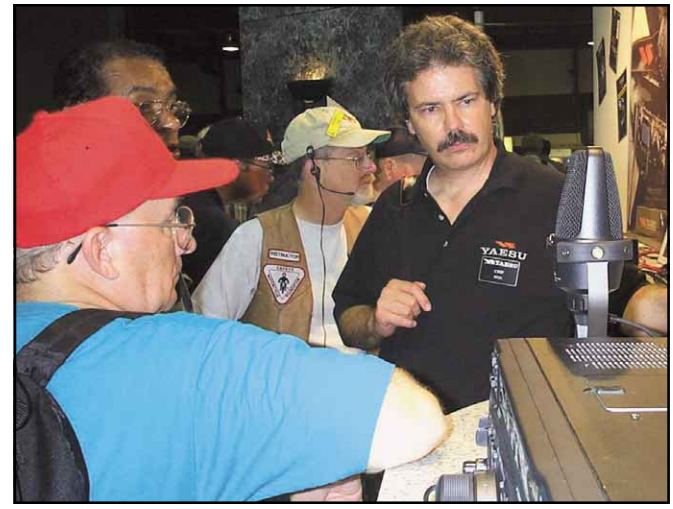
Three things (there may be more, but this isn't a science report) made Dayton Hamvention 2001 noteworthy. First, the May 18-20 event marked the 50th running of what's now the world's largest Amateur Radio gathering (we'll sidestep any technical discussion as to whether it was the 50th *anniversary*; it would sound too much like the one about when the millennium *really* began). Second, unlike most Hamventions, manufacturers (perhaps reflecting uncertainty in the economy) pulled in their horns this year, offering a minimal number of new products. Third, the spirit of the largely happy crowd was not dampened by Friday's thunderstorms, although there were some glum opening-day faces among flea market (*Ooops!* We mean *outside exhibits*) vendors.

Dayton Hamvention General Chairman Jim Graver, KB8PSO, said he was happy to see a good crowd, although it was down a bit from last year's—26,000 to 27,000 was his estimate—possibly as a result of higher gasoline prices and Friday's rain. Graver's team found itself in rumor-control mode during Hamvention weekend, spiking stories that Hara Arena had been sold to developers and faced the wrecking ball, forcing Hamvention to seek other accommodations. Graver said there are no current plans to move Hamvention from the venerable venue it's enjoyed since 1964. The show will return to Hara next year, Graver said, adding that Dayton Hamvention's contract with Hara runs



DXCC card checking at the ARRL booth—Don Search, W3AZD, left, and ARRL DXCC Manager Bill Moore, NC1L. More than 150 applications were processed.

The Ten Tec 6N2 all-mode 6 and 2-meter transceiver. It offers extended FM receive from 136 to 174 MHz, separate output connectors for each band, and a transverter port.



Yaesu's Chip Margelli, K7JA, with the new MD-200 microphone. Margelli said Yaesu's top sellers included the company's new FT-817 multimode and ultra-portable HF/VHF/UHF transceiver. Margelli said sales of Yaesu's VX-5R hand-held, the FT-100D transceiver and the Mark-V FT-1000MP transceiver (seen here) also were good.

through 2003. (Count on *new* rumors to surface before then, however.)

A lot of the smiles were inspired by the show-priced bargains some dealers offered. It appeared that many hams went home with new gear during Hamvention. Not only that but the weather improved immensely on Saturday and Sunday.

The Goodies

No killer products set Hara abuzz this year. Among the more noticeable new items, however, was Kenwood's TH-F6A compact hand-held FM transceiver for 2 meters, 1.25 meters (yes, there's a ham band there) and 70 cm.

Yaesu, which last year came out with the Mark V version of its popular FT-1000MP transceiver this time around offered a new desk microphone, the MD-200, "for elite-class Amateur Radio operators."

Ten-Tec debuted its long-awaited 6 and 2-meter all-mode transceiver—the Tennessee company's first factory-built VHF radio. The Model 526 "6N2" runs 20 W out.

Alpha Power previewed its Alpha 6/2 maximum legal power amplifier for 6 and 2 meters—the first amplifier to be produced under the company's new management and ownership, CrossLink.

Kenwood TH-F6A triband H-T features wideband receive from HF up through around 1.3 GHz (including SSB and CW reception).

Other manufacturers offered a plethora of new accessories, such as Patcomm's new AT-1 HF autotuner, the Palstar "Z-Match" 300-W manual antenna tuner for 160-10 meters that's set to ship soon, and SGC's economically priced SG-239 "Smartuner."

Among its many wares, MFJ had on display a Morse reader that translates CW into text on a small screen, plus a new, portable ground-mounting plate for vertical antennas.

Elecraft, which scored past hits with the popular K2 and K1 transceiver kits, this year added to its growing list of K2 accessories with a 50-W amplifier module. It's set to be on the street by year's end.

AOR's TDF-370 "multi-media terminal" uses DSP technology to decode PSK31 or RTTY on a LCD panel without a PC. It also can be used to enhance transmit and receive audio of SSB and CW and can act as a digital recorder or as a DSP filter.

On the antenna front, Fluid Motion—a new entry into ham radio manufacturing—demonstrated a revolutionary rotatable Yagi that can cover from 20 meters through 6 meters and is remotely adjustable from the ham shack.

Shortly before Hamvention, ICOM *withdrew* a product from the market—the IC-82A hand-held. "It just wasn't right," ICOM National Sales Manager Ray Novak, KC7JPA, said of the deleted offering. "It just wasn't where it needed to be." Novak said the H-T is being renamed, retooled with additional features, and will be on the market in the near future.

Fascinating Forums

Hamventioneers enthusiastically packed forum rooms during the three-day event, May 18, 19 and 20. On Friday it was a good way to get out of the

ARRL's Deputy Circulation Manager Kathy Capodicasa, N1GZO, headed up the ARRL Publications Sales contingent at Dayton this year.

Fred Hopengarten, K1VR (left), author of the new ARRL book *Antenna Zoning for the Radio Amateur*, with Jim O'Connell, W9WU, at the Amateur Radio and the Law forum.

Among the many overseas visitors was ARRL member Ib Pforr-Weiss, OZ5PF, of Denmark, here avoiding the rain at special event station W8BI/8. An ARRL member for more than 30 years, Pforr-Weiss was enjoying his first Dayton Hamvention.

inclement weather.

During the ARRL Forum Saturday, Executive Vice President David Sumner, K1ZZ, said, "It's been great year for Amateur Radio and the ARRL. Things are moving in the right direction on a number of fronts." ARRL President Jim Haynie, W5JBP, echoed those sentiments. Pointing to his career in sales, Haynie said Amateur Radio is "the best product that I have in my repertoire of things to sell, and obviously you believe in that too, because you're here." Haynie called upon those on hand to think about "the product" that is Amateur Radio and how they can share the fun with others.

"I'm asking you to talk to your neighbor, I'm asking you to talk to your brother, your sister, your city council, your mayor, your congressman, and tell 'em about your product, which is Amateur Radio," Haynie exhorted.

During Saturday morning's packed AMSAT forum, Roy Neal, K6DUE, of the Amateur Radio on the International Space Station program, chatted by telephone with so-called "space tourist" Dennis Tito, KG6FZX. Tito told the gathering that Amateur Radio provided a great boost to his recent visit to the International Space Station. "The opportunity to do a phone patch five days in a row was a very important part of my flight, and I looked forward to it every day," he said.

AMSAT also updated the status of the AO-40 satellite, launched last November. "We anticipate many years of successful operation," forum attendees were told. A planned ham radio contact with the ISS crew from the Hamvention did not pan out, however.

One of the banquet speakers, Roy Neal, K6DUE (left), of ARISS/SAREX visits with AMSAT-NA President Robin Haighton, VE3FRH.

***Laid back:* ARRL International Affairs Vice President Rod Stafford, W6ROD, just back from KH6-land.**

A well-attended session on Amateur Radio and the Law covered the hot topic of how to confront antenna ordinances and restrictive deed covenants. "Paying lawyers' fees to enjoy your hobby is absolutely no fun," said Jim O'Connell, W9WU—one of the "antenna attorneys" who joined Fred Hopengarten, K1VR, and ARRL Dakota Division Director Jay Bellows, K0QB, at the podium.

The increasingly popular PSK31 digital mode got a lot of attention. More than 350 packed the room to hear George Heron, N2APB, Del Schier, K1UHF (of West Mountain Radio and RIGblaster renown), and moderator (and *QST* Editor) Steve Ford, WB8IMY, discuss various aspects of the relatively new mode that's growing in popularity.

The ARRL Public Relations Forum Sunday morning featured a panel of public relations volunteers who shared their success stories on getting good PR for Amateur Radio in their areas. ARRL Public Relations Committee Chair Diane Ortiz, K2DO, and ARRL Public Relations Manager Jennifer Hagy, N1TDY, organized this year's forum.

The FCC's Riley Hollingsworth, K4ZDH, not only was one of the Saturday banquet speakers (the others were Bob Heil, K9EID, and Roy Neal, K6DUE), but the highlight of the Sunday morning FCC forum. Playing to a packed house (and preaching largely to the proverbial choir), Hollingsworth and FCC colleague Bill Cross, W3TN, of the Wireless Telecommu-

nications Bureau, reviewed regulatory and enforcement issues confronting ham radio.

Hollingsworth told the crowd that amateur enforcement complaints are way down. With tongue only somewhat in cheek, Hollingsworth said "California" topped his list of enforcement bogeys that keep him awake at night.

"If it weren't for California, amateur enforcement would be a one-day-a-week job," he joked. Cited as a close second and third were "stupidity" and unlicensed 10-meter operation. To demonstrate his point, he played some taped excerpts of actual amateur conversations, largely contentious discussions on HF.

"There was nothing illegal—nothing against our rules" on the tapes, he said. But, he continued, their content presents a poor image of the Amateur Service to anyone listening in—and that could include the media, decision-makers and the general public.

Cross confirmed that Amateur Radio continued to grow at the rate of about 1% during the past year. Further detailed regulation of Amateur Radio "is not in the picture," he said. "Strong and necessary enforcement is."

Hamvention Honorees

Dayton Hamvention named propagation guru George Jacobs, W3ASK, as its 2001 Amateur of the Year. A renowned engineer in worldwide broadcasting technology, Jacobs is probably best known as propagation editor for *CQ* for the past 50 years.

Hamvention picked Frank Bauer KA3HDO, to receive its Special Achievement award for 2001. Bauer, who works for NASA, was cited for his efforts on behalf of the SAREX (Space Amateur Radio EXperiment) and ARISS (Amateur Radio on the International Space Station) programs. Bauer chairs the ARISS Board.

Peter Martinez, G3PLX, received Dayton Hamvention's Technical Excellence award for 2001. Martinez, active on RTTY since the 1960s, is recognized as the father of PSK31.

The three awards were presented formally at the Dayton Hamvention banquet.

ARRL's Marketing Coordinator Bob Inderbitzen, NQ1R, checks out a mug for a customer.

A Very Good Year

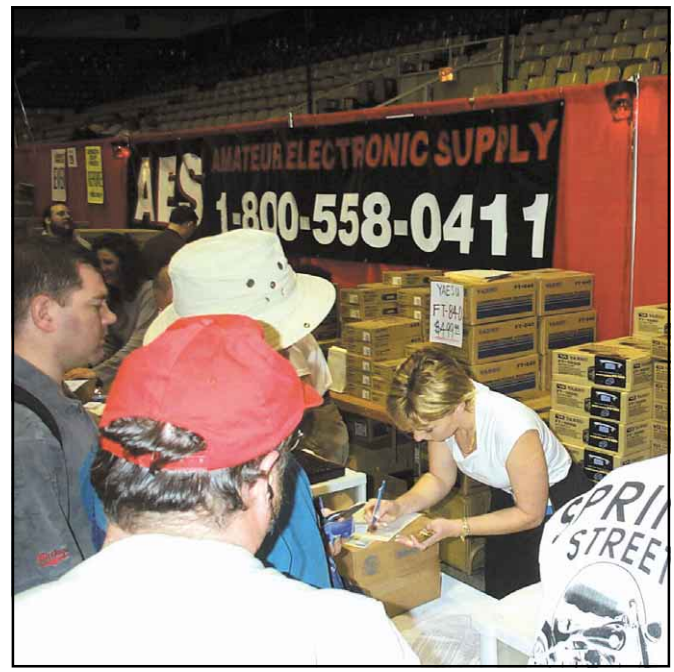
All indications were that it was a very good year to do business at Hamvention. Product sales were brisk as some retailers offered deep Dayton discounts. Those attending the show were eager to take advantage.

"Dayton was a tremendous success for the Yaesu product line," said Yaesu's Chip Margelli, K7JA, a Hamvention veteran. "Sales were very strong."

Competitor Kenwood echoed similar remarks. "Kenwood considered the show to be excellent," said Paul Middleton, KD6NUH. He said response to Kenwood's announcement of a new, triband hand-held transceiver, the TH-F6A, was well received, in part because the H-T includes 222 MHz.

During a pre-show reception, Kenwood presented its "Top Gun Award" to AMSAT Vice President of Field

The FCC's Bill Cross, W3TN, answers a question, while colleague Riley Hollingsworth, K4ZDH (background) listens.



Sales were brisk at many retail counters.

Part of the bounty of vintage gear available in the ouside exhibits area.

(L-R) Young Gary Rolland of St Louis visits with ARRL President Jim Haynie, W5JBP, ARRL RF Safety Committee Chairman Greg Lapin, N9GL, and Bill DeCoursey Jr, KA0RGI.

Operations Barry Baines, WD4ASW, commending him for helping to promote Amateur Radio. Middleton also called Kenwood's first-ever audio webcast from Dayton "an outstanding success."

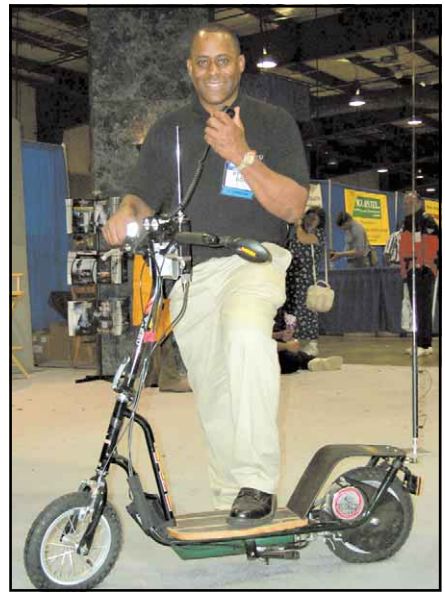
The ARRL concession was among those that benefited from Friday's rainy weather, which drove the crowd indoors. "The rain proved to be a bonus for us," said ARRL Circulation Manager Deb Jahnke, who sat out this year's show. Heading up the ARRL Dayton Hamvention team were ARRL Deputy Circulation Manager Kathy Capodicasa, N1GZO, who oversaw the booth setup and staffing, and Marketing Coordinator Bob Inderbitzen, NQ1R.

Jahnke reports the ARRL contingent broke the previous records for membership signups and publication and software sales. "We consider it to be the most successful show to date," she said.

ARRL Advertising Manager John Bee, N1GNV, said he got "almost universally positive comments" from Dayton Hamvention 2001 exhibitors. "'They came to buy,' was a common refrain," he said. Bee said he found the number of new vendors at this year's show "an encouraging sign" for Amateur Radio.

Scott Robbins, W4PA, of Ten-Tec also was pleased with the results of Hamvention 2001. "Show sales for Ten-Tec were equal with 2000," he said, pointing out that last year's Dayton Hamvention proved to be the company's best ever by a nearly 30% margin.

Robbins said sales of Ten-Tec's brand-new Model 526 "6N2" VHF transceiver "led the pack," with the company's Jupiter HF transceiver "a close second." He said the rain seemed to have altered the breakdown in sales activity this year, with volume approximately equal on Friday and Saturday.



Yaesu's Bob Curry, KC3VO, is on the cutting edge of the latest fad—scooter/mobile.

How sweet it is! **ARRL's Lisa Kustosik, KA1UFZ.**

ICOM's Novak said his company's "Work the Magic" slogan struck a responsive chord. "It seemed the more we talked to people at the show the more we would see the glitter in someone's eye, whether it was a youngster who talked to the space station for the first time, or the Elmer who just logged a new country," he said.

Novak called the 2001 Dayton Hamvention a buyer's show. "Many people found incredible deals on the radio of their dreams, and many radios found new homes," he said. He agreed with assessments that the Dayton crowd was, by and large, a cheerful one.

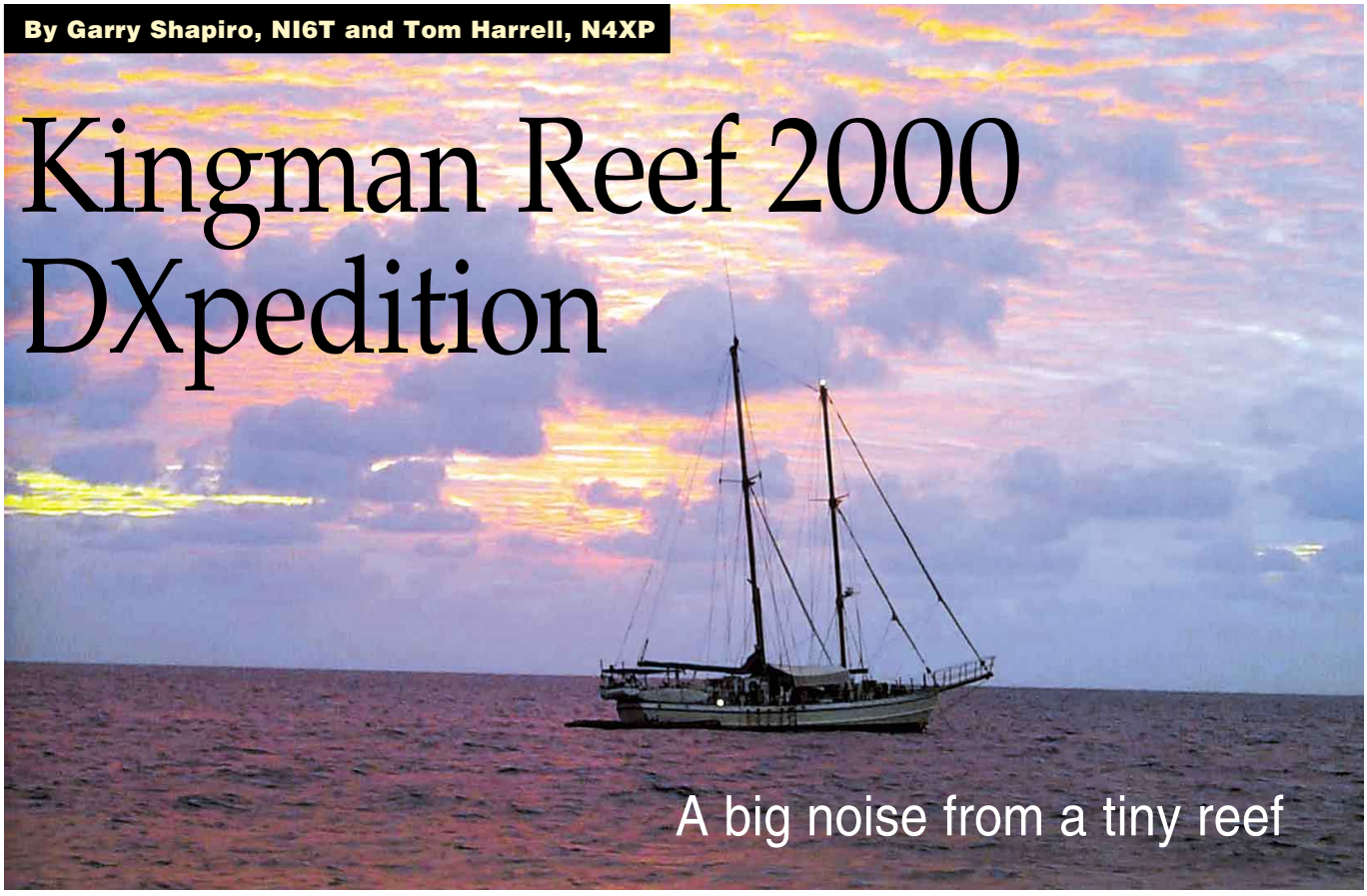
Also agreeing that Friday's rain didn't spoil the show was Katsumi "Naky" Nakata, KE6RD/JE3AVS, of Alinco. The week before Dayton, Alinco announced that it was jobbing out its distribution and service to an Ohio firm—Atoc Amateur Distributing LLC—and closing its US branch in California. "The change in distribution seemed to be accepted by the public, and our newest DR235T 222-MHz mobile radios sold well during the show," said Nakata, who has returned to Japan as a result of the change.

Patcomm's Jim Idone, KE2TR, said that, while he thought Dayton attendance was off, interest was good in the Long Island company's PC-500 dual-band HF transceiver. He said the company plans to focus more on the low-power operating market in the future. "QRP is really where we want to go," he said.

No matter on which side of the retail counter they were standing, many of those who attended Dayton Hamvention 2001 likely would agree with Yaesu's Chip Margelli, who observed, "Overall, it was simply a tremendous weekend!" QST

By Garry Shapiro, NI6T and Tom Harrell, N4XP

Kingman Reef 2000 DXpedition



A big noise from a tiny reef

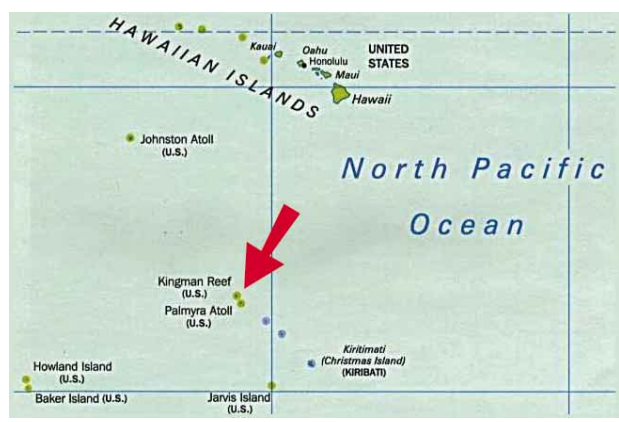
You could say that our adventure began in 1998 when we teamed up to plan a major DXpedition to Central Kiribati, T31. We had wanted to fly to Canton Island's neglected airstrip and thus avoid a long boat trip, but when we could not locate a suitable aircraft, we sought another destination high on the DXCC Most-Wanted List. Tom, N4XP, suggested Kingman Reef, KH5K, whose last substantial activation had been in 1993, and which had since climbed to #16 worldwide and #3 in Europe. After Bhutan, A52A, Kingman would be #2 in Europe, just behind North Korea.

Garry, NI6T, noted that Kingman Reef—a bare, three-part, mostly submerged coral reef near the equator south-southwest of Hawaii—was minuscule, precarious, devoid of vegetation and certainly had no airstrip. Tom countered that if it were easy to reach, it would not be rare. Kingman had only been activated a half-dozen times in 26 years, and then only by smaller groups who had brought modest amounts of equipment and stayed a week or less. We would man six stations, including 6 meters, and stay long enough to knock Kingman way down the Most Wanted List. A boat would be required, but we were hopeful the sail could be much shorter than the thousand miles from Hawaii to Kingman.

At the New Orleans International DX Convention, we shared our vision with Chuck Brady, N4BQW. Chuck, a physician and space shuttle astronaut, had spent 24 hours alone on Kingman in 1998 and was eager to return as part of a major effort. Chuck noted that The Nature Conservancy (TNC) was purchasing Palmyra atoll, KH5, only 35 miles from Kingman, from the Fullard-Leo family of Honolulu. Access via Palmyra had always been pivotal in reaching Kingman. Many DXers were unaware that Kingman's status as a separate DXCC counter was due to its "separate administration" by the US Navy—the Department of Interior administers Palmyra. Chuck believed that assisting the purchase could enhance our access to both counters—and Palmyra had an airstrip!

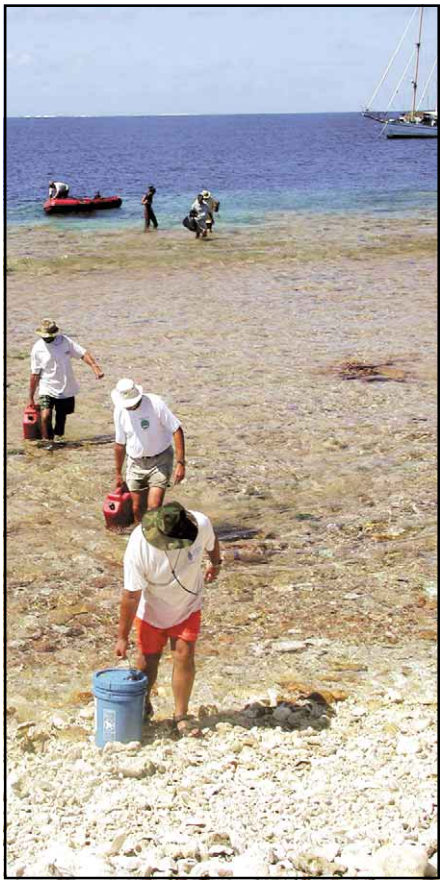
The Plan Takes Shape

By late 1999, we had hired Honolulu-based Bill Austin, master of the motor schooner *Machias*. The 66-foot *Machias*, well known to Central Pacific DXpeditioners, would be appropriate for the anticipated 10-operator team. *Machias*



Above—Life in the Pacific doesn't get much better than this. The *Machias* is at anchor off Kingman in the glow of the setting sun.

Left—Kingman Reef is about a thousand miles southwest of Hawaii, near the Palmyra Atoll.



Bringing more supplies ashore.

Despite crowded conditions, K5K is on the air.

would be loaded and provisioned in Hawaii. Our target window would be autumn 2000. Our primary objective would be Europe, but we would also cover 10 bands and three modes.

Ten meters would peak near the equinox, and 6 meters in October, but the low bands would only just be becoming viable. Weather in that part of the Pacific is heavily influenced by a natural phenomenon known as the "equatorial convergence," where the currents and winds of the Northern and Southern Hemispheres collide, producing highly variable weather and up to 170 inches of annual rainfall. The colliding currents were responsible for building up the broken coral and clamshells that formed the only "dry" land on the otherwise submerged reef. But that part of the reef is often submerged by storms. Bill Austin mandated that we be off the reef and out of the area by early November. We targeted early October for our operation.

The Nature Conservancy had built facilities on Palmyra to host potential large contributors, to be flown from Honolulu by chartered aircraft. But TNC needed help with its communications and medical support—areas where we could be useful. N4BQW made several trips to Palmyra to support TNC medically and electronically—and again managed a 24-hour solo, unsheltered and very uncomfortable visit to Kingman.

Our hope/expectation was that the Conservancy would, in return, assist our DXpedition by allowing its chartered aircraft to transport our team from Honolulu to Palmyra or from Christmas Island, T32 to Palmyra, thus shortening our time at sea to one night. Unfortunately, our expectation was overoptimistic—the aircraft would not be available.

Machias, an older vessel, required renovation, after which she would be loaded in Hawaii, and sail for Christmas Island, 400 miles southeast of Palmyra, ahead of the team. The team would assemble in Honolulu, fly commercially to Christmas Island, board *Machias*, and then sail three days to Palmyra and Kingman. We would be on the air for 12 days on the reef while *Machias*, anchored in the lagoon, functioned as a "mother ship." The team would return to the boat to eat and sleep. We would then sail back to Christmas Island and return via Air Kiribati, exactly three weeks after departure.

We began to recruit our team. With Honolulu as our logistical base, Kimo Chun, KH7U, and Pat Guerin, NH6UY, both experienced Pacific DXpeditioners, were obvious choices. Pat had been part of the 1993 Kingman/Palmyra DXpedition, and both men had assisted many DXpeditions passing through Honolulu. Dave Johnson, WB4JTT, an attorney, would prove invaluable in dealing with the Navy, as well as taking charge of our generators. Bob Allphin, K4UEE, fresh from Clipperton and Bhutan, joined us and became Antenna Czar. Ned Stearns, AA7A, would, as Site Czar, design our Kingman "village" and spearhead the 6-meter operation.

So far, our team was American, but it soon became international with the addition of Roman Thomas, RZ3AA, Massimo "Max" Mucci, I8NHJ, and Katsu Ono, JH7OHF. Max had been part of the E30GA DXpedition to Eritrea, and Katsu would be Ned's right-hand on 6 meters. We were now 11, but more operators were necessary to keep six stations on the air. Ann Santos, WA1S, a veteran of Willis Island, signed on and would take on operator scheduling. We added Steve Wright, VE7CT, a member of the 1990 Conway Reef team, and Alan Brown, K5AB, an enthusiastic topband operator from Texas.

During this phase, Dave, Kimo and Pat flew to Palmyra to assist the Conservancy, but had little time to operate. Later, Mike Gibson, KH6ND, would spend almost three months on Palmyra as a volunteer for the Conservancy. In his off-hours, Mike would log 27,000 QSOs as KH6ND/KH5! Mike joined the team; we would stop at Palmyra to pick him up.

With our team almost complete, we encountered an unexpected setback. N4BQW's NASA duties would prevent his participation, and leave us without a medical person. We had agreed early on that a participant with medical skills was essential, so it was imperative to find a replacement for Chuck—or abort the trip.

Few people can spontaneously commit to an imminent departure to an exotic destination, so we were relieved when I8NHJ suggested Joe Owen, KO4RR, his teammate from E30GA. Retired as a medic with the US Army Special Forces, Joe was a perfect fit. With only weeks to departure, the Kingman Reef team—15 strong—was finally complete.

The Antennas of Kingman Reef

A large DXpedition pursues the widest possible audience, but not every part of the world can be equally served. Of the three primary DX target areas, Europe—straight over the North Pole—had the greatest demand for and toughest path to Kingman Reef. If we could not put big signals into Europe, our DXpedition would not be counted a major success. Our antennas would be key to solving that problem.

The standard antenna strategy for reef DXpeditions is triband Yagis in general, monobanders if possible, and vertical monopoles for the lower bands. But it would be impossible to erect Yagis at Kingman at heights that would allow the lowest takeoff angles—necessary to minimize the number of ionospheric hops and thus maximize signal strength and extend openings on the higher bands.

We were aware of the great contesting success Tom Schiller, N6BT and Kenny Silverman, K2KW, had enjoyed in the Caribbean, using vertical parasitic arrays near the water instead of low Yagis. So, when Tom and Kenny proposed this approach for Kingman Reef, we were quite excited.

The proposed antennas were essentially fixed 2-element Yagis on their ends; the elements were dipoles, not monopoles, with center-fed driven elements. No radials were necessary. The parasitic element would nominally be a director, but a simple jumper at the base would lengthen it to a reflector, reversing the pattern. Verticals work best over very good ground, and there could be no finer ground than the surrounding Pacific. Moreover, our "island" was only a pile of shells and broken coral, and the salt water would be under as well as around us. While the two-element arrays could only provide some 5 dB gain over a dipole at the nose of the pattern, that nose would be very low, and the energy radiated at extremely low angles would far surpass what could be achieved with any horizontal tribander that we could erect, no matter who had designed it.

Two other factors spoke loudly for what Tom and

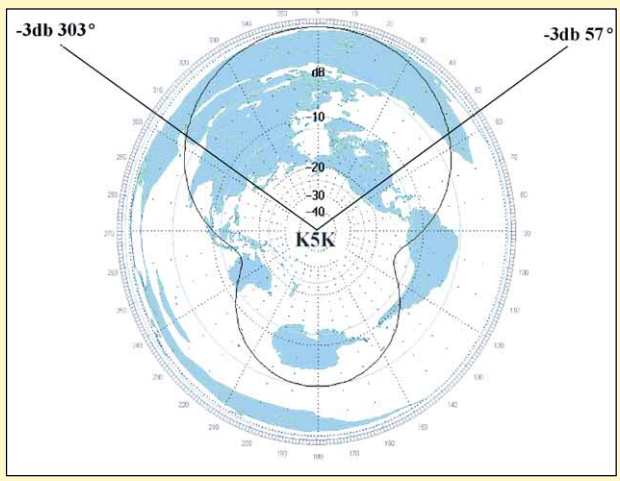
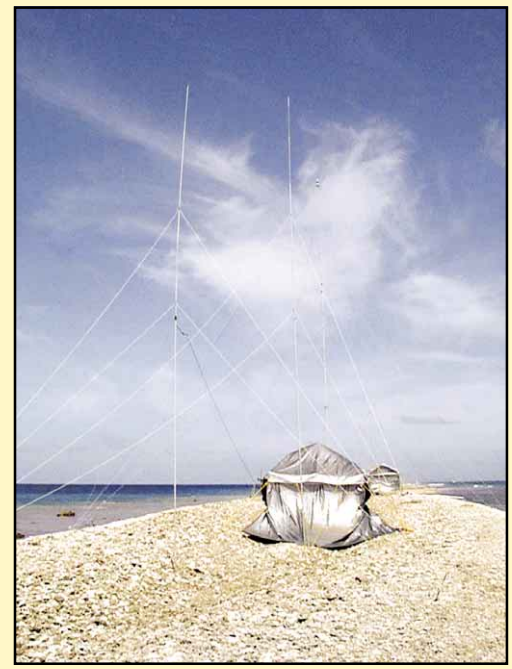


Figure A—The azimuthal radiation pattern of the K5K Switchable Vertical Dipole Array.



Kenny called their Switchable Vertical Dipole Arrays (SVDAs). First, they would be light, easy to erect and take down, simple to guy and service, and unlikely to fall prey to the squalls that frequently ravage the reef. Second, the azimuthal pattern, 114 degrees wide, would encompass all three of the major target areas, with substantial radiation to several secondary target areas (Figure A).

We worried about interstation interference due to the broad patterns and modest front-to-back ratios of the SVDAs. But simulations confirmed that neither a Yagi's nor SVDA's near-field pattern offered relief at the close antenna spacings mandated by the narrow structure of Kingman Reef. It was suggested that some locations would not be well served by the fixed arrays, and that the higher angles of a low Yagi might be more useful for working JA and North America. There was reluctance to rely completely upon one approach.

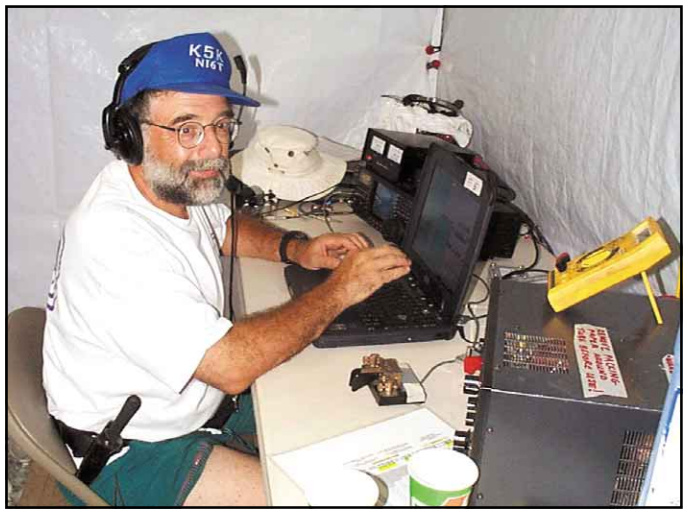
In the end, the SVDAs were to be the primary antennas at and above 20 meters, with conventional tribanders as backup and for direct on-the-air comparison in the pileups. From 160 to 30 meters, we deployed vertical monopoles with raised radials—the famed Battle Creek Special, a K9AY monoband vertical for 80 meters and full-size verticals for 40 and 30 meters. In reserve were Titanex verticals—excellent lowband performers, but considered too large and guy-dependent for the narrow confines and unstable composition of Kingman Reef.

Operator consensus was a unanimous "thumbs up" for the SVDAs—they were simply magnificent to all major target areas. When directly compared with a low tribander, there was no question that our decision had been the right one for our unique situation.

A large DXpedition to an uninhabited destination is an expensive endeavor. Transportation would represent more than half the total cost, and would largely be covered by operator contributions. The remainder would have to come from foundations, clubs and individuals. Our equipment needs were eased when ICOM graciously provided six IC-756 Pro transceivers.

Antennas are, of course, crucial to a DXpedition's success, and we wanted the most effective antennas possible for our location. What we chose surprised many DXers. (See the sidebar, "The Antennas of Kingman Reef.")

Survival on Kingman Reef would require shelter, water, sanitation, electric power and a food supply. The Hawaii logistics team and Ned, AA7A, were responsible for our environment. For shelter, the Hawaiians purchased light popup tents, but knew they would require strengthening and reinforcement, for



Garry Shapiro, NI6T, navigates the pileups.

Tom Harrell, N4XP, takes a turn at one of the operating positions.

which tarps and rebar stakes were supplied. A 200-gal/day watermaker and a large water bladder would ensure plentiful fresh water for drinking, showers, and even laundry. A sanitation tent was planned and a sturdy field commode was purchased, but we worried about waste disposal. We purchased six 5-kW diesel generators, and would fuel them from *Machias'* tanks. Food and shelter were re-thought when we realized it would be impractical to ferry so many people to eat and sleep on *Machias*. Instead, the team would sleep ashore and food would be cooked aboard and brought to the reef.

Based upon 1993 reef dimensions, AA7A designed a site plan that would utilize almost all "land" above high tide—about a half-acre. Ned's challenge was to achieve this with easy access, while minimizing such hazards as exposed antennas and radials and while maximizing antenna separation. He would be ready to update this plan, as required.

Air Kiribati flies weekly to Christmas Island on Sunday mornings and we booked 14 seats for October 15. To rendezvous with us, *Machias* would complete repairs, load our gear and food, and depart Honolulu nine days earlier—October 6. Upon our arrival at Christmas, we would proceed to the harbor and board *Machias* for Palmyra and Kingman. On the return trip, we would arrive back in Honolulu on November 5.

All operators had booked their flights to Honolulu, but Roman, RZ3AA, had visa problems until NI6T enlisted aid from his local congressional office. Meanwhile Dave, WB4JTT, negotiated landing permission for Kingman with the Navy at Pearl Harbor. He also obtained landing permission for both Kingman and Palmyra, for a substantial fee, from the Fullard-Leo family. Our decision to secure double permission for Kingman was based upon the family's historic and unceasing claim to the reef. We would not get involved in that dispute, which remains unresolved.

Then the gods frowned: *Machias* ran out of time with not all repairs completed. The Hawaiian team and the boat crew labored to exhaustion to load the vessel, but that complex effort, fueling and customs delays set back her departure three days—and an angry Pacific would not allow that time to be made up. We had just lost several days from the front end of our operation. Then, a day after *Machias'* departure from Honolulu, the Navy informed WB4JTT that our landing permission for Kingman Reef had been rescinded!

Undaunted, Dave hurried to Pearl Harbor to renegotiate with the Navy, which had unresolved concerns about its liability in the event that something went awry on the reef. Dave's calm assurances that we accepted responsibility for our actions and the serendipitous fact that—at N4XP's insistence—we had all purchased travel insurance, won the day, and Dave emerged with a new landing permit.

Outward Bound

A tired but excited group of 14 DXpeditioners gathered at Honolulu Airport at 5 AM on October 15 for the flight to Christmas Island. That is a quiet time at the airport, and we were quickly processed and on our way, peering at the expanse of Pacific Ocean, hoping, to no avail, for a glimpse of *Machias* below. Her delayed departure from Honolulu would keep us on Christmas for several days.

Christmas Island is the largest coral atoll in the Pacific, but its small population lives a subsistence lifestyle; the old copra plantations are abandoned and overgrown. The atoll lies outside the Equatorial Convergence, and receives far less rain than Palmyra or Kingman. Our hotel, the Captain Cook, is fairly close to the airport and we were soon relaxing in the breezy veranda near the sea. But we had no idea where *Machias* was—no radio contact had been made with her.

We used the unplanned respite to relax, further plan our operation on Kingman and to become better acquainted. We received the T32R group call sign from Tarawa, and Phil, T32O, who lives nearby, lent us materials for a wire antenna. A young hotel employee cheerfully scampered up a coconut palm in the courtyard with a rope, and soon we were operating barefoot from a hotel room into an inverted **V**. It was the first of three DX locations from which we would operate.

We retired for the second night, still with no word of *Machias*, but the early risers learned that the vessel had arrived during the night and was anchored offshore near the entrance to the sandbar-blocked harbor at London village. There had been electrical problems; the radios had not worked, and the sea conditions had made it impossible to perform the repairs. It had been a difficult passage, but the team was energized by the news and quickly packed for departure.

Kim Andersen of Dive Kiribati had arranged our departure processing by Immigration and our transportation via large outrigger canoes from his dive shop to the boat. As we rounded the point at the harbor entrance, we saw *Machias* at anchor with Kiribati officials still on board. We stood alongside with growing excitement, awaiting permission to come aboard. Finally, we boarded and hauled our personal gear below to our sleeping compartments. We now grasped what the Hawaiian contingent had known all along—*Machias*, in which we originally

had intended to accommodate 10 DXpeditioners, was literally stuffed with supplies and equipment for 15. Entry and egress from the tiny bunks would require the flexibility of a contortionist, and movement below in the dark when under way would be a challenge. We would literally sleep with our generators, antennas and equipment.

But there was a problem. The cook, Tom, not a professional sailor, had been overwhelmed by the difficult voyage from Honolulu. He had quit, and was seated in the canoe with his gear, planning to go ashore and fly home. The prospect of having to cook for ourselves while constructing our camp and operating around the clock was not attractive. The young man agreed to meet with our group to discuss the matter and was persuaded to stay and participate in our adventure. There was a collective sigh of relief.

The rest of the crew consisted of Richard, first mate and a seasoned sailor, La'a, second mate, and Lindsey Austin, Captain Bill's 16-year-old daughter.

Within an hour, we weighed anchor for Palmyra Atoll. Captain Bill advised that the currents favored us and that we would make good time—less than two days' cruise. For most of us, the trip was smooth and pleasant, but several of our team chose injections of phenergan to combat the nausea of seasickness and "zoned out" in their bunks. The rest lounged in the fantail and enjoyed the ride. We kept skeds and played a little radio, using a dipole in the rigging. We passed Fanning Atoll to starboard. The crew trolled from the stern and occasionally caught skipjack tuna, which were delicious.

On the morning following our second night, Palmyra was in view. The approach is from the southwest and challenging, but *Machias* made it to the West Lagoon without incident. As we neared the dock, we saw Mike, KH6ND, waiting and waving. We had about four hours to explore and "appreciate" our last view of vegetation for two weeks! Mike conducted a tour of the islet, including a visit to the wrecked aircraft from the ill-fated 1978 DXpedition. Many operated /KH5 from the Palmyra Yacht Club facility. At noon we departed Palmyra with our full team on board. Kingman was now just 35 miles away and we would arrive the next morning.

The K5K team.

The Landing

Several team members went topside at daybreak and were posted as lookouts. The entry into the lagoon is treacherous, with depths as little as 20 feet. The approach is from the south, and, once through the reef opening, Captain Bill turned *Machias* eastward and slowed. *Machias* motored slowly into the sun for over an hour before Dave, WB4JTT, positioned on the bowsprit, yelled, "I see something!" Lindsey Austin called out depth soundings. Soon there was a faint outline on the horizon, which slowly became visible. A half-hour later, we anchored in 150 feet of water, about 300 feet offshore from the islet, with its coral heads, surf and sea birds. We hooted and hollered as if someone were on the reef to hear us!

We prepared a Zodiac for the first landing. Within an hour of dropping anchor, N4XP, AA7A and the two mates were at the reef slope and out of the boat. At the top they waved, then walked the reef from end to end, measuring. Soon all team members were ashore and the two Zodiacs were ferrying equipment to the reef. As each generator came ashore, team members muscled it up the slope with poles and slings. Most of the equipment was on the reef by mid-morning, and tent assembly had begun. But, until then, no one had taken note of the weather.

Although the sky was clear and the sun shining, the wind was quite strong. Then, quickly, it grew darker, and began to rain. Suddenly, several tents—assembled but not anchored—rolled down the reef, with two going into the water. Operators scrambled to retrieve the tents and protect equipment sitting in the open. Soon it was a question of saving the camp!

As darkness fell, some of the team returned to *Machias*—not all could be accommodated yet on the reef. Those remaining would stay all night, as Zodiac operations would be too dangerous in the dark. They attempted to erect the tents securely enough to at least provide shelter for the night, but the storm was unrelenting. It rained all night, with the wind never dropping in intensity, and sleep was tense and fitful.

At daybreak, the weather was still windy and threatening, and the priority that day would be to secure the camp against the weather. Wind and rain were blowing through the corners of the tents, with the tent frames literally being lifted from the stakes. Other team members tended to life-support tasks, such as the sanitation tent and its accompanying pit, and K4UEE's team worked on erecting antennas. Despite the wind, they erected all the antennas, except the Battle Creek Special and the K9AY vertical.

By dark, we still had not put a radio on the air. We had lost almost a day ensuring our survivability, but now team members began to set up for operations. While our original plan had called for four operating tents and a single large sleeping tent, we now decided to employ two operating tents housing six operating positions. The large sleeping tent would now be the primary operating tent, holding four positions, with a single, smaller tent housing the two remaining HF positions plus 6 meters. Operators would sleep in the smaller tents, erected away from the operating, power and sanitation areas.

At daybreak on the second full day,

KH6ND led a work party to complete stabilization and weatherproofing of the sleeping and operating tents. Mike's group sealed corners, covered tents with heavy tarps, drove rebar stakes and guyed, taped and tied every tent and tarp. By midday, most of the living facilities had been "hardened" to a point where we felt secure in their ability to withstand wind and rain. At last, we could turn all our energies to our primary goal—radio!

On the Air from K5K!

Operating positions were being assembled in both tents. We had intended to have all positions on the air simultaneously, but, in consideration of the time lost, we activated each station when ready. The position with the Alpha 99 amplifier was the first one completed, and, without ceremony, Ned, AA7A made the first QSO on 20-meter SSB at 0320Z on October 22. Coincidentally and appropriately, the contact was with Mike, N9NS—co-leader of the 1993 Kingman Reef DXpedition!

We commenced full-scale operations. Some callers were initially perplexed by our choice of the K5K call sign, generally used for domestic special events. Many were unaware that FCC no longer issues call signs for locations without a ZIP code. Our choice had been either to use a personal call sign with a /KH5K suffix, or a 1×1 call sign, and the team had overwhelmingly chosen the shorter call.

The pileups were initially huge, and generally stayed that way. All operators were impressed with the Switchable Vertical Dipole Array (SVDA) antennas (see the sidebar, "The Antennas of Kingman Reef.") The 80-meter vertical did not play well until provided with the elevated radials, which had been originally planned. Until then, the Battle Creek Special had been used on both 160 and 80 meters. We logged a thousand QSOs on 160 meters and over 3000 on 80 meters.

The proximity of the antennas on the tiny reef did cause some interstation interference, particularly on harmonically related bands. Bandpass filters between transceiver outputs and amplifier inputs, and coaxial stubs on amplifier outputs were essential to allow coexistence, and were usually, but not always, sufficient. Problems were sometimes resolved by one station operating CW while the other chose SSB, thus moving the affected station farther from the harmonic frequency.

Because Europe was farther away than either Japan or North America, and beyond the auroral zone, Kingman was most in demand there, and we tried to exploit every possible opening. Our efforts were highly successful from 40 to 10 meters, and successful to Northern Europe on 80. No Europeans were logged on 160 or 6 meters.

We had stated from the first that RTTY would be a focus of our operation. To provide RTTY without impacting CW and SSB, and to compare performance with our SVDAs, we erected a triband Yagi. But, compared to the SVDAs, the tribander was a dummy load! We had proven our point about antenna performance, but a RTTY operator would have to commandeer an SVDA on 20, 15 or 10 meters, displacing another mode. Moreover, interstation interference, occasionally severe on CW or SSB, was worse with RTTY, due to its higher transmit duty cycle. To maximize effectiveness, we limited each calling station to one band for RTTY, and put 1350 RTTY QSOs in the log.

Toward the end of the operation, we noted that the European pileups, while predictably large and raucous, had become much better behaved than we had expected. Meanwhile, Bill, K6GNX, our chief pilot, told us during our daily on-the-air briefings that European operators were reporting long, solid openings and strong signals. Our conclusion was that the SVDAs were delivering such reliable signals into European antennas that our audience, confident of getting through, was behaving in a relatively calm and orderly manner. This in turn allowed us to maintain high rates to our most critical target area.

For Ned, AA7A, and Katsu, JH7OHF, the opportunity to put Kingman on 6 meters had been a primary objective, and October was the optimum time. But the number and ferocity of the pileups surprised even them; they were to log 1000 QSOs from the reef on the Magic Band.

Squalls blew through the area several times during the operation, but were never as intense as those initially encountered, and our encampment weathered them well.

Our original QSO goal had been 65,000. So, with a few days to go, we were surprised when Bob, K4UEE, observed that we had an opportunity to place ourselves among the top ten DXpeditions in terms of total QSOs. Most of the operators were excited by this prospect, but we debated whether to operate in the upcoming CQ Worldwide SSB Contest.

The enthusiastic contesters favored a contest effort, but the leaders worried that there would be excessive duping, and that the contest canon of no split operation would inhibit our QSO rate. So we opted to avoid the contest and concentrate on the CW segments of the six major bands, plus 30, 17 and 12 meters. To our surprise, rates were unimpressive, and we concluded that most DXers were either actively in the contest or were cherry picking new ones. We changed course and entered the contest—and our rates soared.

Max, I8NHJ, our computer guru, had been posting our daily totals in the main operating tent. As we began our final night of operation, we had logged 75,000 QSOs. But we had to be off the reef the next day to ensure arrival at Christmas Island in time for the weekly flight to Honolulu. Some operators favored a maximum effort for the last night, but others wished to begin disassembly to ensure a smooth and timely departure. In the end, we achieved both a record performance and a smooth departure, but there were some animated and intense discussions along the way.

K5K ceased operations at 1848Z on October 31, 2000, with almost 81,000 QSOs in the log. Of these, 16,000, or almost 20%, were with Europe! We had been on the air for only 9.6 days, compared to our planned 12 days. Our total placed us #3 among all DXpeditions to that time, and first among boat-and-tent operations.

Homeward Bound

Disassembly and loading aboard *Machias* was hectic, but proceeded rapidly and smoothly. We burned and buried our waste and picked the reef clean. By mid-afternoon, Kingman Reef was again a bare reef in the middle of the Central Pacific. A final Zodiac run transported the last operators and gear to our boat. Bill Austin and his crew weighed anchor and, as we slowly motored out of the lagoon, we watched Kingman Reef disappear over the horizon and into our memories.

We reached Palmyra Atoll the next morning, spent a few hours enjoying the greenery, said farewell to Mike, KH6ND, and departed for Christmas Island. The cruise from Palmyra to Kiribati, against the wind and current, was rougher than the outward leg, with several more ops succumbing to seasickness, but it was not as rough as it might have been, and we counted ourselves fortunate.

We made Christmas easily, and had time to relax and operate, and to make our farewells with Captain Bill Austin and his crew before catching our plane back to Honolulu. For the *Machias,* it would be a week and a half cruise to Hawaii, where Kimo, Pat and Dave would be waiting to unload her. For the rest, it was the end of the story—until the next DXCC counter beckons.

You can contact Garry Shapiro, NI6T, at 20941 Nez Perce Trail, Los Gatos, CA 95033; **ni6t@intuitive.com**. *Tom Harrell, N4XP, can be reached at 2011 New High Shoals Rd, Watkinsville, GA 30677;* **n4xp@juno.com**.

By John Core, S21YV/KX7YT

A Beginner's Guide to Amateur Radio in Bangladesh

When business dovetails with travel to faraway lands, DX is sure to follow—especially when the destination is on the DXCC "50-most-wanted" entity list. As this amateur discovered, it does the soul good to *be* the DX every now and again!

Although I've been licensed for 30 years in the US, I've only recently had the pleasure of operating from a foreign country—an experience sought by many hams worldwide. I'm usually the guy in the midst of the pileup trying to be heard by *someone else* operating from some faraway location. So, when I had the chance to take on a consulting project in Bangladesh, my first thoughts were of finally discovering what it's like to *be the DX*!

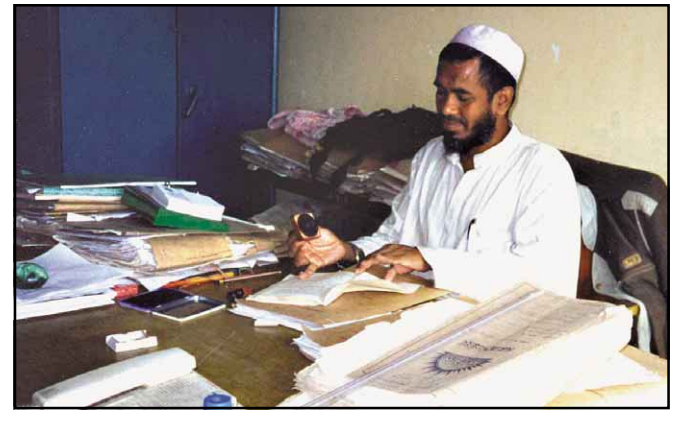
The first hurdle was to find out how to get licensed in Bangladesh. I turned to the Internet, initially seeking information on Amateur Radio, operators or clubs in Dhaka, the capital city. Fortunately, I ran across an e-mail address for Nizam, S21B, who serves as the vice president of the Bangladesh Amateur Radio League (BARL). During the months leading to my departure, Nizam and Mamluker, S21W, another BARL member, were able to help me obtain license applications and customs import documents permitting me to bring radio equipment into the country. Nizam and Mamluker also advised me on a number of related issues, especially those involving relations with the Bangladesh Frequency and Wireless Board, which issues ham licenses.

A Brief History of Amateur Radio in Bangladesh

Bangladesh (S21-land) is located just east of India at the tip of the Bay of Bengal. Economically, it's a relatively poor country with a high population density in its major cities. Although Amateur Radio was allowed prior to 1964 in what was then East Pakistan, licenses were revoked at the outset of the Indo-Pakistan War. After the war of independence and the establishment of the People's Republic of Bangladesh in 1971, Amateur Radio was dormant until 1979, when the BARL was formed. Club members then began lobbying government agencies to reactivate Amateur Radio and, in 1983, a decision to allow ham radio in Bangladesh was made. Unfortunately, government bureaucracy effectively stalled the licensing process. Through years of steady persuasion, ham radio in Bangladesh became a reality in 1992, when the first two licenses were finally issued. Since then, some 40 licenses have been issued to Bangladeshi nationals, many of whom operate only on 2 meters. Through this process, BARL members have formed a strong link with government licensing officials. Many other seven-day temporary licenses have been issued to foreign nationals visiting or living within the country.

The immense value of Amateur Radio during natural disasters was realized during the May 1997 cyclone that devastated the coastal areas of Bangladesh. Two teams (consisting of S21R, S21D and other BARL members) helped the Red Cross, CARE and other relief agencies. Since then, BARL members have been active in relief operations during several other national disasters. In 1998, the BARL established a 2-meter repeater in Dhaka to serve the growing number of

Nizam, S21B, operating from Dhaka.



Mr Alauddin, of the Bangladesh Frequency & Wireless Board, issues amateur licenses in Bangladesh.

Antenna supports go up at S21YV.

Nizam, S21B, and his son Farhad, S21G, work DX with their tri-band Yagi.

hams who were using hand-held radios. The club has also been active in radio direction-finding, JOTA and ham conventions throughout Asia. Attendance at the monthly BARL meetings is growing, suggesting that more S21 call signs may soon be on the air.

Operating in Bangladesh

Although the Bangladesh Frequency and Wireless Board (BF&WB) issues ham licenses, operators living outside the country will have better success during the licensing process if they have the valuable help of a BARL member. Because mail deliveries to BF&WB aren't always dependable—nor are written inquiries likely to be answered promptly—personal contact via e-mail with hams living in Dhaka is the preferred alternative.

A seven-day temporary license is first issued to foreign operators who must then apply for a permanent license pending government security clearance and a letter of support from respective embassies or consulates. This process can take a *long time*, so patience and frequent personal follow-ups with the Board are advised. A customs import permit is required to bring radio gear into the country. The fees for the complete licensing process add up to about $85.

Once my call sign was issued it was time to gather antenna wire, ropes, insulators and other items needed to get on the air. It's difficult to buy ham-related items in Bangladesh. Because there are no amateur retail outlets in the country, visiting operators will have to bring just about everything they'll need (or make local arrangements for required supplies).

Unlike most places in the world, Bangladesh has bamboo poles *up to 50 feet in length* that are readily available and inexpensive. They make great antenna supports for rooftop installations. As I was unfamiliar with local sources of electrical supplies, S21W served as my guide and Bengali interpreter during an outing to buy antenna wire. Traveling via bicycle rickshaw, we headed into the infamous Dhaka traffic to gather the goods.

We hired three local fellows to obtain the bamboo poles and install them on the rooftop of my guest house while I built a half-square antenna for 20 meters and ran coax (borrowed from S21B) to my ICOM IC-756PRO transceiver. At dusk on the evening of January 24, with Dhaka's Central Mosque in the background, we hoisted the half-square up the poles and tied off the lines, ready to jump into the pileups.

Because Bangladesh is rated as the 50th most-wanted DXCC entity, I found that an S21 call sign still draws quite a crowd when the bands are open. Because of the marginal construction of the region's electrical distribution system, however, there is a very high noise level on 40 and 80 meters. Fortunately, conditions aren't too bad on 10, 15 and 20 meters, so working weak-signal DX from Bangladesh on these bands isn't a problem.

Bangladesh is surrounded by many small countries that are all "exotic DX" for stateside hams. Because of the country's location, it's relatively easy to run up a high DXCC country count in a very short time, facilitated by the fact that S21 stations are still sought after by what I always consider to be rare DX stations. For a US ham operating in Bangladesh, the popularity that comes with holding an S21 call sign is a big thrill.

When the bands are open it is difficult to carry on casual QSOs without generating pileups—something that rarely happens when I'm operating as KX7YT. I also discovered that managing pileups can be demanding, and definitely requires crowd management and leadership skills.

In late January, 20 meters was usually open to the states via long path about 1400Z and again at 0100Z, providing an opportunity to work the folks back home. Alas, work responsibilities and propagation conditions during my seven-day temporary license period limited me to about 1000 QSOs and 85 DXCC entities. I was thrilled, however, to work many countries that I've never even heard from the states, including others in Bangladesh as well as operators in Viet Nam, Cambodia, Cyprus, Oman and Kuwait (among others). But the real satisfaction came from giving many hams around the world a new and rare DXCC country.

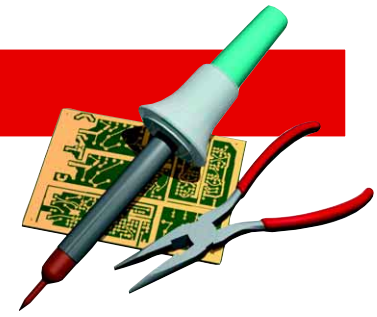
Hams interested in visiting or operating in Bangladesh may contact the BARL for further information and assistance. Check **www.arrl.org** for licensing information and **www.barl.org** for assistance. If you decide to go to Bangladesh, I know you will find BARL club members to be helpful and friendly.

Good luck and good DX from all of us in S21-land!

Acknowledgments

Special thanks go to Nizam, S21B, and Mamlukar, S21W, as well as the other members of the BARL for their support and assistance: S21A, S21AA, S21AB, S21AC, S21AJ, S21AM, S21AR, S21AS, S21B, S21BR, S21C, S21D, S21DM, S21E, S21G, S21HA, S2HQ, S21I, S21J, S21JB, S21JH, S21K, S21L, S21M, S21MA, S21N, S21O, S21P, S21R, S21RA, S21RB, S21RC, S21RD, S21SA, S21W, S21X, S21Y, S21Z. Thanks also go to K7VIT and N7AAM for stateside advice and assistance.

You can contact the author at 1554 NW Benfield Dr, Portland, OR 97229; **kx7yt@arrl.net**.



The Doctor is IN

Q I bought (at an on-line auction) a receiver built in the '60s. When it arrived it reeked of cigarette smoke. I tried to clean the radio, going as far as using gasoline to scrub the chassis. That didn't work. How can I get rid of the cigarette residue?

A That can be a tough nut to crack. Here's what I did about 10 years ago with two Yaesu units of 1980 vintage—hybrid units with plug-in boards—that I had acquired for my collection.

First I disassembled the units as much as I could. I removed all cabinet panels. I removed all the knobs from the front panel and removed all the tubes (driver and final tubes). I then removed all the plug-in/screw-down modules/boards. No wiring was disturbed.

The cabinet sheet metal, the knobs and the tubes were washed in the kitchen sink. I placed them in a plastic tub filled with Fantastic, 409 or a similar strong household product and individually scrubbed with a discarded toothbrush. The components were rinsed, dried with paper towels and set aside. I found that the smell and grunge on these parts were completely gone. Now for the guts of the radio.

From my experience in electronic manufacturing I knew I wanted a good cleaning solvent that would leave no residue. At a local electronics parts distributor I found a product in spray-can form called Freon TF Cleaning Solvent. It was somewhat expensive, about $10 per can as I remember, but I was cleaning a $400 vintage investment so I didn't mind. Although it came in a fairly large can (a little larger than your average spray paint size), I figured I would need more than one can to do the job—I ended up needing about 1 1/2 cans per radio. I stress that whatever you use must leave absolutely *no* residue.

Working in a well-ventilated area (I worked in the garage with the door open and a cross draft to the garage door), I took each PC board, held it vertically, and sprayed it with copious amounts of the product until it was freely running and dripping off the board. Quickly, before it evaporated, I scrubbed it using the toothbrush—which was now thoroughly dry from the previous use (absolutely no water). I did this 2 or 3 times for each board. I propped up the boards on a dry surface and directed a fan at them (the component side) to make sure all nooks and crannies were perfectly dry.

Next came the chassis. I performed the same procedure as with the boards, making sure to get all corners. It's best to do this operation with the surfaces vertical so that the solvent drips off the chassis. I worked on one area at a time, starting at the top and working toward the bottom (both sides of the chassis—transformers, too). Again, I scrubbed with the toothbrush while it was still wet (this stuff evaporates in seconds). When done, I placed the chassis in front of a fan for several hours to make sure it was completely dry.

When everything was thoroughly dry, I placed the chassis and the boards in a cardboard box with some crumpled newspaper and several dryer sheets, closed the box and left it for about a week. The rig came out smelling like a proverbial rose!

You might contact the solvent manufacturer, which is still in business, for information on current, environmentally safe, products. I saw a product on their Web page called Safezone that might be "green," yet suitable.

Contact:
Miller-Stephenson
George Washington Hwy
Danbury, CT 06810
203-743-4447
www.miller-stephenson.com/main.htm

Q Can strong solar activity have an influence on 2.4 GHz terrestrial data links?

A Good question! I don't know how one could completely rule out possible effects. There may be propagation mechanisms not described in the current literature that could be well known a few decades from now. This is one of the benefits of having an Amateur Radio Service—it is an ideal medium for experimentation.

However, conventional theory today does not indicate any obvious direct links between 2.4 GHz propagation and solar activity. Atmospheric refractivity is the primary influence with such links. It could be argued that solar activity affects the weather, which influences propagation, but convincing proof is still unavailable.

Q George Fletcher, AD5CQ, asks, "I have a VHF/UHF transceiver. The center conductor on the SMA antenna connector has receded inside the connector and does not make contact with the center conductor of the screw-on antenna. Is this a common problem with SMA type antenna connectors? Is there a fix available other than replacing the whole connector?"

A I'm afraid that you will indeed have to replace the connector. To avoid this problem in the future, replace it with special "captivated" contact connectors. These exist not just for SMAs, but also for N and other connectors in which the normal design may allow for movement of the center conductor.

SMAs are rated at only 500 mating/unmating cycles, which is rather low compared to other connector types. The lifetime can be reduced even further by twisting the connector on and off, so that the center conductor rubs horizontally. It is preferable to hold the body of the connector fixed and just rotate the hex nut to tighten the connector.

Q Brent, AB5UM, asks, "In my Jeep Cherokee I have my ICOM IC-706 transceiver in the back and my remote control head up front at the driver's seat. I was getting RFI on almost all bands, which caused my digital display on the remote head to go crazy. Installing the entire radio up front is not an option. I wrapped the separation cable in aluminum foil and grounded it. That cured the problem except for the

10-meter band. Can you suggest anything else?"

A The aluminum foil shield may not be as effective on 10 meters as it is on other bands. Perhaps you could obtain some 1-inch copper braid. Most copper braid is actually hollow, so if you separate it, you may be able to slip the cable through it. Experiment with grounding it at either end, or both.

I also suggest you try a ferrite toroid. Use an FT-240-43 and get three turns of the cable onto the core. This should be enough to help on 10 meters.

Other than that, you may need to do a bit of sniffing around the vehicle to find the specific source of noise. A 1-inch loop at the end of a piece of coax, connected to your radio, may help. Do not get the loop anywhere near the ignition wiring; a high-voltage spike can be induced into the loop, possibly causing damage to your radio. Once you find the hot spots, the above hints, coupled with keeping the control cable away from the hot spots, may help.

Q Ron, WB4GWA, asks, "I have what seems to be an incurable noise problem in my Chevy Blazer. My HF mobile antenna mount is bolted and grounded into the frame. I run all power cables as suggested in the *ARRL RFI Book*. I have tapped the dc power at the battery. Despite all this, I still get a huge amount of noise. When the ignition switch is off, my transceiver S meter is at zero and when the switch is on I still enjoy clear reception. When I start the Blazer, however, I get so much ignition noise that the blanker will not take it out. When I look at the S-meter it reads S9. Can you help?"

A You have the negative power wire going to the battery, right? Assuming so, when you turn the ignition switch to **RUN** without starting the car, do you hear the noise for a few seconds with the ignition in the **RUN** position, but with the engine not running? If you hear noise for the first few seconds, it is probably coming from the fuel pump and you should focus your suppression effort there.

But if you do not hear the noise at all until the engine is actually started, we need to follow a different path. If you remove the antenna mast from the mobile mount, does all the noise go away? If it does, no noise is being coupled through the power wiring—it is being radiated directly to the antenna. Look under the hood with the engine running at night, or in a darkened garage. Do you see any sparking from the ignition system? Sparking would indicate a poor connection that's generating the noise. If you don't see sparks, it's likely that the noise is ignition radiation.

Try a new set of plugs and wires, but not the factory type. Take a portable volt-ohm meter (VOM) to the auto parts store and find plugs and wires that measure at 5 kΩ or more each. Measure the wires from one end to the other, the plugs from the top post to the center electrode.

By the way, if you can look at your transceiver's receive audio with a scope, you may pick up a few more clues. In general, computer noise may appear as an overmodulated carrier; ignition noise looks like individual pulse bursts (37 Hz for a 6-cylinder engine at idle); motor noise appears as overlapping pulses.

Q Harry, W2HML, asks, "I'm a fairly new ham , and would like some help regarding my transceiver. I have an old Yaesu FT-102, coupled to an MFJ -949E antenna tuner and a multiband dipole antenna.

"The instructions for tuning the transmitter indicate that the LOAD, DRIVE and PLATE controls should be tuned for a reading of 300 mA on the meter. At that point the instructions state that I should dip the meter reading with the PLATE control. This will tune the transmitter for 100 W output. I have had no problem following the instructions for tuning, and I'm reading 100 W when tuning into the antenna tuner's dummy load. However, the tuner instructions say that I can only use a maximum of 30 W output when initially adjusting the tuner when it is connected to the antenna. Am I supposed to somehow 'detune' the transceiver to reduce its output after peaking it into the dummy load?"

A The answer to your problem is the transceiver **DRIVE** control. Tune your radio into the antenna tuner's dummy load as you describe. Now, adjust the **DRIVE** control counterclockwise until the antenna tuner meter reads 30 W. Stop transmitting, switch from the tuner dummy load to the antenna, start transmitting again and adjust your tuner. When you reach the lowest SWR, crank the **DRIVE** control back up to full output. During all these procedures, remember not to hold the key down for more that 10 seconds at a time—this may damage the finals. Do your tuning in short spurts.

Q I am a ninth-grade student who is currently taking science. I am doing an experiment in which I will try to block AM radio interference caused by a small electric motor in a blender. Will it be possible to block this radio interference using different type materials over the top of the motor (like an aluminum bucket)?

A The technique you describe is known as *shielding*—completely enclosing a circuit (in this case, the motor) in a metal enclosure. For radio signals, this enclosure can be made from any material that conducts electricity. Shielding is usually accomplished with aluminum or steel.

To be effective, however, a shield must be complete. Any gap in the shielding can reduce its effectiveness. Placing a bucket over the blender, for example, would still leave plenty of space for the generated radio noise to leak out. Although the motor is generating the actual noise, the wires connected to that motor are probably acting as antennas and are radiating the noise as well. In addition to shielding, *bypassing* is usually needed on the wires to keep the energy inside the shield. This usually consists of a capacitor connected from each wire to the shield, inside the shield. You should *not* attempt bypassing techniques on the 120-V blender. This voltage presents a serious shock and/or fire hazard.

I suggest that you obtain a small dc motor, perhaps one from an electric toy. You can then experiment safely with that. You can use a battery, or several batteries in series, to power the motor. You could then try the following experiments, noting the noise for each configuration:

- Run the motor with a short wire connecting it to the battery power supply.
- Run the motor with a longer wire (about 5 feet) connecting it to the battery supply.
- Run the motor, long leads, and put a partial shield (a bucket) over the motor
- Run the motor, long leads, with a complete shield (a metal box) with the wires sticking out through small holes in the shield.
- Run the motor, same as above, but with 0.01 µF capacitors connected inside the shield from each wire to the shield.

Do you have a question or a problem? Ask the Doctor! Send your questions (no telephone calls, please) to: "The Doctor," ARRL, 225 Main St, Newington, CT 06111; doctor@arrl.org; www.arrl.org/tis/. Also see, "The Doctor is On-line" at www.arrl.org/members-only/qst/doctor/. QST

By James G. Alderman, KF5WT

Putting Our Best Face Forward: Demonstrating Amateur Radio to the Public

Talking about Amateur Radio with other hams over coffee is one thing. Making effective presentations to classrooms full of eighth-graders or rooms full of local officials is quite another. Here's how to do it right!

The way I see it, educating the public is essential to our hobby's future. To keep our frequency allocations in the years to come, the public must be convinced that hams (and ham radio) are valuable assets—so valuable that we must be protected and allowed to flourish. But how can we possibly educate that many people?

The League's "Big Project" will go a long way toward that ultimate goal. When Amateur Radio is an integral part of academic programs across America, potential usurpers will think twice about eyeing our ham bands for commercial exploitation. (Doing so would be "cutting education.")

Parents, teachers and students will see the benefits that hams provide their communities. In the long term, most of the students exposed to ham radio at school will grow up to become "ham sympathetic" voters, even if they aren't hams themselves.

A good "sales pitch" is the key to effectively educating the public about Amateur Radio. We must sell the virtues and the benefits of our hobby.

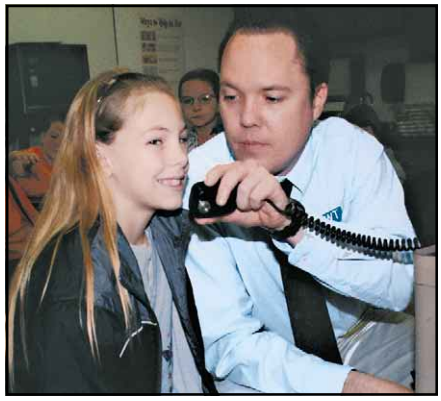
But how do you make an effective ham radio presentation—one that will really benefit our cause? After working up many of my own presentations, I've found that there are seven components that make for an effective Amateur Radio demonstration.

Speak With a Purpose

Amateur Radio demonstrations can be simple or complex. Before you consider doing any demo, make sure you understand the main purpose of your presentation. Why are you doing

Lakeview students await the arrival of the UoSAT-OSCAR 14 satellite.

Jamboree on the Air was a big hit at Camp James Ray near Dallas. The Ericsson Amateur Radio Club set up three stations at the camp and introduced more than 250 Scouts to Amateur Radio. Here Matt Crum (left) and David Hitt of Troop 198 in Plano, Texas, take turns on 40 meters.



Students at Lakeview Elementary School in Mabank, Texas jumped at the chance to speak with a ham in California on 20 meters.

it, anyway? Have final outcome in mind.

The simplest demos often consist of information tables in *uncontrolled environments* such as shopping malls or fairs. Your radio booth may feature brochures and perhaps a 2-meter radio. If you've never done a demo before, this is an easy way to get your feet wet. In uncontrolled environments, your goals might simply be to:

- Raise public awareness about who we are and what we do.
- Recruit prospective hams or sign up students for radio classes.

Your goals should be a bit more focused when speaking in *controlled environments* such as a selected group of students, teachers or Scouts. In this case, the purpose of your demo might be to:

- Prepare for a future school club or "ham radio in the classroom" program such as the League's "Big Project."
- Drum up interest in a future Radio Merit Badge class.
- Curry favor with local officials.
- Drum up interest in a particular aspect of the hobby (if you're speaking at a hamfest).

Take Advantage of Special Events

Doing a demo is much easier if it's piggybacked on an existing activity. If you work in conjunction with a special event, you know that somebody else has already planned the event and is expecting visitors. All you have to do is put on a good show. Here are some special events you can take full advantage of.

Field Day—Set up in a public place and have an information table. Bring a vintage radio along to show the contrast between old and new technologies. You'll get extra Field Day points for operating in a public place and the activity will certainly attract the curious.

Kid's Day—This twice-a-year event lets kids talk to each other on the ham bands. It's a particularly easy event to work. Two years ago I brought my portable HF rig and mobile antenna to a friend's house to let the neighborhood kids participate. We also had refreshments and coloring exercises to keep the kids busy between QSOs. They loved the QSOs most of all.

Frequency *movie opening night*—This sci-fi movie showed Amateur Radio in a positive light, and many clubs set up displays at movie theaters during its release. Now that the movie is out on video you could invite some friends over for a *Frequency* watching party and show them what ham radio is really like. Just be sure they're aware that time travel via the ionosphere only happens in the movies (LDEs notwithstanding)!

Jamboree on the Air—This weekend event is held each fall. Ham volunteers set up stations at Scout camps and let Scouts talk to each other. Every Scout who participates gets a patch. Why not contact your local Scouting organization and volunteer to set up a portable HF station?

Scout camps and meetings—This is a great way to drum up support for a Radio Merit Badge class. Ham radio and Scouting go well together because they're both do-it-yourself activities. Scouts are likely to be among your most attentive and responsive listeners.

School science classes and teacher in-service training—If you volunteer to show off your fascinating hobby to a sixth-grade science class, the students and the teachers will love it. Students love to have guest speakers in class, and the teachers love to get a break for the day.

Community events—Any place where service organizations are setting up information tables is a perfect place to promote Amateur Radio. Remember to stress that hams are volunteer, civic-minded individuals.

Tailor your Presentation to your Audience

It's important that you customize your presentations to fit your audiences and your surroundings. In uncontrolled environments you need to consider two factors when planning your demo.

The first is *traffic flow*. How many people will be passing your location? Will your display area be visible? Is the environment too noisy for QSOs?

Second, your display must have *stopping power*. Will your display cause the curious to stop and see what you have to offer? High-quality banners or signs are in order here. Also, make sure that people will be able to gather around your booth without obstructing other passersby.

In controlled environments you must consider a different set of variables. The most important consideration is the *attention span of your audience.* This will determine the length and complexity of your presentation.

When speaking to adults, one-hour presentations are appropriate. With grade-schoolers, however, you can't go on that long unless you break the demo into several brief segments to keep things moving. Younger audiences simply can't sit still very long. You may want to speak for a few minutes and then do something tangible. You may also want to have some coloring exercises available in case the young troops get restless.

When you begin your presentation, you must *immediately capture the attention of your audience.* Most attendees will

continue to listen—or start to tune you out—during the first minute of your presentation. Make sure the first sentence out of your mouth is captivating.

Speak from an outline or a set of notes, but vary the pace as needed. Don't be too rigid. And don't memorize your speech. It will sound stilted and will certainly put your audience to sleep.

Use laymen's terms in your presentation. For example, most teenagers (and many teachers) don't know what the ionosphere is. Take a moment to explain that it's a layer of the upper atmosphere that becomes electrically charged when struck by sunlight, and that radio waves can bounce off it. Even children can understand such things as satellites and repeaters if you explain them in familiar terms.

Use Props to Illustrate Your Points

Make your presentation come alive with props. After all, you are "demonstrating" Amateur Radio, not just talking about it. Here are some of props that work well in a classroom setting:

Overheads—Overhead transparencies are easy to make on a computer. Clear transparencies can be printed on most printers. Color is best, but it's not absolutely required.

Call sign prefix maps and QSLs—Use a map to show where the call sign areas are in the US and worldwide. As you make contacts on HF, the students can mark the locations on the map. Pass around some of your more colorful QSLs.

Component demo—Bring a few electrical components to class. I have a dramatic capacitor demo I love to do. It's easy—just charge up a big electrolytic capacitor with a small dc supply while you're explaining about stored electrical energy. (Be sure to observe polarity when connecting dc to the capacitor lest you have an explosion on your hands!) Then remove the dc source and discharge the cap with a large screwdriver. *Pow*! Everybody will jump. Then pass the discharged capacitor around the class.

Two-meter H-Ts—If you're near the repeater, bring up the machine and make some contacts. Let the students talk over the air if they want to. Demonstrate the autopatch.

ATV—ATV is a visual medium that has many attractive qualities. If there's a repeater near you, bring a receiver and a talkie. Most ATV repeaters have 2-meter intercom frequencies that will allow you and the students to talk to the hams they see on ATV.

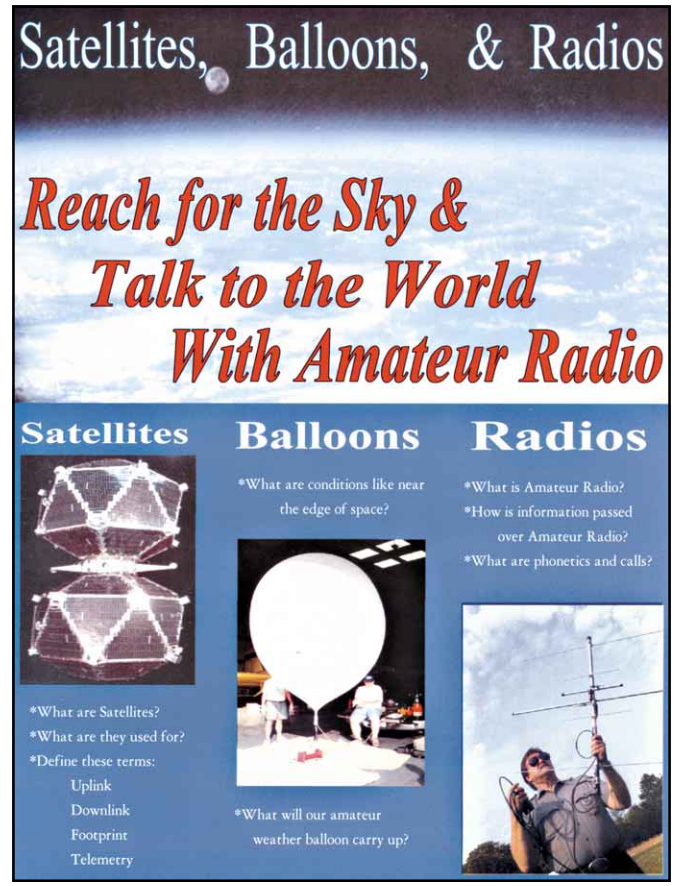
Operate HF—If you have room to put up an outdoor vertical or dipole, HF will really give the students a memorable experience. Start by tuning in WWV and some shortwave broadcast stations. Find out if any students speak a foreign language. Tune around and see how many foreign languages the students can identify. Then go to the ham bands and make some contacts. Again, put the students on the air.

Demonstrate Morse code—This aspect of ham radio is especially popular with kids. Tune the HF radio to a CW station that's going slow enough for you to copy. Then go to the chalkboard and start copying. Explain the common CW abbreviations. Bring a code-practice oscillator and let the students try their hand at the key.

Emphasize Benefits, not Features

Most non-technical folks aren't impressed with the elaborate features found on modern radios. They want to know how Amateur Radio can benefit them. Why should they study for a license and join our fraternity? Make your presentation relevant to the needs of those in the audience.

When addressing *teachers*, explain how having Amateur Radio in the classroom can enhance their existing academic



Overhead transparencies like this one can enhance a presentation.

programs. Ham radio relates to math, science, physics, electronics, geography, history, social studies, space science, satellite communications, etc. Many pages could be written about how beneficial ham radio can be to a school. It's important that you give some examples of this.

In a social studies class, for example, a teacher may want to have students monitor shortwave broadcasts from Brazil and prepare a report about the news of the day in that country. Foreign language students can learn more quickly by monitoring the bands, too.

Are there any veterans in your ham club? When the students are studying about the Korean conflict, a Korean vet could be interviewed via ham radio. The students could ask questions and several classes all over town could participate in the activity as long as there is a radio in each classroom. The possibilities are numerous here.

When addressing *students* you must stress the "fun and adventure" aspect of ham radio. Don't worry that ham radio may have competition from the Internet. They are two different things. Show the students how they can build their own station and talk all over the world or operate 2-meters from a mountain bike. Explain how they can learn skills with ham radio that may springboard them into profitable careers. "Fun" and "profit" are our main selling points when addressing students.

When addressing *Scouts,* stress that with ham radio, Scouts can "be prepared" to communicate during natural disasters or other emergencies. Scouts often pitch in to help their communities in times of need. They need to be able to communicate, don't they? You might explain how they can set up communi-

The author at his first Amateur Radio demonstration operation at Athens Junior High in 1980.

Before your Ham Radio Demonstration...

- Get advance clearance, and make sure you understand where your antennas can be erected. Don't wait until the last minute! Believe me, your presentation will look thrown together! Plan your demo thoroughly.
- Make a list of needed supplies along with "Plan B" stuff. Things have a way of malfunctioning just when they're needed most. At a minimum, have a spare radio available.
- Recruit volunteers early. Get commitments from more volunteers than you really need. Invariably, somebody will have something pressing come up at the last minute.
- If things just aren't working out, have the wisdom to bow out and try for another time. It's better to cancel a demo than to do one that will do more harm than good.
- And *smile*! Radio is supposed to be fun. Let's spread the excitement!

cations with another camp 10 miles—or 1000 miles—away with similar ease. "Preparedness" is your key word here.

When addressing *civic or government leaders*, show how Amateur Radio provides a public service to the community and schools at no expense to the taxpayers. What could be more attractive to politicians than that? Explain the benefits of having a SKYWARN or ARES program in the city.

Also, help them understand that we don't just talk on our radios. Hams often work at emergency shelters cooking meals and transporting supplies. Because we are knowledgeable about radio-related matters, we can operate business band radios, mobile data terminals, etc. We can fix things that don't work. In short, hams make the community safer and better prepared for emergencies—and they do it all for free!

Give your Audience Something to Take Home

ARRL Brochures highlighting various aspects of our hobby can be ordered in quantity from the League. Several pre-packaged exhibit kits are available as well. Archie comic books are great take-home items for younger students.

If you can't get a bundle of brochures for your presentation, there is another alternative. The League also offers a free information package to anybody who writes in and requests it. You may want to have a sign-up sheet where interested parties can write down their addresses. Then you can send the sheet to the League and they will mail out the information packages.

A *license class information flyer* should be available if you're planning Tech or Radio Merit Badge classes. Be sure to have contact names and phone numbers on the flyer, along with your club's web address. Make it easy for people to get more information about ham radio and about your club.

Worksheets for students are great it you're speaking at a school. Make up a fill-in-the-blank worksheet that follows the main points of your speech. Students can fill in the blanks as you speak and have something tangible to turn in for a daily grade. If you're doing a major activity (such as a balloon launch) in conjunction with a science class, you may want to make up a workbook for students to fill out.

Close the Deal

At the conclusion of your presentation, motivate your listeners to take some type of action. In other words, "close the deal." In a classroom setting you might say, "If you'd like to have guest speakers in class, please let your teachers and parents know." If you leave behind an enthusiastic class, you'll likely be invited back. If a ham radio program is being planned in the school, ask the students to join it.

At Scout meetings you might find out how many are interested in the Radio Merit Badge. If there are several, perhaps a class can be scheduled. Of course, make sure your club is up to the task of teaching such a class if the demand is there.

If you're speaking at a teachers' conference, you may have just spent the last hour extolling the virtues of ham radio in the classroom. Now it's time to find out how much interest there is and start planning for a school-based program.

When addressing officials at city hall you might need to close your presentation by asking for a "favor." You might need them to grant your club permission to locate a repeater on a city-owned tower. Perhaps you might be asking to set up a 2-meter radio in the city emergency communications center to provide communications during severe weather or during special community events.

Be sure to reiterate that hams serve their communities free of charge. You're much more likely to get the special consideration you need if officials know that you are benefiting the community without putting further strain on the city's budget.

So how about it? Are you ready to show the public what we have to offer? I guarantee a ham radio demo is at least 10 times more fun than you think it might be. So let's shine up the gear, put on a smile and put on a show!

First licensed at age 13, James Alderman, KF5WT, has worked in the wireless industry for 15 years and currently works for M/A-Com Wireless in Dallas, Texas. Among his many ham radio interests, James is active in several clubs and enjoys showing off the virtues of our hobby at community and civic events, Scout meetings, and schools.

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MMSSTV Version 1.01

Makoto Mori, JE3HHT, has done it again. I don't know how he finds the time to write such remarkable sound-card programs—which he distributes as *freeware* to the amateur community—but I'm glad he does.

If you're curious about the world of Slow Scan Television (SSTV), *MMSSTV* is probably one of the easiest, least-expensive ways to give this mode a try. All you need is a PC running *Windows 95/98/ME/2000* or *NT* and a 16-bit sound card (all modern sound cards are at least 16 bit). The computer clock speed must be at least 100 MHz. *MMSSTV* will run on a 100-MHz Pentium system, for instance, but with some effort. I'd recommend something in the 200 MHz or faster range.

Setup

You can start receiving SSTV transmissions by simply installing an audio cable between your transceiver's speaker or auxiliary audio *output* and the microphone or line *input* of your sound card. Download the *MMSSTV* software, install it and you're in business.

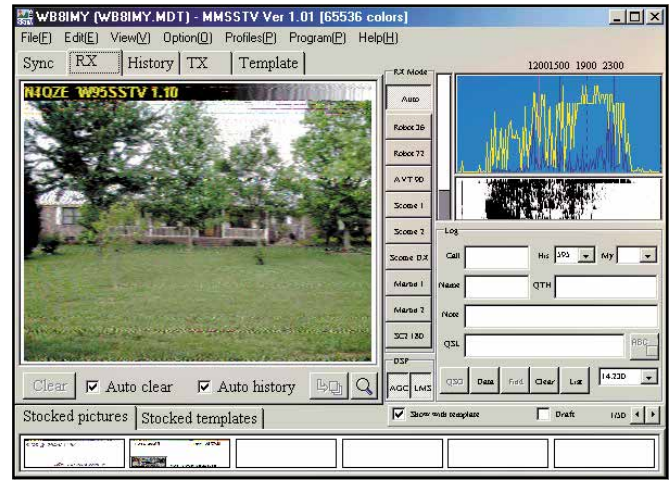
To transmit you'll need a cable from your sound card speaker or line *output* and the microphone or auxiliary audio *input* of your transceiver. You can place your rig in the transmit mode manually, rely on the VOX if you are using the microphone input, or use your computer COM port to key the transmitter through an interface such as one sold by West Mountain Radio (**www.westmountainradio.com**) or TigerTronics (**www.tigertronics.com/**).

MMSSTV on the Air

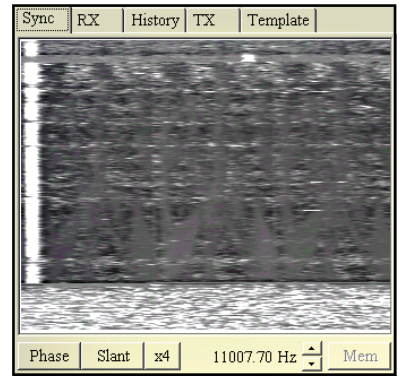
MMSSTV is flexible and easy to use. Click on the **RX** (receive) tab on the main screen. When you find an SSTV signal (try around 14.230 MHz), you can tune the signal on the spectral display (I usually tune until the 1200-Hz sync pulse falls on the green line), or you can use the waterfall display. Assuming you've selected the proper SSTV format (*MMSSTV* supports every popular format from Robot 36 to Martin 2 and many more), the image should begin to appear on the main screen, painting from top to bottom. *MMSSTV* also supports automatic reception, which means that it will attempt to decode the image format and display it whenever an SSTV signal is received.

One of the frustrating aspects of using some types of SSTV software is adjusting for *slant*. Images will appear slanted on the display if your sound card clock is not correctly calibrated. Correcting the slant can be a tedious process. If the response of the software is sloppy, you'll often overcorrect, weaving back and forth like a car with a malfunctioning steering wheel. With *MMSSTV*, however, you can correct slant problems on the fly by simply clicking the **SYNC** tab on the main display, then clicking **SLANT**. The received image appears along with a thick white line that represents the sync signal. Click on the top of the sync line, drag the cursor to the bottom of the line and then click again. That's it! Click the **MEM** button and the slant setting is saved.

Transmitting is even easier. *MMSSTV* displays your library of images at the bottom of the screen (*MMSSTV* can store up to 300 images). Find the one you want to send, click your mouse on the image and drag it into the main window. Click on the **TX** button and *MMSSTV* will begin transmitting. You can apply various text templates to your images such as your call sign, a "CQ" and so on. You can even superimpose the image you just received into the image you are transmitting (so the other operator can see how his signal actually looks on your end).



An SSTV image of the home of N4QZE received on 20 meters using *MMSSTV*.

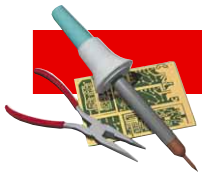


The *MMSSTV* slant adjustment screen. The thick white line represents the sync signal.

Conclusion

In addition to the features I've already mentioned, *MMSSTV* includes a neat logging function that will save an image along with the standard log data. And the *MMSSTV* **OPTIONS** menu allows you to tweak the program functions to suit your particular needs. You can even change the various colors used in the *MMSSTV* displays. These features add even more value to what is already an astonishing program, especially when you consider the cost—*nothing*. You can stretch your ham horizons to include SSTV by just jumping on the Web and downloading *MMSSTV* today at **www.geocities.com/mmhamsoft/mmsstv/index.htm**.

Steve Ford, WB8IMY ♦ Editor



By Gil McElroy, VE3PKD

Opening Lines: A Short History of Coaxial Cable

Do you think the black stuff that feeds your antennas is a recent invention? Would you be surprised to learn that an early form of coax was in use during the time of the American Civil War?

As a typical ham, I have a shack littered with spare coils and pieces of coaxial cable. I feed my backyard dipole with it and the local cable TV provider uses it to supply a wide range of television channels to my house. If I wanted, I could even sign up to have internet services provided via the same cable that supplies the TV signals—without interrupting prime-time viewing in the slightest!

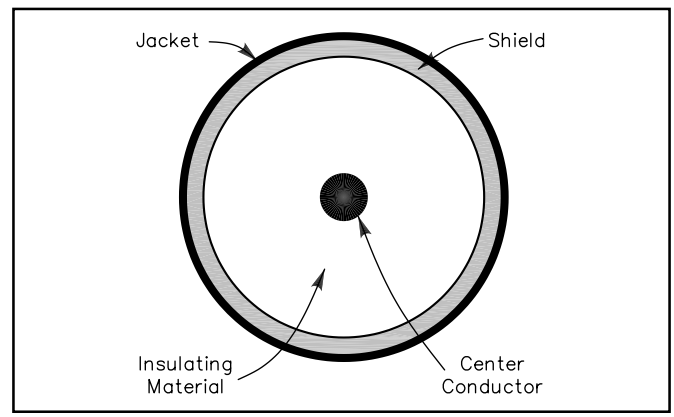
Again, like most hams, I think of coax as a 20th century invention. I remember reading in *Fifty Years of ARRL*, the *QST* anniversary book published in 1965, that coaxial cable really came of age for hams following World War II, when miles of the stuff became available as inexpensive military surplus. From that brief statement I assumed that coax had been a product of military innovation, much like the advances made in other technologies (radar, for example) as a consequence of the war.

Boy, was I wrong! As it turns out, coax is hardly new. In fact, it actually dates back to the 19th century. The geometry of the coaxial structure—one conductor concentrically surrounded by another—lends itself to mathematical analysis by theorists. Because of that, coaxial theory actually dates back to the gloried days of Maxwell and the 19th century explorations of electromagnetism.

But coaxial theory didn't produce a working coaxial cable until engineers were developing transatlantic cable communication in the mid-1800s. The earliest telegraph and the first telephone cables spanning the Atlantic were composed of a central conductor encased in a cylindrical insulating material. In the earliest cables, *gutta percha*, a latex material made from the fluid of Malaysia's Gutta Percha tree, was used as the insulator because of its remarkable abilities to withstand the intense cold and enormous pressures of the depths. These early cables are considered coaxial because the seawater that surrounded them completed their return circuits.

Bandwidths on the earliest transatlantic telegraph cables were extremely narrow—only about 1 to 1.5 Hz! By the early 1920s, however, bandwidths had improved, but only to about 100 Hz. This limitation still posed a big problem for telephonic communication, which required much greater bandwidths and higher frequencies.

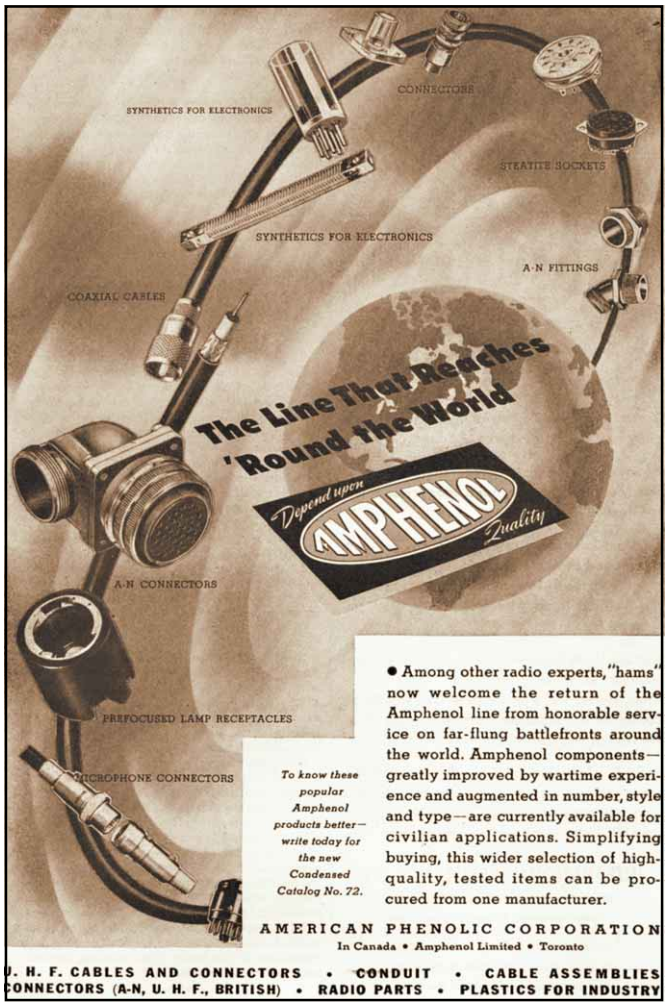
Attempts were made to devise a workable coaxial system with greater bandwidth. In 1921, RCA's H. J. Round filed for a coaxial cable patent on a system that was essentially a shield of wire strands—a cage—surrounding and running parallel to an inner conductor. Although the idea was workable for higher frequencies, its use was restricted to a narrow band of frequencies.



Coax is made up of a center conductor, which may be either stranded or solid wire, surrounded by a concentric outer conductor. The outer conductor may be braided shield wire or a metallic sheath. A flexible aluminum foil is employed in some coaxes to improve shielding over that obtainable from a woven shield braid. If the outer conductor is made of solid aluminum or copper, the coax is referred to as *Hardline*.

Coaxial cable as we know it is actually the invention of two men, Lloyd Espenschied and H. A. Affel, both of whom worked for AT&T. In May of 1929 they filed a patent application on a coaxial cable system and received US Patent No. 1,835,031 on December 8, 1931, for their "concentric conducting system." Their invention had no immediate application in radio. It was intended, rather, for transmitting television signals, which required a transmission line that was broadband enough to transmit a "range of frequencies extending from in the neighborhood of the audible range to such a high frequency as to afford a band sufficiently wide to represent a clearly defined television image."[1] Espenschied and Affix's invention involved placing a central conductor inside a hollow tube and holding it in place with washers spaced equally along the length of the tube. The low-loss dielectric was air.

[1]Notes appear on page 64.



Immediately after World War II, companies such as Amphenol were making coaxial cable available to amateurs. This advertisement was published in the December 1945 issue of *QST*.

(The early cable is similar to modern air-dielectric cables that use a plastic or Teflon helix to keep the center conductor centered in the outer shield/jacket.)

As part of a 1929 field test, AT&T and Bell Labs installed two 2600-foot-long sections of coax in Phoenixville, Pennsylvania, but the first real use of this new transmission medium came in 1936, when an experimental 100-mile-long underground system—two runs of coax, one for each transmission direction with repeaters spaced every 10 miles—was completed between New York and Philadelphia, transmitting voice, telegraph and fax signals. It was publicly demonstrated on November 30, when Frank Jewett, President of Bell Labs, spoke with FCC officials.

A year later, the first field tests using coax for television transmission were made using the upgraded New York-Philadelphia system, culminating in the live broadcast of the 1940 Republican National Convention, held in Philadelphia, to the handful of early television viewers in New York City.

America's involvement in WWII put a temporary stop to work on TV broadcasting, but in 1944, Lloyd Espenschied and Herman Affel received the Television Broadcasters Association medal for their contribution to the field. When the war ended, broadcasting quickly picked up its pace—and coax made it all possible. In 1948, Ed Parsons became the first person to provide TV programming via coax to his neighbors in Astoria, Oregon, who were unable to receive signals by any other means because of the mountainous terrain. The cable TV industry was born.

Coax went on to be used for transatlantic communication. In 1956, TAT-1, the first Transatlantic Telephone cable, went into operation, inaugurated on September 25 with a conversation between the head of AT&T and the British Postmaster General. In all, seven transatlantic coax systems were laid before the switch was made to fiber optics.

Concerning radio applications for coax, the British *Admiralty Handbook of Wireless Telegraphy* for 1938 neatly summed up the state of the art in the days before WWII, noting that coax was "a comparatively new commercial product that has been developed in connection with television." It went on to say:

"It appears possible that this type of cable may find an increasing number of uses. It could be used very conveniently as a transmission line joining a high-frequency aerial system to its receiver."[2]

Lloyd Espenschied

Lloyd Espenschied is perhaps one of the most interesting and under-acknowledged figures of early radio. Born in St. Louis, Missouri, on April 27, 1889, Espenschied became fascinated with wireless in 1904 while attending high school in Brooklyn, New York. Ignoring his school studies, by 1907 he had become an entirely self-taught amateur wireless operator. On March 14 of the same year he attended Lee de Forest's public unveiling of the audion, the first three-element vacuum tube. He later bought one of his own, paying five dollars for it (a princely sum in those days). Espenschield even encountered the very young David Sarnoff, then still an office boy practicing his Morse code to become a wireless operator for the American Marconi Company, where he began his rise to head up RCA.

Espenschied shipped out as a marine operator for the United Wireless Telegraph Company, but quickly decided to return to school. After graduating from the Pratt Institute in 1909, he went to work for the Telefunken Wireless Telegraph Company, which supplied the US Army and Navy with its wireless equipment. By 1910 he was employed by AT&T, where in 1915 he was part of the first transatlantic and transpacific radio telephone experiments. AT&T had combined its engineering department with that of Western Electric to form Bell Telephone Laboratory, and it was there Espenschied would work until his retirement in 1954. He held more than 130 patents, including those for co-inventing coaxial cable, a duplex radio telegraph system, radio altimeter, a system of automatic gain control, and for a crystal filter for use in high-frequency telephone communication. He even anticipated the development of radar, inventing and patenting a system for use on railroads as a safety device.

Espenschied was a founding member of the Institute of Radio Engineers (IRE), and in 1940, he would be honored by the Institute of Electrical and Electronic Engineers (IEEE) with its Medal of Honor for his "accomplishments as an engineer, as a pioneer in the development of radio telephony, and for his effective contributions to the progress of international radio coordination." He rated an entry in Orrin E. Dunlap Jr's *Radio's 100 Men of Science,* published in 1944, where he is called a "Radio Imagineer."

Espenschied had a vast knowledge of both the technological and corporate intricacies of early wireless. He sat in on the 1913 trial of Lee de Forest and others for fraudulent wireless stock dealings, and over the years amassed a priceless archive of early wireless information now held in the Smithsonian Institution in Washington, DC. In his corporate history of early 20th century wireless companies, *Wireless Communication in the United States*, author Thorne Mayes credits Espenschied as the true authority on the subject.

Lloyd Espenschied died in 1986 at the age of 97.

My thanks go to Thomas E. White for his help in compiling this information.—*Gil McElroy, VE3PKD*

For many hams, coax was just what the doctor ordered to keep up with advances in antenna technology. By the late 1930s, rotary beams were commercially available, but the big obstacle of how to feed them remained. Many hams circumvented the problem using complex slip ring technology or inductive coupling systems (examples of which regularly appeared in *QST*[3]). The advent of World War II may have put a temporary hold on Amateur Radio experimentation, but it did wonders for spurring the development of new technologies. The needs of the military accelerated the development and production of flexible, solid-dielectric coax. It was at this time that coax acquired its now-familiar RG/U (Radio Guide Utility) numbers.

Following the end of the war, the reopening of the ham bands went hand in hand with the availability of military surplus hardware, and with miles of cheap coax available for pennies on the dollar, hams began using it as never before. Although coax was lossy when compared to twin-lead or open-wire feeders, its advantages, especially for hams with rotary antennas, were obvious. As the late Ed Tilton, W1HDQ, former VHF Editor for *QST,* wrote:

> Tape it to a steel tower, or bury it; let it wrap around the tower and unwrap again as the beam is rotated—the loss will stay the same, almost regardless of conditions that adversely affect other types of lines.[4]

In fact, the losses made a lot of hams look seriously at lower-loss—though much more expensive—air-dielectric cable. Some even took to making their own hardline![5]

Some half a century after hams first got their hands on it, coax has become a ubiquitous fixture of our hobby. But the times they are a changing. In many areas where coax was king, fiber optics now rule, and it's only a matter of time before fiber optic technology itself becomes commonplace in ham shacks increasingly filled with digital equipment. Today's cutting edge research involves coaxial waveguides that combine the best features of coaxial cable and fiber optics.

Stay tuned.

Notes

[1]Lloyd Espenschied and Herman A. Affel, "Concentric Conducting System," United States Patent Number 1,835,031. Affel and Estill Green, both of AT&T, received another patent for a coaxial cable system in 1930.

[2]*Admiralty Handbook of Wireless Telegraphy* (London: His Majesty's Stationery Office, 1938), Section R37-38.

[3]Robert E. Mumma, W8ORI, "Another Inductive Coupling System for Rotary Beams," *QST*, Sep 1950, pp 20-24.

[4]Edward P. Tilton, "V.H.F. Antenna Facts and Fallacies (Part II)," *QST*, Feb 1964, pp 50-53.

[5]See *Hints and Kinks*, "Homebuilt Air-Dielectric Coaxial Lines," *QST*, Jul 1950, pp 57, 102, 104.

PO Box 7
Colborne, ON Canada K0K 1SO
gmcelroy@eagle.ca

NEW PRODUCTS

2001 PRODUCT SELECTION GUIDE FROM ANTENEX

◊ Antenex has recently released a *2001 Product Selection Guide*.

The company designs and manufactures mobile, portable and fixed location antennas for amateur, commercial, GPS, data telemetry, cellular, PCS, PCN and SMR applications. The catalog describes their entire line of products—including antennas, mounting kits (for both vehicle and fixed installations) and related accessories.

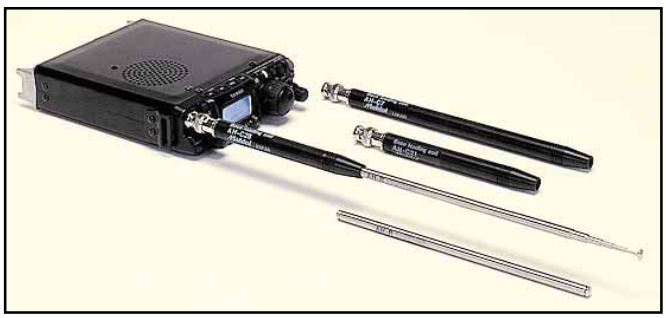
The 44-page full color guide can be downloaded in PDF format directly from their Web site. The file size is approximately 2.6 Mb.

If you would prefer a printed copy, contact Antenex, 2000-205 Bloomingdale Rd, Glendale Heights, IL 60139; tel 800-323-3757 or 630-351-9007, fax 630-351-9009; **www.antenex.com**.

YAESU FT-817 HF ANTENNAS FROM NCG

◊ NCG Co is now marketing a line of Maldol HF antennas and components that are specifically designed for use with Yaesu's subcompact FT-817 portable multiband transceiver (see photo).

Two single band antenna component packages and optional substitute parts are available that allow operation on 10, 15, 20 or 40 meters. The component packages contain a BNC-terminated base loading coil and a removable stainless steel telescoping whip element. The coil/whip assemblies measure around 52 inches when extended and about 16 inches when collapsed. Weight is approximately 3 ounces.



The two package offerings are the Maldol AH-28 and the AH-14. These include coil/whip combinations for 10 or 20 meters respectively. Substitute loading coils to add 15 or 40-meter operation (the AH-C21 or the AH-C7) and replacement—or substitute—coils for 10 or 20 meters (the AH-C28 or the AH-C14) are sold individually. The universal telescoping whip element (the AH-R) is also available separately.

For further information visit your favorite Amateur Radio Products dealer or contact NCG Co, 1275 N Grove St, Anaheim, CA 92806; tel 800-862-2611, fax 714-630-7024; **micks@cometantenna.com**; **www.cometantenna.com**.

Previous • Next New Products

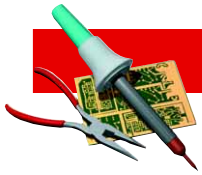
STRAYS

BILL EDGAR, N3LLR

QST Congratulates...

◊...Dennis Silage, K3DS (right) who received the ARRL Atlantic Division Technical Achievement Award from Atlantic Division Director Bernie Fuller, N3EFN, in Rochester, New York.

Next Strays



By H. Ward Silver, N0AX

Test Your Knowledge!

The component you need for a project may not always appear on a store shelf or in a catalog. The real challenge of building comes when you have to "roll your own."

1. You need a 30-µH matching coil for the Field Day wire vertical antenna. In the back of the truck is some solid #12 copper wire and a 4-inch diameter piece of 6-inch long PVC pipe to use as a form. Will the coil fit on the form? How many turns will the coil be? How much wire do you need?

2. The new foursquare vertical array requires a 100-Ω load for dumping out-of-phase power. You figure it will need to dissipate 75 W. A check in the catalog for a noninductive resistor with those ratings leaves you wondering how to afford such a beast! Then you remember that bag of 450-Ω, 10-W resistors you won in the white elephant raffle. How many would you need to make up a load within 5% of the required value?

3. Building your new QRP transmitter, you figure the amplifier output loading capacitor needs to be 300 pF and that it connects between the output and ground. The capacitor can be a fixed value and in the spirit of homebrew, you decide to make it out of printed-circuit board material placed against the metal chassis. You have some single-sided glass epoxy board 0.062 inches thick. The manufacturer specifies the dielectric constant (k) at 3.5. The available space in the rig is 2 × 3 inches. How many layers of PCB are required?

4. A 500-µH choke is needed for filtering RF at the +12-V input to that new switching power supply. Digging through the junk box, you find a T-94-2 powdered-iron core with an $A_L = 84$. How many turns of wire will you have to wrap on the core to achieve the desired inductance?

5.You need a 50-pF HV capacitor capable of handling 4500 Vdc. Inspiration strikes and you find 18 inches of RG-213 under the workbench. It's rated at 3700 V_{rms} and 30.8 pF/ft. Will it do?

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

5	Champion homebrewer.
3-4	Not bad.
1-2	Try again!

Answers [all formulas and constants can be found in *The ARRL Handbook*]

1. $L\ (\mu H) = d^2 n^2 / (18\ d + 40\ \ell)$
d = diameter in inches from wire center to wire center
n = number of turns
ℓ = length of the coil in inches
First, check to see if the form will work: d is 4 inches plus one wire diameter (0.081 inches) or 4.081 inches. Round to 4.1 inches.

$$n = \sqrt{(L(18d+40\ell))}/d^2 = \sqrt{(30(18\times4.1+40\times6))}/16 = 24.2 \text{ turns}$$

24 turns of bare #12 wire requires at least 2 inches so the form will work. The circumference of one turn is 3.14 × 4.1 = 12.9 inches. Twenty-four turns requires 12.9 × 24 = 309 inches, or about 25 feet 9 inches. Have at it!

2. Just paralleling resistors won't work. Four in parallel gives 112.5 Ω at 40 W. Five in parallel results in 90 Ω at 50 W. However, nine in parallel gives 50 Ω at 90 W. Place two sets of nine paralleled resistors in series to hit 100 Ω on the nose with 180 W dissipation capacity. Can you find other combinations using fewer resistors that will result in the right resistance value without overloading any one resistor?

3. $C = 0.2248 \times K \times A \times (n-1) / d$
C = capacitance in pF
K = dielectric constant
A = area of the conducting surface in sq inches
n = number of plates
d = distance between the plates
The area of each plate is 6 square inches and one layer (of two plates) can generate 0.2248 × 3.5 × 6 × 1 / 0.062 = 76 pF. You'll need 300 / 76 = 3.9 rounded to four layers of PCB material with layers 2 and 4 connected to the chassis.

4. $N = 100\sqrt{(L)/(A_L)}$
L = inductance in µH
A_L = number µH per 100 turns

$N = 100\sqrt{500/84} = 244$ turns; better find a different core.

5. First the voltage: 3700 V_{rms} × 1.414 = 5.2 kV, so it's sufficiently rated. Eighteen inches equals 1.5 feet × 30.8 = 46.2 pF. Nope—too short. Keep looking. Note that the V_{rms} to peak voltage conversion assumes a sinusoidal voltage.

22916 107th Ave SW
Vashon, WA 98070

QST

STRAYS

ATTENTION MILITARY RADIO COLLECTORS

◊ The Military Radio Collectors Association will hold its second annual meet at the Tobyhanna Army Depot in Tobyhanna, Pennsylvania, September 13-16, 2001. The event will be held in conjunction with the Red Ball Military Transport annual rally. Hours are 0800-1700. This is a golden opportunity for anyone interested in vintage military electronics. Activities will include equipment displays, on-air operation, formal presentations and a swapmeet. See the MRCA Web page for complete information at **milradio.org/**, or contact Pete Hamersma, WB2JWU, PO Box 467, Holderness, NH 03245; **pehamers@worldpath.net**.

Previous • Next Strays

The ARRL Incoming QSL Bureau System

Within the US and Canada, the ARRL DX QSL Bureau System is made up of numerous call area bureaus that act as central clearing houses for QSLs arriving from foreign countries. These "incoming" bureaus are staffed by volunteers. The service is currently free and ARRL membership is not required, although operating costs are funded from ARRL membership dues. That's why we welcome your support as an ARRL Member.

How it Works

Most countries have "outgoing" QSL bureaus that operate in much the same manner as the ARRL Outgoing QSL Service. The member sends his cards to his outgoing bureau where they are packaged and shipped to the appropriate countries.

A majority of the DX QSLs are shipped directly to the individual incoming bureaus where volunteers sort the incoming QSLs by the first letter of the call sign suffix. One individual may be assigned the responsibility of handling from one or more letters of the alphabet. All Incoming QSL Bureaus have e-mail addresses. Some bureaus have active Web pages. Please send an e-mail to **buro@arrl.org** for the e-mail address or URL of your bureau.

Claiming your QSLs

Send a $5 \times 7^1/_2$ or 6×9-inch self-addressed, stamped envelope (SASE) or money credit where applicable to the bureau serving your call sign district. Neatly print your call-sign in the upper left corner of the envelope. Place your mailing address on the front of the envelope. A suggested way to send envelopes is to affix a first class stamp and clip extra postage to the envelope. Then, if you receive more than 1 oz of cards, they can be sent in a single package.

Some incoming bureaus sell envelopes or postage credits in addition to the normal SASE handling. They provide the proper envelope and postage upon the prepayment of a certain fee. The exact arrangements can be obtained by sending your inquiry with a SASE to your area bureau. A list of these bureaus appears below.

Helpful Hints

Good cooperation between the DXer and the bureau is important to ensure a smooth flow of cards. Remember that the people who work in the area bureaus are volunteers. They are providing you with a valuable service. With that thought in mind, please pay close attention to the following DOs and DON'Ts:

DOs

- DO keep self-addressed $5 \times 7^1/_2$ or 6×9-inch envelopes or money credits on file at your bureau, with your call in the upper left corner, and affix at least one unit of first-class postage.
- DO send the bureau enough postage to cover SASEs on file and enough to take care of possible postage rate increases.
- DO respond quickly to any bureau request for SASEs, stamps or money. Unclaimed card backlogs are the bureaus' biggest problem.
- DO notify the bureau of your new call as you upgrade. Please send SASEs with your new call, in addition to SASEs with your old call.
- DO include a SASE with any information request to the bureau.
- DO notify the bureau in writing if you don't want your cards.
- DO notify your bureau of a change in address.

DON'Ts

- DON'T send domestic US-to-US cards to the various call-area bureaus.
- DON'T expect DX cards to arrive for several months after the QSO. Overseas delivery is very slow. Many cards coming from overseas bureaus are over a year old.
- DON'T send your outgoing DX cards to your call-area bureau.
- DON'T send SASEs to your "portable" bureau. For example, WB8IMY/1 sends SASEs to the W8 bureau, not the W1 bureau.
- DON'T send SASEs or money credits to the ARRL Outgoing QSL Service.
- Don't send SASEs larger than 6×9 inches. SASEs larger than this require additional postage surcharges.

ARRL INCOMING DX QSL BUREAU ADDRESSES

First Call Area: All calls[1,3]
W1 QSL Bureau
PO Box 7388
Milford, MA 01757-7388

Second Call Area: All calls[1,3]
ARRL 2nd Dist QSL Bureau
NJDXA
PO Box 599
Morris Plains, NJ 07950

Third Call Area: All calls
Pennsylvania DX Association
PO Box 100
York Haven, PA 17370-0100

Fourth Call Area: All single-letter prefixes (K4, N4, W4)
Mecklenburg ARC
PO Box DX
Charlotte, NC 28220

Fourth Call Area: All two-letter prefixes (AA4, KB4, NC4, WD4, etc)
Sterling Park ARC
Call Box 599
Sterling, VA 20167

Fifth Call Area: All calls[1]
W5 Incoming QSL Bureau
Magnolia DX Assn
PO Box 999
Wiggins, MS 39577-0999

Sixth Call Area: All calls[1,2]
ARRL Sixth (6th) District DX QSL Bureau
PO Box 900069
San Diego, CA, 92190-0069

Seventh Call Area: All calls[1]
Willamette Valley DXC Inc
PO Box 555
Portland, OR 97207

Eighth Call Area: All calls
8th Area QSL Bureau
PO Box 182165
Columbus, OH 43218-2165

Ninth Call Area: All calls[1]
Northern Illinois DX Assn
W9 Incoming QSL Bureau
PO Box 273
Glenview, IL, 60025-0273

Tenth Call Area: All calls[1]
0 QSL Bureau
PO Box 4798
Overland Park, KS 66204

Puerto Rico: All calls[1]
Puerto Rico QSL Bureau
PO Box 9021061
San Juan, PR 00902-1061

US Virgin Islands: All calls
Virgin Islands ARC
GPO Box 11360
Charlotte, Amalie
Virgin Islands 00801

Hawaiian Islands: All calls[1]
Wayne Jones, NH6K
PO Box 860778
Wahiawa, HI 96786

Alaska: All calls[1]
Alaska QSL Bureau
PO Box 520343
Big Lake, AK 99652

Guam:
Guam QSL Bureau
Marianas A.R.C.
PO Box 445
Agana, Guam 96932

SWL:
Mike Witkowski, WDX9JFT
4206 Nebel St
Stevens Point, WI 54481

QSL Cards for Canada may be sent to:
RAC Incoming QSL Bureau
Box 51
St John, NB E2L 3X1

QSL cards for Canada may also be sent to the individual bureaus:

VE1, VE0,[1]
Brit Fader Memorial QSL Bureau
Box 8895
Halifax, NS B3K 5M5

VE2
Jacques Dube, VE2QK
875 St Severe St
Trois-Rivieres, QC G9A 4G4

VE3
The Ontario Trilliums
Box 157
Downsview, ON M3M 3A3

VE4
Adam Romanchuk, VE4SN
26 Morrison St
Winnipeg, MB R2V 3B4

VE5[1]
Bjarne Madsen, VE5FX
Box 2860
Tisdale, SK S0E 1T0

VE6[1]
VE6 Incoming QSL Bureau
Box 1515
Gibbons, AB T0A 1N0

VE7[1]
Dennis Livesey, VE7DK
8309 112th St
Delta, BC V4C 4W7

VE8[1]
Rolf Ziemann, VE8RZ
2 Taylor Rd
Yellowknife, NWT X1A 2K9

VE9, VY2
VE9, VY2 QSL Bureau
Box 12-255
1633 Mountain Rd
Moncton, NB E1G 1A5

VO1, VO2
Rick Burke, VO1SA
Box 23099
St John's, NF A1B 4J9

VY1
Hugh Henderson, VY1HH
PO 33062
Whitehorse, YT Y1A 5Y5

Notes

[1]These bureaus sell envelopes or postage credits. Send an SASE to the bureau for further information.

[2]These bureaus can only accept specific sized envelopes. Send an SASE to the bureau for further information.

[3]These bureaus will not accept SASEs. Send money credits only.

The ARRL Outgoing QSL Service

Note: The ARRL QSL Service may not be used to exchange QSL cards within the 48 contiguous states.

How To Use The ARRL Outgoing QSL Service

(1) Presort your DX QSLs alphabetically by parent call-sign prefix (AP, C6, CE, DL, ES, EZ, F, G, JA, LY, PY, UN, YL, 5N, 9Y and so on). Note that some countries have a parent prefix and use additional prefixes, ie, G (parent prefix) = M, 2E, 2I, 2M, 2W and so on. When sorting countries that have multiple prefixes, keep that country's prefixes grouped together in your alphabetical stack. Addresses are not required. *Do not* separate the country prefixes by use of paper clips, rubber bands, slips of paper or envelopes.

(2) Enclose proof of current ARRL membership. This can be in the form of a photocopy of the white address label from your current copy of *QST*. You can also write on a slip of paper the information from the label, and use that as proof of membership. A copy of your current membership card is also acceptable.

(3) Members (including foreign, QSL Managers, or managers for DXpeditions) should enclose payment of $4 for the first 1/2 pound of cards or portion thereof—approximately 75 cards weigh 1/2 pound. $8 for one pound, the fee rate then increases at the rate of $4 for each additional 1/2 pound (i.e. a package containing 1 1/2 pounds of cards should include the fee of $12 and so on). A package of only 10 cards or fewer sent in a *single* shipment costs only $1. Please pay by check (or money order) and write your call sign on the check. Send "green stamps" (cash) at your own risk. *Do not* send postage stamps or IRCs. (*DXCC credit cannot be used towards the QSL Service fee.*)

(4) Include only the cards, proof of membership, and fee in the package. Wrap the package securely and address it to the ARRL Outgoing QSL Service, 225 Main St, Newington, CT 06111-1494.

(5) Family members may also use the service by enclosing their QSLs with those of the primary member. Include the appropriate fee with each individual's cards and indicate "family membership" on the primary member's proof of membership.

(6) Visually impaired members who do not receive *QST* need only include the appropriate fee along with a note indicating the cards are from a blind member.

(7) ARRL affiliated-club stations may use the service when submitting club QSLs by indicating the club name. Club secretaries should check affiliation papers to ensure that affiliation is current. In addition to sending club station QSLs through this service, affiliated clubs may also "pool" their members' individual QSL cards to effect an even greater savings. Each club member using this service must also be a League member. Cards should be sorted "en masse" by prefix, and proof of membership enclosed for each ARRL member.

Recommended QSL Card Dimensions

The efficient operation of the worldwide system of QSL Bureaus requires that cards be easy to handle and sort. Cards of unusual dimensions, either much larger or much smaller than normal, slow the work of the Bureaus, most of which is done by unpaid volunteers. A review of the cards received by the ARRL Outgoing QSL Service indicates that most fall in the following range: Height = 2 3/4 to 4 1/4 inches (70 to 110 mm), Width = 4 3/4 to 6 1/4 inches (120 to 160 mm). Cards in this range can be easily sorted, stacked and packaged. Cards outside this range create problems; in particular, the larger cards often cannot be handled without folding or otherwise damaging them. In the interest of efficient operation of the worldwide QSL Bureau system, it is recommended that cards entering the system be limited to the range of dimensions given. (Note: IARU Region 2 has suggested the following dimensions as optimum: Height 3 1/2 inches [90 mm], Width 5 1/2 inches [140 mm].)

Countries Not Served By The Outgoing QSL Service

Approximately 260 DXCC countries are served by the ARRL Outgoing QSL Service, as detailed in the ARRL DXCC List. This includes nearly every active country. As noted previously, cards are forwarded from the ARRL Outgoing Service to a counterpart Bureau in each of these countries. In some cases, there is no Incoming Bureau in a particular country and cards therefore cannot be forwarded. However, QSL cards can be forwarded to a QSL manager, eg, ZB2FX via (G3RFX). The ARRL Outgoing Service cannot forward cards to the following countries:

A5	Bhutan
A6	United Arab Emirates
D2	Angola
J5	Guinea-Bissau
KH0	Mariana Is.
KH1	Baker and Howland Is.
KH4	Midway I.
KH5	Palmyra and Jarvis Is.
KH7K	Kure I.
KH8	American Samoa
KH9	Wake I.
KP1	Navassa I.
KP5	Desecheo I.
P5	North Korea
S7	Seychelles
SU	Egypt
T2	Tuvalu
T3	Kiribati
T5	Somalia
T8	Palau
TJ	Cameroon
TL	Central African Republic
TN	Congo
TT	Chad
TY	Benin
V6	Micronesia
VP2E	Anguilla
VP2M	Montserrat
XU	Kampuchea
XW	Laos
XZ (1Z)	Myanmar (Burma)
YA	Afghanistan
ZD9	Tristan da Cunha
ZK1	North & South Cook
3C0	Pagalu I.
3C	Equatorial Guinea
3W, XV	Vietnam
3X	Guinea
5A	Libya
5R	Madagascar
5T	Mauritania
5U	Niger
7O, 4W	Yemen
7P	Lesotho
7Q	Malawi
8Q	Maldives
9N	Nepal
9U	Burundi
9X	Rwanda

Countries that currently restrict the forwarding of QSL cards to anyone other than members of that country's national society include the following:

Monaco, France, Morocco, Germany, Poland, Japan, Portugal

Additional information:

- We no longer hold cards for countries with no Incoming Bureau. Only cards indicating a QSL manager for a station in these particular countries will be forwarded.
- When sending cards to *Foreign QSL Managers*, make sure to sort these cards using the Manager's call sign, rather than the station's call sign.
- SWL cards can be forwarded through the QSL Service.
- The Outgoing QSL Service **cannot** forward stamps, IRCs or "green stamps" (cash) to the foreign QSL bureaus.

Please direct any questions or comments to the ARRL Outgoing QSL Service, 225 Main St, Newington, CT 06111-1494. Inquiries via e-mail may be sent to: **buro@arrl.org**. QST

A 2-METER SLEEVE-DIPOLE ANTENNA

◊ My car (a Geo Tracker) is a small SUV with a convertible top. The only place I could easily attach a standard mobile whip and have metal all around it was on the front hood, a position that had several disadvantages. I considered a cowl-mount antenna bracket, but that would put the antenna adjacent to passengers and require a hole in the car.

While preparing for a public-service event, N9REP showed me a 450-MHz ground-plane antenna he had made from welding rod for base operation. Inspiration struck and I made a similar ground plane antenna on a seven-foot mast strapped to the bicycle rack at the back of the car. The seven-foot mast was necessary to keep the ground radials above the heads of pedestrians but it also it gave me a 15-mile simplex range with my H-T.

While this antenna was good for work as a chase car at bicycle events, it had two disadvantages: I could not open the tailgate or enter a garage when this ungainly contraption was attached to the rear of the car. I pondered my options and studied the various spare parts lying around my garage. My solution is a sleeve dipole attached to the spare-tire mount on the rear of the car.

The sleeve dipole is simply a dipole antenna where one leg is a tube so that the feed line reaches the feed point through the tubular element, instead of at right angles to the elements. The antenna has been previously described as an easily transported portable antenna when made from a piece of coax cable. An amateur base-station version is the AEA Isopole antenna. My finished sleeve dipole is shown in Figure 1.

This sleeve dipole has several features: All parts were obtained at hamfests or a local hardware store. Only common hand tools were used for construction. It requires no vehicle ground plane. It can be easily scaled for other frequencies.

Design and Construction

The key to a sleeve dipole is the feed-point hardware. I used a RadioShack #21-961 feedthrough/adapter. (Let's call it the "feed point" for short.) It is essentially a bulkhead-mount SO-239 with the center conductor connected to a $^3/_8$×24 stud as is common in whip-antenna hardware. The part comes with a lockwasher, a plastic shoulder washer and a $^3/_8$×24 female coupler to secure it. Similar connectors are used with a metal flange to mount mobile antennas on vehicle drip rails, hood and trunk lips. Here, I used the connector to mount the whip and simultaneously connect to the antenna's other leg, a large copper sleeve. The feed point with its lock washer, shoulder washer and coupler are the parts near the end cap in Figure 2.

The ARRL Antenna Book[1] chart shows how much to shorten an antenna based on its slenderness. Considering that this is a whip of approximately $^1/_8$-inch diameter and a sleeve of approximately 2-inch diameter, I chose to use 96% as a compromise. For a frequency of 146 MHz, this yields an element length of 19.4 inches.

For the sleeve, I used a piece of 2-inch copper drain line and a matching copper end cap. Rough cut the sleeve several inches longer than needed for the antenna leg. Drill a $^3/_8$-inch hole in the end cap to fit the feed point (that's $^3/_8$-inch for the 21-961), then solder the end cap to the pipe.

Look closely at your feed point. Where does the path of the center and shield conductors diverge? That is the actual feed point of the antenna and the point from which the antenna-leg lengths are measured. Depending on the feed point you use, the point to measure from may be near the center of the cap, or could be an inch above that. The 21-961 makes the connection at the top surface of the copper pipe cap. Measure the sleeve length from the feed point, across the end cap, then along the length of the pipe to 19.4 inches and cut the sleeve to length. Drill a clearance hole for a sheet-metal screw (builder's choice; mine is #8×$^1/_2$-inch) about $^1/_4$-inch back from where the sleeve was just cut.

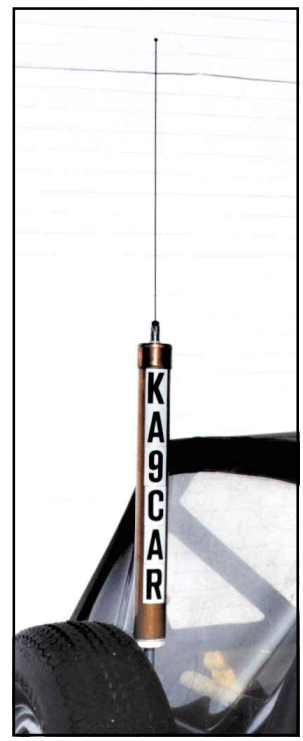


Figure 1—KA9CAR's sleeve dipole mounted on his vehicle.

A piece of $^1/_2$-inch EMT (electrical conduit) has approximately the same outside diameter as the sleeve of a PL-259 connector. In my case, the EMT serves as a mast, extending from the feed point to where I mounted the antenna on my vehicle's spare-tire carrier. The mast length varies among installations. An EMT coupler at the top of the mast holds the PL-259 that attaches to the feed point. Secure the coupling to the mast's upper end.

A bushing centers the copper sleeve on the mast; it also serves as an insulator between them. In the plastic-pipe section of the hardware store, I found a coupling for 1$^1/_4$-inch plastic pipe to be a good fit inside the 2-inch copper pipe. A plastic bushing (reducer) that adapts 1$^1/_4$ to $^1/_2$-inch threaded pipe fits over the mast after a little work with a

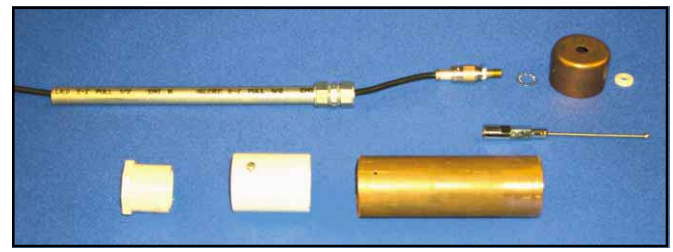


Figure 2—Sample parts used to construct a sleeve dipole.

[1]Dean Straw, N6BV, Ed., *The ARRL Antenna Book* (Newington: ARRL, 2000) Order No 8047, $30. ARRL publications are available from your local ARRL dealer or directly from the ARRL. See the ARRL Publications ad elsewhere in this issue or check out the full ARRL publications line at **www.arrl.org/shop/**.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

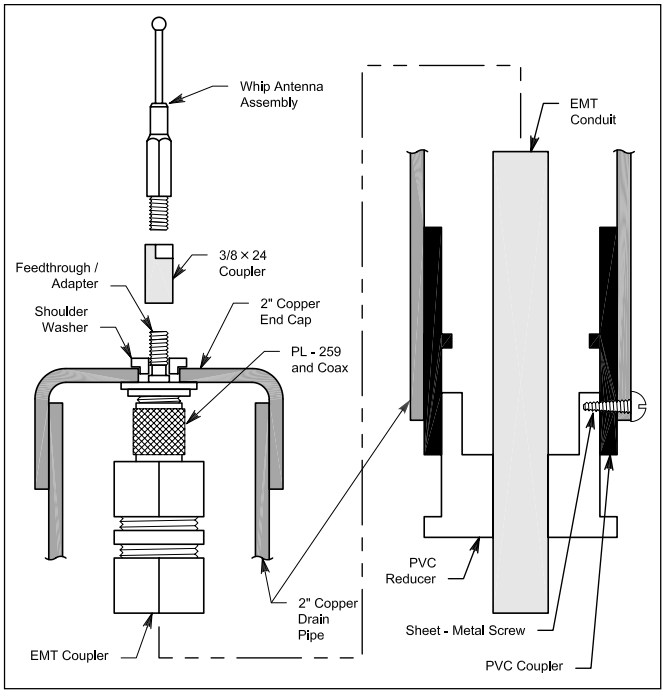


Figure 3—Construction details of the KA9CAR sleeve dipole.

rattail file. Temporarily slide the coupler-bushing assembly into the copper sleeve and drill a pilot hole for the sheet-metal screw.

Place the bushing on the mast, run the coax up the center of the mast, through the EMT coupler and then attach the PL-259. Secure the PL-259 to the feed point, then slip the PL-259 back inside the EMT coupler and tighten the coupler onto the connector sleeve. Now place the lock washer on the feed point, slip the copper sleeve over it, place the insulating washer and tighten down the nut. Be careful that the shoulder washer remains in place. Details of this assembly are shown in Figure 3.

Position the plastic parts in the copper sleeve to align the holes drilled previously and secure them with a small sheet-metal screw. Be sure that you don't short the sleeve to the mast with this screw.

Attach a whip to the feed point. Remember to measure and set the 19.4-inch whip length from the same point you measured the sleeve.

Matching

A dipole is a theoretically 72-Ω device. Most amateur transceivers are 50-Ω devices. I considered three ways to deal with this mismatch:

1. Use 75-Ω line for a good match to the antenna and tolerate a mismatch at the radio.
2. Use 50-Ω feed line cut to a length that a Smith chart shows should be a reasonable match.
3. Use a random length of 50-Ω feed line and see how well it matches.

I chose option three. Using a friend's VHF analyzer to check the match, I found the SWR to be 1.7:1 across the 2-meter band. This won't hurt the transmitter, and the feed-line length is short enough that additional losses resulting from the SWR are not important. You should use a method that you like.

Mounting to the Vehicle

On my SUV, there is enough room to attach the mast to the spare-tire mount between the tire and the tailgate. On some other vehicles, one might simply attach the mast to the spare-tire rack with hose clamps. On a car with a plastic body, one might devise a way to mount the mast to the frame or a trailer hitch. For fixed or portable operation, this antenna can be attached to a wood or metal balcony railing. Whether operating mobile or fixed, you should be sure that it is mounted so that it does not physically and electrically endanger people or risk contact with electric lines.

Results

Standing on the front porch with my H-T, communication through a repeater 12 miles away is marginal. When using this antenna held over my head, I received Q5 reports. Reports from the car using the mobile radio indicate that this antenna meets my needs well.—*John Dewey, KA9CAR, 37 Faringdon Dr, Crystal Lake, IL 60014-7811;* **ka9car@arrl.net**

A 2-METER MEMORY PLAN

◊ If you have a 2-meter or dual-band transceiver with at least 100 programmable memory channels and you live in an area that uses 20-kHz repeater frequency spacing, there is an easy way to quickly access nearly every repeater pair in your part of the 2-meter world.

The repeater output frequencies in the 145.110 to 145.490-MHz segment of the band all have odd digits in the 10-kHz position. Therefore, they can be programmed into the odd numbered memory channels from 11 through 49.

The output frequencies for the 145.620 to 146.980-MHz segment all have even digits in the 10-kHz position. These repeater pairs can be programmed into the even numbered channels from 62 through 98.

The 147.020 to 147.380-MHz repeater output frequencies have even 10-kHz digits, and they fit neatly into the even memory channels from 2 through 38. The 147.000 output can occupy channel 100.

This pattern allows you to access each repeater by selecting the memory channel corresponding to its 100 and 10-kHz digits. For example, the 146.900 repeater is in channel 90, the 145.150 repeater is in channel 15, and the 147.140 repeater is in channel 14. Not only that, there are still left over channels for your favorite simplex frequencies (including channel 52 for the 146.520-MHz national calling frequency) and the few repeaters that may not fit the pattern.

Since my mobile radio (Kenwood TM-V7A) has an alpha-numeric display, I program the CTCSS tone for each repeater into that area of the respective memory channels.

This is not a very technical hint, but it surely does make finding a repeater easy. It also allows me to use the memory scan and individual channel lock-out for listening to only selected repeater frequencies, rather than scanning a whole band segment on the VFO.—*Rick Melcer, N5KAO, 1103 S China St, Brady, TX 76825-6139;* **n5kao@arrl.net**

ELIMINATE PL-259 HASSLE

◊ I recommend taping the PL-259 coupler sleeves to the coax when installing UHF connectors at both ends of a piece of cable. This reduces the possibility of one of them falling off during installation.—*Zack Lau, W1VT, ARRL Lab Engineer;* **zlau@arrl.org**

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

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

Yaesu FT-7100M Dual-Band FM Mobile Transceiver

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

Yaesu has managed to incorporate nearly all of the capabilities and features of their most deluxe model—the FT-8100R—into a stylish new transceiver—the FT-7100M.

Like its predecessor, the '7100 is a "true" dual-band VHF/UHF radio. It contains independent main and sub receivers, allowing transceive operation on the main band while monitoring the sub band. Couple this with its impressive expanded receive frequency coverage (see Table 1), multiple scan and search modes, ample memory storage capacity, and CTCSS and DCS tone systems, and it seems likely that this new model will be particularly popular with hams who also enjoy scanner listening.

Dual in-band receive—where both the main and sub receivers are set up on the same band (VHF/VHF or UHF/UHF)—is also supported. Cross band repeater operation—a feature that allows a transceiver to automatically retransmit signals it receives on one band on a second band—is not.

Feature Rich

Notable highlights include 262 memories with alphanumeric tagging; 50 W VHF/35 W UHF maximum RF power output; direct frequency entry and limited remote control from the microphone; 16 DMTF autodial memories; CTCSS and DCS encode, decode and tone scan; 1200/9600 bps data capabilities and Yaesu's exclusive "Smart Search" and "ARTS" systems.

Yaesu's Smart Search feature can make mining the bands for radio activity a breeze. The system scans once through a band or preset range of frequencies and stores up to 50 active frequencies into a special memory bank. Once the pass is complete (or all 50 memory positions are loaded), the main encoder can be used to step the receiver through the stored frequency information.

This feature could be helpful for finding active repeaters while traveling, and is definitely a handy tool for exploring the expanded receive coverage. The memories are temporary, though. You'll need to transfer interesting hits into the regular memory positions before you exit the Smart Search mode.

ARTS (*Auto Range Transponder System*) is a Yaesu exclusive that's become standard fare on most of their FM gear. It works in conjunction with other ARTS-equipped transceivers to alert operators when they have moved out of communications range. Once enabled, this system automatically transmits DCS pings with each press of the PTT button—or every 30 seconds during periods of inactivity. If one transceiver fails to receive the pings of another ARTS-equipped radio for more than a minute, the units will sound a warning and show a message in the display to inform the operators of the out-of-range condition. A CW ID can be set up to identify the DCS pings.

Touring the Facilities

The front panel of the FT-7100M can be easily removed for remote mounting purposes. It latches onto a plastic receiver on the front of the chassis. The panel is dominated by a $2^5/_8 \times 1^1/_8$-inch LCD display. Displayed segments appear on an orange background. The level of the background illumination can be varied; the contrast level is fixed.

The main band frequency information appears in the upper half of the window; the sub band data is shown just below. A single curving S/RF meter—along the left edge of the window—indicates the signal strength or the relative RF power output level on the main band. An extensive collection of icons shows the state of important settings.

Independent concentric volume and squelch controls are provided for each band. These are located on the left edge of the panel. A large 24-step rotary encoder serves as the main tuning knob.

There are two columns of four control keys—one to the left of the display window and a second along the right edge of the panel. The keys all perform multiple operations, but are only labeled with their primary assignments. A quick press of a key evokes its primary operation. Pressing and holding a key provides access to secondary operations.

Primary assignments cover most of the control commands that are necessary for typical operation—switching bands, selecting the VFO or memory mode, changing the output power level, and setting up and enabling the tone systems for example. Secondary assignments include operations such as memory channel writing, activating dual in-band receive, initiating a priority scan and toggling the

Bottom Line

Yaesu's FT-7100M is a full-featured FM dual-band transceiver—and a well-equipped scanning receiver—in a compact, flexible package.

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1
Yaesu FT-7100, serial number 1D040208

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: Receive, 108-180, 320-480, 810-1000 MHz;[1] transmit, 144-148, 430-450 MHz.	Receive and transmit, as specified.
Power requirement: Receive, 0.5 A; transmit, 11.5 A (high power).	Receive, 0.73 A; transmit, 9.6 A. Tested at 13.8 V.
Modes of operation: FM.	FM, AM (AM receive only).[2]
Size (HWD): 1.5×5.5×6.6 inches; weight, 2.2 pounds.	
Receiver	**Receiver Dynamic Testing**
FM sensitivity, 12 dB SINAD: VHF and UHF, <0.16 μV.	For 12 dB SINAD: VHF, 0.14 μV; UHF, 0.16 μV.
AM sensitivity: Not specified.	10 dB (S+N)/N, 1-kHz tone, 30% modulation, 120 MHz: 0.6 μV.
FM adjacent channel rejection: Not specified.	20 kHz channel spacing: VHF, 64 dB; UHF, 63 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing: VHF, 59 dB; UHF, 61 dB; 10 MHz channel spacing: VHF, 67 dB; UHF, 70 dB.[3]
FM two-tone, second-order IMD dynamic range: Not specified.	82 dB.
S-meter sensitivity: Not specified.	Maximum indication: VHF, 2.0 μV; UHF, 2.3 μV.
Squelch sensitivity: 0.1 μV.	At threshold: VHF, 0.08 μV; UHF, 0.10 μV.
Receiver audio output: 2.0 W at 5% THD into 8 Ω.	2.3 W at 5% THD into 8 Ω.
IF rejection: not specified; image rejection: 70 dB.	First IF rejection, VHF, 105 dB; UHF, 141 dB; image rejection, VHF, 133 dB; UHF, 82 dB.
Transmitter	**Transmitter Dynamic Testing**
Power output (H/M1M2/L): VHF, 50 / 20 / 10 / 5 W; UHF, 35 / 20 / 10 / 5 W.	VHF, 51 / 19 / 9.4 / 4.2 W; UHF, 32 / 18 / 9.4 / 4.2 W.
Spurious-signal and harmonic suppression: ≥60 dB.	VHF, 65 dB; UHF, 62 dB. Meets FCC requirements for spectral purity.
Transmit-receive turn-around time (PTT release to 50% audio output): Not specified.	S9 signal, VHF, 180 ms; UHF, 160 ms.
Receive-transmit turn-around time (tx delay): Not specified.	VHF, 170 ms; UHF 140 ms.
Bit-error rate (BER), 9600-baud: Not specified.	146 MHz: Receiver: BER at 12-dB SINAD, 2.5×10^{-3}; BER at 16 dB SINAD, 5.6×10^{-4}; BER at –50 dBm, 1.6×10^{-4}. Transmitter: BER at 12-dB SINAD, 3.0×10^{-2}; BER at 12-dB SINAD + 30 dB, 1.4×10^{-2}. 440 MHz: Receiver: BER at 12-dB SINAD, 1.9×10^{-3}; BER at 16 dB SINAD, 2.5×10^{-4}; BER at –50 dBm, 8.2×10^{-5}. Transmitter: BER at 12-dB SINAD, 3.4×10^{-2}; BER at 12-dB SINAD + 30 dB, 1.7×10^{-2}.

Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.
[1]Cell blocked from 823 to 850 MHz and 868 to 895 MHz.
[2]AM receive mode available from 108 to 180 MHz.
[3]See text.

display between frequency digits and alphanumeric memory tags. Getting a handle on the unlabeled assignments of the secondary key operations can take a while (you'll want to keep the *Operating Manual* close at hand), but the key presses required for the most common operations are simple and intuitive (and labeled!).

A 34-item menu system handles "set-and-forget" parameters—such as the repeater offset frequency, the tuning step size, the automatic repeater shift and the display illumination level—and also includes selections that are used to activate advanced features. These include the CTCSS and DCS tone scan, AM mode receive, the ARTS system, the time-out timer and the automatic power off timer, for example.

The chassis enclosure is almost entirely made up of a die-cast aluminum shell. The underside and rear apron are covered with cooling fins. A small "pancake" fan is bolted to the back. A sheet metal top cover completes the cabinet. An internal speaker is mounted in the top cover.

The rear panel supports a chassis-mounted SO-239 antenna connector, a $^1/_8$-inch mini phone jack for an external speaker, a 6-pin mini DIN jack for connecting terminal node controllers for packet operation and a short dc power pigtail with a conventional T-type connector. A 9-foot fused dc power cable and a mobile mounting bracket are also provided.

The Cure for Separation Anxiety

Yaesu has made some significant—and welcome—changes to the optional remote faceplate mounting system for this transceiver. Most of their other remote mount kits use tiny screws to secure the radio end of the remote cable to the front of the transceiver's chassis. This makes it inconvenient to remove those radios from the vehicle for short-term fixed sta-

tion or alternative applications.

The system for the '7100—the YSK-7100 Remote Mounting Kit—employs 6-pin modular plugs on both ends of a 19½-foot long remote cable. Mating jacks are located on the front of the chassis and the back the faceplate. (The radio comes with a 4-inch jumper installed between these jacks.) The kit also includes a bracket that the front panel latches into and an extension cable for an external speaker.

An optional quick-release mounting bracket for the chassis (the MMB-60) can further simplify things. The chassis and front panel could then be easily installed or removed from the vehicle without the need for any tools.

Be forewarned, though: You'll definitely want to keep close tabs on the whereabouts of that short jumper cable!

Multitalented Mike

The US version of the FT-7100M comes with Yaesu's MH-48A6J DTMF hand mike. It has a 16-button keypad that's used for manually transmitting DTMF tones when the radio is in transmit, and directly entering frequency digits or memory channel numbers while receiving.

There are four additional buttons located just below the keypad. Their factory default assignments are band selection, VFO/memory operation, tone mode (CTCSS/DCS encode/decode) and setting, and power output level. These can be reprogrammed—via menu settings—to mimic the functions of nearly any of the transceiver's front panel keys. This is a neat feature, as it allows you to customize the mike controls to best suit your particular needs.

The right side of the microphone sports two slide switches. One controls the backlighting of the DTMF pad, the second locks out the **UP** and **DOWN** buttons on the top of the mike and the programmable function keys. The lock feature does not disable the PTT button or the DTMF/entry keypad.

Thanks for the Memories

The FT-7100M has ample memory capacity. There are 240 "regular" memories, 10 pairs of upper and lower band scan limit memories and two "Home" channels. Each band also contains 50 additional slots for temporarily storing the frequencies encountered during a Smart Search.

The 240 regular memories are initially divided into two 120-memory banks—one for each band—but a menu setting allows these to be reallocated (196 memories could be set aside for the VHF band and the remaining 44 memories would be available for the UHF band, for example).

Each of the regular memories can be assigned an alphanumeric name up to six characters long. The main band display area is only capable of showing the first five characters though—the sixth character only appears when a memory tag is displayed in the lower (sub band) portion of the window.

Unlimited Access

The '7100 comes equipped with a full-featured tone squelch system. CTCSS and DCS (digital code squelch) encode and decode are provided, and tone and code scan systems can be employed to determine access requirements. The CTCSS system includes 50 tones; the DCS system offers 104 codes. A menu setting is provided that allows you to "invert" the DCS tones, and the FT-7100M's *Operating Manual* includes an excellent explanation—the best I've encountered to date—of why this adjustment is sometimes necessary.

The '7100 also features CTCSS "Bell Paging." When this system is enabled, the radio will remain silent until it receives a signal with the correct CTCSS tone superimposed. The rig will then "ring," and the squelch will temporarily open.

The transceiver is not specifically set up to allow the use of independent transmit and receive tones or codes on a single frequency, but savvy operators can work around this by employing the dual in-band receive feature.

In Search Of...

The FT-7100M offers several different scanning modes and two scan-resume conditions.

While in the VFO mode, the scan will search the entire band or just between upper and lower limits that you've programmed into the band scan limit memories. In the memory mode, the scan will—of course—check for activity on your programmed memory channels. Scans are initiated by pressing and holding either the **UP** or **DOWN** button on the mike. You can use the PTT button, the **UP** or **DOWN** buttons or the **V/M** key to stop the scan.

Specific memories can be temporarily locked out of a memory scan, but the directions for doing so that are provided in the manual are incorrect. The instructions call for dialing up the desired memory and then pressing and holding the **TONE** key for ½ second. The correct procedure is to dial up the desired memory and then press and hold the **V/M** key until the main and sub displays begin blinking. A quick press of the **TONE** key will then activate the skip feature. Repeat this process to disable the skip feature.

A menu setting allows you to program the scan to stop on an active frequency and remain there until the carrier drops, or to pause on an active frequency for 5 seconds and then resume scanning.

A related feature is "Priority Channel Operation." This system will periodically (every 5 seconds) check for activity on a memory channel while you are operating in the memory channel, VFO or Home channel modes.

On the Air and In the Lab

I initially set the FT-7100M up in my home station. I programmed in a few local frequencies and spent some time getting familiar with the controls.

The 57-page 6×8-inch *Operating Manual* is well organized, and the step-by-step programming instructions—supplemented by a generous number of diagrams and charts—are easy to follow.

I used the transceiver while serving as the net control station for our local club's weekly VHF net. The net usually attracts a couple of dozen check-ins, and concludes with a near-continuous transmission of the *ARRL Audio News*. Needless to say, this is a serious test of a transceiver's cooling system.

The cooling fan on the '7100 automatically switches on when transmitting, but the level of the noise it generates is extremely low. The chassis got very hot—even at the 20 W power output level—but the radio continued to operate without any difficulties. Bear in mind that the transmit duty cycle for net control operation *far* exceeds that of typical operation.

Transmit audio reports universally garnered comments of "sharp" sounding audio. Listening to it in a second receiver confirmed that it generates what I'd describe as "communications grade" audio. It's not as full and natural sounding as my permanent shack transceiver. Receive audio—even when using just the internal speaker—is plenty adequate for fixed station operation, and is sufficiently robust for fairly noisy mobile environments.

I temporarily substituted the FT-7100M for my mobile transceiver. I found the radio easy to use while mobile, and the display is very legible over a wide range of viewing angles and vehicle interior lighting conditions. The microphone control capabilities help reduce the amount of distraction involved with typical mobile operation.

A look at the data in Table 1—specifically the FM two-tone third-order IMD dynamic range—points to a rather poor

level of immunity to strong nearby signals both within (the 20 kHz numbers) and just outside (the 10 MHz numbers) of the amateur VHF and UHF bands. This quickly manifested itself as a scary symphony of odd noises spewing forth from the receiver during a drive through our local "intermod alley."

It turns out that our product review unit is from one of the first batches of '7100s that were released in the US, and Yaesu has subsequently made an update that has improved the 10 MHz offset performance. A second—post update—unit that we borrowed from a local Yaesu distributor showed significant improvements. The VHF IMD dynamic range in the updated version measured 81 dB (up from 67 dB on the product review unit), and the UHF number measured 73 dB—a 3 dB improvement. All of the FT-7100Ms currently on dealer's shelves have been updated. If you purchased an early release unit and are experiencing problems in strong signal environments, a call to your dealer may be in order. Needless to say, ours will be heading back to California for the updates before it shows up in our Bid List.

A second significant shortcoming that turned up during lab testing involves 9600 bps packet performance. While it's not unusual to encounter rather poor high speed packet performance in FM-only transceivers, the BER (bit error rate) is usually small enough at strong signal levels for reasonable throughput. This wasn't the case with either of the FT-7100Ms we tested. Yaesu reports that they have developed a solution for this problem and are implementing it in current production units. It's important to note that this does not point to problems with 1200 bps operation.

Conclusion

The FT-7100M is a feature-packed true dual-band FM transceiver—and a sophisticated scanner receiver—in one very compact package. Yaesu's improved optional remote mounting system makes it flexible enough to serve double-duty as both your fixed station and mobile transceiver.

Manufacturer: Yaesu USA, 17210 Edwards Rd, Cerritos CA 90703; 562-404-2700, fax 562-404-1210; **www.yaesu.com**. Manufacturer's suggested list price: $550. Typical current street price: $445. List prices of selected optional accessories: YSK-7100 remote mounting kit, $69; MMB-60 quick release chassis mounting bracket, $31.

Ameritron ALS-600 Solid State No Tune FET Amplifier

Reviewed by Rick Lindquist, N1RL
ARRL Senior News Editor

Years ago a good friend of mine gave me a 4-400A amplifier that had been homebrewed in Canada—apropos to this review since that's where these words are being written. With this transaction we were doing each other a favor. He wanted to clear out some excess baggage in his basement shack, and I needed (or thought I did) an amplifier.

Like the Ameritron ALS-600—which is, after all, the subject at hand—this amp came in two pieces—an RF box and a power supply. Unlike the ALS-600, both pieces were massive. The RF cabinet featured huge black knobs—one with a crank and counter controlled a vacuum variable for tuning; another was for loading. There were at least two, possibly three, meters on the RF box. The power supply was built into a short rack that sat on the floor. It boasted its own meter to read the line voltage to the transformer, which, as it turned out, was faulty and necessitated surgery (that's a veritable "tale of laminations" best held for another occasion).

On the back of the RF box, its maker had appended a huge, ugly blower that left nothing to chance in terms of moving copious amounts of air past the tubes. The 4-400As could crank out a lot of heat along with the 1 kW of RF, and the amp maker had neglected chimneys.

Suffice it to say, this amp turned out to be both project and problem child over the years I had it in operation. Sometimes it would snap and hiss at me unexpectedly. One time, it blew up in the middle of a contest and took out my exciter's T/R relay in the process. In short, it never was quite "right," yet it always demanded a great deal of respect. One needed to ap-

Bottom Line

The Ameritron ALS-600 is a cool and convenient way to pump up your signal. It's reasonably quiet and runs off 120 V ac, so you don't need to call in the electrician to install a 220 V ac outlet.

Table 2
Ameritron ALS-600, serial number 12727

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency Range: 1.5-22 MHz.[1]	As specified.
Power output: 600 W PEP SSB, 400 W CW.	As specified for SSB and CW.
Driving power required: 100 W maximum.	Typically 100 W.
Input SWR: 1.5:1 maximum.	As specified.
Spurious signal and harmonic suppression: Not specified.	49 dB.
Intermodulation distortion (IMD): 25 dB.	See Figure 1.
Primary power requirements: 50 V dc at 25 A, ±14 V dc at 1 A.	
Size (HWD): main unit, 7.1×9.5×12 inches; weight, 12.5 lb; power supply, 7.1×9.5×12 inches; weight, 36 lb.	

[1]As shipped from the factory, operation on 12 and 10 meters is disabled. The ALS-600 can be modified for operation above 15 meters (by the purchase of an option kit). Information on this kit is available by written request, which should include a copy of the owner's valid Amateur Radio license.
[2]Not including external power supply.

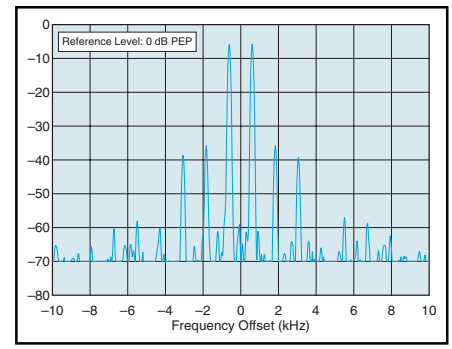


Figure 1—Worst-case spectral display of the Ameritron ALS-600 amplifier during two-tone intermodulation distortion testing. The worst-case third-order product is approximately 37 dB below PEP output, and the worst-case fifth-order product is approximately 40 dB down. The amplifier was being operated at 500 W at 14.020 MHz. The levels of the third- and fifth-order products are higher than those that we have observed on recently reviewed tube-type amplifiers.

proach this amp with fear and loathing.

After it took out the SWR circuit in yet another exciter, I phased it out in favor of a Heath SB-220, which took up far less space in the shack and was far less intimidating.

The Age of the Little Amp

Small, table-top amps are nothing new. My urge to run anything approaching "big" power was tempered by my experiences with the 4-400A monster. Today I run—if I use an amp at all—a vintage Collins 30L-1, which has four 811s in the output. What's nice is that it's small and undemanding, puts out 500 to 600 W, and is easy to tune. What's not nice is that it generates substantial heat, does not cover 160 meters, and I still must twist knobs each time I change bands. (Collins also used a phono jack for the RF input from the exciter—and all along you thought Heath came up with that on its own!)

The ALS-600 is a great compromise for operators such as myself, who neither want nor need *huge* power but want to be able to quickly and easily pop a "half gallon" on the air to compensate for deteriorating conditions or to attract the attention of that DX station that's not responding to your dim 100 W and compromise antenna. Best of all, this little amp—the RF box weighs a bit more than 12 lbs—doesn't take any time to warm up, because it's solid-state, and it doesn't require anything more than the turn of a selector knob to put it into the correct operating range. There's no tuning or loading or dipping involved. As they like to say in those TV gadget ads, "It's just that simple."

Figure 2—The rear panel of the RF deck.

A Good Fit

I found the ALS-600 to be a good fit, not only for my operating style but for my rather compact operating desk. Because it comes in two pieces, the ALS-600 takes up far less space than even my 30L-1. The power supply can sit out of sight on the floor. Ameritron has supplied a 5-foot long cable to connect the power supply to the RF box. You also can stack the two units, as I did for part of the "field" testing. The two boxes are almost exactly the same size.

Hookup is simple, and if this is your first amplifier, Ameritron has included everything you need to know in the *Instruction Manual*. It even covers the oft-misunderstood subject of automatic level control—ALC—and details how to get the amp talking to your exciter to minimize splatter problems.

One important point the manual makes is that there is no industry-wide ALC standard for input voltage, input resistance or attack and decay times. As the manual cautions, "the exact operation of the ALC circuit will vary with the exciter's response to external ALC control voltages." In the case of the ALS-600, the ALC will work on most exciters that

require less than –10 V.

After setting up the unit—which took about 10 minutes or less—I had it putting 500 W or so of RF into a dummy load, just to see if everything was working as it was supposed to be. The RF deck utilizes the combined strength of four MRF-150s in a push-pull parallel circuit.

The ALS-600 does generate some blower noise, somewhat more than my 30L-1, but it's not nearly as noisy as some of the economy tube-type amps on the market. In fact, the ALS-600 involves two blowers—one in the power supply box and one in the RF box. Both run continuously. That's all the more reason to stick the power supply somewhere away from the immediate operating position—although not out of reach or sight (the reasons for this will become clear). More important, however, was that the RF and power supply boxes seemed to run quite cool, even with extended use.

The metering is great. The RF box boasts a nice large, illuminated cross-needle analog meter that measures output power on one scale (forward power) and reflected power on the other, with the SWR appearing at the point where the needles cross. Another smaller, lighted meter on the power supply—a dual-needle affair—reads out the voltage and current. It showed about 50 V and 8 A of current.

Front-panel controls on the RF deck include the **ON-OFF** power switch, the **STANDBY-OPERATE** switch—both just below the meter—the **ALC SET** knob and the **FREQ MHz** range selector. Ameritron has included a **NORMAL-RTTY** switch on the power supply box that lets you adapt the unit for operation in continuous-duty modes (such as RTTY or maybe AM or FM). Ameritron says the RTTY position limits the no-load voltage to about 42 V dc. According to an "update" in the manual, the RTTY position will permit operation for "10-minute key down" at 50% duty cycle. This will give you a maximum of about 350 W output.

There are three LED indicators on the front panel—a yellow **ALC** light, a green **XMT** light and a red **LOAD FAULT** lamp.

Peeking at the rear apron: There's a back-panel **ALC LIMIT** control on the RF deck. This lets you limit the amount of ALC voltage going to your transceiver since—as mentioned earlier—no industry standard exists.

In addition, the rear panel includes SO-239 connectors for the RF input and output. There's also a 12 V dc jack (RCA type) to run an accessory (up to 200 mA), plus RCA jacks for RELAY and ALC. There's a multi-wire connector for power and switching. A wing-nut ground terminal rounds out he back panel. A considerable portion of the rear panel is given over to the fan outlet. The ac cable connects to the back of the power supply deck.

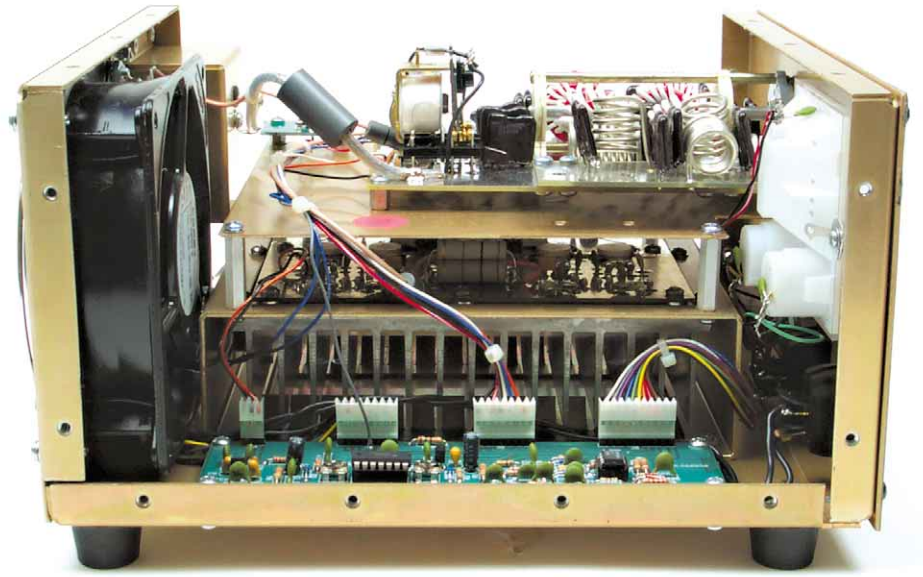


Figure 3—An internal view of the RF deck.

The ALS-600 can operate from a range of line voltages. It comes factory-wired for 120 V ac operation, but it can operate on anywhere from 100 to 130 V ac or 210 to 250 V ac, so it's ready to travel. You'll need to change some jumpers inside the power supply box to adjust the line voltage range. Ameritron recommends against operating the unit on higher-voltage ac mains unless lower voltage is not available. By the way, the power supply is a choke-input design, and it does include "inrush" protection to preserve the filter capacitors.

Switching in the Afterburner

Once you've got the ALS-600 interconnections in place and the input and ALC adjustments set up for your station, a bigger signal is just the flick of a switch away. Well actually, a couple of switches.

You don't select bands, you select frequency ranges. It covers 1.5-2.3; 2.3-4.4; 4.4-8.0; 8.0-14.5; and 14.5-21.6. The ALS-600 employs a broadband, five-pole lowpass filtering system on the output side. See the ARRL Lab test results (Figure 1) for an idea of how well this system did in minimizing undesired output.

By the way, there's an **AUX** position on the amplifier's range switch to add 12 and 10-meter coverage. Ameritron will supply licensees with a kit to include these bands, but it will cost you around $30.

The unit should be in the correct transmit range before you flip the ALS-600 from **STANDBY** to **OPERATE**. I found that it would still produce output—sometimes substantial output—when the unit was not switched to the correct range, and this is something that's extremely easy to do in the general course of things.

The switching relay is on the noisy, clacky side. For push-to-talk operation on SSB, this is acceptable, but it could get tiresome if you plan to run in VOX mode using this amp. Other than that, the ALS-600 runs rather quietly. The ALS-600 is not equipped for full-break-in CW.

The broadband output network seems to know its limitations. I went to 10 MHz on the exciter with the amp still on the 4.4-8.0 MHz setting, and it still appeared to be putting out around 450 W (don't fret—I was doing this into a dummy load at the time). But when I went to 14 MHz, it tripped off, and the **LOAD FAULT** lamp came on.

The manual says the **LOAD FAULT** LED will come on if the band switch is set on the incorrect frequency range, if the load SWR is too high or if output is too high. A little experimenting showed, however, that there's some "overlap" on the **FREQ** ranges in terms of what the amplifier can live with. In the 4.4-8.0 MHz position, it continued to put out full or nearly full output up to around 10.1 MHz, where it began to drop off. Somewhere between 12 and 13 MHz, it finally tripped the **LOAD FAULT**.

On the other side, still in the 4.4-8.0 MHz position, the output actually increased as I went through the 75 and 80-meter bands. There was somewhat less output in the 2.2-4.4 MHz range position when

I was driving it on 80 and 75 meters. The output in that range seemed to peak at around 600 W at 2.15 MHz. Output in the 1.5-2.3 MHz range peaked at just under 600 W also at 2.15 MHz. Output dropped to about 550 W at 1.85 MHz input.

The ALS-600 includes thermal overload protection as well that bypasses the amp if it gets too hot. There's no indicator to tell you the amp has tripped out on high temperature, however. It just stops amplifying and goes into bypass mode, where the exciter's output will show up at the antenna terminal.

In operation, we found that 400 W was a reasonable output for CW operation with about 75 W of drive. You can run the ALS-600 a bit harder on SSB without any problems. One disturbing observation in CW was a little uptick in SWR between the transceiver and the amp upon the initial CW character—as if the exciter were operating into an open load or a mismatch for just a fraction of a second. No one complained about missing characters, and this might not be a problem with other transceivers. In general, the amplifier presented a 1.5:1 SWR (according to my digital SWR meter) or better to the transceiver.

So, What Does This Buy Me?

Some amplifier makers used to talk about "dollar-per-watt" values—maybe they still do. If that makes sense to you, then it will cost you on the order of $2 per watt for the luxury of owning this solid-state, no-tune linear.

More to the point is what a 600-W class amplifier will do for your signal. Remember that doubling your power is equivalent to a 3 dB increase in output. With the ALS-600, you can—at least theoretically—gain around 7.5 dB in power output over your 100 W "barefoot" signal. What this translates into on the other end of the circuit will vary from path to path, of course, and from antenna to antenna. But let's call it roughly one S unit (there's no real industry standard here either, but that's typically 6 dB).

Let's put this into perspective. In general terms, with an ALS-600, you're around three-fifths of the way to a full legal limit amplifier, which will give you most of another S unit—or around 12 dB of gain over your barefoot signal. You can make up that difference with a gain antenna.

The *Instruction Manual* was complete and easy-to-follow. It includes circuit diagrams of both the amplifier RF deck and the power supply. This is a real plus for troubleshooting, should it come to that.

Manufacturer: Ameritron, 116 Willow Rd, Starkville, MS 39759; 662-323-8211, fax 662-323-6551; **mfjcustserv@ameritron.com**; **www.ameritron.com**. Manufacturer's suggested list price: $1299. Typical current street price: $1130.

GOING ONCE, GOING TWICE...

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, Short Takes 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.

ICOM IC-910H VHF/UHF multimode transceiver with UX-910 1200 MHz Band Unit and FL-132 500 Hz CW filter, serial number 01242 (see "Product Review," May 2001 *QST*). Minimum bid: $1445.

ICOM IC-PW1 HF/6-meter linear amplifier, serial number 01203 (see "Product Review," Feb 2001 *QST*). Minimum bid: $3565.

ICOM IC-R3 communications receiver, serial number 01372 (see "Product Review," Feb 2001 *QST*). Minimum bid: $325.

Ten-Tec Jupiter HF transceiver with Model 701 hand-held microphone, serial number 12C10820 (see "Product Review," Jun 2001 *QST*). Minimum bid: $825.

Yaesu VR-5000 communications receiver, serial number 0K030164 (see "Product Review," Jun 2001 *QST*). Minimum bid: $590.

Yaesu FT-817 multiband multimode transceiver with YF-122C 500 Hz CW filter, serial number 0M050276 (see "Product Review," Apr 2001 *QST*). Minimum bid: $610.

Sealed bids must be submitted by mail and must be postmarked on or before Oct 1, 2001. 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. Once notified, confirmation from the successful bidder of intent to purchase the item must be made within two weeks. No response within this period will be interpreted as an indication of the winning bidder's refusal to complete the transaction. The next highest bidder will then have the option of purchasing the item. No other notifications will be made, and no information will be given to anyone other than successful bidders regarding the final price or the 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. [Please note that the bid submission period has been extended by one month.—*Ed.*] QST

NEW PRODUCTS

MAGNETIC LOOP DESIGN SOFTWARE

◊ Glenn, KI6GD, has written a magnetic loop antenna design program for *Windows*. It will calculate the design parameters in standard or metric units for small loop antennas to operate from 1 to 30 MHz. This is freeware for everyone interested in building a mag-loop antenna. The file *LoopCalc.zip* is available on his ftp site at **ftp://ftp.cts.com/users/g/c/gcsperry/**. QST

Previous New Products

FEEDBACK

◊ Two schematic diagram errors appeared in "Simple RF-Power Measurements" in the June 2001 *QST*. The first, in Figure 1, relates to U2. The input and the output are interchanged. The second relates to the 10 dB pad in the inset part of Figure 6. The words "to DVM" at the right hand side of the 10 dB pad, next to R4, should read "to the coaxial cable between the tap and the power meter." QST

TECHNICAL CORRESPONDENCE

COMMENTS ON "HOW TO MAXIMIZE YOUR RECEIVER'S EFFECTIVE SELECTIVITY"

By Harvey Tetmeyer, K5LJM, 9723 W Campana Dr, Sun City, AZ 85351;
k5ljm@arrl.net

◊"How to Maximize Your Receiver's Effective Selectivity" by Larry Scheff, W4QEJ, (*QST,* Feb 2001, pp 42-48, and Mar pp 44-47) addressed the subject of reducing unwanted noise and interference by adjusting the controls on the receiver. Looking back, one of the first adjustments to be found in the early *tuned radio frequency* (TRF) radios, other than the frequency dial, was the *volume control* (AF Gain). When superheterodynes came along, other controls were added. The November 1933 *QST* had an article by James J. Lamb,[1] then Technical Editor, describing *automatic volume control* (AVC) to compensate for the fading experienced in HF propagation. The receiver also had a *radio-frequency-gain control* to prevent overloading. In the same issue, Mr Lamb introduced a crystal filter with a capacitive-controlled-response-shaping adjustment for the single-signal superhets.[2]

Almost 70 years later, we are using refined versions of these adjustments. Frequency control has gone digital. The AF Gain adjusts the speaker or headphone audio to a comfortable level. The AVC terminology has been changed to *automatic gain control* (AGC) but it still keeps the signal level constant at the detector so everyone in the roundtable or on the net sounds about the same. Crystal filters have been greatly improved with *passband tuning* (IF Shift) and *variable bandwidth tuning* (VBT) for advanced unwanted-signal reduction. DSP supplements conventional filters in newer radios. The RF Gain control is still there, but it comes in many forms. Some receivers switch the first RF amplifier out of the system with the *advanced intercept point* (AIP) button. Most have an *attenuation button* (ATT) to reduce the incoming signal by 20 dB or so. The RF Gain control changes the amplification of the IF stages and, in some cases, the RF amplifier stage or stages as well.

In the early days, many CW operators turned off the AVC and used only RF and AF Gain controls. The practice was to leave the AF Gain at a rather high level and "ride the RF Gain" for the most pleasant listening level. This procedure reduced RF and IF amplifier overloading and adjacent-signal interference in the old vacuum-tube receivers, which had poor dynamic range and IMD characteristics.

Larry's article correctly points out that some interference can be greatly reduced by using RF attenuation and reducing RF Gain. It is simply a matter of not overdriving the RF and IF amplifiers ahead of the filters. There are more than enough opportunities for overloading and splattering with up to nine high-gain amplifiers and up to four mixers before the last IF filter. To complicate matters, it is common to have two high-gain RF amplifiers running with up to 40 dB of gain, without automatic or manual gain control, before the first mixer. Combine this with the lack of filtering in the broadband receiver front ends and you have a perfect recipe for overloading.

While the practice of reducing the RF input has been successfully used over the years, the explanation of how it works is not supported in the article by sound technical theory. The first misconception is that RF and IF amplifiers have a lower threshold. All RF and IF amplification stages operate in the linear Class-A mode to maintain signal fidelity. Every signal, right down into the amplifier noise level, is amplified. These amplifiers do have upper thresholds, which cause clipping and distortion when overdriven. That is why we reduce the RF input.

The second misconception is that IF filters have a lower threshold. This too is incorrect and can be demonstrated by measuring properly terminated filters using a tracking generator and a spectrum analyzer. They do have an upper threshold, which is the level where components are damaged.

Thirdly, the frequency response of mechanical, crystal, ceramic and LC filters used in amateur receivers does not change with signal amplitude as described in the text. These are amplitude linear, passive devices. Changing frequency response with amplitude would cause limiting and severe distortion.

Upon examination of the filter-response curves in the article, Figures 1A and 1B are correct per the specifications given in the article. Figure 1C is incorrect in that it shows the same response shape for one filter as for the two-filter combination. Figure 1 of this article gives a more accurate representation of the responses of an individual filter, the two filters in combination and the reduced bandwidth resulting from adjusting the VBT controls. Note also that the shape factor degrades with the narrower configurations. The filter-response error of Figure 1C is carried on to Figures 2B, 5, 6 and 7.

The text describing Figures 5 through 10 is misleading. There is an unsuccessful attempt to adapt a concept shown in the owner's manual to explain how reducing the signal level reduces interference. The owner's manual shows the filter 0-dB response trough aligned with the noise level line as in Figure 2 of this article. This indicates that any signal in the shaded area is reduced to or below the noise level. The real indication from Figure 5A is that any signal in the shaded area is at least 40 dB below the incoming-signal noise level. Figure 5B shows that any signal in the shaded area is no greater than approximately 10 dB above the noise level. The text further misstates that Figure 5A would allow more interference than in Figure 5B. This is not possible since the filter in Figure 5A is sharper. Without going into details, similar errors occur in the text describing Figures 6 and through 10.

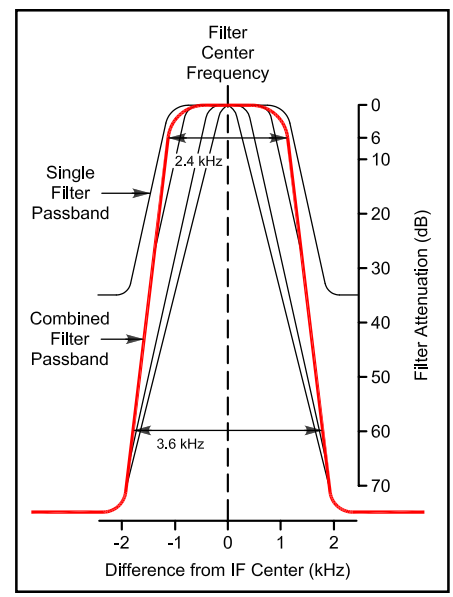


Figure 1—K5LJM's responses of an individual filter, the two filters in combination and the reduced bandwidth resulting from adjusting the VBT controls.

[1]J. Lamb, "Automatic Gain Control for the Superhet," *QST*, Nov 1933, pp 32-33.
[2]J. Lamb, "Developments in Crystal Filters for S S Superhets" *QST*, Nov 1933, pp 21-24.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

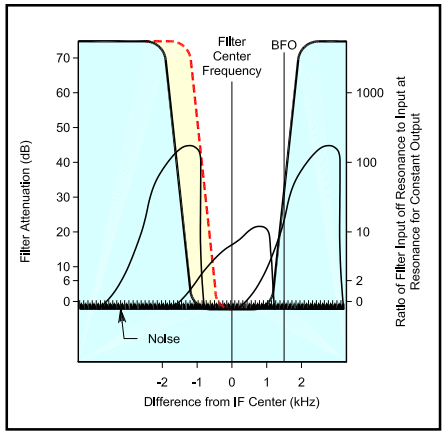


Figure 2—The filter 0-dB response trough aligned with the noise-level line (see K5LJM's comments).

The statement "Filters work best if the signals applied to them are weak." only applies to the operator who wishes to bury the signal in the noise. In practice, any signal level up to filter overloading is filtered the same. This can be easily demonstrated with signal generators and a spectrum analyzer. The results are shown in Figure 3 of this article. Decreasing RF gain by 40 dB reduces the filter output of all incoming signals and noise by 40 dB. The relative signal strengths are the same. With too much attenuation, the signals are buried in the receiver noise. It can be argued that burying static crashes in the receiver noise is desirable. This too is questionable. If the static is below the desired signals, some may prefer the receiver white noise. At these levels, static would probably not be bothersome anyway. If the static is equal to or greater than the wanted signal, masking the noise will also mask the desired signal.

Like many others, I began operating CW radios in the military, and techniques learned there carried over into my forty something years of Amateur Radio. During many hours on the air, I have developed some of the same practices as Larry. When interference starts to creep in, I first try adjusting the IF filter. If the interference sounds distorted, I push the attenuator button. If that helps but does not clear up the problem, I further reduce the gain with the AIP button to bypass the RF amplifier. If it is really overloading, I reduce the RF gain hoping that will help.

I want to thank Larry for writing these much needed articles on receiver operation. It challenged us to rethink our receiver operating practices and causes us to ask, "What are we doing and why are we doing it that way?" The interest and controversy over these writings led me to write Larry on two separate occasions and he was kind enough to provide detailed responses each time. Although he is a "turn off the AGC" man, I still value his comments and appreciate his interest in ham radio.

THEY'RE *NOT REALLY* BRICK-WALL FILTERS

By Tony Brock-Fisher, K1KP, 15 Webster St, Andover, MA 01810-1109; **k1kp@arrl.net**

◊ This letter is to comment on (W4QEJ) Larry Scheff's two-part article, "How to Maximize Your Receiver's Effective Selectivity." First, I'd like to commend Mr Scheff on his excellent diagrams and explanations which describe the operation of VBT and IF Shift.

However, there are several impressions created by terminology used in the article that I feel are misleading. Furthermore, the approach to receiver adjustment proposed is inappropriate under many operating conditions. I think the article gets into trouble early on, with the statement "Filters work best if the signals applied to them are weak." The article's message goes even further astray with the subsequent statement "Often you can use your receiver's attenuation and RF gain controls to reduce the noise level reaching the IF filters to a level so low that the noise will not pass through the filters at all…"

These statements create false impressions as to the manner in which filters work in high-selectivity receivers. First, the filters themselves, if implemented in the form of crystal or ceramic filters, are very linear. The basic definition of linearity is that the filter responds exactly that same way to large signals as it does to small signals. The major advances made in receiver designs over the last 30 years have been in getting the other circuit elements such as RF amplifiers and mixers to exhibit linear behavior for large and small signals. Any filter, whether implemented as a tuned circuit, crystal or ceramic filter, will behave in a very linear manner. This means that whether the signal applied to the filter is within the filter's passband or not, the amount of signal appearing at the output of the filter is a fractional portion of the input signal applied. There is no threshold effect, below which signals will not pass. One cannot think of an IF filter as a sieve which completely blocks stones larger than a certain size, or a brick wall which is capable of completely blocking a signal.

In the two part article, W4QEJ's main message seems to be that an operator should adjust the receiver's attenuation and RF Gain controls to significantly reduce the signal levels applied to the IF filtering. In fact, there are instances where this approach is correct, but only in certain circumstances, and not necessarily for reasons of IF filter effectiveness. To understand this, it is necessary to consider the receiver as a whole, more than merely examining the IF stages.

First, there is the consideration of what happens ahead of the IF stages, in the front-end amplifier and mixers. This portion of the receiver's circuitry is most affected by the attenuation and RF preamplifier settings. The two receivers used as examples in the article, the TS-940 and TS-440, have good-to-excellent strong-signal handling capability. Nevertheless with a band full of 30 dB over S9 (S9 = 50 µV) signals, they will both produce noticeable third-order intermodulation products in their front ends. These products will pass through the IF and appear in the output as chirps, bleeps or "crud." Under these conditions, appropriate reduction of signal levels by using the attenuation and RF Gain controls will reduce the generation of undesired products

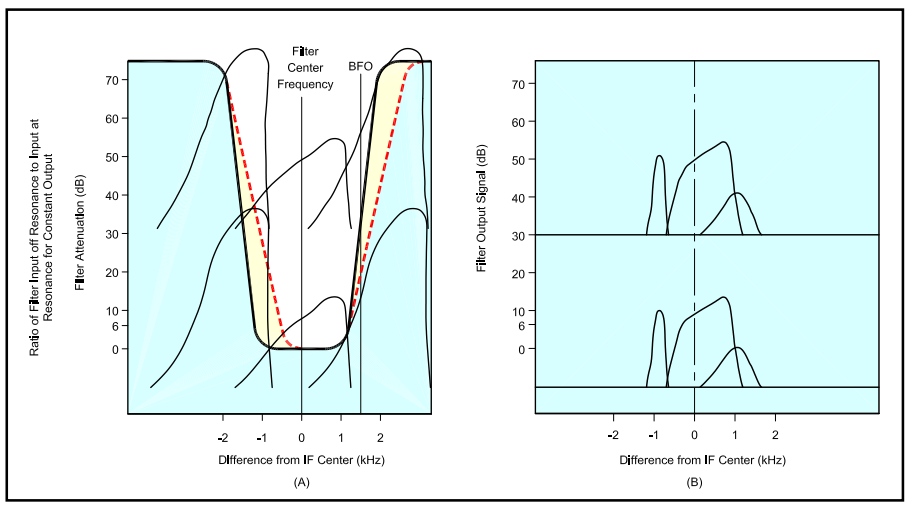


Figure 3—Decreasing RF gain by 40 dB reduces the filter output of all incoming signals and noise by 40 dB (see K5LJM's comments).

significantly—(three times as much as the desired signals levels are reduced, in fact).

It is equally important to consider the circuitry that follows the IF filter circuitry. Many receivers contemporary with those used as examples in the article have poor audio circuitry following the detector stage, which results in excessive noise (hiss) being added to the desired signals. This hiss has been mentioned many times as a cause of operator fatigue. If, as Mr Scheff suggests in Situation 1, the receiver attenuation and RF Gain are reduced by ~50 dB, this gain must be made up for elsewhere. If the signals are not already above the AGC attack threshold by 50 dB, a significant amount of *audio* gain must be applied to maintain the desired listening levels at the speaker or headphones. Applying this amount of audio gain will certainly increase the amount of hiss present in most receivers.

This brings up an important point that is overlooked by the article: adding large amounts of attenuation and making large reductions of RF Gain will render the AGC circuitry useless. This is alluded to in the second part of the article, where the author notes that the suggested technique renders the S-meter inactive. The S-meter in contemporary receivers simply indicates the AGC voltage. If the S-meter is not indicating the signal's strength, then the AGC is being defeated. This means that the operator must now provide manual gain control, at either the AF or RF stage, in order to maintain the desired signal levels under fading conditions. The operator can also be subjected to ear-blasting huge-amplitude audio when his next-door neighbor tunes up a kilohertz away. A major function of the AGC circuitry is to properly position the signals within the dynamic range of the IF and detector circuits. Modern AGC circuits do this very well, and the attack constants of most can be tailored for the particular operating mode.

What's most important when adjusting the VBT and IF Shift controls in a modern receiver is the attainment of a maximum possible signal-to-noise ratio. In this case, the term "noise" includes adjacent-signal interference as well as thermal receiver noise and atmospheric noise. If the IF filter is operating linearly as it was designed to do, reducing the input to the filter and increasing gain after the filter has negligible effect on the ability of the circuit to suppress interference while maintaining the desired signal level. The attenuation, RF Preamp and RF Gain controls should be adjusted to maintain linearity and overload performance of the receiver's front end over varying signal-input conditions.

THE PROOF OF THE PUDDING IS IN THE EATING!

By Larry Scheff, W4QEJ, 679 Creekview Dr, Lawrenceville, GA 30044-3770

◊ Judging by the correspondence and other comments I have received about my two-part article, "How to Improve Your Receiver's Effective Selectivity," many have read the article, correctly interpreted what it said and successfully applied the receiving techniques in the article. This has enabled them to improve their ability to hear what they want to hear in the presence of troublesome adjacent-frequency interference and high noise levels including annoying static crashes. These readers have tasted the pudding and they obviously like the taste.

K5LJM and K1KP have stepped forward to say the receiving techniques in the article won't work. Neither of these gentlemen has given any indication that he has actually tried the techniques in the article. Both quote their understanding of theory as "proof" that the receiving techniques in the article won't work, but theory alone never proved anything!

Facts give proof. Theory may give some understanding of what happens and may enable you to predict what might happen under certain circumstances. If the theory you're using contradicts hard cold facts, however, you're not applying the *correct* theory, you're not applying *all* the necessary theory or, in very, very rare occasions, commonly accepted theory may be *wrong*.

What are the facts here? Those who have actually applied these techniques have found that the techniques in my article work. I certainly can't claim these techniques as my own inventions. Many hams, military radio operators and others have been using these techniques successfully for many, many years. Unfortunately, some misconceptions have become widespread in recent years. The result is that far too few hams know how to get the best results from their receivers. That's why I wrote the article.

See Figures 5B, 6B, 7, 8D, 9B and 10 of my article. K1KP and K5LJM both claim that an attenuation curve has no "floor" and therefore you *can't* slide the atmospheric noise and/or any weak signals below that "floor." Those who use the techniques presented in my article have observed firsthand the phenomenon represented in those graphs, proving that you *can* often eliminate QRM and QRN by taking advantage of the "floor" of the receiver selectivity curve as shown in my graphs. Therefore, any theory quoted to "prove" that "floor" doesn't exist is very obviously inadequate and/or flawed.

K1KP and K5LJM also quote their understanding of filter theory in their claim that the presentation of VBT selectivity curves in my article that show the use of the High Cut and Low Cut controls can't be right. Keep in mind, however, that apparently neither of these gentlemen has actually experimented with the techniques presented in the article. Other readers consistently report that the graphs and text of my article are entirely consistent with what they actually observe when applying those techniques.

Apparently, neither K1KP nor K5LJM has considered what effect the amplifiers associated with these two *individual filters* operating at different IFs might have on the performance of the VBT filtering *system*. In the TS-940S, those filters are *not connected together* and are in fact *isolated from each other* by a mixer and an IF amplifier, both of which are *active* (not passive) devices that have *gain,* which might be "part of the equation."

Please keep in mind that here we're not really talking about just two filters. We're talking about an integrated IF filtering *system*. The manufacturer may consider details of exactly how that system really works as proprietary information that is not made available to anyone except design engineers inside his company. By the way, the graphs I used to explain how to use the VBT system in the TS-940S are entirely consistent with graphs used by Kenwood on page 21 of the TS-940S instruction manual (supplied with my transceiver) to explain their VBT filter system. *In fact, I patterned my graphs after those Kenwood graphs and added additional signals and noise.*

In any case, my article tells how you can often get better performance from receivers than you can get using the limited instructions in the manual. That's not just my opinion; it's what readers have reported to me.

In summary, observable facts give you proof. All too often, inadequate, incomplete, or incorrect theory is represented as proof of opinions or ideas that just don't hold water. I am confident that *QST* readers are smart enough to compare easily observable facts with quoted theory that is inconsistent with those facts. I have no doubt that those readers will successfully use the effective techniques presented in my article despite other people's claims that those techniques "theoretically cannot work." After all, the proof of the pudding is in the eating.

K5LJM responds: I would like to note that I have witnessed the reduction of interference by reducing RF gain. I have heard it on the air. I have measured it in the lab. W4QEJ and I agree that it works. The disagreement is on how it works. QST

HAPPENINGS

ARRL Asks FCC to Investigate Long-Range Cordless Telephone Sales

The ARRL has asked the FCC to investigate and "take appropriate action" against several companies it alleges have been marketing so-called "long-range cordless telephones" via the Internet. The ARRL took the action in the wake of an interference complaint and numerous reports from the amateur community about sales of the devices, some operating on amateur VHF and UHF frequencies.

ARRL General Counsel Chris Imlay, W3KD, said the League was seeking the FCC probe because the apparently uncertificated devices operate on amateur bands and are capable of interfering with amateur communication. He also noted that the devices are not likely to meet maximum permissible exposure levels for RF.

"ARRL has not been able to locate any FCC certification for these devices and, based on the advertised frequency bands and ranges, it is believed that none of these devices could be certificated, or legally marketed or sold, under FCC rules," Imlay wrote. The League said some of the companies may be selling similar wireless products that may operate on amateur or restricted bands.

The letter was addressed to FCC Enforcement Bureau Chief David Solomon as well as to Raymond LaForge of the FCC's Office of Engineering and Technology's Equipment Authorization Division and to FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth.

Imlay said the ARRL also is looking into the marketing of products such as 434-MHz video surveillance equipment and other "apparently non-certificated devices" that use amateur frequencies but are being marketed in the US to non-amateurs.

The ARRL was able to obtain one of the long-distance cordless telephones for testing. The device, made in China and bearing no FCC identification number or label, operates near 147 MHz with an output power greater than 3 W. Other such phones are advertised as having ranges of up to 100 km operating at power levels of up to 35 W on VHF and UHF.

ARRL Lab Supervisor Ed Hare, W1RFI, said he's received at least one report of actual harmful interference from a long-range cordless telephone to amateur communication. The amateur reporting it tracked the telephone to the home of a neighbor, who said he'd bought the device on eBay.

The Optima 8810, an apparently uncertificated telephone device being sold in the US, uses a 2-meter frequency.

Hare said some long-range devices are legally certificated to operate on the 900 MHz or 2450 MHz Part 15 bands. Hare invited reports of unlicensed devices causing actual harmful interference to Amateur Radio operation to **rfi@arrl.org**.

Ham Radio is Hot at "The Big Project" Pilot School

The Texas elementary school serving as a pilot school for the ARRL's "The Big Project" educational initiative already boasts more than a dozen new hams—including the teacher who's spearheading the program—and a lot of enthusiasm. Now, thanks to The Big Project, it's got some new ham gear as well.

The Everette Lee DeGolyer Elementary School in Dallas (**www.degolyer.com**) this spring received some $2600 worth of equipment paid for through the ARRL Education Project Fund to equip its ham radio club station, K5DES. Plans call for establishing similar programs at other schools across the US, as soon as The Big Project—formally The ARRL Amateur Radio Education Project—is fully in place and under way.

"Once we get a coordinator—an educational professional—at Headquarters, we'll begin to develop additional curriculum and coordinate with additional schools across the country," said ARRL President Jim Haynie, W5JBP. Haynie proposed The Big Project shortly after taking office last year. The ARRL Board has adopted it as a League program, but it's still under development.

The ARRL Education Project supplied a Yaesu FT-847 HF/VHF/UHF multimode transceiver plus Cushcraft HF, VHF and UHF antennas as well as other accessories for K5DES. As a bonus, the club station recently benefited from the generosity of Keith Pugh, W5IU, who donated an ICOM IC-706MkIIG that he'd won at Ham-Com in early June. Pugh is AMSAT-NA vice president for operations. Also at Ham-Com, the Lone Star DX Association and W2IHY Technologies donated an eight-band microphone equalizer and noise gate to the DeGolyer club.

DeGolyer teacher Sanlyn Kent, KD5LXO, says that, so far, 14 youngsters—ranging from 10 to 12 years old and in grades 4 through 6—have become licensed. Kent, an art teacher at the school, got her Technician ticket only last fall and says she's been learning along with the kids.

Kent said the school has been able to integrate ham radio into nearly all aspects of the DeGolyer curriculum, from geog-

Rick Lindquist, N1RL ♦ Senior News Editor

ARRL President Jim Haynie, W5JBP, and DeGolyer teacher Sanlyn Kent, KD5LXO (center), with several of the K5DES crew: Standing, Lyndsey, KD5LXP; Haynie; Mary; Jasmine, KD5OJI; Kent; Addy (facing right); Glendon, KD5OJH; Jay, KD5LXN; and Reba, KD5OJC. In front, Megan, KD5OJG, and Jaquoren, KD5OJJ.

raphy and social studies to science and math. In the art classroom, youngsters have been designing their own QSL cards.

While the program was initially intended to be aimed at middle school students, Kent says she believes it works better at the elementary level. She said older youngsters often find themselves involved in too many other activities by the time they reach middle school. "One of the greatest things is that ham radio gets kids used to talking to other people," she said. "We keep finding ways every day to make it fit in."

With a group of largely Technician class operators at this point, Kent said she and the other K5DES members are looking forward to upgrading, so they can chat more readily with stations in other countries and learn more about different cultures.

Under the guidance of ARRL Vice President Kay Craigie, WT3P, the ARRL Amateur Radio Education Project will work directly with teachers who use Amateur Radio as a teaching strategy in the classroom. "The goal is to improve the quality of education for kids by providing educationally valid techniques involving Amateur Radio for teaching all sorts of subjects—science, geography, languages, speech," Craigie said. "Kids get the hobby of a lifetime and preparation for good careers—that's the ultimate goal."

For information on donating to The ARRL Amateur Radio Education Project, contact ARRL Chief Financial Officer Barry Shelley, N1VXY, 225 Main St, Newington, CT 06111; **bshelley@arrl.org**; 860-594-0212, to discuss details. The ARRL is a 501(c)(3) organization, and donations are tax-deductible.

DeGolyer student and Amateur Radio club member Nick, KD5OJB, at the microphone of the newly equipped K5DES.

AMSAT PRESIDENT LAUDS AO-40, LOOKS TOWARD NEW PROJECT

With a modicum of success already assured for the troubled Phase 3D/AO-40 project, AMSAT-NA President Robin Haighton, VE3FRH, says his organization already is looking toward its next bird. Haighton said AMSAT's newest satellite project could be up and running within three years, possibly sooner.

In an interview with the ARRL, Haighton lauded the "fantastic reports" and "great worldwide coverage" of the AO-40 satellite. Earlier this year, AO-40 opened its transponders in an experimental mode with uplinks at 435 MHz and 1.2 GHz and a downlink and beacons in the 2.4 GHz band. As of press time, ground controllers had shut down the

satellite's transponders in preparation for raising AO-40's perigee by about 200 km. The RUDAK beacon and the 2.4 GHz middle beacon remained up, however.

Haighton said it was hoped that the slightly higher perigee would eliminate the effects of what he described as "a mysterious force" that alters the satellite's attitude when it comes through perigee.

While AMSAT continues dealing with AO-40, Haighton said it's also looking ahead to its next satellite, and design work is expected to get under way in earnest by this summer. "We would like people in apartments to have access to satellites with relatively compact equipment and not have to swing large antennas around," he said. "We're looking at our next satellite to provide that."

As conceived, the new satellite would—at least in a pinch—accommodate VHF users with omnidirectional antennas at perigee, plus users with good antennas at UHF as well as L band and S band. It also might employ digital modulation capabilities that, Haighton said, could make the new satellite "probably at least 10 dB better than anything we're currently using."

Like AO-40, the new satellite will not be a low-Earth-orbiting bird but have an elliptical orbit that Haighton said would be "very very similar to the current AO-40 orbit." The configuration would provide up to 17 hours or so of usage out of every 24.

"What we're actually looking at is a new class of satellite," Haighton explained. For the time being, the new satellite is going under the name "Project JJ" after the two people who came up with the idea—Lyle Johnson, KK7P, and Dick Jansson, WD4FAB.

Haighton said AMSAT-NA already has started contacting launch agencies, and "a major design weekend" was set for this summer. He expressed confidence that the new project could reach fruition "on the outside three years from now."

ARISS SCHOOL QSOs CONTINUE APACE; NEW CREW DUE

While he doesn't yet hold a ham ticket, astronaut Jim Voss has made a lot of friends on Earth via the Amateur Radio

on the International Space Station (ARISS) program. Voss and his Expedition 2 crewmate Susan Helms have shared duties in the space-to-school chats, which were taking place at a rate of around one per week this spring.

Voss told students at Parkway Central High School in Chesterfield, Missouri, on May 17 that he felt "lucky and blessed" to be aboard the ISS and that he enjoyed the inspiring view. "The earth is quite a gorgeous place, and we can't take pictures that are good enough to make it look as good as it really is."

On May 23 Voss completed an on-air conversation with youngsters at the Moran Prairie Elementary School in Spokane, Washington. "I think your brain does work a little bit differently up here," he said in response to one youngster's question. On the ISS, Voss said, "you're floating around, and your mind is having to do a lot of things that aren't natural to interpret the way you see things upside down." He said the crew members "have to be a little bit more careful up here."

Voss said, however, that he enjoys

FCC News

FCC PUTS PAPER ON PAR WITH E-FILING FOR VANITIES

The FCC has put paper vanity call sign applications on an equal footing with electronic filings in terms of processing priority. The change was instituted a few months ago, according to Bill Cross, W3TN, of the Wireless Telecommunications Bureau. Cross spoke May 20 at the Dayton Hamvention FCC forum.

"There is no preference anymore for electronically filed vanity applications," Cross said. "What they do now is key them in all together, and then the paper-filed applications have the same chance of being selected as the electronically filed ones."

Vanity applicants should be familiar with acceptable call sign formats before filing. Cross warned that applications seeking unavailable call sign formats would be dismissed.

Cross also reminded hams that license renewal and modification now is done via the Universal Licensing System—or ULS. The ULS is accessible via the FCC ULS Web site, **www.fcc.gov/wtb/uls**.

Cross noted that Amateur Radio licenses may not be renewed any sooner than 90 days prior to license expiration. When only changing an address, he said, licensees should choose the "Administrative Update" (AU) option. When renewing only, he said, choose "Renewal Only" (RO). To change an address while renewing your license within the 90-day window, select the "Renewal/Modification" option. An application requesting renewal that's outside the 90-day window will be dismissed, Cross said.

Modifications no longer automatically result in a new ten-year license term. Call sign changes are not made unless requested by the licensee.

Amateur applicants needing assistance should contact the ULS help desk, **ulshelp@fcc.gov**.

Amateur Radio Enforcement

♦ **FCC orders two amateurs off most repeaters:** FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth has notified two Technician licensees that they must stay off all repeaters on the 144, 222, or 440-MHz bands for the next three years.

Hollingsworth invoked §97.27 of the FCC's Amateur Service rules to modify the licenses of Ted R. Sorensen III, KC6PQW, of Agoura Hills, California, and Joseph Mattern, KG4NGG, of Orlando, Florida. Both licensees have been the subject of repeater-related enforcement inquiries.

Sorensen's restriction was among other FCC actions taken in conjunction with the Los Angeles-area W6NUT repeater. In February, the FCC asked Sorensen and Gregory S. Cook, ex-KC6USO, of Chico, California, to respond to allegations that they conspired in making late-night one-way transmissions on W6NUT that originated from Sorensen's station.

In March the FCC accepted Cook's voluntarily surrendered license. For his part, Sorensen, who did not dispute the allegations, wrote the FCC offering to accept a year's banishment from the W6NUT 147.435 repeater "as fair punishment."

Instead, the Commission imposed a ban on the use of all repeaters on the three most popular repeater bands for the next three years.

"Your radio operation on those dates was in serious contradiction to the basis and purpose of Amateur Radio as set forth in Section 97.1 of the Commission's rules," Hollingsworth wrote Sorensen on June 5. He said the operation also violated prohibitions against one-way transmissions, broadcasting and the transmission of music and failed to comply with station identification rules.

Hollingsworth reminded Sorensen that further violations of Amateur Radio rules could result in additional enforcement action, up to and including license revocation.

Mattern, who formerly held the vanity call sign WW4WJD as a Tech Plus, was called for retesting last September after the FCC received allegations that the licensee had been using amateur repeaters in his area to solicit traffic reports for his employer, a company that markets the reports. In a reply to the FCC, Mattern characterized his traffic-reporting activities as "a hobby" that earned him very little money. He also agreed to abide by the requests of repeater control operators who had asked him not to use their machines.

Mattern failed all elements of last year's retest, but he passed the Technician exam earlier this year, and was granted KG4NGG on May 3. Within two weeks, the Wireless Telecommunications Bureau—in reaction to numerous additional complaints from Central Florida amateurs—set aside the KG4NGG grant until the Enforcement Bureau could investigate. Mattern's application was granted on June 8 with the repeater restriction imposed.

The restrictions on Sorenson's and Mattern's licenses are set to expire on June 10, 2004.

The Enforcement Bureau continues to evaluate the response of W6NUT repeater trustee Kathryn Tucker, AA6TK, to Hollingsworth's February inquiry into the repeater's operation.

♦ **FCC issues short-term renewal:** The FCC issued a short-term license grant to General licensee Reyes Lugo, KB9YDM, of Chicago. Lugo—who once held an Extra class ticket, NP3N—has a track record with the FCC's Enforcement Bureau. Last summer, he was requested to retake the Extra exam but passed only the Morse code element and his license was canceled. Lugo subsequently retested and was granted KB9YDM. The FCC set aside the grant while it investigated complaints it had received about Lugo's radio operations. The Commission said those allegations had "raised questions" about Lugo's qualifications to hold an amateur license.

Hollingsworth informed Lugo on May 10 that the FCC was granting his General application for one year. Lugo would be allowed to renew, provided there were no violations of any sort on any frequency.

NASA

Enjoying a "civilized" meal aboard the ISS: **(L-R) US astronaut Susan Helms, KC7NHZ, Russian crew commander Yuri Usachev, RW3FU, and US astronaut Jim Voss. They are scheduled to return to Earth this month.**

microgravity. "Sometimes I do things with the zero gravity, floating around and doing flips and somersaults—it's like playing in space."

Helms took the microphone of NA1SS May 31 to respond to questions from students at Daviess County High School in Owensboro, Kentucky. The audience of students and guests included ARRL President Emeritus George S. Wilson III, W4OYI, who lives in Owensboro.

Helms told the high schoolers that if the station's communication systems were to fail, "we always have our ham radio." She told another questioner that she had been getting on the air from the ISS "on and off" depending on the crew's work schedule. "I try to come to the ham radio and talk to people as much as I can," she said.

Helms said the international nature of the ISS program has involved having to deal with different languages and cultures. "My crewmates—Yuri and Jim—and I have worked very hard to become bilingual," she said, referring to cosmonaut Yuri Usachev, RW3FU, and astronaut Jim Voss.

Helms also revealed that NASA already was making plans to travel to Mars, "probably with international help." She called The Red Planet the most feasible target for an interplanetary space mission carrying human passengers.

On June 12, Helms chatted it up with youngsters at Henley Middle School in Klamath Falls, Oregon. She said the Expedition Two crew has been conducting an "unofficial experiment" growing onion plants that had arrived aboard a Russian supply ship. The crew wrapped the vegetables in wet washcloths and attached them to the wall of the space station where they're now sprouting, she said.

She also addressed a question about the possibility that the ISS might encounter another object in space. She said that most of the space debris was in a higher or lower orbit than the ISS, and it has not yet presented a problem.

Helms also said that ISS crew members no longer had to suck their meals through tubes. "We actually have fairly civilized food," she said, "like you could get at the grocery store."

The Expedition 2 crew was scheduled to return to Earth this month. Heading up the ISS Expedition 3 crew will be Frank Culbertson, KD5OPQ. He'll be joined by Russian cosmonauts Mikhail Turin and Vladimir Dezhurov. It's hoped that both Russians will have Amateur Radio licenses prior to launch.

NASA

Expedition 3 crew commander Frank Culbertson, KD5OPQ.

KACHINA EXITS AMATEUR RADIO, HF MARKETS

Kachina—which made a big splash at the 1997 Dayton Hamvention when it introduced its then-revolutionary 505DSP PC-controlled Amateur Radio transceiver—has quit the ham radio market. The Arizona manufacturer discontinued production and marketing of the 505DSP, its only ham product, and of all other HF radio products and accessories, effective May 24.

Kachina Vice President Cameron Earnshaw blamed "the slowdown in Amateur Radio in general, and HF radio in particular" for the company's decision to exit the HF market. "Any radio selling for over $1000 is a pretty hard sell these days," he said. The Kachina 505DSP, the first amateur transceiver designed solely for control via a personal computer, had retailed in the vicinity of $2000.

"Unfortunately, the 505DSP was too expensive to produce," he told ARRL. "For that we have only ourselves to blame. Performance costs money, but you really limit your sales when you cross that $1000-$1200 mark."

Earnshaw said Kachina will continue to provide service and spare parts for all Kachina HF radio products for the foreseeable future and will honor all factory warranties through their duration. Kachina was discounting its remaining inventory of Amateur Radio products through its Web site, **kachina-az.com**.

Doug Smith, KF6DX, who had served as Kachina's chief engineer and was lead designer for the 505DSP, said he's sad to see the product line come to an end. "Some might say that this is another blow to Amateur Radio, but I would say it is just an indicator of the need to adapt to changing conditions," he said. "The Amateur Radio Service should see several exciting developments in the coming years, including digital voice, high-speed digital modes, remote control and further improvements in so-called software-defined radios, to name a few."

This spring, Smith accepted an engineering position with Ten-Tec of Sevierville, Tennessee. He plans to continue to edit *QEX/Communications Quarterly* for the ARRL. He is also chairman of the ARRL Digital Voice Committee.

WRTC 2002 TO BE HELD IN FINLAND

The next World Radiosport Team Championship—sometimes characterized as the "Olympics of Amateur Radio"—will be held this coming summer in Finland. Jointly organized by Contest Club Finland and the Finnish Amateur Radio League (SRAL), WRTC 2002 will run from July 9 through July 16, 2002. The on-the-air portion of the event will be July 13 and 14 in conjunction with the 2002 IARU HF World Championship. Heading up the organizing committee is Jouko Häyrynen, OH1RX.

Last held in Slovenia in July 2000, the WRTC involves on-air contest-style competition among two-person teams operating from the same geographical vicinity at stations having equivalent

capabilities. All operation is done at 100 W with modest antennas.

WRTC-2002 has begun seeking donations. The Northern California DX Foundation has agreed to assist in processing US donations. Contributions by credit card or by check (made out to "NCDXF [for WRTC Project]") are tax-deductible to the extent permitted by law for US taxpayers. Send cash, check or credit card donations from the US to NCDXF, c/o Rusty Epps, W6OAT, 651 Handley Tr, Redwood City, CA 94062 (**w6oat@compuserve.com**).

Donations from outside the US may be sent directly to a WRTC 2002 bank account. See the WRTC 2002 Web site, **www.wrtc2002.org/support.htm** for specific information.

In Brief

• **West Texas gets new Section Manager:** Lee Kitchens, N5YBW, of Ransom Canyon, Texas, has been appointed West Texas Section Manager, effective July 1. He succeeds Clay Emert, K5TRW, who stepped down for health reasons. Emert had been appointed SM last January and was recently elected to a two-year term. He also has served as an assistant section manager and assistant director. Kitchens is a retired electrical engineer. An ARRL member even before he got his license, he's been a ham for 10 years and holds a Tech Plus ticket.

• **Vote on *QST* Cover Plaque Award:** The winner of the *QST* Cover Plaque Award for May was Bob Lewis, AA4PB, for his article "An Automatic Sealed-Lead-Acid Battery Charger." The winners of the *QST* Cover Plaque Award for June were Wes Hayward, W7ZOI and Bob Larkin, W7PUA for their article "Simple RF-Power Measurement." Congratulations! The winner of the *QST* Cover Plaque award—given to the author of the best article in each issue—is determined by a vote of ARRL members. Voting takes place each month at **www.arrl.org/members-only/qstvote.html**. As soon as your copy arrives, cast a ballot for your favorite article.

• **Alinco outsources North American distribution, service:** Amateur Radio manufacturer Alinco has closed its US branch in Torrance, California, and shifted its North American distribution to an Ohio firm. Alinco product distribution and customer service now are being handled by Atoc Amateur Distributing LLC in Covington, Ohio. The change was effective May 1. In a news release, Alinco said it will continue to be "a very committed, viable player in the Amateur Radio marketplace" and that all Alinco warranties "will remain in force and continue to be honored through their term." The Atoc facility also is assuming customer support, out-of-warranty service of Alinco products and parts sales. Alinco said it will concentrate on designing and manufacturing products from its Japan headquarters and factory. For more information, visit the Alinco Web site, **www.alinco.com**, or contact Atoc Distributing LLC, 23 S High St, Covington, OH 45318; 937-473-2840.

• **EIMAC co-founder Jack A. McCullough, ex-W6CHE, SK:** The co-founder of tube manufacturer EIMAC, Jack A. McCullough, ex-W6CHE, of Cupertino, California, died April 28. He was 93. An ARRL Life Member, McCullough and Bill Eitel, W6UF (SK), paired up to start Eitel-McCullough—EIMAC—in the 1930s after building a tube for use as a grounded-grid amplifier. A DXer and contester in his younger years, McCullough also was a *QST* author in the 1930s and 1940s, writing mostly about what he knew best—high-power amplifier tubes.—*thanks to Richard Tryce, W6WVP*

• **Kentucky amateur dies installing antenna:** A Kentucky Amateur Radio Emergency Service member died May 20 while installing a 2-meter antenna he'd just bought at the Dayton Hamvention. Ronald L. Oller, KG4JVT, of Irvington, died when the groundplane antenna he was installing fell onto the overhead electrical service line to his house. He had been a ham for about eight months. ARRL Kentucky Section Emergency Coordinator Ron Dodson, KA4MAP, said Oller and a teenaged friend, John Betner, KG4LHQ, had purchased new 2-meter groundplanes at the Hamvention. The pair already had installed one of the units at Betner's home and were in the process of raising Oller's antenna when the incident occurred. Betner was not injured and summoned help for his friend. Dodson said Oller had a history of heart trouble but said he did not know if that was a factor in his death. Dodson described Oller as "one of the most enthusiastic hams I have ever met." Oller was licensed last October and became involved in public service and, as AAT4YQ/T, in the Military Affiliate Radio System. He also had "elmered" the 16-year-old Betner when he studied for his license.

SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Alabama, Alaska, Delaware, East Bay, Kansas, Michigan, New Mexico, Santa Barbara, Tennessee and Western Massachusetts. You are hereby solicited for nominating petitions pursuant to an election for Section Manager (SM). Incumbents are listed on page 12 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. Petition forms (FSD-129) are available on request from ARRL Headquarters but are not required. We suggest the following format:

(Place and Date)

Field & Educational Services Manager,
ARRL
225 Main St
Newington, CT 06111

We, the undersigned full members of the _____ARRL section of the _____ division, hereby nominate _____ as candidate for Section Manager for this section for the next two-year term of office.

(Signature ___Call Sign __City __ ZIP __)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on September 7, 2001. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before October 1, 2001, to full members of record as of September 7, 2001, which is the closing date for nominations. Returns will be counted November 20, 2001. Section Managers elected as a result of the above procedure will take office January 1, 2002.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning January 1, 2002. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the January 2002 *QST*. A Section Manager elected through the resolicitation will serve a term of 18 months. Vacancies in any Section Manager's office between elections are filled by the Field & Educational Services Manager. You are urged to take the initiative and file a nomination petition immediately. —*Rosalie White, K1STO, Field & Educational Services Manager*

Nominees Sought for ARRL Board of Directors

If you're a full ARRL member in one of the following five divisions and are interested in playing a part in the League's democratic organization, here's the opportunity. Nominations are open for the offices of director and vice director for the 2002-2004 term in the Pacific, Rocky Mountain, Southeastern, Southwestern and West Gulf divisions.

ARRL Divisions

The policies of the League are established by 15 directors who are elected to the Board on a geographical basis to represent their divisions and constituents (see page 10 of any recent *QST* for a list of the divisions, directors and vice directors). These 15 directors serve for three-year terms, with five standing for election in each.

Just as in national or state politics, ARRL voters/members have the privilege and responsibility to decide that they like the actions of their incumbent representatives and support them actively for reelection or to decide that other representatives could do a better job, and to work for the election of those persons. Vice directors, who succeed to director in the event of a midterm vacancy and serve as director at any Board meeting the director is unable to attend, are elected at the same time.

Call for Nominations

Nominations are open for director and vice director in the five divisions mentioned above for the three-year term beginning January 1, 2002.

How to Nominate

1. *Obtain official nominating petition forms.* This package consists of a cover letter; a reprint of this election announcement; blank Official Nominating Petition forms and Candidate's Questionnaires for the offices of director and vice director; a copy of the ARRL Articles of Association and Bylaws; and an informational pamphlet for candidates.

Any full member residing in a division where there is an election may request an official nominating petition package. You don't need to be a candidate to request the forms. Your request for forms must be received by the Secretary *no later than noon Eastern Time on Friday, August 10, 2001.* There are separate forms for director and vice director nominations.

2. *Submit petition with statement of eligibility and willingness to serve.* Official forms bearing the *signatures of 10 full members of the division* and naming a full member of the division as a candidate for director or vice director, must be submitted, with a statement *signed by the candidate* attesting to his or her eligibility, willingness to run and willingness to assume the office if elected. These documents must be filed with the secretary *no later than noon Eastern Time on Friday, August 17, 2001.* Only original documents can be accepted; *no facsimiles of any kind are acceptable.* On Monday, August 20, 2001, the secretary will notify each candidate of the names and call signs of each other candidate for the same office. Candidates will then have until Friday, August 31, 2001, to submit 300-word statements and photographs, if they desire these to accompany the ballot, in accordance with instructions that will be supplied.

3. *Election Committee to certify eligibility.* In accordance with the Bylaws, an Election Committee, composed of three directors not subject to election this year, is responsible for the conduct of the election. This year, the Election Committee consists of Jay Bellows, KØQB, (chair), Tom Frenaye, K1KI, and Frank Fallon, N2FF.

The nominee must hold at least a Technician amateur license, be at least 21 years of age and have been licensed and a full member of the League for a continuous term of at least four years immediately preceding nomination. No person is eligible whose business connections are of such nature that he or she could gain financially through the shaping of the affairs of the League by the Board, or by the improper exploitation of his or her office for the furtherance of his or her own aims or those of his or her employer. The primary test of eligibility is the candidate's freedom from commercial or governmental connections of such nature that his or her influence in the affairs of the League could be used for his or her private benefit. The idea behind these rules is to ensure that candidates: (1) possess a lasting interest in Amateur Radio and the League, (2) have the legal capacity to make decisions for the ARRL and (3) are free from conflicts of interest.

Balloting Will Follow

If there is only one eligible candidate for an office, he or she will be declared elected by the Election Committee. Otherwise, ballots will be sent to all full members of the League in that division who are in good standing as of September 10, 2001. (You must be a licensed radio amateur to be a full member.) The ballots will be mailed not later than October 1, 2001 and, to be valid, must be received at HQ by noon Eastern Time on Friday, November 16, 2001. A group of nominators can name a candidate for director or vice director, or both, but there are no "slates," as such. Each candidate appears on the ballot in alphabetical order. If a person is nominated for both director and vice director, the nomination for director will stand and that for vice director will be void. A person nominated for both offices does have the option, however, of declining the higher nomination and running for vice director if he or she wishes. Because all the powers of the director are transferred to the vice director in the event of the director's death, resignation, recall, removal outside the division or inability to serve, careful selection of candidates for vice director is just as important as for director.

Absentee Ballots

All ARRL members licensed by the FCC, but temporarily residing outside the US, are eligible for full membership. Members overseas who arrange to be listed as full members in an appropriate division prior to September 10, 2001, will be able to vote this year where elections are being held. Members with overseas military addresses should take special note of this provision; in the absence of information received to the contrary, ballots will be sent to them based on their postal addresses. Even within the US, full members temporarily living outside the ARRL division they consider home may have voting privileges by notifying the Secretary prior to September 10, 2001, giving their current *QST* address and the reason that another division is considered home. If your home is in the Pacific, Rocky Mountain, Southeastern, Southwestern or West Gulf divisions division but your *QST* goes elsewhere, let the ARRL Secretary know as soon as possible, but no later than September 10, 2001, so you can receive a ballot from your home division.

The Incumbents

These people presently hold the offices of director and vice director, respectively, in the divisions conducting elections this year:

Pacific—Jim Maxwell, W6CF and Bob Vallio, W6RGG

Rocky Mountain—Walt Stinson, WØCP and Warren G. "Rev" Morton, WS7W

Southeastern—Frank Butler Jr, W4RH and Evelyn Gauzens, W4WYR

Southwestern—Fried Heyn, WA6WZO and Art Goddard, W6XD

West Gulf—Coy C. Day, N5OK and David Woolweaver, K5RAV

For the Board of Directors:

May 24, 2001

David Sumner, K1ZZ
Secretary

Yukon Quest International Sled Dog Race

By Linda Mullen, AD4BL

The Yukon Quest International Sled Dog Race started on February 11, 2001, in Whitehorse, Yukon. There were 30 teams at the start line with 419 dogs straining to get on the trail. The trail stretches from Whitehorse through Yukon Territory to Fairbanks, Alaska. That's 1023 miles over wilderness, rivers, and peaks rising to 3650 feet.

The logistics of one of these events is staggering. There are race marshals, veterinarians, checkers, checkpoint managers, air support, pickups for dropped dogs, trailbreakers on snow machines, dog handlers, communications and a multitude of volunteers.

Mushers have to arrange for their supplies to be shipped to the checkpoints. Straw bales are shipped to checkpoints for the dogs to bed in, and food is also sent for the influx of mushers, race officials, vets, family members, team handlers and media. This is an international event, and that adds additional logistical considerations.

This year the trail was the worst that they had seen in the history of the Yukon Quest, but we had really good weather compared to what we have seen in past years. We didn't have severe cold and only one snowstorm. There was wind on top of Eagle Summit, but that is to be expected.

The Yukon Quest is more like old-time mushing. There are fewer checkpoints, and longer distances between them. Participants have to finish with the sled they started with, and it is a test of endurance and the relationship between man and dog. It is more in the spirit of the North and the way folks traveled 100 years ago. Just to finish the Quest is quite an achievement.

Frank Turner's team of dogs wait at the finish line while race officials check the sled equipment.

Net control operators (left to right): Bill Mullen, KE4ITP, Greg Eshright, KL0QS, Billy Connor, AL7FQ, Jim Movius, KL7JM and Alaska SM Kent Petty, KL5T.

Amateur Radio Involvement

The Arctic Amateur Radio Club (AARC) in Fairbanks had the primary communications responsibility. Weeks before the race was to begin, preparations were being made for equipment and operators. "Benny" Benevento, NL7XH, set up the equipment and managed the operation. The heart of the communications was a full Amateur Radio station set up in the Fairbanks Visitor and Convention Center (a log cabin that sits on the banks of the Chena River in downtown Fairbanks). The Quest's finish line this year was on the Chena River in front of the cabin. The folks at the visitor's center gave us full access to the center 24 hours a day for two to three weeks.

This year, we set up a packet link on VHF that used five digipeaters and zigzagged from high point to high point between Fairbanks and Dawson City, Yukon, which is a distance of 500 miles. Benny also set up an HF to VHF voice link. The HF was at his home, and the VHF was carried via 220 to the dual band VHF in the log cabin. We also used HF between some of the checkpoints near the Canadian border and we used two repeaters on VHF. Since one of the repeaters is the main repeater for Fairbanks, normal use by local amateurs was somewhat curtailed.

We received reports from the Canadian checkpoints via fax and phone. Once the teams reached Dawson City, we were able to use Amateur Radio to receive all the reports. There were six checkpoints in Canada and seven in Alaska.

A Set of Three Races

The Yukon Quest was part of a set of three races. The Junior Yukon Quest started the day before the Quest began. It is a race for 14 to 18-year-old mushers. We had 10 teams. That race ran out of Fairbanks 60 miles and back. We had full coverage on that race with 15 amateurs stationed at checkpoints and the control center. We used two repeaters on VHF to log all the check-in times and track the mushers. We also had amateurs on snowmobiles on the trail for both days. Our primary concern was safety for the youngsters because of open water and wildlife concerns. A 14-year-old won the race.

After the main Yukon Quest was un-

derway, they started the Yukon Quest 250 out of Whitehorse. It is a qualifying race to participate in the Yukon Quest and the Iditarod. Our duties on this one were to log all the reports and send them along as needed.

Communications Center Duty

The Yukon Quest Communications Center was manned from the beginning of the Junior Quest on February 10 to the end of the Quest on February 26—24 hours a day. The operators were responsible for packet, HF, two VHF radios, the UHF simplex link to the river, fax, two phone lines, and the Web site. We always had two operators on site, but when things got busy it was hard to manage all the duties.

One of the tasks we had in the Communication Center was to answer the Message Phone. We received calls from folks all over. The fun calls were from the school children. They had classroom projects on the Quest and the children were assigned a musher to follow. They would call the Center to ask about "their" mushers' locations and how they were doing. We have become an instant society used to quick media coverage. What they didn't realize was that the teams were out in the wilderness and there was no way we could know exactly where they were. As the race went on, we received anxious calls from families trying to get information about their family members on the trail.

Checkpoint Communications

The AARC maintained eight checkpoint locations. Seven of them required the team to be on duty for a week. Some of the operators stayed in the checkpoint facilities, and that usually meant a sleeping bag on the floor. Two of the checkpoints had mobile homes that were towed to the location. The checkpoint operators suffered from the cold and lack of sleep, and had their own adventures getting to and from the sites. We had a total of 35 amateurs working the Yukon Quest this year including Doug Burke, WA4LKX, who comes from Richmond, Virginia, every year to help.

One night toward the end of the race, there was a call from the checkpoint at mile 101. A tour bus, a truck and an 18-wheeler were stuck on top of Eagle Summit (3650 feet above sea level), and the winds there had created whiteout blizzard conditions. Some of the passengers in the bus were brought down from the summit to the checkpoint by another truck. Our communications team was able to arrange assistance through the Department of Transportation and the Alaska State Troopers for the remaining folks who were stranded. In the midst of all this, we were also concerned about an Amateur Radio team coming in over Eagle Summit from a closed checkpoint. Fortunately, they made it safely by watching for concrete posts along the edge of the road.

Test of Endurance

The race wasn't without mishaps. One musher came into a checkpoint and reached for what he thought was water and swallowed methyl alcohol. (It is used as a fuel to fire the stove that cooks the dog food.) The musher had to be airlifted to Whitehorse and then Fairbanks. He eventually made a full recovery. Another musher came down with pneumonia and had to withdraw from the race. Yet another musher suffered a severe eye infection and Quest officials brought medicine to the checkpoint for him.

One musher had a dog that was riding in the sled basket. When he stopped to do something with the team, the dog jumped out and took off. The musher had to retrieve the animal before he could go on the next checkpoint. Eventually, 11 teams scratched and one team was disqualified. Nineteen teams crossed the finish line. The last team to finish had some problems. He endured –40° F temperatures that froze his feet and hands, and had problems with his sled runners. This musher received the traditional Red Lantern award for the last team to complete the Quest.

EMCOMM 2001

By Donna Ferguson, N6SVV

The second annual emergency communications seminar held on March 31 near Redding, California, was attended by public agency officials and over 100 Amateur Radio operators from four western states. That more than doubled the previous year's attendance. The one-day training conference, sponsored by ARRL and California Office of Emergency Services, attracted participants who came all the way from Seattle, San Diego and Reno, Nevada, for a full day of presentations and workshops.

For those willing to get up early, Volunteer Examiner testing was offered before the event started, and then the day's program kicked off at 9 AM with comments from Sacramento Valley Section Manager Jerry Boyd, K6BZ. Section Emergency Coordinators Dave Thorne, K6SOJ, and Bill Pennington, WA6SLA, who are also with the California OES/ACS Program, provided a quick update on ARES, RACES and ACS. This was followed by a review of the Incident Command System and SEMS by Jerry Boyd. Setting the tone for the day, humorous comments from the leadership livened up what could have been rather dry topics.

On a more serious note, Dr Wayne Light, K7NCE, and Dr Jay Boyd, K6BZJ, spoke about working with disaster victims and told how to recognize symptoms of stress and trauma, not only among the people we are called out to help, but among disaster service workers themselves. They gave valuable tips on mentally preparing oneself for traumatic situations and ways to deal with disaster victims, such as giving the victim a simple task to do which aids someone else.

An impressive array of technology was on display in the parking lot with mobile communication vans from the California Department of Forestry and Office of Emergency Services.

Here's a look inside the California OES van.

After a short break, Sgt Dave Nicholson, KB6PNT, of the Siskiyou County Sheriff's Department talked about the use of volunteers for Search and Rescue missions. Led by Dave and one other officer, the rescue teams are entirely made up of volunteers, and he stressed that trained radio operators are extremely valuable to his program.

Next was a presentation on "Working with the Media" by Bill Leiken, KC7IXX, and Donna Ferguson, N6SVV, Public Information Officers for Amateur Radio Emergency Service. "Media coverage is important because it helps hams learn from each other and exposes more Amateur Radio operators to the idea of public service work," Donna explained. Bill followed up with the basics of writing a good article and increasing your odds of getting it published.

Representing the American Red Cross, Robert Cross, K6EPH, Disaster Chairman, Three Rivers Chapter, and Vance Montgomery, Emergency Services Director, Shasta-Trinity Chapter, emphasized the ongoing need for communications assistance and the importance of training volunteers.

Wrapping up a busy morning, the break for lunch was ushered in by the loud whopping of a California Highway Patrol Search and Rescue helicopter landing on the field outside, and a TV crew from Redding was there to cover the event. An impressive array of technology was on display in the parking lot with mobile communication vans from the California Department of Forestry and Office of Emergency Services, including a trailer-mounted satellite station. The OES one-ton communications van,

equipped with 16 different radios, 2 cellular phones and 30-foot pneumatic antenna mast, is designed to support a two-position dispatch operation using a pair of 12-channel Motorola "Command Plus" consoles connected to the van by 300 feet of 25-pair telephone cable.

The parking lot display was so impressive that some people missed lunch altogether. The afternoon resumed with two simultaneous presentations: a SKYWARN weather spotter class by Jim Reynolds, KD7MLO, of the National Weather Service and a formal traffic handling class by Bill Leiken, Assistant Emergency Coordinator of Josephine County.

This was followed by a three-part discussion on emergency power sources with Elizabeth Simon, KK7VO, who talked about the pros and cons of various battery options, and Al Pion, KK7XO, who gave tips on shopping for generators. Alternative power sources were covered by George Dibelka, AB6UE, whose home is totally off the power grid—a definite plus during the current energy crisis.

And power shortages are not the only problems that confront West Coast residents. The steep Siskiyou Mountains present a different kind of challenge to local radio communications, but Robert Buckley, W6HOR, offered some good advice on antennas that use the surrounding terrain to one's advantage.

The last session of the day was an open forum panel represented by Jerry Boyd, Bill Pennington, Dave Thorne and Ben Green, WD8CZP, Assistant Chief for ACS/EAS Telecommunications Programs, California Office of Emergency Services, as well as visiting ARRL Pacific Division Director Jim Maxwell, W6CF. Participants had a chance to ask questions and offer comments on various topics. It proved to be a great exchange of information. Wrapping up an exciting day, door prizes were given away to some lucky winners.

The only criticism regarding EMCOMM was that one day wasn't enough time, and there is already talk about extending next year's event to one and a half days to allow for more presenters and an evening to socialize. EMCOMM 2002 promises to be even bigger and better. For more information, check **www.qsl.net/k6soj**.

WEATHER CAN BE A TWO-WAY STREET

By Joe Schmidt, W4NKJ

If you have a weather station and access to the Internet, the National Oceanic and Atmospheric Administration (NOAA) needs your observations.

Your "real-time" data will be used in NOAA weather prediction models. You will be able to see your observations on their new Web page: **www-frd.fsl.noaa.gov/mesonet/**.

To obtain your personal Citizen Weather (CW) number and to download free Internet communication software, visit the Web site of volunteers at the National Hurricane Center: **www.fiu.edu/orgs/w4ehw**.

The easy-to-use software will allow you to send data to NOAA, provide a weather display and synchronize your computer's clock with time from the Naval Observatory. Radio amateurs with an active APRS weather station do not need to obtain Citizen Weather numbers. Complete information on participating in the program will be found on the W4EHW Web site.

Approximately two weeks after completing registration, your data will be processed by the findu.com server and appear on the NOAA surface observation map. If you have questions please e-mail **w4ehw@fiu.edu**.

The Citizen Weather Observer Program is a joint effort of radio amateur volunteers at the National Hurricane Center and NOAA. Joe Schmidt is the Internet Coordinator for W4EHW.

Field Organization Reports

Public Service Honor Roll
May 2001

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers).

Please note the maximum points for each category:

1) Checking into a public service net, using any mode, 1 point each; maximum 60.

2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24.

3) Performing assigned liaison between public service nets, 3 points each; maximum 24.

4) Delivering a formal message to a third party, 1 point each; no limit.

5) Originating a formal message from a third party, 1 point each; no limit.

6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30.

7) Participating in a communications network for a public service event, 10 points each event; no limit.

8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points.

Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ on written notification of qualifying months to the Public Service Branch at HQ.

943 NM1K
450 W9RCW
434 K9JPS
406 KV4AP
378 N9VE
370 WA4GSQ
310 K4FQU
297 WD8V
271 N8IO
283 W7TVA
247 WA4QXT
246 KA2ZNZ
244 W7BO
241 KK3F
238 KK5GY

232 WA5OUV
212 KB1AJ
205 WB5ZED WA9VND
203 KB2RTZ
202 AD4GL
200 K8PJ N2LTC
198 KJ4N N5IKN
192 W4ZJY
190 K2UL
189 W6DOB
188 K9FHI KB2VRO
186 W7GB
182 W5ZX

179 W6IVV
178 KC5OZT
177 N8OD
176 KA4FZI
173 NN7H
172 WB2UVB
171 N5NAV
170 WB4GM
169 W4EAT
168 KA2GIV K6YR
167 WN0Y
166 K0IBS
165 N9KNJ
164 N2OPJ
163 W4CAC

WA2MWT
162 W6QZ
160 WB4BHH W8YS
159 K5NHJ
157 N5OUJ
156 K0PY KC5QZZ
155 N2CCN KC8CON
154 KW1U
153 N1LKJ
152 W0OYH
151 N3ZKP N7YSS W7ZIW N2GJ
150 W3YVQ N2RPI
149 K4YVX

W2MTA
148 W3HK
147 N2JBA WA5I KC4ZHF NR2F
145 WA4DOX KF6OIF
144 AF4NS K9LGU
143 WA1FNM N8BV K4IWW N0SU W0LAW K2CSS KC2DAA WA2YBM
142 WB2ZCM KC2EOT
141 KG4FXG N3YSI K4DMH
140 W2EAG W5GKH

KB5W
139 W0WWR N2KPR N9BDL
138 K3JL W3BBQ NYJZ KB2KLH W7GB KT6A
137 WB5NKC
136 AA3SB
135 W2AKT W9YCV K2BCL
134 KE4JHJ K5DPG W2GUT W9CBE WB5NKD KA1GWE
133 WD9FLJ KD4GR
132 W4NTI
131 KJ9J
130 W3IPX N3EFW
129 AD4XV WD4JJ NN2H WB2GTG K5VV KA4UIV
128 K5IQZ N3WK WA0TFC KB2ETO WD8DHC KB5TCH AF4QZ KE4JFS
127 W1ALE K7GXZ

126 KB0RRU KG2D KK1A W7GHT WD4GDB
125 KI4YV WI2G
124 N7AIK KC4ML AA3GV KA4HHE W5MEN
123 W3CB N2AKZ KG4FQG WX4H
122 W1QU W1PEX KC6NBI N9TVT
121 W1GMF W5CDX AA4AT AA2SV
120 NZ1D N7CEU W4WXA
119 K0PIZ W2JHO WB2QIX K9GBR W7QM
118 W4CKS K4MTX KA2DBD K1FP KA8WNO W3OKN N7DRP W7LG K7MQF
117 KD1LE
116 K4WKT WD9HII W3UAQ
115 WD0GUF

KB0DTI KC7SRL KE4UOF N9MN
114 W1JX K4BEH N3WAV
113 K2PB
112 AC4CS W2FR AG9G
111 N8DD
110 W4DGH KB5WY N3WKE KB2KOJ KB2WII WA1JVV KA4LRM
109 AB4E K2DN N3RB
108 KG4KCC KV4AN WA2YOW AC5Z KO4OL KJ7SI
107 KC8HTP W5AYX W6JPH
106 KM5YL WA2CUW KF4WIJ
105 WA8SSI WA1QAA WA2GUP WA4EIC WB7VYH
104 W2LC
103 W4XI WD4MIS
102 KC4VNO

AA4YW
108 W2RJL
101 K1JPG
99 KC8KYP AF2K
98 KA0DBK WB4ZNB AF2K KA2IWK W3NNL
97 K5MC WB2IIV WW8D
96 K1STV W7VSE AA4BN KE4EZQ
95 W1JTH KC6SKK
94 NG1A KE4GYR WB2IJH KA2CQX WB4PAM
93 W0FCL
92 KC7SGM
91 K3CSX W5XX KA1VED
90 KA2ZKM W4CC AB2IZ K4BG KM4WC
88 KC2ANN
87 K1SEC KC2HUV WB4BIK KD4HGU
86 WB4UHC KE4PAP

W2PII N2VQA WB9GIU
85 N3SW
84 KA8VWE WA4GLS KA2YDW WA4CSQ KG4CHW
83 KC3Y KA2BCE WA4EYU
82 KD1SM KE3FL
81 KE4DNO
80 NC1X KF4NJP KJ5YY K3TX KC2GZB
79 WB9OFG K2DBK
78 KE0K W2CC
77 KF5A
76 K8QIP W8IM
75 N1IST KG9B
74 N4CQR W2JG
73 WJ2F W7EP
72 K8LEN
71 KA9FVX WA9JWL
70 W5PY N8NMA

The following stations qualified for PSHR during April, but were not recognized in last month's column: W2EAG 144, W4NTI 131, KC7SRL 129.

Section Traffic Manager Reports
May 2001

The following ARRL sections reported: AL, AR, CT, CO, DE, EMA, ENY, EPA, EWA, GA, IA, ID, IL, IN, KS, KY, MDC, ME, MS, MN, NC, NFL, NH, NLI, NNJ, NTX, OH, OK, OR, ORG, SBAR, SDG, SC, SD, SFL, SNJ, STX, TN, VA, VT, WCF, WI, WMA, WNY, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports
May 2001

The following ARRL sections reported: EWA, CT, IA, IN, KS, KY, MDC, NLI, OH, SD, SFL, STX, SV (North), WCF, WMA, WNY.

Brass Pounders League
May 2001

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	*Orig*	*Rcvd*	*Sent*	*Dlvd*	*Total*
WX4H	479	793	1472	0	2744
W1GMF	0	822	1527	15	2364
KB1AJ	23	1030	951	71	2075
NM1K	831	314	911	8	2064
N2LTC	0	1000	1021	32	2053
KT6A	0	815	728	0	1543
W7BO	312	534	462	0	1308
W1PEX	0	1104	71	8	1183
KK3F	31	548	486	62	1127
W5SEG	19	534	494	0	1047
W9RCW	0	391	50	386	827
K9JPS	2	341	45	338	718
KF5A	3	340	342	0	685
WB5ZED	—	—	—	—	661
W6DOB	0	198	418	41	657
N1LKJ	6	332	291	19	648
WB2GTG	0	274	357	11	642
K4FQU	174	153	290	13	630
W9IHW	0	314	34	280	628
W7TVA	87	197	216	68	568
KB5W	—	—	—	—	563
KA1VED	3	265	265	8	541
KA2ZNZ	28	258	174	80	540
WA9VND	19	318	195	8	540
KW1U	0	257	247	16	520
N9VE	0	239	33	242	514
WD9GNK	0	238	30	288	506
N8IO	116	164	214	7	501

BPL for 100 or more originations plus deliveries: N5IKN 179, WA4QXT 171, KK5GY 120, WA4QXT 111.

Maritime Mobile VHF

Not so long ago, maritime mobile operating was confined almost exclusively to the popular high-frequency bands, but that has changed over the past decade. Thanks to a new group of VHF maritime stations, those who inhabit the world above 50 MHz have also been enjoying contacts with ships at sea, and coincidentally finding new opportunities to work otherwise impossible all-water grids. Maritime mobile operating refers specifically to Amateur Radio activities in international waters only. Operating mobile from a boat on an inland lake or river does not fit these criteria.

Clint Walker, W1LP, is captain of the *Chemical Pioneer,* which makes it convenient for him to mount 50, 144 and 432-MHz Yagis on the railing of his ship. Other antennas, including the ship's long wires and one for radar, can also be seen in this view.

W1LP/mm

Clint Walker, W1LP, is perhaps the best-known maritime station to American VHFers. Clint has provided thousands of contacts on 50, 144 and 432 MHz from several dozen rare grids in the Atlantic, Gulf of Mexico and Pacific during his voyages along the North American coasts. Clint made the longest 2-meter tropospheric-ducting contact ever reported when he worked Hawaii from near the coast of Mexico in 1999. During the past year, Clint has added 10 GHz to his list of bands and made dozens of high-speed CW meteor-scatter contacts on 2 meters.

European Maritime Mobile Operators

Several European maritime stations have also consistently handed out VHF contacts from all the other great oceans of the world. PA3HEN (G0HEN when in the territorial waters of the United Kingdom) has been quite active from northern European waters and the Mediterranean, primarily on 50 MHz.

G0KZG operates from a British oceanic research vessel when time allows. He has made many 144-MHz contacts via meteor-scatter and auroral propagation into Europe from the North Atlantic, in addition to his 50-MHz activity. This year his ship is conducting research in the Indian Ocean. He was active on 6 meters as the ship steamed along the West African coast early in the year and has since made contacts to Europe from the ship's research positions in the Indian Ocean.

Croatians have been active on 6 meters from various parts of the world. 9A4QV has been reported on 50 MHz in the Mediterranean this past spring, and 9A2NC made contacts from the North Atlantic in previous years. 9A2NC worked several alert 6-meter stations in the Northeast via single-hop sporadic-E in 1999, for example, using the ship's long wire. Two Polish operators have also been reported making 6-meter maritime mobile contacts earlier this year, including SQ2EEN from the West African coast and SP2HNF in the Pacific. TX0A/mm was also reported on 50 MHz from the western Pacific this past spring.

Numerous other maritime mobile stations, many apparently on recreational boats adjacent to European and American coastlines, have also been reported from time to time. A few VHF contesters even found W3EP/mm on 6 and 2 meters from all-water grid FN40 during a June contest some years back. I was aboard my friend's 30-foot sailboat *Nepenthe*, where we slung a 2-meter halo high into the rigging and lashed a 6-meter halo to the guardrail. A deep-cycle marine battery provided power.

This Month

August 4-5	ARRL UHF Contest
August 12-13	Perseids Meteor Shower
August 18-19	ARRL 10-GHz Cumulative Contest
August 19	Excellent EME conditions, but new Moon

The KP4EOR/mm Cruise

Long-time VHFer David Ternent, KP4EOR, operated a makeshift station while a passenger on the cruise ship *Millennium* as it steamed from Barcelona to Istanbul during the second half of May. David took along an IC-706IIG and a Comet trap vertical for 28 through 432 MHz, which he mounted on a balcony rail adjacent to his cabin.

Most of his operating opportunities were on 6 meters, where KP4EOR/mm worked through pileups of Europeans via sporadic-E. David noted that sometimes stations were incredibly strong, with

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40-dB-over-S9 signals. He was on the air during the May 25 multihop sporadic-E opening to North America, and heard a few Europeans calling a K1, but he did not hear any Americans himself. David also found the band open to southern Africa via lingering TEP on May 26 and 29. His activity on 2 meters was limited to 145-MHz FM contacts while sailing close to Spain, Italy, San Marino and Greece.

You Can Participate

There are two ways you can participate in the fun of maritime mobile operations. First, give those VHF maritime mobile some contacts and collect some rare all-water grids yourself. VHF maritime mobile stations can pop up anytime from most anywhere. There may be little indication that the bands are open to some distant ocean, as a maritime station might be hundreds or thousands of kilometers from the nearest VHF station or beacon. In other cases, a ship may be sailing through all-water grids within normal VHF operating distances of the coastline.

Second, it is relatively easy to operate maritime mobile yourself, even if you are not a crewmember on a ship. Perhaps you own a boat, have a friend who does, or are planning to take a cruise. In all instances, you need prior permission from the captain to operate and to put up temporary antennas. Get permission even if you plan to use only a hand-held rig (like the new FT-817) while walking on the deck. Making contacts while in port or close to a foreign coast may require additional licenses, as most countries do not permit Amateur Radio activities within their territorial waters unless authorized.

Antennas may present another problem. Even moderate-sized Yagis are usually difficult to mount temporarily on any boat, mainly due to space restrictions. Rotators add another level of mechanical and electrical complexity. Omnidirectional halos, loops or verticals might make better compromise choices. They are simple but effective antennas that can be erected and taken down quickly without taking much space.

ON THE BANDS

Six meters was quite lively during May, as sporadic-E quickly filled the gap left by declining F-layer propagation. Two-meter sporadic-E openings and tropospheric ducting also made early and strong appearances in various parts of the world this month. There was just one day with auroral activity, down considerably from April's excitement. Several modest expeditions to neighboring DX entities and VHF maritime mobile stations also kept alert operators busy.

In addition to sources mentioned, the summaries also relied on the *50 MHz DX Bulletin*, postings on the WWW-based DX Summit, and on KQ1V, K2KW, WB2AMU, N2AMC, W3BO, W3ZZ, N3CB, KA5TJI, KE6GLA, K7QXA, WB9GKM, W0HL, G4UPS, OZ5IQ, VE2PIJ and VE4AMU. Dates and times are in UTC.

Holly Thompson, CE0Y/N0QJM, operating from the shack of XQ0YAS, who just happened to be the hotel proprietor on Easter Island. Holly and her husband Arliss, W7XU, completed their successful 6-meter expedition in April. See the July column if you missed the details.

Domestic Sporadic E

The 2001 sporadic-E season got off to a roaring start this past May, with strong openings somewhere across the US and Canada on two out of every three days, on average. WB0ESV was surprised to make two dozen contacts in seven different US and Canadian call areas on May 26 with just 60 W and a dipole that sloped down to 6 feet above the ground, but that is not uncommon during these strong spring events. K0AZ used the intense May 13 opening to work Indiana, Maine and Kentucky to complete Worked All States. He had been at it only since last October, and was quite grateful for W8TN's willingness to drive 85 miles from his home in West Virginia to give him Kentucky for that final state.

Double-hop coast-to-coast openings appeared on the evenings of May 13, 25-26, 26-27, 27-28 and May 31-June 1. Several of these openings were significant because they included stations in Hawaii. N7DB (CN85) worked WA2BPE (FN12) just after 0200 on May 26 and two hours later logged K6MIO/KH6. AC4TO (EM70) completed the 7050-km path to Hawaii on his own when he hooked up with K6MIO/KH6 (BK29) on May 28 around 0200.

There were two brief opportunities to make 2-meter sporadic-E contacts on the early evenings of May 30 and June 1. AC4TO (EM70) hooked up with N0KQY (DM98) on both evenings and logged W5SFW (DM95) on the thirtieth and K0CS (DM79) on the first. N0LL (EL09) found KE4YYD (EL79) on June 1. Europeans recorded their first 2-meter sporadic-E opening of the season on the evening of May 21, when Spanish stations worked Italians and Slovenians.

Six Meter DX

The big news for May was the welcome appearance of multihop sporadic-E propagation, including some early transatlantic openings. Other parts of the world also enjoyed the new opportunities for sporadic-E DX. F-layer contacts, primarily over trans-equatorial paths, declined considerably and essentially disappeared by the end of the month.

Caribbean, Central and South America

US and Canadian stations worked DX stations to the south on half a dozen days during the month, but May 31 stood out as especially productive. The long list of DX worked, primarily from the eastern two-thirds of the US and adjacent Canada, was impressive. In addition to several CE, CX, KP2, KP4, LU, PY, TI, YS and YV stations, North Americans logged K2KW/6Y5, 9Z4BM (Trinidad and Tobago), C6AGN, W3EP/C6A, CE3RR, HI8ROX, HP2CWB, HR1BY, HR4/TI5KD, P40JB, P43JB and VP5VAC.

Conditions were often quite good. Jeff Dover, KU4WW (EM65), caught the attention of both W3EP/C6A and K2KW/6Y5 with just 10 W and a halo antenna. LU6DRV ran stations in VE3, W1 through 5, 8 and 0 call areas on the evening of May 17. YV4DDK found 9Z4BM, FM5WD and FM5AD for new countries, as well as PZ5RA.

South Americans continued to make runs into Europe on a dozen days from May 3 to May 30. PY5CC worked UT5JAJ and TA1AZ, among others, on May 4 and caught up with EK4AD (Armenia) the following day for DXCC entity #207—a tremendous achievement for so late in the F-layer season. On May 22, PY5CC ran off 170 Europeans. Many

other PY, LU, CX, ZP and CE stations continued to work into Europe as far east as Bulgaria and Romania.

Europe and the Mediterranean

Ten years ago, transatlantic contacts via sporadic E were big news. Now with nearly every European country on the band (Hungary may be the lone holdout) and activity at an all-time high, we have come to expect such openings. This year's season seems to have started especially early. US and Canadians made it across the Atlantic via sporadic-E on May 25, 29, 30 and 31.

Table 1 presents a synopsis of May's transatlantic openings. As has become the practice in presenting tabular summaries, not all the US and Canadian call areas had opportunities to work all the European and African entities listed. This presentation simply suggests the greatest extent of activity on both sides of the Atlantic.

Hidden by the summary accounts were some notable achievements. N5JHV (DM62) in New Mexico heard strong 48.250-MHz video, presumably from northern Europe, on May 28 and reported that OH3NWQ heard his fluttery signal around 1845. May 31 was the spectacular day. K1SIX (FN43) ran off his usual long string of Europeans, including T77GO and T72EB (San Marino), to bring his DXCC tally to 140. G4ASR, G8BCG and others worked as far westward as northern Illinois. ON4GG completed more than 100 QSOs as far westward as the W5, 9 and 0 call areas. Stations along the Gulf coast and Texas also made it into Europe that morning. W5RCI (EM55) worked a few Europeans from Mississippi, N5WS (EL09) found G4ASR at 7850 km, and K5XX (EM21) logged ON4GG at around 8000 km.

EH8BPX (IL18sk) made some of the longest transatlantic contacts of the month late in the afternoon of May 31. Among Avelino's many contacts into North America that day were those with K5XX, N0LL and N0KQY, in the 7400- to 7650-km range, N5JHV at about 8400 km, and AA7A (DM43) in southern Arizona, about 8700 km distant. If this is a sample of what is to come, we have probably already had a fantastic season by the time you read this.

Europeans continued to make transequatorial contacts into Africa, including contacts with 6W4RK (Senegal) and J5X (Guinea-Bissau) and the adjacent Indian Ocean with such catches as 3B6RF (Agalega and St Brandon), 5R8FU, VQ9IO and VQ9NO. Single- and double-hop sporadic E provided additional opportunities to catch new and more elusive stations, including 5A1A (Libya), A45XR (Oman), EK6AD, HV5PUL, HV0A (Vatican), HZ1MD (Saudi Arabia), SU9ZZ, SU1SK, SU/WA0VOM (Egypt), TA1Z (Turkey) and Z36W (Macedonia).

Asia and the Pacific

Reports of North American contacts across the Pacific fell off considerably during May. N7DB (CN85) reported TX4A/mm (RG27) in the western Pacific, VK4PU, FK8CA, V73AT and V73SP, on the evening of May 4. It was likely that these contacts were via lingering F-layer propagation. XE2EED also worked TX4A/mm and added FO3BM.

VU2ZAP worked huge pileups of Japanese, along with his first Koreans, on the evenings of May 6, 9, 10 and 21. Signals were sometimes as strong as 20 dB over S9 over paths in the 6500 to 7200 km range. These openings had all the characteristics of sporadic-E propagation, especially as they crossed Southeast Asia, where the highest incidence of E-skip occurs anywhere in the world.

For their part, the avid 6-meter operators of Japan and neighboring Asian and Pacific areas caught such exotic DX as 9N7WU (Nepal), JT1CO (Mongolia), TX0C (Marquesas), V63YV and V63LJ (Micronesia) and XV3AA (Vietnam), all likely via sporadic E as well.

Table 1
Transatlantic 50 MHz Contacts in May

Date	Time	North America—Europe and Africa
25	1050-1600	VE1, W1—G, PA, ON, DL, OE, OM, 9A, S5
29	1510-1525	K1SIX—CT
30	1155-1230	W1, 3—GM
30	2045-2145	VE1,W1—EH8, EH, F
31	1030-1545	VY2, VE1-3, 9; W1-5, 8-0—EH, EI, GI, GW, GM, G, GU, GJ, ON, PA, OZ, F, HP9, T7, I, S5, OE, OK, DL
31	2200-0100	W1-5, 7, 0—EH8BPX

Aurora and the Six-Meter Sprint

An aurora appeared during the evening of May 12-13, which provided welcome 6-meter contacts for those along the northern tier of US states and southern Canada who were participating in the four-hour sprint. Auroral effects did not seem to spread much farther south than New York to Iowa. Simultaneous sporadic E across the Midwest also helped to enliven this short contest.

Tropospheric Ducting

Excellent ducting conditions in two distant, but possibly related, parts of the world was a bit of a surprise for May. Tom Haddon, K5VH (EM00), and Paul Turman, KA5TJI (EM20) reported excellent conditions from Texas to Florida on 144 through 1296 MHz on May 24. K5VH worked stations from the Florida panhandle to the Florida Keys, including KF4YOX (EL96) on 432 and 1296 MHz and W4WHN (EL94) on 432. The longest distances were about 1850 km. KA5TJI logged five 144-MHz contacts along the Florida coast as far as W4FF and KF4YOX (EL96), and Paul made an additional 432 MHz QSO with KF4YOX.

Two days later and 5000 km away on the eastern side of the Bermuda High, which straddles the North Atlantic between Florida and southern Europe, another great ducting event took place. David Butler, G4ASR, made a string of 144-MHz contacts into France, Spain and the Canary Islands, including a pair of 2850-km QSOs with EB8BTV and EA8BPX. At least a dozen other stations in England and Wales made the grade to the Canaries. The longest contacts were somewhat over 3000 km. This path, like the 4000 km California-Hawaii link, occurs more frequently later in the summer.

Expedition Summaries

W3EP/C6A (FL24) operated 6 and 2 meters from the Bahamian Research Station, San Salvador, May 24 to June 2. The compact station consisted of an IC-706 with a 100-W brick for 2 meters and small Yagis (overlooking the ocean) for each band. Six meters was open to the states nearly every day, but more interesting things to do on this small and sparsely populated island kept me busy much of the time. Nevertheless, the final tallies on 50 MHz showed 764 QSOs in 150 grids, 43 states and 7 DXCC entities. The pileup on the evening of May 31-June 1 was especially deep.

Evening schedules on 144 MHz with EA8FF yielded nothing, and N4IS in south Florida ended up as the only 2-meter contact. The transatlantic attempt was worth the effort, especially as the Canary Islands did have an opening to England during this time. EA8FF is interested in running similar schedules with 144- or 432-MHz stations in the Caribbean or perhaps southern Florida. EA8FF runs high power and multi-Yagi arrays on both bands. Contact Mark Demunck at **ea8ff@arrakis.es**.

Two 6-meter operators accompanied WPX contest expeditions to other islands. Ken Silverman, K2KW/6Y5 (FK18), got in two good afternoons of 6-meter operating from the 6Y1A site on the northern coast of Jamaica. He had a JST-245 and a 1-kW amplifier. Ken logged 542 SSB contacts (3 on CW) on May 28 and 29 in 154 grids, including contacts with KP2, KP4 and FM.

Jon Jones was a bit disappointed with his 6-meter effort from HC8N in the Galapagos. He worked TI5KD via meteor scatter on May 24 and then logged LW3EX and LU2DEK, but that was it. A 2-meter meteor-scatter schedule with TI5KD yielded only pings.

QSL BLUES

Complaints about poor returns on QSL cards, especially for 6-meter contacts, seem to have increased over the past few years. Perhaps this only reflects the increase in worldwide activity on the band, as confirming contacts has always engendered some frustrations. You can increase your chances for success by including an SASE with your own card for domestic contacts. If this fails, try sending a generic card with the other station's call, date, time, frequency and mode of the contact already filled out, with a request that the other operator simply sign the card and return it in an SASE that you provide. All QSL cards should be signed or authenticated in any case.

The strategy for confirming foreign contacts is similar. The quickest and safest method is to send your card via airmail with a self-addressed envelope and an international reply coupon (IRC), which can be purchased from the US Postal Service. An IRC can be exchanged for one unit of airmail postage any-

222-MHz Standings

Published 222-MHz standings include call-area leaders as of June 1. For a complete listing, check the Standings Boxes on the World Above 50 MHz Web pages at **www.arrl.org/qst/worldabove/**. To insure that the Standings Boxes reflect current activity, submit reports at least every two years by e-mail to **standings@arrl.org**. Printed forms are available by sending a request with an SASE to Standings, ARRL, 225 Main St, Newington, CT 06111.

Call Sign	QTH	States	DXCC	Grids	Best DX (km)†
AF1T	NH	24	2	—	2019
K1TEO	CT	24	2	93	1720
K1LPS	VT	17	2	54	1472
K1UHF	CT	17	2	65	1938
KU2A	NH	15	2	31	1144
W1AIM	VT	15	2	44	1223
W1GHZ	MA	15	2	31	1207
K1WVX	CT	9	1	12	973
WA1HOG	NH	7	1	9	291
N2WK	NY	28	3	87	1960
K2AN	NY	20	2	56	1043
W2FCA	NY	19	2	41	1209
WB2VVV	NJ	16	2	29	779
K2KIB	NJ	15	2	25	718
W3HHN	NY	15	2	29	1525
K1JT	NJ	14	2	29	889
W2CNS	NY	12	3	29	626
WA2ZFH	NY	12	1	19	497
W3ZZ	MD	36	2	99	1862
N3XJX	PA	8	2	27	—
K4RF	GA	37	2	105	1968
N4CH	VA	30	1	76	2000
AA4H	TN	25	2	66	1737
K4ZOO	VA	25	2	82	1438
KC4QWZ	TN	24	1	53	—
W4WTA	GA	23	1	57	1485
K9OYD/4	VA	22	2	52	776
W4EUH	GA	17	2	36	725
KU4WW	AL	14	1	22	1240
AD4DG	VA	10	1	18	532
W5LUA *	TX	50	—	—	—
W5RCI	MS	37	1	119	1930
K5SW	OK	31	2	117	2051
W5ZN	AR	20	2	50	1940
W5UWB	TX	17	2	54	2197
AA5C	TX	16	2	68	1843
WA5TKU	TX	14	—	28	—
W5HUQ*	AR	9	1	14	1500
N5QGH	TX	8	—	27	—
K6TSK	CA	4	2	16	4125
KR7O	CA	4	1	22	1638
N6RMJ	CA	4	2	22	4017
WA7KYM	WY	14	1	40	1822
W7RV	AZ	9	3	51	1740
NJ7A	UT	7	1	11	1980
WA8WZG	OH	38	2	127	1715
KE8FD	OH	34	2	127	1892
K8MD	MI	28	2	82	1903
W8PAT	OH	27	2	66	1901
N8KOL	OH	24	2	74	1510
K2YAZ	MI	21	2	71	2167
N8AIA	MI	9	2	25	647
N8GHZ	OH	8	2	18	663
W9UD	IL	40	2	141	1650
WB9SNR	IL	27	2	61	1745
W0UC	WI	22	2	100	1471
N9NJY	IL	21	2	56	2140
KA9CFD	IL	18	2	51	1537
W9JN	WI	18	2	63	2005
WA1MKE	IN	15	2	56	1800
W9RPM	WI	8	2	12	850
N0LL	KS	23	2	95	1691
W0FY	MO	23	1	72	—
W0JRP	MO	22	1	72	1305
K0FF	MO	18	1	52	1174
W0GHZ	MN	17	1	56	1264
K0SQ	MN	11	1	36	1074
N0UK	MN	11	1	42	1040
K0GU	CO	10	1	18	1913
K0RZ	CO	9	1	41	2040
WA2HFI/0	MN	7	1	24	868
K0VSV	IA	6	1	14	675
KR0I	MO	5	1	6	474
VE3AX*	ON	50	4	62	1892
VE2PIJ	PQ	8	2	21	694
VE6TA*	AB	4	2	10	1655

—Not given
†Terrestrial
*Includes EME contacts

where in the world. Inserting a $1 US bill (a so-called green stamp) for postage might be an acceptable alternative, but some countries have currency restrictions that make this difficult, illegal, or even dangerous for some foreign operators. Envelopes addressed to radio amateurs in some foreign countries are sometimes pilfered for the currency they might contain. Follow the DX operator's instructions or find out first if sending currency through the mail to a particular country is safe and legal.

Some foreign operators and expeditions engage managers to handle all their QSL chores. Use the same procedures for obtaining cards from QSL managers that you would for direct confirmation. QSL managers are usually quite efficient. Several VHF-oriented newsletters and journals, DX-oriented WWW sites and DX newsletters publish lists of QSL managers. Sending cards through the ARRL outgoing QSL bureau and making the appropriate arrangements to receive cards from your incoming call-area bureau is much less expensive and involves less risk, but it takes time. It is common to wait a year or more for cards to come back. See *QST* for April 2001, pp 166-168, for more details on using the QSL bureaus.

Reply promptly to all QSL cards you receive! If you cannot afford to buy colorful printed cards, make your own. You can print or even handwrite the necessary information (call signs, date, time, frequency, mode, signal report and station location) on a plain index card. Handmade QSL cards can be quite elegant and personal. Be sure to sign your cards in any case. Exchanging QSL cards is one of the courtesies radio amateurs worldwide have always expected from each other. Do your part by returning the compliment with your own QSL card.

FEEDBACK

Gary Kohtala, W7NTF, noted that the WR7V 6-meter beacon, mentioned in the March column on auroral warnings, has not been on the air in several years. After reading the article, Gary became interested in putting 50- and 144-MHz beacons with northerly facing antennas on the air from CN87 to replace the long silent WR7V. Perhaps other individuals or groups can fill some of the many gaps along the US-Canadian border with auroral beacons.

It was Tom Glaze, K4SUS (EL95), who worked FO5RA, FO3BM, KH8/N5OLS and AH8A on 6 meters in April. He was misidentified in the July column. QST

From August 1946 QST

VHF/UHF CENTURY CLUB AWARDS

Bill Moore, NC1L
Century Club Manager

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations for contacts with the minimum number of Maidenhead grid-square locators (indicated in *italics*) for each band listing. The numbers preceding the call signs indicate total grid squares claimed. The numbers following the call signs indicate the claimed endorsement levels. The totals shown are for credits given from April 10, 2001 to June 12, 2001.

The VUCC application form, field sheets and complete list of VHF Awards Managers can be found on the *ARRLWeb* at **www.arrl.org/awards/vucc/**. Please send an SASE if you cannot download the forms online. If you have questions relating to VUCC, send an e-mail to **vucc@arrl.org**.

50 MHz
100

1118	AF4MI
1119	N4SC
1120	VA3FIN
1121	CX4AAJ
1122	N6JV
1123	VE3KZ
1124	K4HBI
1125	K6CQR
EH7CD	375
G8BQX	450
VA3DPB	200
WA1ECF	455
N3FA	175
AA5XE	450
WA5KBH	225
KB6NAN	475
K6HEW	125
KI8G	375
W8PAT	250
WA8RJF	375

144 MHz
100

W8PAT	125

222 MHz
50

W8PAT	60

432 MHz
50

W8PAT	60

Satellite
100

103	W9CRK
104	N9EL
105	WA1ECF
106	KF2ZQ
W5ADC	175
W5BTS	150
KK5DO	525
N5AFV	200
W5ADC	175
N5AFV	225
N7SFI	725
K9HF	250

QST

DXCC HONOR ROLL

*Edited by **Bill Moore, NC1L** • Century Clubs Manager*

The DXCC Honor Roll is earned by amateurs who submit confirmation for contacts reached within the top 10 of the overall number of entities on the DXCC List. There were 334 entities on the list for the period ending March 31, 2001 with 325 being required for the Honor Roll. The **boldface** number indicates the total of current DXCC entities. The number beside the call sign represents the individual's overall totals.

MIXED

334
DU9RG/341
ES1AR/377
I2KMG/367
JA1BRK/370
JA1QXY/354
JA1UQP/359
JA2ANA/343
JA2NDQ/350
JA3ART/359
JA3CMD/350
JA3DY/374
JA3THL/354
JA4DLP/354
JA4ZA/367
JA6VU/343
JA6WW/348
JA8ADQ/365
JF2MBF/340
JH2AYB/339
JH4FEB/347
JR1DUP/344
KH6WU/366
N6OJ/351
OH2BN/348
OH3YI/363
OH4NS/367
SM3CXS/362
SM3EVR/348
SM5CZY/370

333
4X1FQ/372
4X4DK/384
4X4JU/381
4X6UO/339
AA4H/344
AA4S/356
AF2C/343
AJ6V/344
AL7R/339
CT1BH/361
CT1DRA/339
CT1ZW/352
CX7BV/342
DF3CB/340
DF4PL/340
DF9ZW/339
DJ2BW/382
DJ2YA/371
DJ4PI/359
DJ4XA/362
DJ4ZB/348
DJ5DA/367
DJ5JH/360
DJ6NI/356
DJ8NK/355
DJ9ZB/355
DK2OC/348
DK6NP/347
DK8NG/347
DL1BO/381
DL1EY/355
DL3SZ/362
DL3ZA/364
DL6MI/339
DL7AFV/339
EA3NA/358
EA4AV/339
EA4MY/350
EA5AT/340
EA6NB/339
EA8AKN/339
F3AT/376
F3TH/339
F6AJA/355
F6ANA/339
F6AOI/357
F6BEE/347
F6CQU/339
F6CUK/345
F6DHB/344
F6DLM/344
F9RM/375
G0DQS/339
G3GIQ/366
G3HCT/377
G3HTA/361
G3LQP/358
G3MXJ/358
G3NDC/348
G3NLY/365
G3RTE/345
G3RUV/355
G3SNN/344
G3UML/364
G3VMW/343
G3ZBA/356
G4BWP/342
G4EDG/340
G4IUF/341
G4LVQ/339
G4ZCG/339
GM3BQA/363
GM3ITN/373
GM3WIL/342
GW3CDP/345
HB0LL/357
HB9AQW/353
HB9BGN/344
HB9BLQ/340
HB9BZA/340
HB9DLE/338
HB9HT/358
HB9PL/374
HB9RG/348
I0AMU/383
I0OLK/359
I0WDX/351
I1ZL/377
I2EOW/341
I2MQP/346
I2WTY/342
I2XIP/343
I2YDX/353
I3EVK/363
I4AVG/342
I4EAT/346
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Chinese Radio Sports Association Officials Visit ARRL

Chinese Radio Sports Association Secretary General Wang Xinmin, BA1OK, and Deputy Secretary General Han Zhaofang, BG1HZF, visited ARRL on May 22. ARRL Executive Vice President David Sumner, K1ZZ, officially welcomed the visitors and staff member Dave Patton, NT1N, led a tour of League Headquarters and Maxim Memorial Station W1AW.

Prior to their visit to ARRL Headquarters, the two men had attended Dayton Hamvention along with CRSA President Zhao Mingyu. CRSA presently boasts 3000 amateur licensees among its 11,000 members. As CRSA continues to grow, its leaders are focusing on ways to improve the Association's services and continue its expansion by adapting methods proven by other Amateur Radio associations around the world. Their visits to ARRL and to Dayton Hamvention—the world's largest Amateur Radio event—provided many opportunities for the CRSA visitors to observe and learn.

In a letter to ARRL following his return to China, Han Zhaofang expressed his gratitude:

> It is greatly appreciated for all you have done for our trip to Dayton and Newington. Your hospitality will encourage me to further strengthen the cooperation between ARRL and CRSA. I am deeply moved by the Dayton Hamvention. And the visit to ARRL HQ is the realization of a dream of mine since beginning to work for CRSA in 1998. Witnessing everything in ARRL HQ has really established my confidence to work harder for amateur radio and improve the development of amateur radio. However, I clearly know that there are many difficulties on the way to promoting amateur radio in China, but we have to do very practical work and take every chance. Therefore, your experience will play an important role, and maybe that was the main reason for our visit to the USA.

The visitors took back with them several new ARRL publications as well as China-bound QSLs from the ARRL Outgoing QSL Service. Executive Vice President David Sumner, K1ZZ, also presented the pair with call sign-embroidered ARRL shirts.

This marked the second time that ARRL Headquarters has hosted a CRSA contingent. In October of 1987, three CRSA officials stopped by during a two-week visit to the US—their first to this country (see *QST* Jan 1988).

ARRL PHOTO

IARU Region 1 Vice Chairman Tafa Diop, 6W1KI (in suit), looks on as members of the Royal Omani Amateur Radio Society (ROARS) operate their club station, A47RS, during a reception for the Region 1 Executive Committee on April 21. The Region 1 EC meets annually; this year's meeting was ably hosted by ROARS.

The CRSA was formed in 1964 under the jurisdiction of the All-China Sports Federation. It is the sole national organization authorized to represent radio amateurs in China, and has represented China in the International Amateur Radio Union since 1984.

IARU NEWS

The International Amateur Radio Union (IARU) announced the approval by the International Telecommunication Union Development Sector (ITU-D) of two landmark documents related to amateur radio disaster communications in developing countries. These documents represent the culmination of two years of work by the IARU and ITU-D Study Group 2 chaired by Nabil Kisrawi of Syria.

The first is Recommendation ITU-D 13, Effective utilization of the amateur services in disaster mitigation and relief operations. It recommends that administrations include the amateur services in their national disaster plans, reduce barriers to effective use of the amateur services for disaster communications, and develop memoranda of understanding (MoU) with amateur and disaster relief organizations. ITU Telecommunication Development Bureau Director Hamadoun I. Touré announced the approval of Recommendation ITU-D 13 on 12 April. It will be available in English, French, and Spanish from the ITU bookshop at **www.itu.int**.

The second, now being finalized for printing, is the Disaster Communications Handbook for Developing Countries. This was a joint effort of the IARU and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) with contributions from L.M. Ericsson (Sweden), Volunteers in Technical Assistance (VITA) (USA), and others. The Handbook, to be published in English, French and Spanish, will have three parts devoted to policy, operational and technical considerations of disaster communications. It is one of a series of Handbooks being produced by the ITU-D under the coordination of Maurice Ghazal of Lebanon for use by developing countries. The Handbook is scheduled for printing this year and will be available from the ITU bookshop.

PITCAIRN ISLAND ARA APPLIES FOR IARU MEMBERSHIP

The Pitcairn Island Amateur Radio Association (PIARA) has applied for membership in the IARU. PIARA is an independent nonprofit organization to promote and develop amateur radio friendship, technical knowledge, and communication technology, providing public service and furthering the public interest, plus fostering international goodwill. It has 10 members, representing the entire population of resident amateur operators. PIARA reports that there are 23 amateurs licensed to operate including several temporary residents and visitors, plus one club station. Amateur Radio has special significance on Pitcairn Island, as it continues to provide the main communications link to the outside world.

Pitcairn Islands (including Pitcairn, Henderson, Ducie, and Oeno Islands) is an overseas territory of the United Kingdom. The application for IARU membership by PIARA is supported by the Radio Society of Great Britain. Due to transport difficulties from and to Pitcairn, PIARA has requested that the RSGB continue to represent PIARA at IARU Region 3 Conferences.

The officers include Tom Christian, VP6TC, President; Dennis Christian, VP6DR, Treasurer; Betty Christian, VP6YL, Secretary; and Kan Mizoguchi, VP6BK, IARU Liaison. IARU member societies have until 15 November 2001, to submit their votes determining the outcome of PIARA's application.

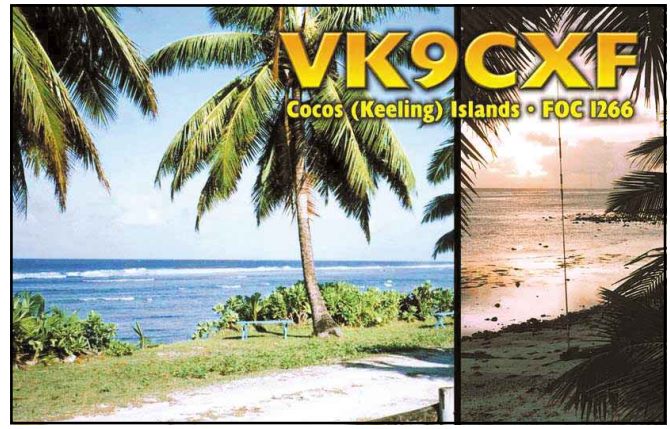
BRIEFS

Europe Adopts 5 WPM as Morse Code Standard

The Conference of Postal and Telecommunications Administrations—CEPT—has effectively lowered the Amateur Radio Morse code test speed to 5 WPM for all European countries. The CEPT Radio Regulatory Working Group (WGRR) has adopted a revision of Recommendation 61-02 to include the 5 WPM standard. The European Radiocommunication Office published the revised version of T/R 61-02 in March. It establishes requirements for the issuance of a *Harmonised Amateur Radio Examination Certificate* (HAREC), which reduces the Morse requirement from 12 WPM. "In revising what is known as the CEPT Recommendation T/R 61-02, it has in effect recommended to 44 European countries to adopt the 5 WPM standard," said Wireless Institute of Australia-Victoria President Jim Linton, VK3PC, who closely follows global developments in Amateur Radio Morse code trends. Additional information is available on Linton's Morse code watch site, **www.wiavic.org.au/mcw**. Information on CEPT is on the ERO Web site, **www.ero.dk**. QST

HOW'S DX?

This month we have the pleasure of hearing from CW DXpeditioner and contester Roger Western, G3SXW, who recently returned from Cocos Keeling. Roger is one of the best CW pileup operators.



Roger, G3SXW, Dennis, G3MXJ, and Nigel, G3TXF, were on the air from Cocos Keeling as VK9CXW, VK9CXJ and VK9CXF this past May making over 21,000 contacts in one week.

MODERN PILEUPS

By Roger Western, G3SXW

Pileups have changed a lot in recent years. These changes were fresh in our minds as we embarked on the 48-hour journey home from Cocos-Keeling Island. We had spent a week on the island, logging 21,500 CW contacts as VK9CXF (G3TXF), VK9CXJ (G3MXJ) and VK9CXW (G3SXW). The changes in pileup operating over recent years are almost all for the better—but there are also one or two disturbing trends.

Calling

Pileup operating skills have improved dramatically in recent years, allowing more QSOs to be made in the limited time available to a DXpedition. Everybody is happier for that, at both ends. More and more operators are calling at the right times and in the right ways, although there are still sizable minorities who struggle.

Everybody understands split operating these days and partial call signs are a thing of the past, on CW anyway. Everyone knows that it is important to be extremely brief, but some have not yet learned the best ways to listen. A caller who repeats his call sign three times before stopping to listen has no idea what is happening on the DX frequency. During that time the DX station may have already sent a report to another caller. When the three-time caller pauses, he hears nothing on the DX frequency (the DX station is listening to the incoming report), so he starts calling again. Continuous calling is sometimes a deliberate tactic (selfish behavior), but perhaps much of the out-of-turn calling is unintentional, caused by poor calling/listening techniques.

Tip to callers: send your call sign *once*, pause, listen briefly, send it again, listen…until the DX station replies to someone (hopefully you!). Better still, use QSK with full break-in. It is so much easier to stay in touch with what is happening on the DX station's frequency if you can hear the activity in the midst of your sending. In this case, the purpose of QSK is not to copy CW through your own transmission—it is simply to know *if* the DX station has started transmitting again, so you can immediately stop sending, listen and get back in sync.

Tip to DX stations: the majority of callers will not hear an ultra-brief acknowledgments such as "G3" at 40 WPM because they are transmitting at the time. We should not be surprised if most of them keep calling, even if they are not the G3 in question. Maybe it's better to send a complete call sign or to send the partial call and a report, then the partial call again. With each additional second of your transmission more of the pileup will have the chance to hear it and react accordingly. Perhaps there is an optimal length of transmission that helps keep control of the pileup. I'd suggest about 3-5 seconds.

Proxy QSOs

Someone famous once said that rules are made to be broken, but we all know in our bones what is right and wrong. It is all about fun and personal fulfillment. After all, this is only a hobby. But there is the competitive aspect of awards, especially DXCC. There are also cultural differences; some only enjoy their success if it has been personally won, while others seem almost eager to accept false glory.

One example is when a big-gun DXer works the DXpedition with a string of call signs, helping his local club members to get in the log. Until very recent years such "Proxy QSOs" seemed to be relatively rare. But now we often hear, say, a PY2 or UA9 operator calling with many different call signs. On our latest trip to VK9C, one loud station with distinctive keying kept calling with a dozen different EA5 call signs. He called each of our three VK9C stations on several bands. Our response was "QSO before." He did not even know that his friends were already in our log. Meantime, dozens of other genuine stations could not get into our logs because this fellow had squandered our limited time.

This practice is against the intentions of DXCC and other awards. In Proxy QSOs the actual owner of the call sign does not make the contact, nor are his station/antennas used.

Deliberate QRM

Deliberate jamming of the DX station's frequency seems to be much more common and causes much frustration, but it probably emanates from a tiny number of individuals. This is a difficult one to solve because we do not understand why it happens in the first place; these anonymous troublemakers never explain why they do it. It is far more common in Europe than elsewhere, so a small group of DXers in different parts of Europe is developing a Direction-Finding network. When enough readings have been logged we will be able to identify jamming hotspots and home in on the individuals.

The thrill of the pileup, operating at either end, is tremendous fun—but we can make it even better.

Bernie McClenny, W3UR ♦ 3025 Hobbs Rd, Glenwood, MD 21738-9728 ♦ w3ur@arrl.org

JAWBONING—INTERNET LOGS

By Bernie McClenny, W3UR

The Internet, as most of you know, can be a terrific tool for the savvy DXer. Most would agree that one of the benefits of the 'net has been in the area of on-line logs. Over the past few years more DXpeditions have been putting their logs on the Internet, both during and after the expeditions. This has allowed those who thought they had worked the DXpedition to confirm that their call is in the log without making another QSO to ask questions such as, "Am I in the log on 20 meter CW?"

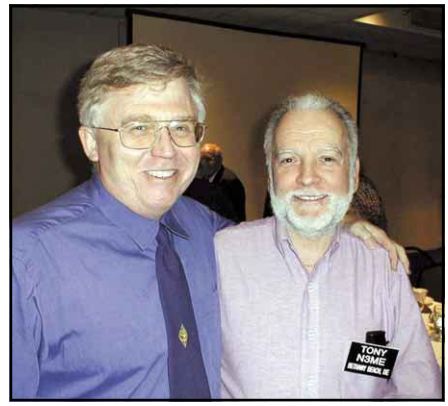
So what information should be displayed with on-line logs for DXpeditions and others? Obviously, the log must display call signs, bands and modes. Everyone puts the dates and times in his or her log, but should that information be displayed to the public as well?

Some of the on-line logs now have a feature that will allow wild cards in the call sign field. Here is how the wild card works. Tommy Notinlog, WQ3NIL, thought he worked the recent QX32A DXpedition in Upper Slovolia on July 4, 2001 at 1234Z on 20-meter CW. He checks the logs by entering his call in the call sign field and finds he is not in the log. He then enters WQ3* in the call-sign field. The * tells the databases to sort for all call signs that start with the prefix WQ3. Seconds later Tommy sees the call WQ3ILN. Close, but no cigar.

How did this happen? Perhaps Tommy was mistaken, the DX station logged him incorrectly, or it may have been a pirate. Time to investigate further.

Tommy checks the date and time. This now opens a door that we hope no DXer would consider ever going through. Tommy needs a QSL for this new country and has the contact information of a call sign that is close to his, but the date and time do not match. If Tommy is "ethically challenged," he may submit the information of the QSO with WQ3ILN and send a note to the QSL manager saying that the DXpedition miscopied his call and that he worked the group at such and such date and time. Now Tommy, WQ3NIL (not in log), can claim the WQ3ILN (I'm Logged Now) QSO.

Obviously DXing is a hobby and most people would not think of doing such a thing. But there will always be a certain number of amateurs who will not be able to resist the temptation. I propose that DXpeditions *not* publish dates and times on Internet logs unless they are willing to state that the logs will not be changed once they are posted. Let's close this door and lock it.



Astronaut Chuck Brady, N4BQW/3Y0C (left), and Tony McClenny, N3ME, had something in common at this year's Dayton DX Dinner. This was their first Hamvention as licensed amateurs.

Members of the Chinese Radio Sports Association (CRSA) were present at this year's Dayton Hamvention. Han Zhaofang, BG1HZF, Deputy Secretary General (left) and Wang Xinmin, Secretary General (right), stopped by to say hello to your editor.

DX TIDBITS FROM AROUND THE GLOBE

International Lighthouse/Lightship Weekend

International Lighthouse/Lightship Weekend is August 18-19. A hundred stations have already stated their intention to be on from a lighthouse, lightship or maritime beacon. You can find the list at **www.vk2ce.com/ILLW/2001**. Notify Mike, GM4SUC, at **gm4suc@compuserve.com** if you spot an error or omission.

J3, Grenada and J8, St Vincent

The Low Land DXpedition Team (LLDXT) recently announced their 6th Caribbean tour. This year's tour will take the team to the island of Carriacou, Grenada (NA-147) from August 2 to 15 and the island of Bequia, St Vincent (NA-025) from August 16 to 27. The team members will be Bouke, PA0ZH, Ronald, PA3EWP, Rob, PA5ET, and Dennis, PA7FM. The call signs will be J3/homecall and J8/homecall. They will use two Yaesu FT-1000MP transceivers with amplifiers and will be active around the clock on 10-160 meters on CW, SSB, RTTY and PSK31. Titanex has supplied a V160E vertical antenna to give the group a good low-band signal. As in past years, the LLDXT will have a Tour Web site, which will be updated daily with the latest information, on-line logs, tour diary, digital photos and digital pileup recordings. The LLDXT home page can be found at **www.qsl.net/lldxt/**. All QSLs will be managed again by Rob Snieder, PA5ET, Van Leeuwenstraat 137, 2273 VS Voorburg, The Netherlands.

OJ0—Market Reef

Trond, LA9VDA, Arne, LA3IKA, Bjorn, LA5UKA and Paul, LA6YEA, are going to Market Reef from August 5 to 8. The team will use their home calls /OJ0 on 2 through 160 meters CW, SSB and RTTY. Lars, OH0RJ, has also been invited to join the group. More details are expected on Trond's Web page at **www.qsl.net/la9vda**. QSL all stations via their home calls except LA6YEA, which go via LA9VDA.

TY—Benin

French operators Flo, F5CWU, Terry, F5MOO, Didier, F5AOV and SWL operator Sylvain, soon to be licensed, plan to be active from this semi-rare West African nation from August 9 to 31. Benin ranked #84 on the ARRL DXCC Most Wanted list. They expect to be active on all bands from 6 to 160 meters on CW, SSB, PSK31, RTTY and SSTV. At press time the team was still waiting for their licenses. For antennas they will use a 27-meter high vertical on the low bands, a 2-element homebrew quad on 12 and 17 meters, a 3-element homebrew quad on 10, 15 and 20 meters and a 5-element Yagi on 6 meters. For the low bands they will have a 500-W amplifier.

ZK1—North & South Cook Islands

A multinational group has announced plans for a DXpedition to both the North and South Cook Islands between mid October and mid November. First stop will be Manihiki (OC-014), in the North Cook Islands between October 18 and November 1. The team will operate a multiop in the CQ WW SSB DX Contest as ZK1CG. Next it's on to Rarotonga (OC-013), in the South Cook Islands between November 1 and 13. Activity is expected on 2 through 160 meters (excluding 30 meters) on CW and SSB. The team will be equipped with beams, verticals and dipoles. The operators include Ralph, VE7XF/ZK1AKX; John, AA7PM/ZK1APM; Bob, W7TSQ/ZK1ASQ; Roger, W7VV/ZK1VVV; Victor, ZK1CG and Tuatai, ZK1MA/ZK1CY. They are seeking donations, which can be sent to Roger Huntley, W7VV, 13710 235th St, Snohomish, WA 98296. Donations of $20 will receive a sand sample from Manihiki North Cooks. Donations of $100 or more receive a Manihiki pearl shell to mount on your wall or desk, or to use as an ashtray. Donations of $500 or more receive a Black Pearl from Manihiki Lagoon, a pearl shell and sand sample.

W9DXCC Convention in September

The 49th annual W9DXCC Convention will be held at the Holiday Inn in Rolling Meadows, Illinois on September 15, 2001. Some of this year's planned programs include 9M0M, YJ0PD, 4W/K7BV, PW0S and YK9A. There will also be talks on PSK31, propagation, QSL managers, RF Safety, IOTA and the ARRL and DXCC. DXCC card checking will also be performed. This year's dinner guest speaker will be recent CQ DX Hall of Fame member Bob Allphin, K4UEE. For more information, contact Bill Smith, W9VA, by e-mail to **w9va@aol.com**, or check the W9DXCC Web site at **www.qth.com/w9dxcc/**

WRAP UP

That's all for this month. Keep sending your pictures, stories, DX news and club newsletters. Thanks this month go to F5CWU, G3SXW, GM4SUC, KE3Q and PA5ET. Until next month, see you in the pileups!—*Bernie, W3UR*

The Hallicrafters SX-23

Hallicrafters introduced the SX-23 in the March 1939 *QST* in a big way. With a total of 10 pages of advertising, including a two-page-wide photo of the receiver, the debut was noticed by everyone. In the ad Bill Halligan, president of Hallicrafters, said, "Today we find ourselves building this ideal receiver, different from anything the Hallicrafters have produced in the past—new in conception, new in design, new in performance. Because its design is based on functional principles, and because it embodies the newest developments in the art of building communications receivers, it is extremely unconventional as compared to receivers designed even as late as a year ago."

Halligan didn't stop there. He also had the enclosure specially designed. The art deco styling of the cabinet and speaker is striking and makes it unique among communications receivers of this period. In fact, it is my belief that this may be the most beautiful receiver ever designed. Ironically, Hallicrafters never continued this elegant design in later receivers.

How the SX-23 was Developed

According to Halligan, it was several years earlier, in the wee small hours following a typical hamfest, that several well-known amateurs and communications engineers sat in a smoke-filled room discussing the ideal communications receiver. Each had his own pet ideas but, strangely enough for radio engineers, they agreed on several basic principles.

Returning to Chicago, two of the Hallicrafters engineers started to build this ideal receiver as a separate, private project of their own, purely experimental. As time passed the project grew and became the pet of the laboratory. At that time the design was far ahead of manufacturing techniques of the day, so it remained in the lab reminding everyone of the challenge they faced if they hoped to someday produce it.

As 1939 approached, manufacturing techniques had advanced to the point where the SX-23 could be built as a Hallicrafters receiver, at a price within the average amateur's purse. The company decided to go ahead with the project.

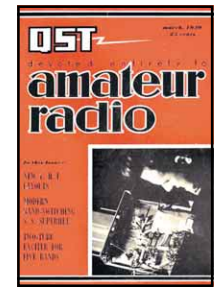
The introductory price was around $115. In succeeding months, *QST* ads show that many of the radio stores had affordable "time payments" for hams.

This is just one portion of the SX-23 advertising blitz that consumed 10 pages in *QST*.

The Hallicrafters SX-23 receiver.

There is a Story...

When I picked up my SX-23, I was told that Jim Robertson, K2EA, purchased it in March 1939 directly from Leo Meyerson, at his World Radio Labs in Council Bluffs, Iowa. Then a young engineer, Jim was traveling through Council Bluffs between work locations and missed his connection. Looking for something to do while waiting for the next bus, he visited WRL. Prominently on display was the radio he would fall in love with and purchase using Leo's "easy time payments of $15 per month."



The "birth" of the SX-23 was announced in the March 1939 *QST*.

The SX-23 became part of his travel baggage that spring. Eventually, when his work was done, he journeyed back to his New Jersey home by train.

His train arrived at the station late at night. Unable to carry everything, Jim left the receiver and speaker sitting on the station's platform while he walked several miles home. Returning an hour later with a relative's car, the SX-23 was still there waiting for him. A testament to Jim's care, the radio still looks almost new.

Conclusion

There are no official Hallicrafters records available, but it is believed that fewer than 5000 SX-23s were built, making it hard to find the radio today.

I want to thank Bill Kleronomos, KD0HG, and *Electric Radio* magazine for contributing to this article. I would recommend anyone interested in the SX-23 to read Bill's extensive article in the March 1992 *Electric Radio* (issue 35). Back issues are available for $3.25 delivered in the US. Please contact Electric Radio, 14643 County Rd G, Cortez, CO 81321-9575.

I will have the ten pages of SX-23 ads mentioned above, along with additional SX-23 information, on my Web site at **www.eht.com/oldradio/arrl/index.html**. QST

John Dilks, K2TQN ♦ 125 Warf Road, Egg Harbor Township, NJ 08234-8501 ♦ k2tqn@arrl.org

A Pickup with Pizzazz

What do you do with a 12-year-old truck with a decided lack of radio gear? Why, you turn it into a mobile QRP station, that's what! My old Ford F-150 pickup truck was starting to look like Ed Hare's, W1RFI, Deathmobile. Since Ed's truck is a world class clunker, I decided not to compete with him in "The Rustiest Pickup Truck in Ham Radio Contest." Late last year I sprung for a new engine and followed that up with a dark blue metallic paint job. What a difference! I told the guys at the body shop to mount two Hustler ball mounts, one on each side of the bed, near the tail gate. A $^5/_8$-wavelength 2-meter antenna was installed in the center of the cab roof. Hey, I was all set to throw some radio gear into the truck and drive off into the sunset. "The best laid plans..." What I found out in putting my mobile QRP station together is worth describing here.

Figure 1—My QRP sandwich: Elecraft K1 at the top, ICOM 2-meter transceiver in the middle, attached to a RadioShack scanner.

Figure 2—A modified Posse Box serves as my clock, clipboard and storage bin.

Start with a Plan

Mobile QRP operation is a real eye opener. First of all, let me quickly explain that I *do not* operate while in motion. I don't recommend you do, either. Since I find it difficult to walk and chew gum at the same time, for me to try driving my truck while operating CW would be an accident waiting to happen!

When I first started seriously considering mobile HF QRP operation, I made a list of the things I would need to outfit my mobile station properly. First on that list was a mobile antenna system. In the past, I had used several different makes of mobile HF antennas with varying degrees of frustration. One of the problems I had encountered in these early attempts was trying to obtain a good RF ground plane from my Subaru Outback, one of the new breed of vehicles that uses polymer/composite body panels. Bonding and grounding on newer vehicles can be a real challenge. No HF antenna will work well unless it has a reflecting plane comprised of the vehicle body and frame. Getting the antenna bonded to the vehicle may take some real ingenuity on the part of the QRPer. This is less of a problem on older vehicles (like my truck) that do not use "plastic" body panels.

Hustling a Hustler

After polling several of the locals who regularly operate HF mobile, I settled on the Hustler mobile whip and resonator system. The Hustler system has been around for a number of years and is a proven performer. There are other HF antenna systems available that are larger and much more eyecatching than the Hustler, but I had to draw the line somewhere. I purchased the Hustler foldover mast (MO-2) along with the 40 and 20 meter standard resonators to start. The coax from each ball mount was routed up the frame and into the cab through grommets in the frame and floor of the cab, thanks to the guys at the body shop. They also assured me that the pickup box (bed) was securely bonded to the frame with several large bolts. I am confident that there is an adequate RF bond on each ball mount to the necessary metal mass of the truck.

Now, a Word about Power

Obtaining "clean" 12 V dc power for your mobile communications equipment in today's vehicles can be a unique experience. The trend toward using cigarette lighter adaptors is to be avoided at all costs. There is an above average chance of picking up noise from onboard systems and feeding that noise directly into your rig via the power cable. You've got enough of a challenge to hear stations using an electrically short HF whip antenna without injecting additional noise into your receiving system via the vehicle's onboard computer systems, servo and fan motors and digital devices. Since the dc wiring for the cigarette lighter is bundled with other cabling in the vehicle wiring harness and can pick up extra noise from the vehicle systems, it's best not to trust the cigarette lighter as a source of dc voltage.

In my case, 12 V dc power was obtained directly from the pickup's battery via a commercial fuse block. Since the first piece of radio gear I installed was an ICOM 2 meter rig, I had a chance to debug the power system prior to installing the HF radio gear. Several of the locals complained about alternator whine on my transmitted 2 meter FM signals. In order to clean up the power buss, I installed a brute force power filter available from RadioShack. This LC circuit connects in series with the positive power cable and effectively bypasses all alternator and electrical system noise directly to ground *before* it has a chance to enter the dc power cabling. Gone was the annoying alternator noise and I felt confident that the dc power buss was as clean as I could make it.

The dc power cable was routed from the battery through the Ford's firewall via a handy grommet. A dab of silicone sealant around the grommet keeps moisture out of the cab. The cable I used was #12 AWG red/black zip cord available from most wire and cable distributors at ham fests. Fuses were installed at the battery in case the power cable shorted due to vehicle vibration over time. Initially, this power cable was terminated in a MOLEX plug. A mating multiple MOLEX connector arrangement was engineered to distribute dc power to sev-

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ k7sz@arrl.org

eral radios. This is being replaced with an actual power distribution box that will be installed in the near future.

Keeping the RF from Becoming *RFI*

As long as we are talking about interference, remember that your radiated RF signals can cause interference to onboard computer systems in your vehicle. This is especially true if your vehicle was produced within the last 7-10 years. What worked in "the old days" to suppress RFI in older vehicles may, in fact, cause moderate to severe damage to today's modern cars and trucks. Many manufacturers have toll free numbers for folks to call to discuss installing "two-way radio" equipment. Your vehicle owner's manual may even have a warning included, stating that the vehicle warranty is voided should you install any radio gear. Be sure to read your operating manual thoroughly and contact the car dealer where you bought the vehicle and/or your vehicle's manufacturer prior to any radio installation. These folks are your first line of defense when it comes to installing radio gear. The last thing you want to do is void the factory warranty on your vehicle. For much more detailed information on RFI/EMI and mobile installations consult *The RFI Book* published by the ARRL (order #6834) and available from your local dealer or the ARRL Bookstore.

Where am I Gonna Put this Thing?

Mounting equipment can be almost as much of a challenge as getting clean power. With today's vehicles sporting plastic, curved dashboards, multi-function center consoles and very little usable space for radio gear, the prospective mobile operator faces a vexing series of problems when it comes to where to mount equipment. This holds true even for 12-year-old pickup trucks. My Ford F-150 has a lot of room in the cab but no place to attach any gear. The dashboard is essentially all plastic and cannot be trusted to hold several pounds of radio equipment under the constant vibration that is inherent to my truck.

After looking over the mobile installation of Bob Reynolds, WB3DYE, I had some inspiration. Bob's rigs were hung on a commercially manufactured metal "Christmas tree" bracket that was bolted to the floorboard. A machinist friend of mine took my crude sketches and transformed them into my version of Bob's Christmas tree. After bolting my creation to the transmission hump, I had ample room to hang radio gear in my truck. The ICOM 2 meter rig and RadioShack scanner are mounted together (Figure 1). Since I do not intend to operate HF while in motion, the HF rig is not permanently mounted. Instead, when I set up to operate HF, I place the rig (currently an Elecraft K1) atop the ICOM radio for ease of use.

Figure 3—New engine, new paint, new transceiver/ antenna installation, and voila: a pickup with pizzazz.

Keyer paddles are placed on an aluminum "Posse Box"[1] specifically designed for use by police officers to hold citations, pens/pencils, etc, while on patrol. The box has an integral clipboard and I have affixed two digital clocks to the top, one for local and the other for Zulu time (Figure 2). A tablet on the clipboard allows me to jot notes while the QSO progresses. Inside my box I keep QSL cards, an ARES notebook, repeater/ fire/PD frequency directory and Skywarn materials.

I Love it when a Plan Comes Together!

Once everything was in place, I used my MFJ antenna analyzer to adjust the whips in both resonators. Since I intend to operate only HF CW from the truck, I set up each resonator for minimal SWR on the QRP calling frequencies of 7040 kHz and 14060 kHz, respectively. Initial contacts netted QSOs with Bob Chapman, W9JOP/4 in Bealton, Virginia on 40 meters and Dick Baxter, K5TF, in Atlanta, Georgia on 20 meters. My location was the parking lot of my work place, which happens to be situated on the top of a large hill. Since that time, I have worked some overseas DX on 20 meters and a bunch of two-way QRP QSOs on 40, including Bob Reff, K2OGT/3 in Goldsboro, Pennsylvania.

It's nice to be able to sit in my truck at noon hour and make some QRP contacts. It is a fun time, and provides a welcome break from my classroom schedule. If you have ever entertained the idea of taking your QRP rig on the road, I hope you use the information in this column as a guide to setting up your own mobile station. The mobile environment can be a challenging undertaking, but it is an extremely rewarding endeavor. I'll be looking for QRP QSOs between 1500 and 1600Z daily, Monday through Friday.

Correction: In July's QRP Power, the web site of EPA QRP Club should have been written as **www.galls.com**. QST

[1]Posse Box, available from Galls, Inc, 2680 Palumbo Dr, Lexington, KY 40509-1000, Tel 800-477-7766, Web **www.galls.com**.

STRAYS

NORM STYER, AI2C

QST Congratulates...

◊…the Loudoun Amateur Radio Group for capturing first place in the 2001 Virginia QSO Party club competition. Denny Boehler, KF4TJI (left), president of the Loudoun Amateur Radio Group accepts the plaque from Dennis Bodson, W4PWF, ARRL Roanoke Division Director.

Previous • Next Strays

Confidence

Say "I can do it." Repeat 20 times. Save that thought. Repeat daily.

Have you ever thought about upgrading your skills, starting a business, getting involved with your radio club or other organization or trying something new (a new invention or a new hairstyle)? Did you get support from your friends and family or did you get a negative response? If you are like most women, you have often been on the receiving end of comments such as "that will never work," or "it's too difficult for you." As women, we often seek the advice and opinion of others and when the response is negative, will not challenge it—especially if the comment comes from a man or someone in authority. Does this self-imposed intimidation confine women to rigid roles? At times, yes, but times are changing.

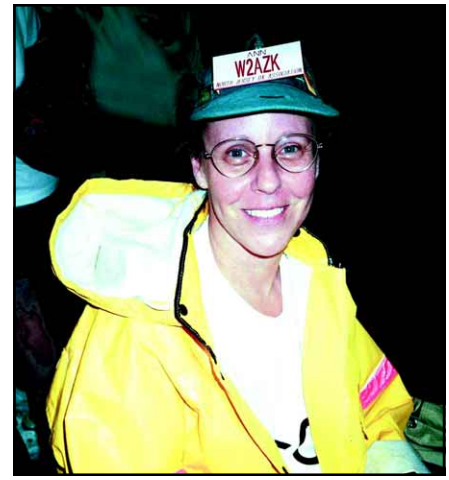
A group photo taken at the Buckeye Belle/YLRL booth at the Dayton Hamvention this past May. Seated, left to right: Carol Schmitkons, KI8IM, Buckeye Belles treasurer and YLRL receiving treasurer for Districts 8-10, KH6, KL7 and VE; Cheryl Muhr, N0WBV, YLRL 10th District chairwoman; Mary Moore, KL7P. Standing, left to right: Betty Mallay, KL7AP, nonham XYL Kathy and Diane, K2DO.

The 2001 Dayton Hamvention

Women's attitudes are definitely in a positive upswing. There is a "can do" attitude in women's groups that is contagious. The YLRL (Young Ladies Radio League) forum at the Dayton Hamvention in May was well attended and the attitude in the audience was elevated to say the least. At one point a list of amateur activities (DX, ARES, PSK31, RTTY and more) was read aloud and audience members were asked to stand if they were involved. Not only did many women jump to their feet, a large portion of the audience indicated that they were involved in more than one activity. Quite a few attendees were interested in learning more about specific topics and the YLs with experience were quick to offer help and information.

The forum, moderated by Kay Eyman, WA0WOF, emphasized the positive, with handouts that listed the many YLs who have been active on DXpeditions all over the world. Some examples were Vivien Johnson, KL7YL and her daughter Melissa, N9MAJ, who operated from Bhutan in January; Sandy Uthus, KT4YI, who operated in Belize and Holly Thompson, N0QJM, who operated from Easter Island. Another positive for women came from moderator Carole Perry, WB2MGP, who said that half of the Dayton Youth Forum speakers were YLs.

The Buckeye Belle/YLRL booth at the Hamvention always had a crowd. The Belles and the Chix on Six are two of Ohio's successful YL clubs. They are sponsoring the YLRL Convention to be held in Cleveland, August 2-4, 2002 (see **www.geocities.com/CapeCanaveral/Lab/3376/conventions.html** for more information). Other US clubs are WRONE, SAYLARC, PENS YL, Treasure Coast YL Group, Southern Belles, HAYLARC, TYLRUN, GAYLARK YLRC of LA, LARA, Two YL Club, TASYL, Colorado YLs and the Sunflower Group. Most hold regular meetings (and luncheons), have a newsletter, and HF and VHF nets. Two good sources for YL group Web pages are **www.qsl.net/ylrl/ylclubnet.html** maintained by Carol Hall, KC4IYD and **members.home.net/srarc/yl.html** run by the Stones River Amateur Radio Club of Tennessee. Clubs and nets are a great way to connect with other women amateurs and learn more about not only Amateur Radio, but the other interests that we share.



Ann Keegan, W2AZK, at the YLRL Forum at the Dayton Hamvention.

A Lesson in Determination

A few weeks after Dayton I went to another women's forum, this time at Americade—the world's largest motorcycle touring rally—held in Lake George, New York. There were about 60 women at the forum and many of their concerns were the same as the women at the YLRL forum: how to get experience, learn more and have fun. The moderator, Carol Youorski, said it all in two sentences: "You can do it just because you hear it said that you can. What you decide and are determined to do, you will do."

She shared an experience she had while on her way to the convention on her motorcycle. She had traveled about 100 miles alone with her bike loaded with gear and supplies. At a fuel stop, some guys in a car told her "You'll never make it up there [to the event] with all that stuff on your bike. It's too heavy for a woman." So what happened? When she left the gas station she felt unsure of herself and almost fell because the load that had been easy to manage for the last 100 miles suddenly felt too heavy for her. Those casual remarks had put a dent in her confidence. Her solution? Saying to herself, "I can do it"…and she did.

Whether it's riding a motorcycle or learning the Morse code, life is full of challenges. As women, we need to meet them head on. You *can* do it!—*33, Diane, K2DO* QST

Diane P. Ortiz, K2DO ♦ PO Box 296, Bellport, NY 11713 ♦ k2do@arrl.org

COMING CONVENTIONS

ARIZONA STATE CONVENTION

July 27-29, Flagstaff

The Arizona State Convention, sponsored by the Amateur Radio Council of Arizona, will be held at the Coconino County Fairgrounds; located at the Flagstaff Airport Exit 337, 3 miles S of I-40 on I-17. Hamfest hours are Friday and Saturday dawn to dusk, Sunday dawn to 2 PM; Exhibit Hall hours are Friday noon to 5 PM, Saturday 9 AM to 5 PM, Sunday 9 AM to 2 PM. Features include commercial booths, major manufacturers, special presentations, seminars, ARRL forum, nationally renowned speakers, VE sessions (Saturday, walk-ins only; registration 8:30 AM to noon), near-space ATV repeater balloon launch (Saturday), dinner (Saturday night), junque sale (Sunday). Talk-in on 146.98 (100 Hz). Admission is $1. Tables are $5 (limited number available). Contact Dave Reynolds, KE7QF, 1208 W Laird St, Tempe, AZ 85281; 480-731-4691 or 602-881-2722; **arcathill@aol.com**; **www.phx-az.com/ARCA**.

ALABAMA SECTION CONVENTION

August 18-19, Huntsville

The Alabama Section Convention, sponsored by the Huntsville Hamfest Assn, will be held at the Von Braun Center (South Hall), 700 Monroe St. Doors are open Saturday 9 AM to 4:30 PM, Sunday 9 AM to 2:30 PM. Features include giant dealer/manufacturer show, huge flea market (256-883-2760), exhibitors, vendors, forums (ARRL, MARS, Skywarn, QRP, and more; 256-539-8950), DX banquet (256-721-5996), VE sessions (10 AM sharp, both days; $10 test fee), Hospitality Rooms (Friday and Saturday nights at the Huntsville Hilton), convenient parking. Talk-in on 146.94. Admission is $6, under 12 free. Contact Don Tunstill, W4NO, 1215 Dale Dr SE, Huntsville, AL 35801; 256-536-3904; **dtunstil@hiwaay.net**; **www.hamfest.org**.

KANSAS STATE CONVENTION

August 19, Salina

The Kansas State Convention, sponsored by the Central Kansas ARC, will be held at the Salina Bicentennial Center Heritage Hall, Oakdale Park, 800 The Midway; from I-70 take the Ohio St Exit and turn S, at the 3rd stoplight (Greeley Ave) turn W (right), continue W on Greeley to the Bicentennial Center. Doors are open 8 AM to 4 PM. Features include large indoor air-conditioned flea market, commercial vendors, full slate of interesting forums and meetings, DX card checking, VE sessions (9 AM, walk-ins accepted), free parking, refreshments. Talk-in on 147.03, 443.9. Admission is $5. Tables are $15 ea (includes electricity). Contact Ron Tremblay, WA0PSF, 112 N Douglas Dr, Salina, KS 67401-3516; 785-827-8149; **rtremblay@kscable.com**; **home.kscable.com/wa0psf**.

MISSOURI STATE CONVENTION

August 25, Columbia

The Missouri State Convention, sponsored by the Central Missouri Radio Assn, will be held at the National Guard Armory, 5151 N Roger Wilson Dr; 4½ miles N of I-70 on Hwy 63N to Prathersville Exit, follow signs. Doors are open 8 AM to 2 PM. Features include forums, vendors, VE sessions, special guest speaker Dan Miller, K3UFG, (Field and Educational Services Dept Certification Specialist at ARRL HQ). Talk-in on 146.76. Admission is $4 in advance, $5 at the door. Tables are $10 (includes 1 admission). Contact Dale Huffington, AE0S, 2709 Cimarron Dr, Columbia, MO 65203; 573-875-6170; **dale@tranquility.net**; **www.qsl.net/cmra/hamfest2001.htm**.

WEST VIRGINIA STATE CONVENTION

August 25, Weston

The West Virginia State Convention, sponsored by the WV State AR Council, will be held at the Jackson's Mill and Convention Center; I-79, Exit 99, W on US Rte 33 to 4th stoplight, N on US Rte 19 to Jackson's Mill Rd. Doors are open 8 AM to 11 PM. Features include flea market, tailgating, dealers, forums, educational programs, meetings, demonstrations, auction sale (amateur equipment and other items), walk-in VE sessions, on site camping facilities, refreshments. Talk-in on 145.39. Admission is free. Tables are $5 (first-come, first-served). Contact Ann Rinehart, KA8ZGY, 1256 Ridge Dr, S Charleston, WV 25309; 304-768-9534; **ka8zgy@arrl.net**; **www.qsl.net/wvsarc**.

July 20-22
Montana State, East Glacier*
Pacific Northwest DX, Everett (Seattle), WA*

July 26-29
Central States VHF Conference, Fort Worth, TX*

July 27-28
Oklahoma State, Oklahoma City*

August 3-4
South Texas Section, Austin*

August 4-5
Eastern Washington Section, Spokane*

August 5
Western New York Section, Williamsville*

September 14-15
W9DXCC, Rolling Meadows, IL

September 14-16
Illinois State, Peoria

September 15
Arkansas State, Little Rock

September 22-23
Virginia State, Virginia Beach

October 7
Connecticut State, Wallingford

*** See July *QST* for details.**

NEW MEXICO STATE CONVENTION

August 25-26, Rio Rancho/Albuquerque

The New Mexico State Convention (Duke City Hamfest), sponsored by the New Mexico Hamvention/Duke City Hamfest Committee, will be held at the Rio Rancho National Guard Armory, 4001 Northwest Loop; take I-25 to Bernalillo, W on US 550 (NM-44), approximately 8 miles to the Armory (watch for signs). Doors are open Saturday 8 AM to 5 PM, Sunday 8 AM to 1 PM. Features include flea market, vendors, dealers, tailgating ($5), forums (ARRL, ARES/RACES), satellite demos, T-hunts, antique displays, VE sessions, RV parking (no hookups). Talk-in on 145.33 (100 Hz), 444.0 (100 Hz). Admission is free. Tables are $12 (without power), $17 (with power or along the walls). Contact Marcus Lieberman, KM5EH, 2300 Hurley Dr NW, Albuquerque, NM 87120; 505-836-1724; fax 505-352-6154; **km5eh@arrl.net**; **www.qsl.net/dchf**.

EASTERN VHF/UHF CONFERENCE

September 1-2, Enfield, CT

The Eastern VHF/UHF Conference, co-sponsored by the Eastern VHF/UHF Society and the North East Weak Signal Group, will be held at the Radisson Hotel. Doors are open Saturday 8 AM to 11 PM, Sunday 8 AM to 1 PM. Features include flea market, lectures, lab sessions, noise figure and antenna measurements, banquet. Admission is $20 in advance, $25 at the door. Tables are $5 (flea market only, Sunday). Contact Bruce Wood, N2LIV, 3 Maple Glen Ln, Nesconset, NY 11767; 631-265-1015 (home) or 631-293-9600 (work); **bdwood@erols.com**.

SOUTHWESTERN DIVISION CONVENTION

September 7-9, Riverside, CA

The Southwestern Division Convention, sponsored by the Inland Empire Council of Amateur Radio Organizations (IECARO), will be held at the Riverside Convention Center and Holiday Inn, 3400 Market St; exit Mission Inn Dr from the 91 Freeway in Riverside, follow directions to the Convention Center. Features include ARRL President Jim Haynie, W5JBP, opening the convention on Friday afternoon with the keynote address; vendors; exhibits; forums (ARRL, antenna and propagation, contesting, DX, VHF/UHF, QRP); demonstrations of Public Safety Organizations; Satellite Workshop; Special Event Station; local area T-hunt; VE sessions (Saturday, Holiday Inn, all license classes; registration 8 AM, exams 9:15 AM, $10 fee for each test); Hospitality Suite; technical programs; banquet (Saturday, $33; special guest speaker Dr. H. Paul Shuch, N6TX, of the SETI League); DX Breakfast (Sunday, $17.50); free parking; handicapped accessible; refreshments. Talk-in on 146.85, 146.88 (146.2 Hz), 146.52. Admission is $12.50 in advance (by Aug 20), $15 at the door (or after Aug 20); under 17 free when accompanied by a paying adult. Contact Judy Lowman, W6YBS, 7726 Ditmar Ave, San Bernardino, CA 92410-4717; 909-862-1886 (home) or 909-941-2367 (work); **jalowman@ix.netcom.com**; **www.qsl.net/arrl-2001swdc/**.

KENTUCKY STATE CONVENTION

September 8, Louisville

The Kentucky State Convention, sponsored by the Greater Louisville Hamfest Assn, will be held at the Bullitt County Fairgrounds, approximately 20 miles S of Louisville on I-65; take Exit 112 and go E. Doors are open for setup Friday starting at noon; public Saturday 8 AM to 3 PM. Features include hamfest and computer show, indoor flea market (Richard Pumphrey, WN9DDV, 859-284-9090), outdoor tailgating (car $3, camper $5), commercial vendors ($30 per space with 2 tables; bring your own extension cords), foxhunt (noon), ARRL booth, VE sessions (registration 8 AM, testing 9 AM to 2 PM), Special Event Station, free overnight camping (Friday night; Carlos York, KB9KOI, 812-294-4021), free parking. Talk-in on 146.7 (151.4 Hz). Admission is $6 in advance, $7 at the door. Tables are $16 (8-ft); $10 for space only (no table). Contact Herb Rowe, W4WQD, 5612 Hwy 160, Charlestown, IN 47111; 812-294-4905; **wd4ixl@juno.com**; **www.thepoint.net/~glha**.

WESTERN PENNSYLVANIA SECTION CONVENTION

September 9, Butler

The Western Pennsylvania Section Convention, sponsored by the Butler County ARA, will be held at the Butler Farm Showgrounds, Rte 68; 3 miles SW of Butler. Doors are open 8 AM to 4 PM. Features include flea market, new product displays, special forums, refreshments. Talk-in on 147.36. Admission is $5. Tables are $15 (8-ft, indoor, with electricity); outside space $5. Contact Kevin Berry, KF4RMA, 380 Three Degree Rd, Renfrew, PA 16053-9375; 724-586-1182; **kf4rma@arrl.net**; **www.qsl.net/w3udx/**.

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.

Gail Iannone ♦ Convention Program Manager

HAMFEST CALENDAR

Attention: The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **August 1** to be listed in the **October** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

Alabama (Huntsville)—Aug 18-19, Alabama Section Convention. See "Coming Conventions."

Arizona (Flagstaff)—Jul 27-29, Arizona State Convention. See "Coming Conventions."

†**Arkansas (Mena)—Sep 7-8;** 7 AM to 5 PM. *Spr:* Queen Wilhelmina Hamfest Assn. Queen Wilhelmina State Park, 13 miles W of Mena on Hwy 88. Flea market, dealers, ARRL forum, Skywarn Repeater Council Meeting, VE sessions. *TI:* 146.79 (100 Hz). *Adm:* Free. Tables: bring your own tables; space under tent $10, outside space $5. Charlotte Lee, KC5DOR, 415 Crosstrails Rd, De Queen, AR 71832; 870-642-7656 (home) or 870-642-2234 Ext 107 (work); **clee48@ipa.net**; **QWHA.ORG**.

†**California (Chico)—Aug 4.** *Spr:* Golden Empire ARS. University Farm Pavilion, 311 Nicholas Schouten Ln; from Chico go S on Midway toward Durham, turn right on Hegan Ln, go 1.2 miles to University Farm, turn left. Swapmeet, tailgating ($5), VE session (9 AM), foxhunt, pancake breakfast. *TI:* 146.85. *Adm:* Free. Tables: $5. Ed Everett, KI6MX, 4495 County Rd 202, Orland, CA 95963; 530-865-7432; **ki6mx@w6rhc.org**.

California (Riverside)—Sep 7-9, Southwestern Division Convention. See "Coming Conventions."

†**California (Santa Barbara/Goleta)—Aug 12,** 8 AM to 3 PM. *Spr:* Santa Barbara ARC. Elks Picnic Grounds, 150 N Kellogg Ave; take Hwy 101 to Patterson Ave, N to Calle Real, W to Kellogg Ave. Vendors, ARRL booth and bookstore, displays, contests, VE sessions (8:30 AM), Santa Barbara style BBQ. *TI:* 146.79 (131.8 Hz). *Adm:* Free. Al Soenke, WA6VNN, 497 Camino Talavera, Goleta, CA 93117; 805-562-2694; **wa6vnn@sbarc.org**; **www.sbarc.org**.

†**California (Vacaville)—Sep 1,** 9 AM to 1 PM. *Sprs:* Vaca Valley RC and Western States Weak Signal Society. Larry Hogue's house, 7372 Paddon Rd; I-505, exit Midway Rd, go W 1/2 mile, turn right onto Paddon Rd, third driveway on right. Flea market, VUCC checking, VE sessions (1 PM), refreshments. *TI:* 441.15 (77 Hz), 145.47 (127.3 Hz). *Adm:* Free. Larry Hogue, W6OMF, 7372 Paddon Rd, Vacaville, CA 95688-9634; 707-452-9701; **w6omf@cwnet.com**.

Connecticut (Enfield)—Sep 1-2, Eastern VHF/UHF Conference. See "Coming Conventions."

Florida (Fort Pierce)—Aug 18. Ladd Sajor, W2KGV, 561-878-9710.

†**Florida (Tampa)—Aug 25,** 8 AM to 1 PM. *Spr:* Tampa ARC. TARC Club House Center, 7801 N 22nd St; I-275 to Sligh Ave Exit, E on Sligh Ave to 22nd St, left (N) on 22nd St, go to end of road. Indoor swap tables, tailgating, free parking, refreshments. *TI:* 147.105 (146.2 Hz). *Adm:* $2 ($3 additional for tailgate space). Tables: $15 (first table), $10 (for each additional table). Biff Craine, K4LAW, 13515 Greenleaf Dr, Tampa, FL 33613; 813-265-4812 (eves); **k4law@arrl.net**; **www.hamclub.org**.

Illinois (Danville)—Aug 26. Curt Chambers, WX9EMA, 217-766-5208.

†**Illinois (Joliet)—Aug 26.** *Spr:* Bolingbrook ARS. Joliet Park District (Inwood Center), 3000 W Jefferson St; I-55 to Rte 52 (Jefferson St), go E 1 mile to Center. Flea market, vendors, VE sessions, overnight parking (no services), plenty of parking, refreshments. *TI:* 147.33, 224.54. *Adm:* advance $4, door $5. Tables: $8 and $12. Joe Cassata, KA9CAI, 10 S Meadow Ln, Naperville, IL 60564; 630-420-0342; fax 630-257-7468; **tb1303@mediaone.net**; **www.geocities.com/k9bar**.

†**Illinois (Peotone)—Aug 12,** 6 AM to 2:30 PM. *Spr:* Hamfesters RC. Will County Fairgrounds; I-57 to Peotone Exit 327 (go E 1 mile). *TI:* 146.64, 146.52. *Adm:* advance $5 (with double stub), door $6 (with single stub). Robert Nelson, WB9WFR, 1720 Vollmer Rd, Flossmoor, IL 60422; 708-756-7984; **wb9wfr@arrl.net**; **hamfesters.org**.

†**Illinois (Quincy)—Aug 11,** 8 AM to 2 PM. *Spr:* Western Illinois ARC. Eagles Alps, Eagles Alps Grounds, 3737 N 5th St; 4.5 miles N of downtown Quincy with easy access from US Hwy 24. Ham Radio and Computer Swapfest, indoor flea market, outdoor tailgating (free with paid admission), VE sessions (12:30 PM, all license classes; 217-224-8526; **na9q@arrl.net**), DXCC card checking (8-11 AM), plenty of convenient parking, refreshments. *TI:* 147.03. *Adm:* advance $4, door $5, under 12 free. Tables: $10 (first table), $16 (for 2 tables), $21 (for 3 tables); each additional table after 3 is $5. Bob Crockett, N9KUT, Box 3132, Quincy, IL 62301; 217-222-4467; **w9awe@arrl.net**; **www.qsl.net/w9awe**.

†**Indiana (Greentown)—Aug 12;** set up Saturday 6-8 PM, Sunday 6-8 AM; public 8 AM to 1 PM. *Sprs:* Kokomo and Grant County ARCs. Lions Club Fairgrounds; 15 miles E of Kokomo, 25 miles W of Marion, 3 blocks N of Hwys 22/35, follow signs. Vendors, tailgating ($3 per space), VE sessions (anyone who obtains a Tech license at our testing session will be admitted free), handicapped parking. *TI:* 146.79, 146.91. *Adm:* advance $4, door $5, under 13 free. Tables: $8 (inside). L. B. (Nick) Nickerson, K9NQW, 517 N Hendricks Ave, Marion, IN 46952-2319; 765-668-4814; **k9nqw@skyenet.net**; **www.grantarc.com/greentown.html**.

†**Indiana (Lafayette)—Aug 19,** 8 AM to 2 PM. *Spr:* Tippecanoe ARA. Tippecanoe Fairgrounds, 1401 Teal Rd (SR 25); 60 miles NW of Indianapolis on I-65. Indoor/outdoor vendors, VE sessions, free parking. *TI:* 147.135 (88.5 Hz), 443.775 (88.5 Hz). *Adm:* $4. David Dull, WB9BRX, 49 Knoll Crest Ct, W Lafayette, IN 47906; 765-743-8305; **dave@dullville.com**; **www.w9reg.org**.

Indiana (LaPorte)—Aug 25. Neil Straub, WZ9N, 219-324-7525.

†**Indiana (Spencer)—Sep 8,** 9 AM. *Sprs:* Owen County ARA and Bloomington ARC. Owen County Fairgrounds; State Rd 46 (Morgan St) to East St, turn S to Fairgrounds. Forums, contests, VE sessions. *TI:* 146.985. *Adm:* $3. Tables: $5. Millard Qualls, K9DIY, 2129 S Rogers St, Bloomington, IN 47403; 812-332-0074; **w9inl@arrl.net**; **www.bloomingtonradio.org/hamfest**.

†**Iowa (Amana)—Aug 12,** 8 AM. *Spr:* Cedar Valley ARC. Amana Convention Center, 39 38th Ave; I-80, Exit 225, N on US Rte 151, right at "T", left at 4-way at Amana, right before Lily Pond, follow signs. Flea market, ham and computer vendors, air-conditioned exhibit hall, forums, VE sessions (walk-ins accepted), lots of parking, free coffee. *TI:* 146.745, 146.52. *Adm:* $5. Tables: $10. Chuck Bassett, N0UTS, 207 7th Ave, Hiawatha, IA 52233; 319-378-0448; **n0uts@rf.org**; **cvarc.rf.org/**.

Kansas (Chanute)—Aug 18. Charlie Ward, WD0AKU, 316-431-6402.

Kansas (Salina)—Aug 19, Kansas State Convention. See "Coming Conventions."

†**Kentucky (Lexington)—Aug 12,** 8 AM to 4 PM. *Spr:* Bluegrass ARS. National Guard Armory, 4301 Airport Rd; from I-75/I-64 Exit 115, KY 922 S 1.5 miles, New Circle Rd W 4.6 miles; US 60 W 1.5 miles, Man O' War Blvd S 1.3 miles; Parkers Mill Rd W 1.2 miles, Airport Rd N, left into Armory grounds. Forums (ATV, ARRL, ARES), electrical safety around power lines demonstration, VE sessions, special-event station. *TI:* 146.76. *Adm:* advance $5, door $6. Tables: advance $15, door $25. John Barnes, KS4GL, 216 Hillsboro Ave, Lexington, KY 40511-2105; 859-253-1178; **ks4gl@juno.com**; **www.BluegrassARS.org/**.

Kentucky (Louisville)—Sep 8, Kentucky State Convention. See "Coming Conventions."

†**Maine (St Albans)—Aug 11,** 8 AM to noon. *Spr:* Piscataquis ARC. SnoDevils Snowmobile Club, N of St Albans on Rte 152 (Todd's Corner Rd). Tailgating (free), VE sessions (10 AM, all classes), camping/RV spaces (no hookups), free parking, refreshments. *TI:* 147.39, 146.52. *Adm:* $5, under 12 free. George Dean, WA1JMM, Box 365, Brownville Junction, ME 04415; 207-965-8864; **wa1jmm@midmaine.com**; **www.qsl.net/parc/**.

Massachusetts (Cambridge)—Aug 19. Nick Altenbernd, KA1MQX, 617-253-3776.

†**Massachusetts (Orange)—Sep 9;** sellers 6 AM, buyers 8 AM to 2 PM. *Spr:* Mohawk ARC. Elks Lodge No 1837, 92 New Athol Rd; Rte 2 (E or W) to Exit 16, then Rte 202 N to Junction of Rte 2A, left on Rte 2A to Orange, Elks is 1 mile on left. *TI:* 145.37, 146.58. *Adm:* $3, under 12 $1. Tables: advance $8, door $12. John Dould, AE1B, 22 S Athol Rd, Athol, MA 01331; 978-249-5905; **ae1b@gis.net**.

Massachusetts (South Dartmouth)—Sep 9. Tim Smith, N1TI, 508-758-3680.

†**Michigan (Grayling)—Sep 8,** 8 AM to noon. *Spr:* ARA of Hansen Hills. Hansen Hills Recreation Center, 7601 Old Lake Rd; M-72 W from Grayling to M-93, S on M-93 approximately 1 mile, left on Old Lake Rd, follow signs. VE sessions (all classes), ample parking. *TI:* 145.13. *Adm:* $2. Tables: $5 (per 6-ft). John Schultz, N8YSS, 3729 E Branch Rd, Grayling, MI 49738; 517-348-4966; **jschultz@i2k.net**; **www.arahh.org/swapshop.html**.

†**Michigan (Jackson/Vandercook Lake)—Aug 11,** 8 AM to noon. *Spr:* Cascades ARS. Jackson Community College, 2111 Emmons Rd; US 127 to M-50, M-50 W to Hague Rd, S on Hague to Emmons, W on Emmons to College entrance. Trunk sales ($5), VE sessions. *TI:* 146.88. *Adm:* $5. Tables: $15 (wall), $10 (regular). Dennis Byrne, KC8IJZ, 10265 Mack Island Rd, Grass Lake, MI 49240; 517-522-4058; **byrneda@voyager.net**; **www.qsl.net/cars-jxn**.

†**Minnesota (Rush City)—Sep 8,** 8 AM to 11 AM. *Spr:* East Central Minnesota ARC. Rush City High School; I-35, Rush City Exit, go 1 block E, then 1 block N to High School. QLF contest, ARES info. *TI:* 145.33. *Adm:* $3. Tables: $5. Larry Jilek, KA0MEN, 51835 Belle Isle Dr, Rush City, MN 55069; 320-358-4205; **lj@ecenet.com**.

†**Minnesota (St Joseph)—Aug 12;** set up 8 AM; public 9 AM to 2 PM. *Spr:* St Cloud ARC. Del-Win Ballroom, 1985 88th Ave; I-94 to Hwy 75. Swapfest, dealer displays, flea market ($5 per parking space), VE sessions (1 PM), free parking, free coffee, refreshments. *TI:* 147.015, 146.94. *Adm:* $5. Tables: $10. Jack Maus, W0MBD, 12647 210th St, Cold Spring, MN 56320; 320-685-8295; **w0mbd@arrl.net**; **www.w0sv.org**.

Missouri (Columbia)—Aug 25, Missouri State Convention. See "Coming Conventions."

†**Missouri (St Charles)—Aug 26,** 6:30 AM to 1 PM. *Spr:* St Charles ARC. VFW Hall, 66 VFW Ln; Hwy 70, S on Hwy 94, go 1 mile, turn right on Pralle for about 500 ft, turn left on Old Hwy 94, Hall is 1/4 mile on right. Flea market, vendors, new and old ham-related equipment, tailgating ($7 per parking space), live demonstrations (packet, ATV, moon bouncing), free forums, ARRL representative, VE sessions. *TI:* 146.67. *Adm:* Free. Tables: $12 (inside air-conditioned hall). Ken Fieser, KB0VLN, 2315 Entity, St Louis, MO 63114-1835; 314-428-4383; **kfieser@aol.com**; **www.qth.com/wb0hsi/**.

†ARRL Hamfest

Gail Iannone ♦ Convention Program Manager

†**New Jersey (Bayville)—Aug 12;** set up 6 AM; public 8 AM. *Spr:* Jersey Shore ARS. Bayville Firehouse, Rte 9 S; Garden State Parkway to Exit 80, take Rte 9 S to Bayville, approximately 5 miles S of Toms River. Vendors, VE sessions (registration 11:00 AM, exams 11:15 AM), refreshments. *TI:* 146.91 (127.3 Hz). *Adm:* $5, nonham spouses and under 15 free. Tables: $15 (includes 1 admission). Ed Genoino, WA2NDA, Box 295, Toms River, NJ 08754-0295; 609-971-2792; **wa2nda@aol.com**; **www.jsars.org/**.

†**New Jersey (Mullica Hill)—Aug 19,** 8 AM to 2 PM. *Spr:* Gloucester County ARC. 4-H Fairgrounds, Rte 77; from Commodore Barry Bridge follow Rte 322 E to Rte 45, then follow Rte 45 S to Rte 77, continue S for another 1 1/2 miles, Fairgrounds are on left. Ham Radio/Electronics/Computer Flea Market, dealer displays, tailgating ($5), antique and vintage radios, VE sessions (9:30 AM), free parking, refreshments. *TI:* 147.18. *Adm:* advance $4, door $5, nonham spouses and under 12 free. Tables: $10 (covered pavillion space). Harry Bryant, AA2WN, 117 Highland Ave, Pennsville, NJ 08070; 856-478-4738; **hbryant@excelonline.com**; **www.gcarc-w2mmd.org**.

†**New Jersey (Oakland)—Aug 18;** sellers 6 AM; buyers 8 AM to noon. *Spr:* Ramapo Mountain ARC. American Legion Hall, 65 Oak St, I-287 to Exit 58, US 202 S, turn right onto Oak St, hamfest on left. Ham Radio/Computer Flea Market, vendors, tailgating ($8), refreshments (kitchen opens at 7 AM). *TI:* 146.49, 146.52. *Adm:* $4, nonham spouses and kids free. Tables: $10. Steve Oliphant, N2KBD, 10 Glen Rd, Ringwood, NJ 07456-2331; 973-962-4584; fax 973-962-6210; **rmarc@qsl.net**; **www.qsl.net/rmarc**.

†**New Mexico (Alamogordo)—Sep 1.** *Spr:* Alamogordo ARC. Fairgrounds, N White Sands Blvd; N end of town, E of Shopping Mall. Forums (ARRL, MARS, Road Runner Net), VE sessions, table to test your gear. *TI:* 146.8. *Adm:* Free. Tables: $5. June Richmond, K5BHE, 1109 Monroe Ave, Alamogordo, NM 88310; 505-437-0298; **k5lrw@zianet.com**; **www.zianet.com/aarc/**.

New Mexico (Rio Rancho/Albuquerque)—Aug 25-26, New Mexico State Convention (Duke City Hamfest). See "Coming Conventions."

†**New York (Ballston Spa)—Sep 8;** set up Friday 6-8:30 PM; public Saturday 7 AM to 3 PM. *Spr:* Saratoga County RACES. Saratoga County Fairgrounds; I-87 to Exit 12, W on Rte 67 to Ballston Spa, follow hamfest signs. Commercial vendors, new and used equipment, computer software and hardware, tailgating ($5 per space, includes admission), auction, foxhunt, on site radio test area, VE sessions, free parking, refreshments. *TI:* 147.0, 147.24. *Adm:* $5. Tables: $5 (reservations and prepayment welcomed and encouraged; first-come, first-served basis). Darlene Lake, N2XQG, 314 Louden Rd, No 84, Saratoga Springs, NY 12866; 518-587-2385; **lake@capital.net**; **www.capital.net/users/lake**.

†**New York (Bethpage)—Sep 9;** set up 7 AM; public 8:30 AM to 1 PM. *Spr:* Long Island Mobile ARC. Briarcliff College, 1055 Stewart Ave. Electronics Hamfair and Flea Market, vendors, tailgating ($15 per space, includes 1 admission, additional workers $6 each; no advanced registration needed), equipment, computers, accessories, VE sessions, tune-up clinic. *TI:* 146.85 (136.5 Hz). *Adm:* $6, nonham sweethearts and under 13 free when accompanied by paying parent. Ed Muro, K2EPM, Box 392, Levittown, NY 11756-0392; 516-520-9311 (24-hour info line); **hamfest@limarc.org**; **www.limarc.org**.

†**New York (Margaretville)—Aug 25;** set up 6 AM; public 8 AM to 3 PM. *Spr:* Margaretville ARC. Margaretville Fireman's Field, behind A&P; at the junction of State Rtes 28 and 30. Tailgating ($7), VE sessions (11 AM). *TI:* 146.985, 449.125, 146.52. *Adm:* $4. Tables: $15 (table and space, includes 1 admission), $10 (space only). Lester Bourke, KB2DCE, HC 2, Box 126-C, Margaretville, NY 12455; 845-586-2324; **bourke@catskill.net**; **www.catskill.net/marc**.

†**New York (Westmoreland)—Aug 11,** 8 AM. *Spr:* Rome Radio Club. Westmoreland Fire Department; NYS Thruway to Exit 32, after toll booth turn right, then left onto Rte 233. Vendors, tailgating (free), programs. *TI:* 146.88. *Adm:* $5. Tables: $5 each (vendors 6 for $25). Russell Schorer, KB2MAS, Box 327, Clark Mills, NY 13321-0327; 315-853-8739; **kb2mas@gpoconnect.net**.

†**New York (Yonkers)—Aug 26.** *Spr:* Yonkers ARC. Saunders Trade and Technical School. Flea market, tailgating, VE sessions, refreshments. *TI:* 146.865. *Adm:* $5. Tommy Monzon, W5ACT, 21 West Ln, South Salem, NY 10590; 914-533-2892 (home) or 203-794-2665 (work); **w5act@arrl.net**; **www.yarc.org**.

†**North Carolina (Shelby)—Sep 1-2;** gates 6 AM, buildings 8 AM to 5 PM. *Spr:* Shelby ARC. Cleveland County Fairgrounds, on Hwy 74 Business; I-85 S to US 74 (W to Shelby), to US 74 Business, 1/4 mile on right. Forums, VE sessions. *TI:* 146.88. *Adm:* advance $5, door $6. John Ledford, W4JL, 3410 Oakcrest Dr, Shelby, NC 28150; 704-482-4507; **w4jl@shelby.net**; **www.shelby.net/n4fan**.

†**Ohio (Findlay)—Sep 9,** 8 AM to 3 PM. *Spr:* Findlay ARC. Hancock County Fairgrounds, 1017 E Sandusky St; State Rte 568, 1 mile E of Main St. *TI:* 147.15. *Adm:* $5. Tables: $14. Bill Kelsey, N8ET, 3521 Spring Lake Dr, Findlay, OH 45840; 419-423-4604; **kanga@bright.net**; **www.bright.net/~kanga/w8ft/hamfest.html**.

Ohio (Friendship)—Aug 18. Jack King, KB8NBI, 740-372-5811.

†**Ohio (Warren)—Aug 19;** 6 AM (flea market), 8 AM (inside sales). *Spr:* Warren ARA. Kent State University Trumbull Campus, 4314 Mahoning Ave NW; at the intersection of Rtes 5 and 82 Bypass and Rte 45; entrance will be at Educational Highway which is the second road N of the By-Pass off Rte 45 to the right. Flea market ($5 per 10-ft outside space), forums (antenna, VHF, packet, computer), CW contest, VE sessions (registration 9:30 AM, testing 10 AM). *TI:* 146.97, 443.0. *Adm:* $5. Tables: $10 (8-ft, inside, plus admission). Renee McCaman, KB8SVF, 317 Raymond Ave NW, Warren, OH 44483; 330-847-8478; **mccaman@cboss.com**; **www.onecom.net/wara**.

Ontario (Carp)—Sep 1. Greg Danylchenko, VE3YTZ, 613-236-9291.

†**Pennsylvania (Bartonsville)—Sep 8;** set up 6 AM; public 8 AM to 4 PM. *Sprs:* Eastern PA ARA and Pocono ARK. Monroe County Vo-Tech School, Laurel Lake Dr. Electronics Exposition, vendors ($15 inside space, $5 outside space), exhibitors, new and used equipment, computers, VE sessions, forums and discussion groups, various area public service agencies, refreshments. *TI:* 147.045 (131.8 Hz), 146.865 (100 Hz), 146.535. *Adm:* $5, children and spouses free. Bill Connelly, W3MJ, RR 3, Box 3165, E Stroudsburg, PA 18301; 570-424-0845 or 570-424-2174; **wbc@epix.net**; **www.qsl.net/n3is**.

Pennsylvania (Butler)—Sep 9, Western Pennsylvania Section Convention. See "Coming Conventions."

Pennsylvania (Lewistown)—Aug 4. Richard Yingling, WB3COB, 717-242-1882.

†**Pennsylvania (Matamoras)—Aug 12;** sellers 7:15 AM, buyers 8 AM. *Spr:* Tri-State ARA. Airport Park, 7th St; Exit 11 off I-84, go 1.3 miles N on Rtes 6 and 209, take right onto 7th St. Tailgating ($7, includes admission), lots of parking, refreshments. *TI:* 145.35 (100 Hz), 146.76 (100 Hz). *Adm:* $5. Tables: $10. Carl Will, KB3DHN, Box 1012, Dingman's Ferry, PA 18328; 570-828-7622; **kb3dhn@mercurylink.net**; **www.qsl.net/k3tsa**

†**Pennsylvania (New Kensington)—Aug 26,** 8 AM to 2 PM. *Spr:* Skyview Radio Society. Skyview Club House, 2335 Turkey Ridge Rd; from the intersection of Rtes 380 and 366, take 366 W toward New Kensington, go approximately 1 mile and turn right onto Whitten Hollow Rd, go 1/2 mile, turn right onto Turkey Ridge, Club House is on left at top of hill. Flea market ($5 per spot). *TI:* 146.64 (131.8 Hz). *Adm:* Free. Robert Livrone, N3WAV, 116 Arizona Dr, Lower Burrell, PA 15068; 724-339-9607; **n3wav@arrl.net**; **www.microconnect.net/~ggross/skyview.htm**.

†**Pennsylvania (Shrewsbury)—Aug 12,** 7 AM to 3 PM. *Sprs:* Southern PA Comm. Grp, Hilltop Transmitting Assn, and York ARC. Shrewsbury Firehall and grounds, 25 W Forrest St; Exit 1 off I-83, take Rte 851 W, go 1/2 mile to Firehouse on right. Ham and Computer Swapfest, mid-morning fun auction, tailgating ($3 per space), VE sessions (Saturday, Aug 11, Shrewsbury Borough Building; registration 9:30 AM, testing 10 AM; Carol, KC6GMN, **carol@nfdc.net**), refreshments. *TI:* 146.7. *Adm:* $5. Tables: $10. Cecil Mundorff, K3DCU, 2085 Delta Rd, Felton, PA 17322-7979; 717-927-6662; fax 717-927-9282; **k3dcu@juno.com**; **www.carli-online.com/hamfest**.

†**Tennessee (Lebanon)—Aug 26.** *Spr:* Short Mountain Repeater Club. State Park; from Lebanon go S on Hwy 231 for 6 miles. *TI:* 146.91. *Adm:* Free. Roger Hughes, W4IV, 3301 Crestmont Dr, Murfreesboro, TN 37129; 615-893-5623.

Texas (Gainesville)—Aug 25. James Floyd, N5ZPU, 940-668-7511.

†**Washington (Graham)—Sep 8;** set up Friday 2-7:30 PM, Saturday 6-8:30 AM; public 9 AM to 3 PM. *Spr:* Radio Club of Tacoma. Frontier Park, Pierce County Fairgrounds, 21718 Meridian Ave E; from I-5 take Exit 127 to SR 512 E; go 8.6 miles to SR 161, turn right onto Meridian St, go S 7 miles to Frontier Park on your right. Flea market, VE sessions (10 AM, on site), Antique Station W7OS will be "On the Air," ham gear, commercial displays, computers, Country Store (consignment sales, PSK-31 demos), radio and antenna testing, overnight camping (on site), free parking. *TI:* 147.38 (103.5 Hz). *Adm:* $5. Tables: non-commercial $20 (includes 1 seller admission, helpers $5 each), commercial $30 (includes 2 helper admissions). Lou Simmons, KB7WDB, 21915 78th Ave E, Graham, WA 98338-9201; **kb7wdb@juno.com**; **www.w7dk.org**.

†**Washington (Longview)—Aug 11,** 9 AM. *Spr:* Lower Columbia ARA. Cowlitz County Expo Center, corner of 7th Ave and Washington St; take either Exit 36 or Exit 39 off I-5, go W, follow signs for the County Fairgrounds, now known as the Expo Center. Commercial dealers (get free tables and admission), tailgating ($5 per space), APRS display. *TI:* 147.26 (114.8 Hz). *Adm:* $4. Tables: $10 (free tables for NW radio clubs). Bob Morehouse, KB7ADO, 2437 Allen St, Kelso, WA 98626; 360-425-6076 (after 6 PM weekdays); **kb7ado@aol.com**; **www.qsl.net/nc7p/swapmeet.htm**.

†**West Virginia (Huntington)—Aug 11,** 8:30 AM to 2 PM. *Spr:* Tri-State ARA. Veterans Memorial Fieldhouse, 2590 5th Ave; I-64 to Exit 11 (Hal Greer Blvd), right (N) on Hal Greer to 5th Ave, right on 5th Ave to corner of 5th Ave and 26th St, on left just before the intersection. Hamfest/Computer Show, flea market, dealers, vendors, forums, VE sessions (registration 10 AM, exams 10:30 AM; all elements, $10 fee per test). *TI:* 146.76 (131.8 Hz). *Adm:* $5. Tables: advance $8 (by Jul 31; Ezra Taylor, N8KTA, 304-429-1667), door $12 (if still available); electricity $10 per plug. Garry Ritchie, W8OI, 19 Pinecrest Dr, Huntington, WV 25705; 304-733-1300; **w8oi@arrl.net**; **www.qsl.net/tara**.

West Virginia (Weston)—Aug 25, West Virginia State Convention. See "Coming Conventions."

†**Wisconsin (Baraboo)—Aug 11;** set up 6 AM; public 7 AM to noon. *Spr:* Yellow Thunder ARC. Sauk County Fairgrounds, 8th St, on Hwy 33, far E side of Baraboo. Circus City Swapfest, vendors, tailgating, VE sessions (code 9 AM, written 10 AM), camping, free parking. *TI:* 147.315 (123.0 Hz). *Adm:* advance $4, door $5. Tables: $5 (8-ft; includes 1 admission, advance sales only). Steve Schulze, N9UDO, 1120 City View Rd, Baraboo, WI 53913; 608-356-2313; **n9udo@arrl.net**; **www.qsl.net/ytarc/**.

SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

K1AS, Alan R. Sherman, Danielson, CT
WA1BXU, Sandra J. Marchant, Largo, FL
K1GXD, Ed Bullock, Burlington, MA
W1HYK, Frank O'Classen, Rutland, VT
WA1INL, Samuel E. Banks, Shelton, CT
K1JNJ, Harry B. Smith III, Hillsboro, NH
KD1Q, Chester C. Smith, Pittsfield, NH
K1RZO, Ruth M. McNamara, Nashua, NH
K2AGJ, Eileen V. Holmes, Linden, NJ
W2AMS, Henry J. Treger, Westfield, NJ
K2BUS, Art Seidman, Great Barrington, MA
*KC2EA, Charles E. Tallman, Canandaigua, NY
AA2ED, Arthur M. Reynolds, Lockport, NY
W2HAJ, M. Sorochka, Freehold, NJ
K2IOM, Gordon E. Reese, Danielson, CT
WB2JMR, Edward N. Hahn, Moorestown, NJ
K2JWS, Frank F. Thomas, Elmira Heights, NY
K2MLT, Walter S. Taylor, Hammondsport, NY
KA2TYT, Norman E. Litsche, Canandaigua, NY
WB2WPA, Gary S. Arnold, Naples, FL
W3ABN, Albert E. Gibson, York, PA
W3EDD, W. C. Harney, Summerville, SC
W3HSU, Richard E. Pheil, Chambersburg, PA
W3IVC, Elton A. De Wolf, Hatfield, PA
K3JWL, Kenneth A. Akers, Nottingham, PA
*W3NQA, Richard A. Gilson, Warren, PA
ex-K3OSD, Norman H. Heline, Murrysville, PA
WC3Q, Brian Cassidy, Hatboro, PA
W3VZB, Floyd L. Kendall, Williamsport, PA
K3YPO, Thomas W. Powell, Ardmore, PA
K3ZMC, Alfred N. Dolenti, Royersford, PA
W4AFM, William L. Hayes, Black Mountain, NC
W4DJ, Alfred C. Weed, Gainesville, FL
WA4DXB, Theodore J. Godwin, Birmingham, AL
W4EZU, E. D. Freeman, Evans, GA
WA4EZU, Dyrell J. Marquis, Fairforest, SC
*WA4FDC, Richard A. Hann, Eutaw, AL
AA4HM, Charles L. Cox, Montgomery, AL
*W4HYY, Baker D. Springfield, Senatobia, MS
K4IBP, E. Jack Goforth, Knoxville, TN
K4IYP, Clifford N. Rudge, Tarpon Springs, FL
*W4JMW, Charles A. Walker, Palm Bay, FL
KG4JVT, Ronald L. Oller, Irvington, KY
AE4ON, Rodney C. Lancaster, Morehead City, NC
W4ONE, Theodore J. Zuk, Gloucester, VA
W4PNV, Donald E. Chapman, Martin, TN
AD4RM, Walter D. Smith, Front Royal, VA
W4TS, Hal S. Justice, Canton, NC
N4UNU, Mark R. Verstring, Youngstown, FL
W4VFK, Vardy M. Abernethy, Burlington, NC
W4VY, William S. Couch, Milton, FL
W4WAF, C. W. Freeman, Daytona Beach, FL
W4WDL, Eugene Hicks, Albuquerque, NM
AF4WX, Russell Ballard, Calhoun, GA
**W4YN, Tracy Levy, Merritt Island, FL
WB4ZML, Gerald E. Hite, Louisville, KY
W5CCV, Joe P. McDonald, Edmond, OK
*WB5CVR, Zeke Green, Sherman, TX
K5CXP, Albert I. Rauscher, Oklahoma City, OK
W5DKD, F. C. Shepard, Deming, NM
WD5GUL, Richard M. Czaplewski, Houston, TX
W5IZO, Charlie B. Thompson, Raton, NM
W5RNA, Roy J. Grubbs, Dallas, TX
W5RYC, Max Tidmore, Lubbock, TX
N5TQX, Robert W. Myers, Ranger, TX
W5VY, Joe C. Patterson, San Antonio, TX
W6FJU, David E. Jewell, Chico, CA
W6FWG, Clifton V. George, San Antonio, TX
AH6IL, Francis L. Brown, Hilo, HI
KA6IWN, Earl J. Franzel, Ventura, CA
KD6JJ, Carl J. Bassler, Encinitas, CA
W6MEN, Stephen M. Stambuk, San Pedro, CA
KK6NQ, Paul T. Kramer, Indian Wells, CA
N6OH, Walter Bruun, Petaluma, CA
W6PHT, Cynthia De Launey, Scotts Valley, CA
NR6P, Hazel L. Kirk, Indio, CA
W6VWD, Robert F. Kofron, Banning, CA
*KE6Y, Gordon R. Jackson, San Dimas, CA
KA6YRB, Jack P. Wilson, Chandler, AZ
W6ZKM, Frank H. Holst, Sunnyvale, CA
N7BIW, Bruce I. King, Bakersfield, CA
K7CZQ, Beatrice Clousing, Livingston, MT
N7DNV, Jack R. Collins, Hood River, OR
W7EDC, Edward M. Carbary, Wickenburg, AZ
*K7EX, John D. Hultgren, Springfield, OR
W7HAH, Francis D. Shepard, Stevensville, MT
W7JIU, Robert N. Ferry, West Sedona, AZ
W7KVL, Milford J. Borchert, Tucson, AZ
W7MIO, Ermon Lewis, Apache Junction, AZ
KB7MTK, Hazel M. Griffith, Yakima, WA
K7OFI, Kurt W. Zimmermann, Phoenix, AZ
N7OQM, David E. Rankin, Page, AZ
WB7QQM, Ira E. Nicks, Tacoma, WA
K7RZV, Michael Franevsky, Phoenix, AZ
N7VVA, Robert H. St Clair, Lake Havasu City, AZ
KB7WRR, Randy J. Scheeler, Klamath Falls, OR
W8AHA, Marvin G. Vergon, Sun City Center, FL
WD8ANB, Harland Heimke, Hubbell, MI
W8AXW, Edward Jones, Tecumseh, MI
W8BMS, Albert D. Blancett, Cambridge, OH
W8EQU, Edmund Kisiel, Vista, CA
W8GMF, William Demeter, Parma, OH
K8KWD, L. Van Prooyen, Rockford, MI
W8PAU, Charles H. Becker, Cincinnati, OH
WT8P, Joseph W. Tomazic, Cleveland Heights, OH
WD8QNA, Christina I. Kaplan, Marietta, OH
W8RKL, Edgar A. Smith, Dayton, OH
AK8S, Oslin D. Whiddon, Ann Arbor, MI
W8SPU, Helen V. Smith, Sycamore, OH
K8THY, William J. Amos, Fairborn, OH
KA8ZWZ, Tami L. Hensley, Phil Campbell, AL
WD9GEJ, Jon L. Foster, Crawfordsville, IN
K9HHH, Charles E. Crofoot, Tomahawk, WI
K9IIR, Carlisle S. Hazelwood, Oshkosh, WI
K9LWZ, Arthur O. Smith, Wisconsin Rapids, WI
KD9NQ, Dean E. Timmerman, Sun City, AZ
KA9OSF, Barnett B. Morris, Indianapolis, IN
W9PLW, Le Roy W Hulvey, Lake Station, IN
N9TMI, Donnie R. Roberts, Higginsville, MO
KC9V, Betty Collins, State Line, IN
K0BH, Roger P. Anderson, Saint Paul, MN
W0BTM, Vertice E. Crosby, Grand Island, NE
KB0CDX, Le Roy D. Van Eckhout, Bowman, ND
W0EUQ, George E. Kraus, Grand Forks, ND
KD0GM, Alan J. Hicks, Deadwood, SD
K0IFJ, Robert E. Nordstrom, Wichita, KS
W0KCG, Charles O. Alexander, Jefferson City, MO
AB0KY, Robert E. Dixon, Minot, ND
W0QOA, George L. Tucker, Parsons, KS
N0SDE, James A. Kirchen, West Fargo, ND
K0VNJ, George F. Phillips, Princeton, MO
W0YDX, John W. Foster, Waseca, MN
DK3LP, Philipp Lessig, Gauting, Germany
LU9JH, Luis F. Heras, Concordia, Argentina
VE3AVL, Frederick O. Ross, Tillsonburg, ON, Canada

*Life Member, ARRL

**Charter Life Member, ARRL

‡Call sign has been re-issued through the vanity call sign program.

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

Kathy Capodicasa, N1GZO ♦ Silent Key Administrator

NEW BOOKS

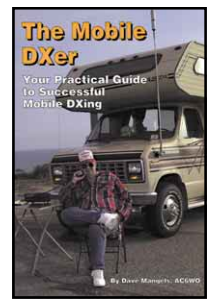
THE MOBILE DXER

By Dave Mangels, AC6WO

First edition. Copyright 2001 by CQ Communications, Inc, 25 Newbridge Rd, Hicksville, NY 11801. Softcover, 6×9 inches, 128 pages. Available from ARRL (toll-free 1-888-277-5289) or on ARRLWeb (**www.arrl.org/shop/**). *$12.95 plus shipping and handling.*

Reviewed by Joel Kleinman, N1BKE
QST Managing Editor

◊ Subtitled *Your Practical Guide to Successful Mobile DXing*, this book provides a useful introduction to the art and science of chasing DX from your vehicle. It's certainly easier to pursue band openings and rare DX than it ever has been—thanks to a new generation of full-featured HF transceivers that can be as small as a 2-meter mobile rig. As the author points out, "…you no longer have to install under the dashboard a 70 pound monster radio that takes up half the space meant for your legs."



The author has done an admirable job of mixing the anecdotal—stories about interesting DX he has worked while mobile—with the practical. Under the latter category, the book covers a comprehensive glossary, features of the transceivers most useful for mobile DXing, an explanation of UTC, phonetics list, logging, working split, QSLing, applying for awards, a list of references and (for those with good eyesight) an index.

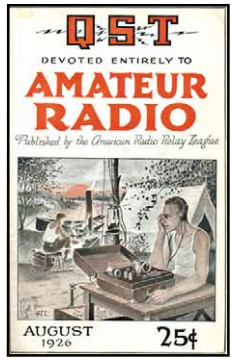
The book is nicely illustrated, with both color and black-and-white images. The b&w images understandably suffer by comparison with the color illustrations, which are all the more attractive because they are printed on high quality paper.

Although compact, this book manages to cover its subject thoroughly. The author's apparently short but varied mobile DXing experience is put to good use, as his recollections of memorable mobile DX QSOs hold the reader's interest throughout. His QSL card collection, sprinkled throughout the book, is a nice touch, although I would have liked to have seen some of them in color, especially the striking card of 9Q5TR. With more color pages, however, the book would probably have cost more. . . and then I'd be commenting on its relatively high price! The authors and CQ have struck a good compromise here—the book looks good, and its cost is reasonable. QST

Previous New Books

75, 50 AND 25 YEARS AGO

August 1926



◊ Clyde Darr, 8ZZ, provides the cover art, showing two hams at a portable station in the field, with one operating and one cooking. The editorial, in "Part of the Game," tells several stories of how hams have so often helped with communication in emergency situations. Under the heading, "The Libraries," the editorial suggests that hams go to their local libraries and ask the librarian to subscribe to *QST*.

A. B. Goodall tells about "Mercury Arc Rectifiers." Lief Jenssen describes the use of "Short-Wave Radio in the Antarctic." F. H. Schnell, 9XH-9EK, discusses "A Shielded Wavemeter for Your Station." Paul Mueller tells about his "Tuning Tricks." The League's Robert Kruse describes a power supply for "Operating Receiving Filaments without Batteries." Benjamin Melton tries to put misinformation to rest in "Straightening out the Antenna." L. B. Root tells how to build "A 20-40-80-Meter Crystal-Controlled Transmitter." Don Wallace, 9ZT-9XAX, tells how to have a successful ARRL convention, in "Convention Success." This month's "Amateur Radio Stations" presents descriptions and photos of 2AHM, Schenectady, N.Y., and 1AXA, Plymouth, Mass. "I.A.R.U. News" reports that tFEA is now on the air from a new country—Turkey; that bg1JT will soon be on the air from British Guiana; that fi8QQ is active from Saigon, French Indo China; that fc8EM is active in Shanghai, China; and that there are now 16 members of the WAC Club.

August 1951

◊ The cover photo shows the Good brothers—Walt, W3NPS, and Bill, W3LQE—operating one of their radio-controlled aircraft. The editorial discusses the recent Field Day and its very snappy voice operators, products of the new generation of phone nets.

In the cover article, Walt and Bill Good tell about "Radio Control of Model Aircraft," describing the radio gear used. [One of the Goods' early R/C aircraft has been on display in the Smithsonian's National Air and Space Museum for many years—Ed.] Vern Chambers, W1JEQ, tells how to get "Seven Bands at Low Cost," with a 30-W bandswitching transmitter for 3.5 to 50 Mc. Dick Baldwin, W1IKE, tells how to build a low-cost two-tube receiver in "A First Receiver for the Novice." Ed Harrington, W1JEL, describes his "Ten-Meter Mobile with Remotely Tuned VFO." "Happenings of the Month" reports on the forthcoming East Coast Army maneuvers, and tells about the mutual interference that hams can expect as they share the HF bands with the military. Jim Perkins, W1BDV, describes his work with "An Easily Adjustable Low-Frequency Mobile Antenna" for 80 meters.

August 1976

◊ The cover photo shows how microprocessor technology is reaching everywhere—"ham radio, too!" The editorial, "Time for Another Breakthrough," discusses that now is the time for simple and inexpensive speech processing circuits to come into widespread use, to reduce mutual interference among HF phone operators.

"Meet the Microprocessor—Part 1," by Bill Thomas, WB6FGR, and Steve Belter, WN9SGP, is the first of a three-part series to introduce the reader to microprocessor technology. Walt Maxwell, W2DU/W8KHK, presents Part 7 of "Another Look at Reflections." Doug DeMaw, W1CER, and Jay Rusgrove, WA1LNQ, tell about "An RF-Sensed Antenna Changeover Relay." D. J. Kozakoff, W4AZW, describes "Designing Small Vertical Antennas." D. K. Belcher, WA4JVE, and P. W. Casper, K4HKX, tell about their computer analysis to prove the quad antenna's superiority, in "Loops vs. Dipoles—Analysis and Discussion." Nicolai Holter, LA5CH, reports on "Radio Foxhunting in Europe—Part 1." Lowell Croysdale, W5UCY, describes "The Value of Special-Event Stations." In "One Shoe Drops…," The FCC's First Report and Order on restructuring is detailed by Perry Williams, W1UED. QST

Al Brogdon, W1AB ♦ Contributing Editor

W1AW Schedule

PACIFIC	MTN	CENT	EAST	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	VISITING OPERATOR TIME (12 PM - 1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	TELEPRINTER BULLETIN				
4 PM	5 PM	6 PM	7 PM	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	TELEPRINTER BULLETIN				
6^{45} PM	7^{45} PM	8^{45} PM	9^{45} PM	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

♦ **Morse code transmissions:**

Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 1992 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by K6YR. See "Contest Corral" in this issue. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Send a 9×12-inch SASE for a certificate, or a business-size SASE for an endorsement.

♦ **Teleprinter transmissions:**

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

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

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

♦ **Voice transmissions:**

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

♦ **Miscellanea:**

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

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

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

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

SPECIAL EVENTS

Grand Haven, MI: North Ottawa ARC, W8CSO, 1600Z **Aug 2** to 1600Z **Aug 4**, during Grand Haven's annual Coast Guard Festival. 7.235 14.235. QSL. NOARC, Box 44, Ferrysburg, MI 49409.

Hannibal, MO: Hannibal Missouri ARC & Western Illinois ARC, W0MTL, 2200Z **Aug 3** to 2400Z **Aug 5**, from the Mark Twain Lighthouse, ARLHS USA-915, during National Lighthouse Weekend. 14.270 7.270 21.370 28.370. QSL. Hannibal Missouri ARC, PO Box 1522, Hannibal, MO, 63401-1522.

St Michaels, MD: Kent Island ARC, N3C, 2200Z **Aug 3** to 2400Z **Aug 4**, in celebration of National Lighthouse Week. 3.970 7.270 14.270 21.370. Certificate. Tom Dove, K3ORC, 22H Queen Victoria Way, Chester, MD, 21619.

Hinton, WV: Bluestone Amateur Radio Club, KC8CNL, 1400-2000Z **Aug 4**, during the 37th West Virginia Water Festival Celebration. 7.230 14.270 28.450 147.255. Certificate. Windle McQuaig, KB8WSK, HC 77 Box 26B, Hinton, WV 25951.

Menominee, MI: Marinette & Menominee Amateur Radio Club, W8PIF, 1600-2100Z **Aug 4**, for the Menominee Lighthouse/Waterfront Festival. 7.245 14.245 21.345 28.445. Certificate. M&M Amateur Radio Club, PO Box 1082, Marinette, WI 54143.

Mukilteo, WA: Boeing Employees Amateur Radio Society, W7FLY, 1600-0100Z **Aug 4**, for National and International Lighthouse Weekend. 14.265 14.270. QSL. Fritz, W7EBQ, 7717 143rd Ave NE, Lake Stevens, WA 98258.

Delaware River, DE: Amateur Radio Lighthouse Society, KC2HOU, 0001Z **Aug 4** to 2359Z **Aug 5**, for National Lighthouse Week. 7.267 14.267 21.367 28.367. Certificate. Jim Weidner, PO Box 2178, Cinnaminson, NJ 08077.

Orient, NY: Peconic ARC, W2AMC, 1300Z **Aug 4** to 2000Z **Aug 5**, from Long Beach Bar (Bug) Lighthouse during National Lighthouse Weekend. 7.270 14.270 28.370 50.125. Certificate. Peconic ARC, PO Box 113, Peconic, NY 11958.

Twinsburg, OH: Ramzy Twins Radio Club, WT8WIN, 1400Z **Aug 4** to 2200Z **Aug 5**, celebrating the Twins Day Festival in memory of Randy, K8RCR. 7.270 14.270 21.370 28.370. Certificate. Rick Ramzy, K8RMR, 11781 Fraze Rd, Doylestown, OH 44230.

Evanston, IL: Metro Amateur Radio Club, K9Y, 1800-2400Z **Aug 5**, at the Grosse Pointe lighthouse. 28.370 21.370 14.270 14.030. QSL. Michael Dinelli, N9BOR, 9423 Kolmar Ave, Skokie, IL 60076-1321.

Barnegat Light, NJ: Old Barney ARC, N2OB, 1300Z **Aug 4** to 2200Z **Aug 5**, for 2001 National Lighthouse Day from the "Old Barney" lighthouse. 7.280 14.280 21.380 28.480. Certificate. Old Barney ARC, N2OB, PO Box 345, Tuckerton, NJ 08087.

Camden, NJ: Amateur Radio Lighthouse Society, K2JXW, 0001Z **Aug 4** to 2359Z **Aug 5**, for National Lighthouse Week. 7.273 14.273 21.373 28.373. QSL. Jim Weidner, PO Box 2178, Riverton, NJ 08077.

Barnegat Lightship, NJ: Amateur Radio Lighthouse Society, W3L, 0001Z **Aug 4** to 2359Z **Aug 5**, during National Lighthouse Week. 7.270 14.270 21.370 28.370. QSL. Jim Weidner, PO Box 2178, Riverton, NJ 08077.

Pacific Grove, CA: Naval Postgraduate School ARC, K6LY, 1600Z **Aug 4** to 2400Z **Aug 5**, for National Lighthouse Week from Point Piños Lighthouse. 14.030 21.370 28.370 7.270. QSL. Richard W. Adler, K6RWA, 822 Devisadero St, Monterey, CA 93940.

Tybee Island, GA: Amateur Radio Lighthouse Society, K4T, 0001Z **Aug 4** to 2359Z **Aug 5**, for National Lighthouse Weekend from Tybee Island Light. 3.970 14.270 28.370. QSL. Phil Faulkner, 3010 Larkspur Court, Cumming, GA 30041.

Asheboro, NC: Randolph ARC, NC4ZO, 1300-2000Z **Aug 4**, for the annual demonstration at the North Carolina Zoo. 28.390 14.240. QSL. Randolph ARC, 6747 King Mt Rd, Asheboro, NC 27203.

Jupiter Lighthouse, FL: Amateur Radio Light House Society, WA7OBH, 1300-1600Z **Aug 4**, during National Lighthouse and Lightship Weekend. 21.370 28.370 14.270 7.270. QSL. F. Lee Graves, 4341 SE Satinleaf Pl, Stuart, FL 34997.

Hawley, PA: Camp Watonka Amateur Radio Club, KB3BUM, 1330Z **Aug 4** to 2130Z **Aug 5**, during the 4th annual event at Camp Watonka Science Camp for Boys. 7.240 14.240 21.340 28.440. Certificate. Camp Watonka ARC, PO Box 127, Hawley, PA 18428.

Greenville, OH: The Treaty City Amateur Radio Association, W8UMD, 1300-2300Z **Aug 4** and **Aug 5**, celebrating the 90th anniversary of the club. 7.270 14.055 14.340 28.470. Certificate. TCARA W8UMD/90, PO Box 803, Greenville, OH 45331-0091.

Lawton, OK: Lawton-Ft Sill Amateur Radio Club, W5KS, 1500Z **Aug 4** to 0300Z **Aug 5**, celebrating the 100th anniversary of the founding of Lawton by land lottery. 7.246 14.246 21.346 28.446. Certificate. Bruce A. Brown, LFSARC, PO Box 892, Lawton, OK 73502.

Bristol, ME: Lincoln County Amateur Radio Club, K1LX, 1200Z **Aug 5** to 2200Z **Aug 6**, for National Lighthouse Weekend from Pemaquid Light. 3.965 7.265 14.265 21.365. Certificate. LCARC, PO Box 171, Bristol, ME 04539.

Bascom, OH: Seneca Radio Club, W8ID, 1300Z **Aug 6** to 1900Z **Aug 10**, operating from Buckeye District Cub Scout Day Camp. 14.225 21.225 28.325. QSL. Curtis Robison, KC8PUY, 88 W Market St, Tiffin, OH 44883.

Lincoln, MI: Alcona County Amateur Radio Group, K8A, 1600Z **Aug 6** to 0200Z **Aug 12**, during the 30th Alcona County Fair. 3.945 7.245 14.245 21.345. QSL. Stanley L. Darmofal, W8SZ, PO Box 15, Harrisville, MI 48740.

Sycamore, IL: Kishwaukee Amateur Radio Club, W9S, 1300Z **Aug 9** to 2100Z **Aug 12**, during the annual Northern Illinois Steam Power Show and Threshing Bee. 7.108 7.245 14.255 28.390. Certificate. Bob Yurs, W9ICU, PO Box 341, Sycamore, IL 60178.

West Union, OH: De Forest Amateur Radio Club, K8GE, 1700-2300Z **Aug 12**, celebrating the Bicentennial of the State of Ohio. 7.225 7.300 14.225 14.350. Certificate. De Forest Amateur Radio Club, PO Box 73, West Union, OH 45693.

Monticello, IL: E.L. Christensen Memorial Radio Society, W9EAC, 1900Z **Aug 12** to 2300Z **Aug 13**, operating from John Allerton Park in Monticello, Illinois, during the Plainfield Wildcats Marching Band summer camp. 7.230 21.310 28.440 UO-14. Certificate. Roger Bonuchi, WB9JXE, 93 Spring Hill Ln, Plainfield, IL 60544.

Baton Rouge, LA: USS *Kidd* Amateur Radio Club, W5KID, 1500-2300Z **Aug 14**, commemorating VJ-Day—the end of WWII in the Pacific. 28.440 21.340 14.240 14.060. QSL. W5KID, 305 River Rd, Baton Rouge, LA 70802.

Centralia, IL: Centralia Wireless Association, W9HAB; 2000Z **Aug 17** to 1800Z **Aug 19**, operating during the annual Centralia Balloonfest. 7.245 14.250 18.130 21.325. Certificate. Centralia Wireless Association, W9HAB, PO Box 1166, Centralia, IL 62801.

Wrightstown, PA: Warminster Amateur Radio Club, K3DN, 1800Z **Aug 17** to 1600Z **Aug 19**, during the Middletown Grange Fair. 7.270 14.270 21.370 28.470. Certificate. Warminster Amateur Radio Club, PO Box 113, Warminster, PA 18974.

Bennington, VT: Southern Vermont Amateur Radio Club, N1B, 1300-2000Z **Aug 17** and **Aug 18**, celebrating the American victory at Battle of Bennington in 1777. 14.285. Certificate. SOVARC —Howard Crego, 415 Ridge Rd, Shaftsbury, VT 05262

Peapatch Island, DE: Delaware County (Pennsylvania) ARA, W3P, 0000Z **Aug 17** to 0000Z **Aug 20**, for the 50th anniversary of the Delaware State Park System Civil War Living History. 14.260 21.260 28.460 7.040. QSL. Dan Cashin, N3LMY, 1335 Harrington Rd, Havertown, PA 19083.

Marshfield, MA: Marshfield Fair, W1M, 0000Z **Aug 17** to 2400Z **Aug 26**, during the 134th Marshfield Fair. 14.190 18.145 21.295 28.450. QSL. Robert F. Burns, 728 Auburn St, Unit I-3, Whitman, MA 02382.

Rocky Mountain House, AB: Rocky ARC and Three Hills ARC, VE6RMH, 1700Z **Aug 18** to 2400Z **Aug 19**, commemorating and celebrating the achievements of David Thompson. 14.250 7.060 3.735. Certificate. RAC Rocky Mtn House, Box 818, Rocky Mtn House, AB T4T 1A6, Canada.

Southold, NY: Peconic ARC, W2AMC, 1300Z **Aug 18** to 2000Z **Aug 19**, from Horton Point Lighthouse during International Lighthouse/Lightship Weekend. 7.270 14.270 28.370 50.125. Certificate. Peconic ARC, PO Box 113, Peconic, NY 11958.

Port Huron, MI: Eastern Michigan Amateur Radio Club, K8FGL, 0001Z **Aug 18** to 2359Z **Aug 19**, during International Lighthouse/Lightship Weekend. 7.025 14.035 14.270 28.350. QSL. K8FGL, PO Box 1230, Port Huron, MI 48061-1230.

Low Head, Tasmania: Northern Tasmania Lighthouse Club, VK7LUV/P, 0001Z **Aug 18** to 2359Z **Aug 19**, operating from Low Head Lighthouse, Tasmania, Australia during International Lighthouse/Lightship Weekend. 3.600 21.220 28.350. QSL. Susan Brain, PO Box 81, Ulverstond, Tasmania, 7315.

Buffalo, NY: The Western New York DX Association, K2L, 0000Z **Aug 18** to 0000Z **Aug 19**, operating from the Buffalo, New York, Lighthouse during Lighthouse/Lightship Weekend. CW and SSB. QSL. WB2YQH, PO Box 73, Spring Brook, NY 14140

Port Huron, MI: L'anse Creuse Amateur Radio Club, N8LC, 1400Z **Aug 18** to 2000Z **Aug 19**, operating from the Huron Lightship during International Lighthouse/Lightship Weekend. 7.238 14.238 7.120 14.060. Certificate. Vince Cuker, WA8BIJ, 145 Huron St, Mt Clemens, MI 48043-1713.

Presque Isle, MI: L'anse Creuse Amateur Radio Club, K8AYZ, 1400Z **Aug 18** to 2000Z **Aug 19**, operating from the Presque Isle Light during International Lighthouse/Lightship Weekend. 7.238 14.238 7.120 14.060. Certificate. Vince Cuker, WA8BIJ, 145 Huron St, Mt Clemens, MI 48043-1713.

Gasparilla Island, FL: Englewood Amateur Radio Society, K8ONV, 1400Z **Aug 18** to 2000Z **Aug 19**, operating from the Boca Grande Lighthouse, NA-069. 14.275 21.375 28.375. QSL. EARS, PO Box 572, Englewood, FL 34295-0572.

Baltimore, MD: Social Security Employee's Amateur Radio Club, W3SSA, 1300-2100Z **Aug 18**, commemorating the 66th anniversary of the Social Security Act. 7.290 14.290 21.290 28.390. Certificate. Greg Stec, K3ANG, 1624 Pickett Rd, Lutherville, MD 21039.

Mount Solon, VA: Valley Amateur Radio Association, W4MUS, 1000Z **Aug18** to 0400Z **Aug 19**, celebrating the 180th Jousting Tournament at Natural Chimneys. 3.870 7.230 14.310 28.410. Certificate. Richard Huttinger, 1345 Chatham Rd, Waynesboro, VA 22980.

Merritt Island, FL: Indian River Amateur Radio Club, N4L, 0001Z **Aug 18** to 2359Z **Aug 19**, for International Lighthouse Weekend. 14.270 21.370 28.370. QSL. IRARC, PO Box 579, Cocoa, FL 32922.

Jupiter Lighthouse, FL: Amateur Radio Light House Society, WA7OBH, 1300-1700Z **Aug 19**, for International Lighthouse and Lightship Weekend. 21.370 28.370 14.270 7.270. QSL. F. Lee Graves, 4341 SE Satinleaf Pl, Stuart, FL 34997.

George Fremin III, K5TR ♦ 624 Lost Oak Trail, Johnson City, TX 78636 ♦ k5tr@arrl.org

Big Sur, CA: Naval Postgraduate School ARC, K6LY, 1600Z **Aug 18** to 2400Z **Aug 19**, for International Lighthouse Weekend from Point Sur Light Station. 14.030 21.370 28.370 7.270. QSL. Richard W. Adler K6RWA, 822 Devisadero St, Monterey, CA 93940.

Tuckerton, NJ: Old Barney ARC, W2T, 1200Z **Aug 18** to 2300Z **Aug 19**, from Tucker's Island Lighthouse. 7.280 14.280 21.380 28.480. Certificate. Bob Schenck, N2OO, PO Box 345, Tuckerton, NJ 08087.

Fire Island National Seashore, NY: Great South Bay ARC, W2GSB, 1400Z **Aug 18** to 2000Z **Aug 19**, from Fire Island Lighthouse for International Lighthouse/Lightship Weekend. 7.260 14.260 21.260 28.460. QSL. W2GSB/LH, PO Box 1356, West Babylon, NY 11704.

Hooper Strait Lighthouse, MD: Amateur Radio Lighthouse Society, W3L, 0001Z **Aug 18** to 2359Z **Aug 19**, during International Lighthouse / Lightship Weekend. 7.270 14.270 21.370 28.370. QSL. Jim Weidner, PO Box 2178, Riverton, NJ 08077.

Chesapeake Bay, MD: Amateur Radio Lighthouse Society, K2JXW, 0001Z **Aug 18** to 2359Z **Aug 19**, for International Lighthouse/Lightship Weekend. 7.267 14.267 21.367 28.367. QSL. Jim Weidner, PO Box 2178, Riverton, NJ 08077.

San Pedro, CA: United Radio Amateur Club, K6AA, 0001Z **Aug 18** to 2359Z **Aug 19**, during International Lighthouse/Lightship Weekend. 14.029 14.270 28.029 28.370. QSL. Douglas Dowds, 415 East 238th St, Carson, CA 90745.

Burnt Island Lighthouse, ME: Yankee ARC, KA1RFD, 0001Z **Aug 18** to 2359Z **Aug 19**, during International Lighthouse/Lightship Weekend. 3.970 7.270 14.270 21.220. QSL. Rod Scribner, KA1RFD, RR 4 Box 6770, Gardiner, ME 04345.

Hazel Crest, IL: Tri-Town Radio Amateur Club, W9VT, 1400Z **Aug 17** to 0300Z **Aug 18**, celebrating the 70th anniversary of Tri-Town. 146.49 7.249 14.260 28.590. Certificate. TTRAC c/o Tricia Jaggard, 17609 Golfview Ave, Homewood, IL 60430.

St. Michaels, MD: Kent Island ARC, N3C, 0001Z **Aug 18** to 2359Z **Aug 19**, for International Lighthouse/Lightship Weekend. 3.970 7.270 14.270. Certificate. Tom Dove, K3ORC, 22H Queen Victoria Way, Chester, MD 21619.

Sturgeon Point, MI: South Lyon Area Amateur Radio Club, N8SL, 0001Z **Aug 18** to 2359Z **Aug 19**, operating from the grounds of lighthouse USA823 during International Lighthouse/Lightship Weekend. 7.270 14.270 21.370 28.370. Certificate. Thomas Peasley, WB8IIA, 30960 Bramley Circle, New Hudson, MI 48165.

Silverton, CO: Durango Amateur Radio Club, N0G, 1400Z **Aug 23** to 2400Z **Aug 26**, during Rai Fest 2001 at the D&G RR station in San Juan County. 14.050 14.250 21.350 PSK31. QSL. Durango Amateur Radio Club, PO Box 2942, Durango, CO 81302.

Hanover, KS: Crown Amateur Radio Association, K0ASA, 1400-2100Z **Aug 26**, operating from the Hollenberg Pony Express Station Festival. 7.125 14.040 18.085 18.140. Certificate. Crown Amateur Radio Association, 11551 West 176th Terr, Olathe, KS 66062.

Pikes Peak, CO: Colorado VHF Group, K0YB, 1500-1800Z **Aug 26**, during the Colorado 14er event, an Amateur Radio operation from the summits of Colorado's 14,000-foot mountains. 147.42 14.260 21.330 28.350. QSL. Colorado VHF Group, K0YB, 21060 Cappella Dr, Monument, CO 80132. QST

CONTEST CORRAL

W1AW Qualifying Runs are 10 PM EDT, Monday, August 6 and 4 PM EDT, Tuesday, August 21. The K6YR West Coast Qualifying Run will be at 9 PM PDT on Wednesday, August 1. Check the W1AW schedule for details.

August
4-5

ARRL UHF Contest, see July *QST*, page 119.

North American QSO Party, CW, sponsored by the *National Contest Journal*, from 1800Z Aug 4 until 0600Z Aug 5 (phone is 1800Z Aug 18 until 0600Z Aug 19). Single op (no spotting nets, no packet) and multi-two. Single ops may have only one transmitted signal at a time; multi-twos have a 10-minute rule. All entries must use ≤100 W output power. Multiops may operate for the full 12 hours, Single ops may operate 10 hours, with off times at least 30 min long and marked in the log. Work stations once per band. CW in CW subbands only (phone in phone sub bands only). Exchange name and state/province/DXCC entity. Final score is QSOs × multipliers. Team competition. Awards. Electronic awards accepted. Send CW logs to Bob Selbrede, K6ZZ, 6200 Natoma Ave, Mojave CA 93501; **cwnaqp@ncjweb.com**. Send phone entries to Bruce Horn, WA7BNM, 4225 Farmdale Ave, Studio City, CA 91604; **ssbnaqp@ncjweb.com**; **www.ncjweb.com/**.

Ten-Ten Summer QSO Party, sponsored by Ten-Ten International, 0001Z Aug 4 to 2400Z Aug 5. Single op, phone only, 10 meters only. Exchange call sign, name, state/country and ten-ten number (if member). Score 1 pt./QSO w/nonmember, 2 pts/QSO w/member in contiguous US, 3 pts/QSO w/DX. Final score is QSO points. Send logs by Aug 23 to: Don Ward, W0RTV, 4514 Ferrer Dr, St Louis, MO 63129-3741; **www.ten-ten.org/**.

QRP ARCI Summer Daze SSB Sprint, sponsored by QRP ARCI, 2000Z to 2400Z Aug 5. Entries may be All Band, Single Band, High Band (40, 20, 15, 10, 6), Low Band (160, 80, 40), Multi-op or DX. Work stations once per band. Exchange signal report, state/province/country and power or ARCI number. 1.860 3.865 7.285 14.285 21.385 28.385 50.128. One point per QSO. Bonus points, per band, for using homebrew equipment: 500 pts for transmitter, 500 points for receiver, 1000 points for transceiver. Final score is total QSO points (all bands) multiplied by total of states/provinces/countries (all bands) × power multiplier (> 10 W PEP out = 1; < 10 W PEP out = 7; < 2 W PEP out = 10; < 500 mW PEP out = 15). Include a description of equipment and antennas used. Mail entry within 30 days to: Randy Foltz, K7TQ, Attn: Summer Daze, 809 Leith St, Moscow, ID 83843, or e-mail to: **rfoltz@turbonet.com**; **personal.palouse.net/rfoltz/arci/arcitst.htm**.

YO-DX Contest, sponsored by the Romanian Amateur Radio Federation (RARF). 0001Z to 2000Z Aug 5, 80 40 20 15 10 meters, phone and CW. No crossmode QSOs. Classes: single op, single band; single op, multiband; multiop, multiband. Exchange RST and ITU Zone. YO stations will send two letters indicating their county. Count 0 pts/QSO with own country, 2 pts/QSO with own continent, 4 pts/QSO with different continent and 8 pts/QSO for YO stations. Multiply by sum of YO counties and ITU zones worked per band. Mail entries by Sept 3 to Romanian Amateur Radio Federation, PO Box 22-50, R-71100 Bucuresti, Romania. E-mail **yo3kaa@pcnet.pcnet.ro**; **www.qsl.net/yo3kaa/**.

11-12

Maryland-DC QSO Party, sponsored by Antietam Radio Association, 1600Z Aug 11 to 0400Z Aug 12 and 1600Z Aug 12 to 2359Z Aug 12, phone and CW (CW in subband/no cross mode QSOs). Work stations once per band/mode, portable/mobiles can be worked again in each county. No packet, repeater or net QSOs, MD-DC stations work everyone, others work only MD-DC. Exchange: QTH and category (Club, QRP, Mobile, Novice/Tech and Standard). Count 5 pts/mobile QSO, 4 pts/QRP QSO, 3 pts/CW, digital or ATV QSO, 1 pt for all others. Highest single point applies. Final score is total QSO points × overall different multipliers (MD counties + Baltimore City + DC). MD-DC stations include states/provinces/DXCC entities. Awards. Club competition. Send logs by Sept 1 to: Antietam Radio Association, PO Box 52, Hagerstown, MD 21741-0052; **www.qsl.net/w3cwc/rules.htm**.

Worked All Europe DX Contest, CW, sponsored by the Deutscher ARC, 0000Z Aug 11 to 2400Z Aug 12 (phone is Sep 8-9; RTTY is Nov 10-11). 80 40 20 15 10. Single op (PacketCluster or spotting nets allowed; 36 hours max, up to three off periods, 1 hour minimum) and multi-single (only one signal/band). All stations must remain on a band for at least 10 minutes, except to work a new multiplier. Send RS(T) and serial number. Score 1 pt/QSO and 1 pt/QTC. Non European stations must work Europe only (except on RTTY, where everyone works everyone). Final score is QSOs + QTCs × EU countries/band (except on RTTY: WAE countries + DXCC entities). Multipliers: 3.5 MHz QSOs, × 4; 7 MHz, × 3; 14-28 MHz, × 2. A QTC is a report of confirmed QSOs that took place earlier in the contest that is sent back to the European station. Only non-European stations to European stations may send QTCs. A QTC contains the time, call sign and QSO number of the station being reported. A QSO may only be reported once, and not back to the originating station. A maximum of 10 QTCs can be sent to the same station; the same station can be worked several times. Only the original QSO has QSO point value. Keep a list of QTCs sent. E.g., QTC 3/7 would indicate that this is the third series of QTCs sent, and seven QSOs are reported. Awards. Club competition. Deadlines: CW–Sep 15; phone—Oct 15; RTTY—Dec 15. Send logs to: WAEDC Contest Committee, Dürerring 7, D-74372 Sersheim, Germany; **waedc@darc.de**; **www.darc.de/referate/dx/**.

18-20

ARRL 10 GHz and Up Cumulative Contest, see July *QST* page 120.

New Jersey QSO Party, sponsored by Englewood ARA, 2000Z Aug 18 to 0700Z Aug 19, 1300Z Aug 19 to 0200Z Aug 22. Phone and CW. CW contacts may not be made in phone band segments. 3 pts/QSO. Out-of-state stations, QSO pts × NJ counties worked. NJ stations, QSO pts × states (but not NJ)/provinces/NJ counties (max, 40+12+21 = 82). Logs must show UTC date and time, call sign, exchange, band and claimed multiplier. Awards. Logs and comments (include SASE for results) no later than Sep 15 to: Englewood ARA, PO Box 528, Englewood, NJ 07631-0528.

North American QSO Party, phone, see Aug 4-5 listing.

25-26

TOEC WW Grid Contest, CW, see June *QST* page 108.

W/VE Island Contest, sponsored by the US Island Awards Program, from 1600Z Aug 25 through 2359Z Aug 26. 160 80 40 20 15 10 meters. Island stations exchange RST and US/VE island name & number. Non-island stations exchange RST and state/province/country. Scoring: 5 points for each W/VE island. Island stations also score 1 point for each non-island contact. Multipliers are states/provinces. Winner plaques & entrant certificates. Send logs by Sept. 22, 2001 to Ray Phelps, AD4LX, 1440 SW 53rd Terrace, Cape Coral, FL 33914; **ad4lx@arrl.net**; **eng.mu.edu/usislands/**.

Ohio QSO Party, sponsored by the Mad River Radio Club, from 1600Z Aug 25 until 0400Z Aug 26. Categories: single-op, multiop and mobile rover. Ohio stations exchange serial number and county. Stations outside Ohio exchange serial number, and state or province. Work stations once per band and mode. Score 2 points per CW QSO and 1 point per phone QSO. Final score: Multiply QSO points by total multipliers. Send logs to Goose Steingass, 1690 N. Honeytown Rd, Wooster, OH 44691-9511; **w8av@aol.com**; **www.qsl.net/mrrc/oqp.html**. QST

George Fremin III, K5TR ♦ 624 Lost Oak Trail, Johnson City, TX 78636 ♦ k5tr@arrl.org

2001 ARRL September VHF QSO Party Rules

1. Object: To work as many amateur stations in as many different 2 degrees × 1 degree grid squares as possible using authorized frequencies above 50 MHz.

2. Date and Contest Period: The second full weekend of September. Begins **1800 UTC Saturday and ends 0300 UTC Monday (September 8-10, 2001).**

3. Entry Categories:

3.1. Single Operator.

Low Power

High Power

See "General Rules for all ARRL Contests Above 50 MHz," page 106 in the November 1999 issue of *QST* for power limits for Single Operator entries.

3.2. Single Operator Portable.

3.3. Rover.

3.4. Multioperator.

3.5. Limited Multioperator.

4. Exchange: Grid-square locator (see April 1994 *QST*, p 86).

4.1. Exchange of grid square is required. Exchange of signal report is optional.

5. Scoring:

5.1. QSO points:

5.1.1. Count one point for each complete 50- or 144-MHz QSO.

5.1.2. Count two points for each 222- or 432-MHz QSO.

5.1.3. Count three points for each 902- or 1296-MHz QSO.

5.1.4. Count four points for each 2.3-GHz (or higher) QSO.

5.2. Multiplier: The total number of different grid squares worked per band. Each 2 degrees × 1 degree grid square counts as one multiplier on each band it is worked.

5.3. Final score: Multiply the total number of QSO points from all bands operated by the total number of multipliers for final score.

5.4. Rovers only: The final score consists of the total number of QSO points from all bands times the sum of unique multipliers (grid squares) worked per band (regardless of which grid square they were made in) plus one additional multiplier for every grid square activated (made a contact from)

Rovers are listed in the contest score listings under the Division from which the most QSOs were made.

Rovers who submit scores for the club competition must submit a second log and summary sheet indicating QSOs and score *if they make any contacts from outside of the club territory.* Indicate clearly on the summary sheet and in log if the log is the total entry or that portion to be counted for the club score

6. Miscellaneous:

6.1. Stations may be worked for credit only once per band from any given grid square, regardless of mode. This does not prohibit working a station from more than one grid square with the same call sign (such as a Rover).

6.2. Only one signal per band (6, 2, 1¼, etc) at any given time is permitted, regardless of mode.

6.3. Multioperator stations may not include QSOs with their own operators except on frequencies higher than 2.3 GHz. Even then, a complete, different station (transmitter, receiver and antenna) must exist for each QSO made under these conditions.

7. Awards:

7.1. Certificates will be awarded in the following categories.

7.1.1. Top single operator in each ARRL/RAC Section.

7.1.2. Top single operator on each band (50, 144, 222, 432, 902, 1296 and 2304-and-up categories) in each ARRL/RAC Section where significant effort or competition is evident. (Note: Since the highest score per band will be the award winner for that band, an entrant may win a certificate with additional single-band endorsements.) For example, if WB0TEM has the highest single-operator all-band score in the Iowa Section and his 50 and 222-MHz scores are higher than any other Iowa single operator's, he will earn a certificate for being the single-operator Section leader and endorsements for 50 and 222 MHz.

7.1.3. Top single-operator, QRP portable in each ARRL/RAC Section where significant effort or competition is evident. (Single-operator, QRP portable entries are not eligible for single-band awards.)

7.1.4. Top rover in each ARRL Division and Canada where significant effort or competition is evident. (Rover entries are not eligible for single-band awards.)

7.1.5. Top multi-operator score in each ARRL/RAC Section where significant effort or competition is evident. (Multioperator entries are not eligible for single-band awards.)

Top limited multi-operator in each ARRL/RAC Section where significant effort

or competition is evident. (Limited multi-operator entries are not eligible for single-band awards.

7.1.6. Top scoring club in each club competition category will be awarded a gavel.

See General Rules for all ARRL Contests for club competition information.

7.2. Participation Pins

7.2.1. Available, while supply lasts, to all who make at least 25 contacts (any combination of bands and modes) during the contest. This includes all operators of qualifying multi-operator efforts.

7.2.2. Order at: ARRL Contest Branch, 225 Main St, Newington, CT 06111. Price is $5 for each pin. Make check or money order payable to the ARRL. Pins will be shipped only after the contest results are verified and are prepared for publication in *QST*.

8. Submission:

8.1 All submissions must be emailed to **SeptemberVHF@arrl.org** or postmarked no later than October 10, 2001. Paper logs should be mailed to ARRL Contest Branch, Attn Sept VHF QSO Party, 225 Main St, Newington, CT 06111. Logs mailed or emailed after the submission deadline may be designated as check logs.

8.2 Stations that use computers to log must send the electronic log file for log checking purposes. Electronic logs must be in the Cabrillo file format. Submitted electronic files must be in ASCII / text readable format. A paper printout of an electronically generated log is not an acceptable substitute for the required log file.

8.3 All entries must include a properly completed summary sheet, or facsimile of the current summary sheet. Electronically submitted summary sheets are considered signed.

9. Other:

9.1 See "General Rules for All ARRL Contests" and "General Rules for ARRL Contests on bands above 50 MHz (VHF)," November 2000 *QST,* or at the Contest Branch Web site at: **www.arrl.org/contests**

For queries contact **contests@arrl.org** or 860-594-0232.

9.3. Forms may be obtained by:

9.3.1. Downloading from the Internet at the Contest Branch Website: **www.arrl.org/contests/forms**

9.3.2. Sending an SASE to September VHF Form Request, ARRL, 225 Main St, Newington, CT 06111. QST

STRAYS

SUSAN HELMS, KC7NHZ, THRILLS FD OPS FROM SPACE

◊ In what's believed to mark a Field Day "first," Astronaut Susan Helms, KC7NHZ, aboard the International Space Station joined in the annual ARRL Field Day fray and worked dozens of stations. The NA1SS contacts will count for Field Day credit, but they will not count for satellite bonus points, because the ISS is not an "Amateur Radio satellite," as rule 7.3.7 specifies. ARRL Contest Branch Manager Dan Henderson, N1ND, said Helms' ISS Field Day entry likely will end up "in a class by itself." W/VE stations working NA1SS QSL to Margie Bourgoin, KB1DCO, ARRL, 225 Main St, Newington, CT 06111. Include a self-addressed, stamped envelope for a return QSL.

Previous Strays

By Dan Henderson, N1ND
Contest Branch Manager

ARRL January 2001 VHF Sweepstakes Results

Super Sunday has become engrained in the American psyche. It is the day legends are made, or are extended. We know the names and deeds of the heroes from that day. It hasn't always been the last Sunday in January. It has been played as early as January 9 (1977—Raiders over Vikings) and as late as January 31 (198—Washington over Denver, 1993 Dallas over Buffalo, and 1999 Denver over Atlanta).

The Super Bowl has worked its way even into Amateur Radio and the ARRL's contest schedule. Rule 2 of the ARRL January VHF Sweepstakes rules read, in part "The weekend before the NFL Super Bowl." So as the 'Monsters of the Midway' or 'America's Team' spend the weekend in preparation for the final clash on the field, the "denizens of the VHF/UHF/Microwave" go to full battle. Whether in the monsoons of Miami, the frozen tundra of Lambeau Field, or the sunshine of Pasadena, while the All-Pro linemen get ready to block All-Conference linebackers, the *real* players—the VHF/UHF contesters—carry out their well-designed game plans. Their goal is simple: defeat the competition and winning the ARRL January VHF Sweepstakes.

A total of 799 logs, representing 1043 participants, were received for the 2001 VHF Sweepstakes. This is a decrease of about 2% from the number of logs received in 2000. Judging from the Soapbox comments, a substantial part of the decline is due to the third consecutive year of severe weather in parts of the US over the contest weekend. Nonetheless, log after log commented on the fun participants enjoyed for the weekend.

The Single Operator Low Power category, which was added to the event in 2000, again proved to be the most popular category, with 53% of the participants (420 of 799) claimed this entry level. Just like NFL training camps, the category attracts rookies, veterans looking to extend great careers, and those seeking a new challenge. Being relatively new, it is also the category with the best chance to see records fall. This proved to be the case as the overall category mark and eight Division records were set. Bob, K2DRH, led the way with a new category record of 142,975 points (which also sets a new Central Division record). Bob easily outdistanced Fred, N1DPM, by a comfortable margin of 35,359 points. Congratulations are also in order to the seven others who set new Division category marks: KU4R (Delta), WA8RJF (Great Lakes), N0IS (Northwestern), K6MI (Pacific), W6OAL (Rocky Mountain), W4EUH (Southeastern) and K5LLL (West Gulf).

While not setting an overall category or division record, perennial Top Ten VHF contester Jeff, K1TEO, took no prisoners as he blitzed his way through the Single Operator High Power category. Like a linebacker taking aim on the opposing quarterback, Jeff sacked the opposition by a nearly 2 to 1 margin. His score of 377,580 topped the excellent effort of 190,800 posted by Dale, K1UHF. Division category records were set by KM0T (Midwest), NU7Z (Northwestern) and N6AJ (Pacific) during this year's contest.

Occasionally an athlete will change their name, but it doesn't change their ability (ask Lew Alcindor a.k.a. Kareem Abdul Jabbar). Similarly, the old QRP Portable category saw a name change to Single Operator Portable. It did not change the requirements for entering the category. It is still a limited power station (no more than 10 W), requires a portable power source, and the operator still must abide by the 500-meter circle

Top Ten

Single Operator, Low Power

K2DRH	142,975
N1DPM	107,616
AF1T	91,258
W3KM	53,475
K1JT	51,310
N3FUJ	51,300
K9YR	45,936
WA8RJF	44,619
WA3GFZ	39,870
K9VHF	37,145

Single Operator, High Power

K1TEO	377,580
K1UHF	190,800
K2AXX	168,454
W3RJW	156,416
KE8FD	151,074
WA3NUF	141,882
WZ1V	133,198
K1RZ	130,696
WA2FGK	124,754
WW8M	120,250

Single Operator Portable

N8XA	21,356
N9MYK	6,600
K6LMN	4,922
VE7DXG	4,256
KA9BXG	2,496
N8KWX	2,466
KQ6EE	2,204
N2IM	1,632
WB2AMU	697
N3FTI	676

Limited Multioperator

W2ODH	129,260
AA4ZZ	101,320
K8EB	87,345
N2BJ	85,272
N8KOL	84,227
W1QK	58,302
W3IP	52,190
W2FU	44,745
W2SAG	42,336
W1VHF	27,755

Multioperator

K8GP	501,416
N2PA	366,120
W0RSJ	323,070
W2UR	289,651
K2TVI	196,321
N3YMS	76,798
WA2OMY	53,880
N1JOY	43,878
W6TOI	43,818
K3EOD	35,563

Rover

N2JMH	144,534
W5DF	140,336
K2TER	140,250
N6DN	128,480
K0DAS	120,564
NA0IA	104,310
N6TEB (WB6JDH,op)	96,903
KF6GYM	74,184
WO2P	48,990
K7XC	47,085

Affiliated Club Competition

	Score	*Entries*
Unlimited Category		
Mt Airy VHF Radio Club	2,009,231	52
Medium Category		
North East Weak Signal Group	1,450,110	30
Rochester VHF Group	1,163,954	30
Potomac Valley Radio Club	979,007	23
Northern Lights Radio Society	371,850	29
Badger Contesters	246,378	24
Murgas ARC	205,600	5
Green River Valley ARS	143,356	3
Downey ARC	141,241	3
Society of Midwest Contesters	109,516	8
Six Meter Club of Chicago	70,294	23
South Jersey Radio Assn	62,738	6
Crawford County ARC	50,974	12
Bergen ARA	48,752	6
Quaboag Valley ARC	14,794	5
Yankee Clipper Contest Club	13,240	5
Burlington County Radio Club	8,137	6
Warminster ARC	4,199	9
Bears of Manchester	4,004	7
Mobile Sixers Radio Club	2,468	4
Rochester (MN) ARC	1,397	14
Ventura County ARC	1,219	3
Local Category		
Cedar Rapids Microwave Society	225,090	3
Clear Lake ARC	141,380	4
Delaware Valley VHF Society	72,528	4
Rocky Mountain VHF Plus	42,518	3
Schenectady Museum ARA	31,306	10
Hudson Valley Contesters and	23,650	4
Thomson ARC	12,586	3

as required in the general rules. Axel, N8XA, hunkered down like a lineman in the trenches and set a new Great Lakes Division record while winning the overall category with a final score of 21,356. Axel was joined as a new division record setter by category runner-up Dick N9MYK (Central) and VE7DXG (Canada).

The two multioperator categories only comprise 8.5% of the total entries for the contest, but account for over 25% of the participants. Working with one of the established multioperator stations could be said to be similar to being a special teams players. Just like punters, kickers, and return men, those who man the stations at the various multioperator sites play a valuable role in the overall contest. It is a great way to introduce newcomers to the finer points of VHF contesting, and allows them to hone the specialized talents, while learning some of the special nuances required to become a top flight VHF/UHF devotees.

Close games going down to the last minute are always fun for both the audience as well as the participants. The Limited Multioperator category was such a contest. The operators at W2ODH/6, operating in the Los Angeles section edged out a solid effort by the AA4ZZ operators, working from their QTH in NC by a final of 129,260 to 101,320. The ops at fourth place finisher N2BJ ground out the local yardage, and gained a few more "first downs" among the QSO total (564 to 522), but the long distances accumulated by K8EB (135 mults to 114) allowed them to sneak into third place in a very close finish.

Of course you do have the dynasties – those franchise multi-multioperator stations that are always at or near the top of the boxes annually. They never seem to lose a beat when one of their ops moves on—they just simply reload. Few are more prolific in scoring performance or consistency than the established crew at K8GP. Operating from the old Fairfax (VA) dump (instead of their usual roost on Spruce Knob, VW), the Grid Pirates broke through the line and ran away from opposition, as they posted a winning score of 501,416 In the process they established a new Roanoke Division record. Runner-up in the category was N2PA, operating from the snowy area around Lake Ontario.

In football, they say that it takes a special breed of player to be a kick returner. The closest they come in VHF contesting is probably the rover, especially in January. Maximizing grids and QSOs in a short period of time in snow, sleet, ice or storms shows a bit about living on the edge (just like not fair-catching a punt with those 240 pound defensive backs closing in on you at full speed). The top rover entry in 2001 was from Jim, N2JMH, (with Todd, N2WVK, as the "blocking back"). This duo outpaced the West Gulf category record setting effort of Dan, W5DF, (with John, AB5SS, handling the cohort duties). New division records were also set by K0DAS (Midwest), N6DN (Southwestern), and VE3OIL (Canada).

Once again the Affiliated Club competition saw the PacRats of the Mt. Airy VHF Radio Club place first among all scorers. They were also the only club submitting sufficient entries to qualify in the Unlimited category. A good battle was staged for top honors Medium Club category, with the North East Weak Signal Group beating out the Rochester VHF Group. The Local Category crown was captured by the Cedar Rapids Microwave Society. A total of 48% of the logs received were from entries participating in this annual Club competition.

The 2002 January VHF Sweepstakes will be contested this coming January 19-22. We don't know right now which two NFL franchises will have fought their way through the tough battle to get to the Super Bowl the following weekend. But we do know that hundreds of gladiators of the VHF/UHF airwaves will have prepped themselves and be ready for solemn battle of the Grid(square) iron.

SOAPBOX

Way too cold for driving around on frozen mountaintops! (AC4LS/R)… First contest for me, first 1.2 GHz contest contact and did it roving (AH6RH)… NA0IA/R and I came across KB0DCO/R out in EN24 for an impromptu rover convention at 2:00 AM under a crystal clear star-lite sky and a temperature of minus 7 degrees (K0DAS/R)… Big snowstorm on Sat night almost kept us from getting home to recharge our batteries! The NJ Turnpike was down to 35mph on Sunday and we were unable to head to the northern grids (K1DS)… Poor tropo, no

Region Boxes

Northeast Region
(New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

N1DPM	107,616	A
AF1T	91,258	A
W3KM	53,475	A
K1TEO	377,580	B
K1UHF	190,800	B
K2AXX	168,454	B
N2IM	1,632	Q
WB2AMU	697	Q
N3FTI	676	Q
W1QK	58,302	L
W3IP	52,190	L
W2FU	44,745	L
N2PA	366,120	M
W0RSJ	323,070	M
W2UR	289,651	M
N2JMH	144,534	R
K2TER	140,250	R
WO2P	48,990	R

Southeast Region
(Delta, Roanoke and Southeastern Divisions)

W4EUH	23,636	A
KU4R	17,750	A
K1LH	16,344	A
K4QI	86,139	B
KD4K	16,445	B
KU4WW	13,731	B
AA4ZZ	101,320	L
K8JF	6,811	L
N4ION	5,412	L
K8GP	501,416	M
K4RF	20,169	M
KV4T	2,590	M
W3IY	9,400	R
N4OFA (+KB4NVD)	8,512	R
NJ4I (KF4VZQ,op)	3,570	R

Central Region
(Central and Great Lakes Divisions; Ontario Section)

K2DRH	142,975	A
K9YR	45,936	A
WA8RJF	44,619	A
KE8FD	151,074	B
WW8M	120,250	B
K8MD	77,423	B
N8XA	21,356	Q
N9MYK	6,600	Q
KA9BXG	2,496	Q
K8EB	87,345	L
N2BJ	85,272	L
N8KOL	84,227	L
N9YZK	38,936	R
KB9WVL	29,184	R
K0PG	28,413	R

Midwest Region
(Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)

K5LLL	31,755	A
W6OAL	19,459	A
KB0ZEV	17,343	A
W0GHZ	70,228	B
KM0T	63,140	B
W0ZQ	62,322	B
W0JH	18,361	L
N5XU	5,811	L
AD5V	5,586	L
KA0MR	10,553	M
K0NY	6,320	M
W5DF	140,336	R
K0DAS	120,564	R
NA0IA	104,310	R

West Coast Region
(Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)

K6MI	27,466	A
KC6ZWT	13,772	A
W6IT	11,475	A
N6AJ	51,543	B
W6KBX	35,568	B
KJ6KO	30,912	B
K6LMN	4,922	Q
VE7DXG	4,256	Q
KQ6EE	2,204	Q
W2ODH	129,260	L
K6QG	3,944	L
AD6IJ	3,146	L
W6TOI	43,818	M
K6WLC	12,740	M
N6DN	128,480	R
N6TEB (WB6JDH,op)	96,903	R
KF6GYM	74,184	R

QSO Leaders By Band

Single Operator, Low Power

50 MHz

K1JT	188
N3FUJ	161
N1DPM	138
AF1T	137
K0VXM	124

144 MHz

KB0LYL	326
N3FUJ	246
WB2CUT	216
K2DRH	197
K1JT	191

222 MHz

N3FUJ	86
K1JT	81
W3KM	69
WA3GFZ	67
N2SCJ	66

432 MHz

N3FUJ	138
KE6GFF	134
K2DRH	99
K1JT	96
K9YR	89

902 MHz

N1DPM	25
W3KM	21
WA3GFZ	19
AF1T	18
AA3RE	17

1296 MHz

WA3GFZ	38
K2DRH	35
W3KM	31
N1DPM	29
N2SCJ	29

Single Operator, High Power

50 MHz

K1TEO	281
K8TQK	200
N2WK	196
K1UHF	175
K1RZ	174

144 MHz

K1TEO	377
K3TV	360
K1UHF	353
K1RZ	242
K1FO	241

222 MHz

K1TEO	108
N3EXA	88
K1UHF	86
K1FO	85
WA3NUF	83

432 MHz

K1FO	166
K1TEO	152
W3RJW	95
KE8FD	95
K1UHF	94

902 MHz

K1TEO	40
WA3NUF	35
W3RJW	35
N3EXA	35
WZ1V	32
K1UHF	32
W2SJ	32

1296 MHz

K1TEO	53
W3RJW	53
N3EXA	48
WA3NUF	44
K1RZ	43

Multioperator

50 MHz

K2TVI	432
K8GP	346
W0RSJ	314
W1VHF -L	304
W1QK -L	262
W2UR	249
N2PA	224
W2ODH -L	221
W2FU -L	218
AA4ZZ -L	204

144 MHz

K8GP	507
W0RSJ	429
W2UR	408
N2PA	336
K2TVI	321
W2ODH -L	295
W1QK -L	270
K8EB -L	262
N3YMS	240
N2BJ -L	231

222 MHz

W0RSJ	128
W2ODH -L	123
K8GP	120
N2PA	115
K2TVI	108
W2UR	89
N2BJ -L	65
WA2OMY	61
N3YMS	60
W6TOI	60
W2EA -L	60
W3IP -L	60

432 MHz

K8GP	202
W2ODH -L	181
W0RSJ	166
K2TVI	144
N2PA	125
N2BJ -L	119
W2UR	109
N3YMS	103
AA4ZZ -L	102
W6TOI	90

902 MHz

W2UR	38
K8GP	32
W0RSJ	30
N2PA	29
WA2OMY	19
N3YMS	12
WA3ZKR	11
K2TVI	9
N1JOY	8
N3ADC	8

1296 MHz

W2UR	55
K8GP	48
W0RSJ	39
N2PA	36
W6TOI	30
WA2OMY	30
N3ADC	23
K3AX	19
K2TVI	19
WA3ZKR	17

-L denotes Limited Multioperator

Multiplier Leaders By Band

Single Operator, Low Power

50 MHz

K2DRH	33
WA8RCN	27
K4TO	26
N1DPM	26
K1LH	25

144 MHz

K2DRH	42
VE3TMG	33
K4TO	33
WA8RJF	32
KC8CCD	32

222 MHz

K2DRH	31
WA8RJF	21
WA1MKE	19
K9YR	18
AF1T	18

432 MHz

K2DRH	38
K4TO	25
WA8RJF	23
K9VHF	22
VE3TMG	21

902 MHz

N1DPM	13
K2DRH	9
K5LLL	9
AF1T	7
WA1MKE	6
K6MI	6

1296 MHz

K2DRH	22
N1DPM	11
AA2WV	8
K5LLL	8
K6MI	8

Single Operator, High Power

50 MHz

K1TEO	57
K8TQK	55
N2WK	45
WB8XX	36
KE8FD	36

144 MHz

KE8FD	65
K4QI	48
KM0T	46
K1TEO	44
K2YAZ	43

222 MHz

KE8FD	36
K1TEO	31
K9EA	26
K2AXX	26
K1UHF	24
K4QI	24
K8MD	24

432 MHz

KE8FD	44
K4QI	37
K1TEO	30
K9EA	29
K2YAZ	27

902 MHz

K1TEO	14
WA2FGK	13
K1UHF	12
WW8M	12
K5IUA	11

1296 MHz

KM0T	17
K1TEO	17
WA2FGK	15
WW8M	14
K8MD	14
K9KL	14
K4QI	14

Multioperator

50 MHz

K8GP	57
W2FU -L	50
N2PA	48
N8KOL -L	42
AA4ZZ -L	41
W2ODH -L	41
W1VHF -L	40
K2TVI	39
W0RSJ	37
W2UR	35

144 MHz

K8GP	58
N2PA	53
N8KOL -L	49
K8EB -L	49
W0RSJ	48
W2UR	46
W2FU -L	42
AA4ZZ -L	40
W2ODH -L	37
N3YMS	35

222 MHz

N2PA	39
K8GP	33
W0RSJ	31
K8EB -L	26
AA4ZZ -L	25
N8KOL -L	24
W2SAG -L	22
N2BJ -L	21
W2UR	21
K2TVI	20

432 MHz

K8GP	36
N2PA	34
K8EB -L	32
W0RSJ	30
AA4ZZ -L	30
N8KOL -L	28
K2TVI	23
W2UR	22
W2SAG -L	21
K3MJW -L	20

902 MHz

N2PA	18
K8GP	16
W0RSJ	10
W2UR	10
WA3ZKR	6
K2TVI	6
N1JOY	5
WA2OMY	5
N3YMS	5
W6TOI	4

1296 MHz

K8GP	19
N2PA	17
W2UR	14
W0RSJ	12
K2TVI	11
W6TOI	7
WA3ZKR	6
WA2OMY	6
N1JOY	6
K6WLC	6

-L denotes Limited Multioperator

aurora, little sporadic E, so I expect scores in the Northeast to be down from last year. I was 0-for-3 in getting new bands on the air at the 11th hour. Lots of fun, anyway!(K1JT)… 1 0 GHz finally playing like it should. Need more than 10 mW to make it more fun though! (K2AXX)… What a weekend! Rain, Snow, Ice, and wind! Even had a smoking coax relay due to a Murphy visit. (K3TV)… What a trip! Thanks to Tim - NS9E for braving the unknown world of ROVER contesting with me (K7XC)…This is the first time I have submitted a log for a contest, even though I have participated in several previous contests (KB0DCO)… Nearly double my best score ever (KB0OBT)… The "upside" to the poor 6M conditions was that the other bands got a more thorough workout than usual for me, and total QSOs were the highest I've ever had in any contest. (KB0ZEV)… We introduced several new club members to VHF contesting! (KC0AHN)… New definition of Clean Sweep is working Northern Lights Radio Society fixed stations on all 3 bands in the Rover Mobile from the 6 grids activated. This must mean we need to drive to grids further away (KC0P)… Not bad for a dual band mobile into a body-mounted, $^1/_4$-wavelength whip! (KK7GP)… Had a great time although propagation was pretty poor. Was great to see some of the new guys on! (N0VSB)… Spent too much time shoveling snow after a storm (N3FNE)… I should be able to complete a VHF contest without blowing up something N3RN)… Kept hearing "little" burst on 6M, but it never opened up to us. Same on 2 and 432. Loneliest contest I have ever worked. Where were you DM93 and 95? We ALWAYS can hear you.(N5YYX)… Achieved personal goal of 300 min. QSOs! Even with lousy band conditions. Six meters tried to open Sunday early morning and I heard N2PA & W3EP on bursts (N9TF)… Twenty-five hours of operation and 1100 miles driving activates 15 grids with over 600 QSOs. Operation was with omni antennas and Run and Gun or as we call it Rover-A-Go-Go. We never got out of the vehicle except for gas, food, sleep and impromptu rover conventions (NA0IA/R)… After 15 years off the air, comparing then and now, I found the characteristics of the contest very positive... more activity, great operators, dedicated rovers, and when aurora arrived - the flame burned very brightly. Gobs of fun! (W0VB)… My Leonids Kids (twins born during Leonids '99) took an appreciable portion of my time, but my wife gave me enough time to make a decent effort (W2EV)… Contests... a good way to make those station upgrades happen (WJ7L)… First attempt at VHF contesting. Lots of fun, but had the trouble deciding between NAQP on Saturday or VHF (WM3T)… A real snow job!

Scores

Each line score lists call sign, score, stations worked, multipliers, hours, number of grids activated (if Rover), and bands (A= 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, I = 10 GHz). Band winners are listed in **boldface** type.

1

Connecticut

N1JMM 9,184 194 41 A **ABC**D
K1WVX 4,512 109 32 A ABC**DE**
N1OPO 1,330 85 14 A ABD
WB1GIC 1,260 69 15 A ABCD
WB1GCM 1,020 68 15 A AB
N1TUP 590 41 10 A ABCD
N1ZXL 530 53 10 A AB
KA1SZP 430 41 10 A ABD
N1SPI 385 33 11 A ABCD
N1SFE 336 35 7 A ABCD
N1QVQ 125 20 5 A ABD
K1SW 80 14 4 A ABD
N1TUJ 2 1 1 A D
K1TEO 377,580 1042 210 B **ABCD9E**FGI
K1UHF 190,800 789 150 B ABCD9EFI
WZ1V 133,198 542 101 B ABCD9E**FGIP**
K1GX 97,650 532 105 B ABCD9EFG**HI**
K1FO 94,284 652 97 B ABCDE
N1NQD 4,422 99 33 B ABCD9E
W1QJL 3,584 95 28 B ABCD
N1UXA 1,157 70 13 B ABD
KA1VMG 910 65 14 B AB
WA1FUJ 370 30 10 B ABD
WA1GTP 312 23 13 B ABC
W1QK (+W1NG,W1JMA,K1XS,KA1SYG)
58,302 635 79 L ABCD
NZ1U (KB1H,KB1DFB,N!XS,ops)
18,400 340 46 L ABD
W1NRG (KB1CIW,K1MKF,N1API,ops)
189 21 9 L AB

Eastern Massachusetts

W1PM 33,361 302 73 A **ABCD9E**
KA1EKR 3,703 101 23 A BCDE
K1NKR 3,542 97 23 A ABCD9E
N1ABY 2,992 136 22 A AB
KV1J 2,280 91 20 A ABCD
W1DYJ 2,184 104 21 A AB
K1HC 2,079 96 21 A ABCD
N1OP (K1BFD,op)
2,014 94 19 A ABD
K1UR 1,414 101 14 A A
AA1VL 1,400 90 14 A ABD
K1YZ 1,162 79 14 A ABD
N1VQR 1,001 82 11 A ABD
N1BC 858 56 13 A ABD
K1EP 770 70 11 A A
WA1OFR 648 46 12 A ABD
W1GHZ 58,968 441 84 B **ABCD9EI**
WA1ENO 1,666 86 17 B ABD
N1EKV 1,275 62 15 B ABCD
W1XM (KT1D,KB1CGZ,W1GSL,KD6BUE, KB1FPJ,KD1KY,KB9IJB,KA2ZLZ,WA1VRB, KB1EHH,KB1DBY,KB1FEO,ops)
18,568 338 44 L ABCD
N1FDX (+N1FY)
1,853 109 17 L AB
N1JOY (+KE1LI,N1TZM,N1RHS)
43,878 426 71 M ABCD9EHI
WA1LBK (+N1ZRD)
5,152 119 32 M ABCDE

Maine

N1YIS 99 11 9 A **B**
N1DGF 975 65 15 B **B**

New Hampshire

AF1T 91,258 493 103 A **ABCD9EFGHIP**
KU2A 32,400 245 72 A ABCD9EF**G**
W1BQ 14,448 197 48 A ABCD9EF
AC1J 10,800 215 40 A ABCD
WW1Z 6,480 145 36 A ABCD
W6FC/1 5,120 154 32 A ABCD
K1PDY 1,080 56 15 A ABCD
N1KQW 930 62 15 A A
W1OA 828 62 12 A ABCD
W1DAD 30 10 3 A A
WA1YHO 49,665 372 77 B AB**CD9EF**
K2HZN 36,975 369 75 B **AB**CDE
WA1T 19,435 219 65 B ABCDE
K1TR 11,960 166 52 B ABCD
W1ZC 3,024 84 24 B BD
N1JHJ 2,112 73 22 B ABCD
N1NUM 2,040 103 17 B ABCD

Rhode Island

KM1X 16,300 277 50 A **ABD**
AI1K 1,440 64 20 A ABD
W1BAT 1,674 90 18 B **ABD**
W1CPC 780 60 12 B **ABD**
W1VHF (W1JJM,N1RWK,K1AST,K1DAM,ops)
27,755 414 61 L ABD

Vermont

K1LPS 17,095 187 65 A **ABCD9E**
N1FMP 434 31 14 A AB
W1AIM 21,534 209 74 B **ABCD9E**
K1UC 1,725 52 25 B ABCD
W1FN (WB1BRE,KD1P,K1IB,KA1UAG, N1HAC,AA1KL,N5IEP,AC1H,ops)
10,927 178 49 L ABCD
N1JEZ (+N1MJD)
8,060 126 52 M ABCDE

Western Massachusetts

N1DPM 107,616 484 118 A **ABCD9EFG**
N1SIF 10,032 250 33 A ABD
K1ISW 8,190 186 35 A ABCD
N1MHH 3,936 136 24 A ABCD
K1MAP 2,438 72 23 A ABCDEF
N1VOR 1,440 88 15 A BC
K1KBU 396 44 9 A AB
WA1MBA 28,779 195 53 B BCD**9EFGHI**
W1RZF 19,800 300 45 B **BCD**
W1RIL 6,630 95 39 B ABCD9E
W1NMQ 832 52 16 B **AB**

2

Eastern New York

WG1Z 25,032 308 56 A **ABCDE**
W2IR (W2PR,op)
9,386 197 38 A ABCD
WB2SIH 8,942 217 34 A **ABD**
W2XL 8,142 145 46 A ABCD
N2WCY 3,328 122 26 A ABD
N2TY (W2JHO,op)
3,088 141 16 A ABCD
WA2YEI 2,184 79 26 A ABD
W2ENY 1,452 66 22 A AB
KB2TSA 165 23 5 A BCD
W2FW 32 14 2 A BD
W3HHN 21,200 190 80 B **ABCD9E**
N2MCI 5,499 137 39 B ABCD
W2GKR 3,224 79 31 B ABCD
WA1KKM 2,001 63 29 B ABD
AA2CW 105 17 5 B BCD
KA2NKO 6 6 1 B B
KY2J (+logger)
8,557 180 43 L ABDP
K2TVI 196,321 1041 137 M ABCD9EFGI
K2CT (K2BX,N1JP,WE2F,K2XA,WD2AJS, K2EP,K2XF,W2FWS,N1EU,W2ZU,ops)
23,168 285 64 M ABCD
WA2BAH (+KA2NKO,KB2WAO,N2UZQ,N2TJQ, W2FW) 20,496 252 61 M ABCD9E

NYC-Long Island

KB2NOW 2,037 79 21 A **ABC**D
K2OVS 1,298 50 22 A **ABD**
WA2ZFH 8,496 137 36 B AB**CDE**
K2LCK 2,500 100 25 B **AB**
WB2AMU 697 37 17 Q ABD

Northern New Jersey

K2KIB 27,268 266 68 A AB**CD9EF**
K2MLB 15,456 258 42 A AB**DE**
KC2DTA 7,272 163 36 A ABD
W2UDT 5,404 162 28 A ABC
WB2CUT 4,752 216 22 A **B**
WA2BKN 663 51 13 A AB
KC2FYA 560 60 7 A BD
K2JT 168 21 8 A A
W2JEK 432 36 12 B **AB**
K2BAR (K2AMI, WA2QHL, WA2LXE, K2PJM, K2ZB, W2MSK , ops)
14,740 241 44 L ABCD
NA2AA (+KB2IHV)
11,692 293 37 L ABD

Northern New York

K3KYR 6,432 134 48 B **AB**

Southern New Jersey

K1JT 51,310 556 70 A **ABCD**
N2SCJ 23,100 421 35 A ABCD**E**
W2PAU 6,720 183 32 A ABD
KA2WRE 5,736 195 24 A ABD
N1RK 3,712 92 32 A ABCD
N2DEQ 1,100 99 10 A BCD
N2VW 984 110 8 A ABD
N2RF 847 77 11 A AB
WA3RHW 784 99 7 A BD
W2MAT 455 65 7 A AB
N2MPU 440 55 8 A AB
WA4FRA 400 46 8 A ABD
K2KID 130 65 2 A B
KK2CW 48 24 2 A B
W2SJ 53,185 419 55 B **ABCD9EFG**
K2TXB 31,919 292 59 B **BDEI**
WA2ONK 28,356 301 51 B ABCD9E
KB2WQM 1,240 50 20 B ABD
N2WFN 20 10 2 B B
W2EA (K2WB,N2FY,KV2M,KV2R,KF2YX,ops)
22,360 404 43 L ABCD
K2AA (KD4HZW,W2MC,W2RDS,KC2AZO,ops)
6,446 242 22 L ABCD
W2UR (+W2PED)
289,651 992 163 M ABCD9EFGHI
K3EOD (+WR3P)
35,563 416 61 M ABCD9E

Western New York

AA2WV 28,609 238 67 A **ABCD9EFGI**
N2UIO 12,546 223 41 A ABCD**P**
W2ONP 10,763 144 47 A ABCD9E
KA2ENE 9,920 241 32 A **ABD**
WA2ZNC 6,816 151 32 A ABCDE
K2UA 4,340 111 28 A ABCD
KG2NI 3,570 163 17 A ABD
K2CS 3,550 129 25 A ABD
W8JW 2,184 128 14 A ABD
W2VO 2,016 63 32 A AB
W2WGL 1,885 52 29 A BD
KB2NFS 1,792 97 14 A ABCD
W2EV 1,736 89 14 A BD**IJ**
WB2YJH 1,540 104 14 A ABD
N2UM 1,320 112 10 A ABD
WY2Z 1,155 76 15 A ABC
AB2HG 768 78 8 A BD
KA2KQP 595 77 7 A ABD
W2TX 352 32 11 A B
W2RDX 170 29 5 A ABD
K2OS 144 18 8 A A
KC2HHB 135 15 9 A A
KB2KJV 72 6 6 A ABCDE
N2TWI 30 15 2 A B
N2USB 22 11 2 A B
K2AXX 168,454 555 143 B **ABCD9EFGIJP**
NQ2O 44,928 255 96 B ABCD9EFG
K2AN 23,607 280 43 B ABCDEFG
N2WK 14,880 248 60 B **AB**
AA2GF 11,169 188 51 B BD
N2HJD 6,670 200 23 B ABCDF
AF2K 5,434 209 26 B AB
WB2WPM 3,996 111 36 B AB
K2NV 2,706 75 33 B ABD
KC2FFS 432 64 6 B BD
N2IM 1,632 65 17 Q BCD
W2FU (+N1MU)
44,745 453 95 L ABD
W2SAG (N2VBM,AI2A,N2PBU,WA2RKP, KB2RLO,K2LMH,KB2YAA,KC2EHY,ops)
42,336 328 98 L ABCD
K2GXT (KB1EKZ,KB0WJO,KB1ENW,KB2WLK, KC2HGN,KB2YQE,KC2FQD,KC2HBW,KB1DOX,ops)
4,828 210 17 L ABD
KB2SGX (+W2JEF,N2VR,)
416 87 4 L ABCD
N2PA (N2HLT,N2JDQ,W3OAB,N2JQR,N2KG, N2YB,ops)
366,120 905 226 M
ABCD9EFGHIJP
WA2AAZ (KB2UDB,N2MKT,N5THV,W2GIV,AB2F, N2MKR,KB2LEP,ops)
6,336 152 32 M ABCD9

3

Delaware

K0UWO 1,848 72 22 A **ABD**
WA3WUL 300 50 6 A **A**
K3DEL (W3OR,op)
20,178 187 57 B **ABCD9EFG**
N3YMS (+K4CHE,N3FZP,KE3UY)
76,798 573 94 M ABCD9E

Eastern Pennsylvania

W3KM 53,475 391 69 A AB**CD9EF**G
N3FUJ 51,300 631 60 A **ABCD**
WA3GFZ 39,870 424 45 A ABCD9EF**GP**
AA3RE 22,260 326 42 A ABCD9E
K3DMA 10,450 268 25 A ABCDE
N3DHI 9,264 282 24 A ABCD
NE3I 9,126 207 27 A ABCDE
WS3C 9,120 197 40 A ABD
N3PLM 6,946 164 23 A ABCD9EF
W3IIT 5,808 203 22 A ABCD
K3XR 4,312 129 28 A ABCD
KD3TB 1,770 112 15 A ABD
N3JNX 1,334 50 23 A ABD
W3JS 1,326 91 13 A ABD
N3EMA 963 83 9 A ABCD
K3ZK 847 55 11 A ABCD
KD3ST 784 56 14 A AB
KB3DHU 637 76 7 A ABD
KA3YCG 340 66 5 A ABD
W8IJ 231 18 11 A ABD
N3OGY 200 45 4 A BD
N3RAH 196 38 4 A BD
WR9P 170 22 5 A BCD
N3MXT 130 65 2 A B
KB3EXB 114 16 6 A BC
KB3FCH 108 18 6 A A
KD3DI 100 23 4 A BD
K3VEQ 98 49 2 A B
KI3P 60 10 6 A AB
KA3MGB 60 15 4 A B
K3KT 50 25 2 A B
WG3S 13 13 1 A B
W3MY 4 4 1 A A
W3RJW 156,416 660 104 B ABCD9EF**GHIP**
WA3NUF 141,882 648 102 B ABC**D9**EFG**HIJP**
WA2FGK 124,754 471 134 B ABCD**9EF**G
N3EXA 109,020 637 92 B AB**CD9**EF
WA3DRC 82,725 483 75 B ABCD9EF**GIP**
K3CX 82,080 537 80 B ABCD9EF
AA3GN 47,150 427 50 B ABCD9EFGH
KB3XG 41,993 277 49 B ABCD9EFG**HIP**
N3FA 41,656 365 82 B ABCD9EF
N3NGE 40,300 333 52 B ABCD9EFGH
N3RN 38,208 281 96 B ABCD9EF
N3ITT 30,528 364 48 B ABCD9E
K3IPM 26,624 431 52 B **AB**CD
W3KJ 17,580 236 30 B BCDEF
KU3A 17,325 268 45 B ABCDE
K3MFI 16,275 298 31 B ABCD9EF
NA2T 14,552 179 68 B ABD
WA3RLT 12,710 253 31 B ABCDE
K3TV 12,600 360 35 B **B**
KB3ZS 12,035 280 29 B ABCDE
WA3AQA 10,738 252 26 B ABCD9E
W3KKN 10,350 271 23 B ABCD9E
W3GAD 10,080 231 32 B ABCD
W3SZ 8,917 135 37 B BCDEF
K3IUV 7,337 219 23 B ABCDE
W3DFM 7,223 169 31 B ABCDE
KB3CPL 7,163 170 29 B ABCDEI
W3GXB 5,616 142 24 B ABCD9E
KB3IB 4,186 104 23 B ABCD9E
WA3EHD 4,000 169 16 B ABCDE
K3IB 3,816 159 24 B B
W2SK 3,672 77 17 B ABCD9EFGH
WA4GPM 3,045 105 29 B A
N3VJH 2,030 147 10 B ABCD
W3AWA (WA3KFT,op)
1,188 95 11 B ABCD
K3JJZ 1,160 115 8 B BC
N3EVV 1,071 50 9 B ABCI**JP**
N3AHP 912 69 12 B ABCD
N3CB 560 46 10 B ABCD
N3EMY 480 52 8 B ABCD
W3JG 352 43 8 B ABD
WA3CSP 200 20 10 B A
KB3CKD 186 29 6 B BD
N3KGC 135 15 9 B AB
N3FKR 120 20 6 B AB
N3AOG 52 9 4 B ABCD
W3TDZ 16 8 2 B B
N3FTI 676 46 13 Q ABD
W3HZU (AD3E,N3NBT,KE3YR,WB3CQN,K3ELM, KB3FKG,ops)
5,810 161 35 L ABD
W0RSJ (N2CEI,N2EOC,N2IX,+net)
323,070 1132 178 M ABCD9EFGHI
WA2OMY (+WA3YUE)
53,880 460 60 M ABCD9EFGHI
K3AX (+N3XJX,+net)
30,096 292 66 M ABCDE
N3ADC (+KB3HE)
18,270 322 35 M ABCD9E

Maryland-DC

K3HCE 20,160 272 60 A **ABD**
K3IXD 17,088 263 48 A ABC**DE**
N3UM 3,432 143 24 A AB
N3II 2,360 118 20 A AB
WN3C 1,312 68 16 A ABD
WA4PRR 1,170 60 18 A ABD
N3AM 936 71 13 A BD
K3ROJ 660 56 11 A ABD
W3FT (N3NYC,op)
520 40 13 A B
N3UN 210 38 5 A ABD
K3BPP 120 15 8 A A
W2GG 112 15 7 A ABD
N3FNE 76 19 4 A A
K3CHP 54 27 2 A A
WA3GYW 40 8 5 A AB
K1RZ 130,696 631 124 B AB**CD9EFI**
K3DNE 113,520 543 132 B ABC**D**9E
N3HBX 44,100 389 90 B ABCDE
W3EKT 42,075 365 85 B ABCDE
W3ZZ 22,922 213 73 B ABCD9E
K3ZO 18,966 327 58 B AB
N3ZTZ 11,567 253 43 B ABD
W3VRD 3,078 79 27 B ABCD9E
N3VOP 3,006 141 18 B ABD
W3GN 736 46 16 B AB
W3IP 52,190 469 85 L ABCD
WA3ZKR (+KA3EJJ)
32,300 284 68 M ABCD9EFI

Western Pennsylvania

KA3SDP 18,864 196 72 A **ABCD**
AA3GM 3,700 74 37 B **ABCD**
WB0IWG 55 11 5 Q AB
K3MJW (KA3WSW,N3GJ,N3NOS,N3WAV, N3WMC,ops)
22,016 207 86 L ABCD
W3SO (W3TEF,K4VV,W3YOZ,ops)
10,600 210 50 L ABD

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Alabama

W4OZK 1,188 46 22 A **ABD**
N4YQ 209 19 11 A **A**
KU4WW 13,731 158 69 B **ABCD**
KU4IU 10,858 160 61 B **ABD**
AJ4W 1,012 43 22 B ABD
N4ION (+KS4B,N4JDB)
5,412 100 44 L ABCD
KV4T (+W4CCF,KF4DGS)
2,590 58 37 M ABCDE

Georgia

W4EUH 23,636 247 76 A **ABCD**
K4KAZ 3,040 68 32 A ABCD**E**
NY4F 290 23 10 A ABD
KD4K 16,445 193 65 B **ABCD**
K4RF (+K4SZ,W4KXY,KB4IDC)
20,169 192 83 M ABCDE

Kentucky

K4TO 30,492 236 99 A **ABCD**
KD4EVB 1,920 53 30 A ABD
KC4JGS 15,048 180 72 B **ABD**

North Carolina

N1GC 15,580 162 76 A **ABCD**
AF4HX 8,284 154 38 A ABCD
W4FAL 1,116 51 18 A ABCD
WB4TLX 750 42 15 A ABD
K0GHZ/4 720 36 20 A AB
KF4LVF 198 18 11 A AB
N4CW 27 9 3 A A
K4QI 86,139 386 153 B **ABCDE**
W4VHH 5,734 79 47 B BDE
AA4ZZ (K4DXA,K4MQG,W4GRW,W4MW, W4VHF,ops)
101,320 588 136 L ABCD

Northern Florida

KU4WD 2,436 106 21 A AB**C**D
KE4YYD 989 43 23 A **AB**
WD8KUF 770 48 14 A AB**D**
WE2M 624 35 16 A ABD
W4QS 495 28 11 A ABD**E**
W2BZY 10,080 191 42 B **ABCD9EF**

Puerto Rico

WP4LNY 90 16 5 A **ABD**

South Carolina

AC4Q 8,008 120 52 A **ABCD**
N4UFP 3,420 72 38 A ABCD

Southern Florida

K0VXM 13,328 199 49 A **ABCD9EF**
KF4FAJ 3,990 127 30 A ABCD
KB2SFA 2,160 94 20 A ABCD
WA4OFS 540 32 10 A ABCDE
NJ2F 5,970 169 30 B **ABCD**
W2YX 3,266 137 23 B **ABD**
K2OY (+KF4VHX)
3,836 133 28 L ABD

Tennessee

KU4R 17,750 185 71 A AB**CD**E
K1LH 16,344 193 72 A **ABD**
KV4EB 3,610 95 38 A AB
WA4YRK 2,380 64 28 A ABD**E**
W4ZUG 2,160 73 24 A ABD
WB4JGG 13,282 166 58 B **ABCD**
KG4BMH 3,745 107 35 B **B**
AE4BT 330 43 6 B BD
KC8MHP 14 7 2 B AB

Virginia

K4FJW 2,925 117 25 A **AB**
N4MM 1,476 82 18 A AB
K3MZ 845 65 13 A AB
KL7GLL/4 550 55 10 A AB
KG4GVJ 266 38 7 A AB
K4ME 192 24 8 A B
WM3T 88 11 8 A AB
AD4TJ 36 9 4 A AB
KF4QQY 5,822 139 41 B **ABD**
K4FTO 2,750 86 25 B AB**CD**
K8GP
(K1RA,KA1TB,K3MM,KC3WD,W4XP,KD4DSX, K8ISK,K9SP,ops)
501,416 1296 233 M
ABCD9EFGHIJP

West Central Florida

K9HUY 2,625 102 25 A **ABD**

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Arkansas

N5QYC 170 15 10 A **ABD**

Louisiana

K5CZD 60 9 6 A **ABD**
WA5RT 1,040 46 20 B **ABD**

Mississippi

W0HL 322 20 14 A **BD**
KJ5RC 91 13 7 A **A**

New Mexico

K5RHR 2,592 71 27 A **ABCD**
N5YYX 60 15 3 A ABD
N5XZM 3,973 79 29 B **ABCD9EI**

North Texas

KM5OL 1,440 54 20 A BC**D**
W5CMP 1,155 55 21 A **B**
AD5AC 1,098 47 18 A BCD
N5TIF 1,029 49 21 A **AB**
KD5LVY 598 33 13 A **BCD**
AA5C 15,960 97 57 B AB**CD9EFGHI**
K5LOW 3,515 76 37 B **AB**CD

Oklahoma

WD5AGO 3,515 69 37 A **ABCDEH**

South Texas

K5LLL	31,755	174	87	A	**ABCD9EF**
N5BA	2,914	68	31	A	ABCD
KC5YKX	1,210	44	22	A	ABD
AJ4F	374	34	11	A	AB
KA5GLX	222	27	6	A	ABDE
KD5GKP	70	12	5	A	ABD
K5IUA	40,293	199	99	B	**ABCD9EFGHIP**
W3XO/5	15,500	147	62	B	ABCD9EF
W5UWB	3,854	62	41	B	ABCDE
KC5YOV	448	43	8	B	ABCDE
N5XU (W5JLP,KB5LBN,WM5R,ops)	5,811	110	39	L	ABCD
AD5V (W5UTZ,KC5PJM,KD5KJD,KC5YDM, KD5FCP,N5HFP,ops)	5,586	131	38	L	ABCD

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East Bay

KE6QR	1,296	61	18	A	**ABD**
KK7GP	154	15	7	A	BD
W6OMF	9,460	137	44	B	**ABCDE**

Hawaii

WH6TF	16	8	2	A	**B**

Los Angeles

KD6RUH	9,324	218	28	A	**ABCDE**
KE6AXJ	1,936	70	16	A	ABCD
WB2KXC	1,170	62	15	A	ABD
K0DI/6	708	45	12	A	ABD
N6VI	192	19	8	A	ABCD
N6KN	17,850	267	51	B	**ABCD**
K6HLH	6,004	106	38	B	**BDEI**
K6LMN	4,922	161	23	Q	ABCD
KQ6EE	2,204	88	19	Q	ABCDE
W2ODH (+K6KWQ,KR6DR,N6RMJ,W6PPT, WA6DJS)	129,260	820	115	L	ABCD
W6TOI (KB6WKT,KE6HPZ,AD6HT,ops)	43,818	379	67	M	ABCD9EI

Orange

KN6VR	3,960	130	22	A	**ABDE**
KE6GFF	3,752	134	14	A	**D**
N6CMF	2,394	104	19	A	ABD
K6IBY	1,771	53	23	A	**ABC**D
KE6GFI	520	35	13	A	ABD
KG6DNJ	504	44	9	A	ABCD
KE6QCB	140	16	7	A	BD
K6TSK	26,535	246	61	B	**ABCDE**
N1ZZZ/6	44	11	4	Q	B
AD6IJ (+KC0HEN,KG6EQR)	3,146	108	22	L	ABCD
W6ZQ (+WB6IRR)	290	26	10	L	ABD

Santa Barbara

W9EC	2,727	70	27	A	**ABC**DE
N6ZE	1,184	61	16	A	**ABD**
KC6NBI	918	50	18	A	**ABC**
KE6CWD	27	9	3	A	AB
KK6UE	8	3	2	A	BD
W6WE	2,528	64	32	B	**ABC**
K6WLC (+K0BGL,K6NDV)	12,740	150	52	M	ABCDEF

Santa Clara Valley

W6IT	11,475	158	51	A	**ABCD**
NR6CA	2,640	91	20	A	ABCD**E**
W6GYD	2,599	90	23	A	ABCD
K6KLY	20,709	273	59	B	**ABCDE**
K6PVJ (+KF6MXK,KE6HCK,K6HSV,N6KKX, K6GWV,KD6VCD)	3,140	115	20	L	ABCD

San Diego

W6OYJ	1,079	58	13	A	**BC**DE
K6CYS	884	26	13	A	**DE**
KF6JBB	4,092	102	31	B	**ABCD**

San Joaquin Valley

K6MI	27,466	224	62	A	**ABCD9EF**
K6IRZ	7,215	135	37	A	ABCDE
WA3KOG	2,275	73	25	A	ABD
KF6KDA	2,109	88	19	A	ABD
N6AJ	51,543	329	83	B	**ABCD9EF**
K6QG (+WB6GPD)	3,944	129	29	L	ABD

Sacramento Valley

KC6ZWT	13,772	209	44	A	**BCD**
KD6VNQ	7,000	162	35	A	**ABC**D
KA6VQV	2,808	70	26	A	ABCD
W6KBX	35,568	290	76	B	**ABCDE**
KJ6KO	30,912	317	64	B	**ABCDE**

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Arizona

KE7FC	6,016	105	47	A	**ABCD**
N7IR	828	37	18	A	ABD
K6IAH	260	20	13	A	AB
KE7NR	5,148	96	39	B	**ABCDE**
WB7OHF	192	20	8	B	ABCD

Idaho

W7USB	1,166	44	22	A	**ABD**
W7MEM	2,856	71	34	B	**ABD**
K7MAC	1,541	50	23	B	ABCD**E**
W7ID	840	35	20	B	ABCD**E**
K7YVZ	434	31	14	B	AB

Montana

N7CZ	198	17	9	A	**ABD**

Nevada

NW7O	1,760	53	22	A	**ABCDE**
W6ABW	416	35	8	A	ABCD
KC6UCN (+KB6HRB)	1,323	57	21	L	ABCD

Oregon

N7DB	4,736	130	32	A	**ABCD**
K7DLT	693	47	11	A	ABD**E**
KG7FU	676	48	13	A	ABD
KA6T	261	23	9	A	ABD
AA7IH	119	13	7	A	ABD
NN7J	9,040	188	40	B	**ABCDE**
W7DSA	2,916	83	27	B	**ABCD**
KI7N	516	37	12	Q	ABD
W7LT (+KC7AOI,KC7PDI)	2,820	125	20	L	ABD

Utah

NJ7A	7,326	121	37	A	**ABCD9E**F
N7DBW	3,792	99	24	A	ABCD**E**
N7MLD	816	42	16	A	ABCD
K7RJ	494	30	13	A	ABD
WJ7L	440	25	11	A	ABDE
KC7PVD	297	22	11	A	ABD
KA7EII	825	40	15	B	**ABD**

Western Washington

N0IS	10,209	159	41	A	**ABCDE**
N7MWV	5,778	106	27	A	ABD**9EF**
W7DMN	1,245	79	15	A	ABC
WA1IED	767	59	13	A	AB
W7/JR1NKN	44	11	4	A	A
NU7Z	27,759	223	57	B	**ABCD9EFGHI**
KE7SW	23,358	228	51	B	**ABC**D9EF**G**
K7ND	22,770	204	55	B	**ABCD9EF**
N7EPD	9,065	103	37	B	ABCD9EF
KD7TS	5,070	93	26	B	ABCD9EFG**HI**

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Michigan

N8AIA	5,940	114	44	A	A**BC**
WB8TGY	3,213	69	27	A	AB**D9EF**
K8KD	2,449	66	31	A	ABD
KC8OID	1,652	53	28	A	ABD
W8WNX	1,216	64	19	A	**A**
N8ZVB	918	54	17	A	A
NE8I	672	19	14	A	ABCD9E**FG**
WA8YLZ	60	15	4	A	AB
WW8M	120,250	373	130	B	ABC**D9EFGHIJK**
K8MD	77,423	359	139	B	ABCD**9**E
K2YAZ	68,586	325	142	B	A**BC**D9E
KB8U	41,713	336	101	B	A**BC**D
K8NFT	7,128	146	44	B	ABD
K8PNW	1,380	46	20	B	BDE
K8EB (+K8PZ,KG8BK,N8WMU)	87,345	522	135	L	ABCD

Ohio

WA8RJF	44,619	279	107	A	A**BCD9EF**G
KC8CCD	33,943	262	91	A	ABCD9**EF**
K8MR	18,723	183	79	A	ABCD
WB8AUK	16,060	168	73	A	ABCD
WA8RCN	9,936	207	48	A	**AB**
KC8OKJ	8,183	167	49	A	AB
WD8AML	7,353	135	43	A	ABD
KK8O	6,273	127	41	A	ABD
W8DN	5,311	101	47	A	ABD
WM8I	4,699	104	37	A	ABD
KC8MZB	4,602	100	39	A	ABD
WA8GMT	4,360	90	40	A	ABD
W8DD	2,821	91	31	A	AB
W8DEL	2,675	90	25	A	ABD
N8TQ	2,550	86	25	A	ABD
KB8UUZ	2,093	91	23	A	A
KU8E	2,030	70	29	A	AB
N8DOT	1,050	54	14	A	ABD
KT8U	986	52	17	A	ABD
W8PLZ	882	46	18	A	ABD
W8IDM	765	40	15	A	ABD
N8LIS	649	53	11	A	ABD
K8IN	592	37	16	A	AB
WA8PRA	175	21	7	A	ABD
N8QWJ	132	38	3	A	ABD
N8QQA	132	38	3	A	ABD
KB8WZZ	57	17	3	A	ABD
KC8JYJ	7	7	1	A	B
KF8VB	6	6	1	A	B
KE8FD	151,074	533	198	B	**ABCD9EF**
WR8E	29,810	357	55	B	ABCDE
K8TQK	23,655	260	83	B	ABCD9E
N8BJQ	4,428	123	36	B	AB
K8UD	4,160	99	32	B	ABCD
WB8XX	3,960	110	36	B	A
KB8VAO	3,360	76	35	B	ABDE
KB8ZBU	2,212	79	28	B	B
N8GLS	1,320	55	24	B	B
N8XA	21,356	180	76	Q	ABCD9EI
N8KOL (+K8ROX, KI8L)	84,227	484	143	L	ABCD
W8BAE (+K8USA)	9,408	163	48	L	ABD
K8YR (KC8HFX,KC8CHF,KB8VRO,KA8SBI, KB8RQD,N8VGQ,ops)	2,132	78	26	L	ABD

West Virginia

K8DXN	2,580	81	30	A	A**BD**
N8II	1,207	71	17	A	**A**
K8MN	2,077	67	31	B	**AB**
W8TN	1,274	44	26	B	**ABD**
K8JF (WA8DQR,K8LG,WA8YCG,WF8X, WD8AFJ,ops)	6,811	139	49	L	AB

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Illinois

K2DRH	142,975	523	175	A	**ABCD9E**
K9YR	45,936	391	87	A	ABCD
N9TF	31,188	320	69	A	ABCDE
W9JXN	12,150	189	54	A	ABD
WA9FIH	9,024	234	32	A	ABCD
KG9IL	6,562	167	34	A	ABD
WA9RIJ	3,440	147	20	A	ABD
N9VKE	3,321	103	27	A	ABCD
WO9S	3,198	108	26	A	ABD
NV8V	2,751	131	21	A	B
WO9LF	2,484	83	27	A	ABD
W9NSP	2,408	122	14	A	BCD
WA9CCQ	2,210	106	17	A	ABD
K9DDS	2,180	90	20	A	ABD
KV9Y	1,992	83	24	A	B
W9NHX	1,612	109	13	A	ABD
W9AVB	1,272	93	12	A	ABD
WB9IFM	795	53	15	A	AB
W9CEJ	770	70	11	A	B
KB9KDC	770	70	11	A	B
N9TUQ	567	67	7	A	BD
K9PG	484	42	11	A	ABD
KB3AFT	217	25	7	A	ABD
K9LPL	212	53	4	A	B
AK9Y	208	52	4	A	B
N9ZKC	185	28	5	A	ABD
WD9GJK	155	27	5	A	BC
KB9SKP	105	15	7	A	B
KA9UZH	104	26	4	A	B
K9TMW	88	22	4	A	B
WN9GWC	72	15	4	A	BD
NG9R	54	7	6	A	ABD
N9EYF	45	14	3	A	BD
K9ENZ/M	18	9	2	A	B
WB9SNR	27,548	224	71	B	**BCD9E**
KB9TQB	1,584	79	18	B	A**BD**
N9MZP	198	22	9	B	AB
N8KWX	2,466	98	18	Q	ABCD
N2BJ (+K2PAC)	85,272	564	114	L	ABCD
KG9PF (+K9IJ,KB9LNE)	15,840	271	45	L	ABCD

Indiana

WA1MKE	36,630	252	99	A	A**BCD9E**
W9DZ	12,348	168	63	A	A**BD**
K9RU	6,321	122	43	A	ABCDE
WB9DRB	2,730	58	39	A	ABCD
K9MQ	864	51	16	A	ABD
K9QFL	56,135	370	109	B	ABCD**E**
K9EA	54,636	359	116	B	**ABCD**
K9RQ	9,688	148	56	B	ABD
W9BLI	3,816	102	36	B	ABD
WD9DSN (+WD9DSP)	8,840	150	52	L	ABD
KG9BV (+KB9VZJ)	8,370	117	54	L	ABDE
W9VCF (N4TZ,N9DR,N9OWN,KB9SIH,KB9NTH, KB9NTD,ops)	3,224	99	31	L	ABCD

Wisconsin

K9VHF	37,145	287	95	A	A**BCDE**
N9LLT	22,052	225	74	A	ABCD
N9DG	18,070	240	65	A	A**BC**D
WA9LZM	10,146	144	57	A	ABD
WA1UJU	4,690	134	35	A	AB
KB9TLV	4,553	144	29	A	ABD
W9XT	3,920	96	35	A	ABD
W9PHJ	3,584	128	28	A	AB
KB9Q	2,730	78	30	A	ABCD
KB9UZV	2,025	75	27	A	AB
KB9VSG	2,000	100	20	A	AB
KB9JIF	1,700	79	20	A	ABD
W9KHH	1,368	51	24	A	ABD
N9NDP	1,254	59	19	A	BC
KB9VUG	992	62	16	A	AB
N9UDX	442	28	13	A	ABD
KB0LGB	144	16	9	A	AB
K9KL	45,047	288	107	B	**ABCDE**
W9GA	14,022	167	57	B	ABCDE
K9DQ	5,082	135	33	B	BCD
W9JN	3,984	60	48	B	ABCD
KB9PJL	3,471	80	39	B	ABD
N0AKC	2,590	67	37	B	ABD
ND9Z	2,015	39	31	B	ABCDE
W9NVK	1,518	65	23	B	BC
N9QQB	969	57	17	B	AB
N9LIA	666	32	18	B	ABCD
N9MYK	6,600	116	40	Q	ABCDE
KA9BXG	2,496	85	24	Q	ABD

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Colorado

W6OAL	19,459	181	61	A	**ABCD9EFGHI**
K5GZ	42	7	6	A	B
N0VSB	22,649	216	71	B	**ABCDE**
W0ETT	3,762	82	33	B	ABCD

Iowa

N0SM	1,860	60	31	A	**AB**
NE0P	1,809	57	27	A	**ABD**
WA9ENA	1,560	57	24	A	BD
N0SPP	1,484	43	28	A	AB**D**
AB0HF	420	30	14	A	AB
KE0FT	276	23	12	A	B
W0NKN	216	18	9	A	BD
KM0T	63,140	281	140	B	**ABCD9EF**
N0URW	11,218	158	71	B	**AB**
K0JQA	2,240	51	35	B	ABD

Kansas

N0LL	27,454	178	106	B	**ABCDE**
N0KQY	16,536	147	78	B	ABC**D**E
W0EKZ	9,891	111	63	B	ABCD**9**
KC0AHN (N5CLU,K0CIY,KC0IFQ,KC0HZR, N5QOJ,WD0FGS,KC0JDD,KC0EMK,KA0KCI,ops)	1,197	46	19	L	ABDE
KA0MR (+KA0KCI)	10,553	119	61	M	ABCDE

Minnesota

KB0ZEV	17,343	278	47	A	**ABC**D
KC0AKU	12,825	181	57	A	AB**D**
WA2VOI	12,452	148	44	A	ABCD9E**FI**
W0AUS	9,240	163	35	A	ABCD**EI**
WB0LJC	8,547	137	33	A	ABCD9E**FI**
KB0OBT	6,222	148	34	A	ABD9
KC0HEW	5,236	126	34	A	ABD
KB0LYL	4,890	326	15	A	**B**
KC0EPV	4,356	96	36	A	ABD
KB0N	4,070	143	22	A	ABCDE
W0VB	3,600	100	36	A	AB
W0EPZ	2,775	88	25	A	ABD
N0KP	1,121	46	19	A	ABD
KB0TZA	792	50	9	A	BCD9
KA0NAN	693	53	9	A	ABCD
N0QHP	639	54	9	A	ABCD
KB0OLI	312	52	6	A	B
N0AT	180	30	6	A	AB
K0VH	75	15	5	A	AB
K0KTY	52	13	4	A	B
KC0IDR	44	10	4	A	BD
KG0KJ	21	6	3	A	BD
KC0CJP	12	4	3	A	AB
N0MGY	10	3	2	A	BD
KB0WDI	1	1	1	A	B
W0GHZ	70,228	373	97	B	ABCD9E**FGHI**
W0ZQ	62,322	397	94	B	**ABCD9EI**
K0SQ	18,069	206	57	B	ABCDE
W0OHU	9,086	111	59	B	ABD
N0UK	6,501	116	33	B	ABCD9EI
W0PHD	2,280	54	30	B	ABDE
WA2HFI/0	1,914	76	22	B	ABCD
W0SHL	847	72	11	B	BD
W0VLZ	6	3	2	B	B
W0JH (WB0VHF,N0MR,W0SEI,K9NJ,NY9D, KC0IJB,op)	18,361	247	61	L	ABD
N0HZO (+KC0P)	55	8	5	L	ABD
K0NY (+KF0Q)	6,320	108	40	M	ABCDE

Missouri

K0AZ	8,845	120	61	B	**ABD**

North Dakota

N0MSS	1,872	54	26	B	**ABD**
NT0V	1,690	44	26	B	**ABC**DE

South Dakota

WB0HHM	7,896	102	56	A	**ABCD**
WB0ULX	897	30	23	A	ABD
KE0Z	513	27	19	A	B
WA0TDK	54	9	6	A	AB

VE

Newfoundland-Labrador

VO1GO	345	23	15	A	**A**

Quebec

VE2SMG	3,136	69	32	A	**ABCDE**
VE2ZP	2,400	66	30	A	**ABD**
VA2ADB	168	17	8	A	ABD
VE2VLJ	1,200	60	20	B	**B**
VE2PIJ	6	3	2	Q	AB

Ontario

VE3TMG	23,217	264	71	A	**ABD**
VE3KZ	15,360	219	60	A	**ABD**
VE3FHU	2,914	74	31	A	**ABCDE**
VE3CVG	2,125	66	25	A	ABD
VE3EU	1,958	70	22	A	BD
VE3SXE	1,518	59	23	A	ABD
VE3MQW	60	12	5	A	A
VE3IEY	5,712	95	48	B	**ABC**
VE3TEJ	5,145	75	49	B	**ABCD**
VE3NPB	1,794	36	26	B	ABCD**9EIP**

British Columbia

VE7XF	2,992	110	22	A	AB**DE**
VE7HPS	1,808	104	16	A	**ABD**
VA7MM	132	22	6	A	A
VE7DXG	4,256	122	28	Q	ABCD

Rovers

Atlantic

N2JMH (+N2WVK)	144,534	542	102	R	ABCD9EFGIP	8
K2TER (+KV2X)	140,250	549	102	R	ABCD9EFGIP	6
WO2P	48,990	275	71	R	ABCD9EIP	8
N2KXS	43,680	249	70	R	ABCD9EIP	8
K1DS	32,148	27	47	R	ABCD9EFGHIP	5
N1XKT	31,464	270	46	R	ABCD9EFGHIP	5
N2OPW (+KB2VGH)	29,640	264	52	R	ABCD9EFGHIJP	11
AA2UK	26,156	189	52	R	BCD9EFGI	2

Central

N9YZK	38,936	228	124	R	ABD	10
KB9WVL	29,184	252	76	R	ABCDE	11
K0PG	28,413	244	77	R	ABCDE	11
NE9O	5,049	115	33	R	ABCD	4
N9KS	4,620	184	22	R	ABD	8
K9TMW	2,090	95	22	R	AB	4
N9KZJ	1,216	50	19	R	ABD	4
KS9WI	186	23	6	R	ABD	2
N9RLA	117	13	9	R	AB	2
WB8BZK	90	15	6	R	B	2

Dakota

KB0THN	10,030	172	34	R	ABCDE	4
KC0P (+N0ADQ)	8,340	221	30	R	ABD	6
N0HJZ	6,634	107	31	R	ABCD9EGI	2
KB0DCO	4,008	131	24	R	ABD	2
KC0FXY	1,921	92	17	R	ABD	4
K7CJO	98	13	7	R	BD	2
KB0PSS	80	16	5	R	B	2
KC0IDR	64	8	8	R	B	4
KG0KJ	32	8	4	R	B	2

Delta

N4OFA (+KB4NVD)	8,512	179	38	R	ABDE	5
NJ4I (KF4VZQ,op)	3,570	119	30	R	AB	3
AC4LS	1,080	60	18	R	AB	4

Great Lakes

NE8I	7,980	121	28	R	ABCD9EFGHIJK	6
KF8QL (+K8DOG)	7,740	131	45	R	ABCD	7

Hudson

W2BEJ	520	31	10	R	ABCD9E	2
KB2ZZC	413	52	7	R	BD	2
KA2MCU	108	12	6	R	ABCD	2
N2UZQ	75	15	5	R	B	2

Midwest

K0DAS (+N0LNO)	120,564	672	102	R	ABCDEF	15
NA0IA (+W0ODS)	104,310	608	95	R	ABCD9E	15
N0DQS	26,004	266	66	R	ABCDE	13
KB0QGT	12,444	168	51	R	ABCD	8
N0JK	1,932	46	23	R	ABDE	4
KA0YSQ	338	19	13	R	ABDE	2

New England

K1DY	7,755	117	47	R	ABCD	4
KJ1K	6,732	135	33	R	ABCDE	4
KB1EFZ (+KB1EAU)	3,024	97	24	R	ABDE	3

Northwestern

N7CFO	31,208	247	47	R	ABCD9EF	6
W7DHC (+XYL)	20,943	283	39	R	ABCD9EF	4
KA0TP (+KD7EYP)	1,624	94	14	R	ABD	2

Pacific

KF6GYM	74,184	330	132	R	ABCDE	6
K7XC (+NS9E)	47,085	457	73	R	ABCD	15
NI6G (+N1VM)	10,780	141	44	R	ABD9EF	4
K6ALF	1,955	66	23	R	ABD	2
AH6RH	432	35	8	R	BDE	2
AH6NF	162	20	6	R	BD	2

Roanoke

W3IY	9,400	127	47	R	ABCD9EF	7

Rocky Mountain

W5JAK	1,380	71	15	R	ABD	5
KB0CY	410	34	9	R	ABD	3

Southwestern

N6DN (+N6VHF)	128,480	652	110	R	ABCD9E	12
N6TEB (WB6JDH,op)	96,903	552	97	R	ABCD9E	12
K6FZZ (+K6FZY)	33,728	325	64	R	ABCDE	10
KC6UIX	5,940	169	27	R	ABD	4
KQ6YI	1,080	45	20	R	ABD	5

West Gulf

W5DF (+AB5SS)	140,336	345	112	R	ABCD9EFGHIJ	13
K0MHC	5,152	65	28	R	ABCD9EFGHI	3
NL7CO	3,038	89	31	R	ABD	8

Canada

VE3OIL	23,310	213	63	R	ABCD9EFI	6

Checklogs

K7ICW, KA9CAR, N7AU, N9GH, VA3MOD, VE2JWG, VE3TMZ, W4LAW, W5LUA, W8ULC, WB7BNH

By Dan Henderson, N1ND
Contest Branch Manager

2000 ARRL 160-Meter Contest Results

In the fall of the year, it is hard not to notice the migration of birds. You may experience the gaggle of Canada geese flying south with their perfect V formation. Some will be engulfed by flocks of starlings or sparrows, perhaps reminiscent of the old Hitchcock thriller *The Birds*. Perhaps you will witness a pair of eagles soaring to their winter habitats from the summertime nests in the mountains.

In many ways hams go through the experience of migration. When we first get our HF licenses, we nest on the DX or public service frequencies. As seasons and interests change, we begin to migrate to new spectrum as we seek new thrills and challenges. Some will move to higher frequencies, perhaps developing skills in EME or VHF contacts. Others will migrate to lower frequencies, being called by the intrigue of what is referred to as the "Top Band"—160 meters.

It is this special species of Top Banders that come out in force the first full weekend of December annually to participate in the ARRL 160-Meter Contest. Any Top Band enthusiast knows the challenges of playing in the 1.8 MHz spectrum. Space and size become issues (a half-wave dipole cut for the low end of the band will run almost 260 feet in length for example). A quarter-wave vertical will run about 130 feet tall. A radial field of just 20 quarter-wave elements requires over 1/2 mile of wire. If one is trying to identify the best operators who tackle the toughest challenges, they just need to look and see who has migrated to this contest.

In 2000, a total of 690 logs were received, representing a total of 762 participants. This is a 14% increase from the number of logs received last year and a total of over 165,000 completed QSOs reported. When you look at the QTHs of the Top Ten boxes, you will find that 23 ARRL sections and one DX entity (VP5) are listed. Illinois and Ohio each placed 5 stations in the boxes. Virginia followed with 4 stations, then North Carolina with 3. Top Ten finishes came from 9 of the 10 US call areas. It seems the migration patterns are diverse when you're looking for Top Band guys.

Leading the way in the Single Operator High Power category was Bill, W4AN, who found his way to W8JI's station as a guest op. Bill's score of 394,485 from Georgia easily outdistanced second place finisher Jon, AA1K, from Delaware and Bob, W4MYA, in Virginia. Bill's score was the only new Division record (Southeastern) set in any of the four contest categories.

Ron, W4WA, operating at his Georgia QTH, claimed top honors in the Single Operator Low Power category with a score of 151,956. Jim, N9JF, held his own from Illinois to finish as runner-up in the category, followed by Fred, K8FH, who finished third from his Ohio QTH. Douglass, W0AH, finished a close fourth, only 411 points behind.

Heading up the pack in the Single Operator QRP category was Richard, WK3I, with a score of 68,103 from Maryland. Finishing hot on his heels were Roger, KA9EKJ, operating in Alabama and Dick, W8VK, from home in Ohio. Dick narrowly edged out Charlie, N0TT, by a mere 20 points in the final analysis.

Multioperator entries are especially appropriate because not only do they migrate to the band, they migrate in flocks! The K9NR flock took roost at WB9Z's and posted the winning entry in the Multioperator category with a score of 215,520. Settling in on their tail feathers were the ops at K8ND, falling only 2,178 points off the winning pace. N8CC's shack was the QTH for the K8XXX third place effort. Congratulations to all of the top finishers.

The Society of Midwest Contesters continued their resurgence as a top club by taking top honors in the Unlimited Category in the Affiliated Club Competition, beating the Potomac Valley Radio Club by half a million points. The Medium Category was won by the Frankford Radio Club, which edged out the Mad River Radio Club by a score of 787,440 to 716,929. The Hudson Valley Contesters and DXers took top honors in the Local Category over the River City Contesters by a score of 180,180 to 111,841.

Top Ten

Single Operator, QRP

WK3I	68,103
KA9EKJ	56,666
W8VK	55,448
N0TT	55,428
W4TMR	50,008
WA8RCN	34,397
W3TS	34,028
N4ROA	31,631
N9UC (WO9S,op)	29,939
N7IR	27,183

Single Operator, Low Power

W4WA	151,956
N9JF	125,780
K8FH	106,536
W0AH	106,125
N2NFG	100,533
W0UO	93,758
K4OAQ	93,665
K1PX	93,184
W2LC	88,968
WX9U	84,607

Single Operator, High Power

W8JI (W4AN,op)	394,485
AA1K	247,248
W4MYA	243,612
K5NA	218,644
K5GO	212,420
K9DX	207,955
KE9I	207,281
N4AF	170,798
K7CA	170,343
WD5R (N5ECT,op)	165,968

Multioperator

K9NR (@WB9Z)	215,520
K8ND	213,342
K8XXX (@N8CC)	200,728
W5TM	199,916
N0NI	181,305
K5NZ	156,400
VP5K	141,450
K4IQ	129,808
W8VE (@K8DX)	127,366
N5FG	114,720

Affiliated Club Competition

	Score	Entries
Unlimited Category		
Society of Midwest Contesters	2,798,977	74
Potomac Valley Radio Club	2,297,845	51
Medium Category		
Frankford Radio Club	787,440	16
Mad River Radio Club	716,929	13
Yankee Clipper Contest Club	513,365	21
Tennessee Contest Group	503,631	12
Ozark Contest Club	378,208	4
South East Contest Club	372,687	8
Rochester (NY) DX Assn	369,622	7
North Texas Contest Club	358,336	7
North Coast Contesters	353,450	8
Central Texas DX and Contest	309,203	7
Minnesota Wireless Assn	283,882	13
Oklahoma DX Assn	278,026	3
Northern California Contest Club	211,619	14
Willamette Valley DX Club	186,840	5
Southern California Contest Club	178,182	8
Florida Contest Group	170,322	7
Kentucky Contest Group	127,710	3
Carolina DX Assn	111,664	4
Western Washington DX Club	47,030	3
Bay Area Wireless Assn	31,996	3
West Park Radiops	29,328	4
Bergen ARA	20,263	3
Local Category		
Hudson Valley Contesters and DXers	180,180	5
River City Contesters	111,841	3
Redmond Top Key Contest Club	73,136	5

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)			Southeast Region (Delta, Roanoke and Southeastern Divisions)			Central Region (Central and Great Lakes Divisions; Ontario Section)			Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)			West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)		
WK3I	68,103	A	KA9EKJ	56,666	A	W8VK	55,448	A	N0TT	55,428	A	N7IR	27,183	A
W3TS	34,028	A	W4TMR	50,008	A	WA8RCN	34,397	A	N0JK	26,523	A	N6LL	8,772	A
K3TEJ	18,690	A	N4ROA	31,631	A	N9UC (WO9S,op)	29,939	A	K0FRP	15,453	A	K6EI	7,700	A
N1RL	13,454	A	KV8S	16,000	A	N9SE	23,103	A	KD7AEE	11,395	A	KB6FPW	7,590	A
WA2QKF	10,710	A	W4DEC	14,835	A	K8CV	5,824	A	W3FAF	10,865	A	K7TQ	7,552	A
K1PX	93,184	B	W4WA	151,956	B	N9JF	125,780	B	W0AH	106,125	B	KI7Y	55,575	B
W2LC	88,968	B	N2NFG	100,533	B	K8FH	106,536	B	W0UO	93,758	B	N6NF	48,007	B
KB1EAX	71,862	B	K4OAQ	93,665	B	WX9U	84,607	B	N0SM	65,208	B	AC7A	34,709	B
K2CDJ	67,413	B	K1KY	76,104	B	K9LU	80,065	B	K0RWL	61,690	B	N6BM	31,122	B
K1NK	57,288	B	K4CNW	71,412	B	K9WJU (W9CG,op)	79,380	B	N0OQW	53,676	B	WO7Y	27,391	B
AA1K	247,248	C	W8JI (W4AN,op)	394,485	C	K9DX	207,955	C	K5NA	218,644	C	N7GP (N5IA,op)	99,461	C
K2AXX	159,715	C	W4MYA	243,612	C	KE9I	207,281	C	K7CA	170,343	C	N6RO	88,264	C
W3GH	91,725	C	K5GO	212,420	C	K8JP	151,285	C	K5RX	161,962	C	K6AM	87,600	C
K1VW	91,701	C	N4AF	170,798	C	WT9Q	111,948	C	K0RF	154,190	C	KH6ND (@KH7R)	72,870	C
K3SV	83,265	C	WD5R (N5ECT,op)	165,968	C	K4AO	109,719	C	W6PU	76,368	C	K6SE	62,977	C
K2UG	109,277	D	K4IQ	129,808	D	K9NR (@WB9Z)	215,520	D	W5TM	199,916	D	W6AW	45,522	D
K3WW	103,884	D	N5FG	114,720	D	K8ND	213,342	D	N0NI	181,305	D	K6NO	22,513	D
W3UR	93,525	D	N4BP	87,932	D	K8XXX (@N8CC)	200,728	D	K5NZ	156,400	D	N7KE	22,032	D
K1JT	61,047	D	K4HA	76,245	D	W8VE (@K8DX)	127,366	D	W7CW	85,702	D	N5BF	4,117	D
W2XL	54,208	D	K3KO	75,208	D	W0AIH	60,720	D	K5ZO	74,834	D			

A total of 311 entrants participated in the Affiliated Club Competition. The top tier clubs will tell you the key to their success is simple: if you get the participants out, your club standings will improve.

The 2001 ARRL 160-Meter contest will be held December 7-9 (always the first full weekend in December). You may migrate to warmer climates or to a better station. Perhaps you simply erect new antennas and migrate your radio to the Top Band. Either way, we bet you won't be unhappy that you extended your operating horizons to include the "gentleman's band" known as 160 Meters.

Scores

Scores are listed by DXCC Entities and ARRL/RAC Sections. Within each Entity or Section, scores are listed Single Operators in descending order, by power categories, followed by Multioperators. Line scores list call sign, score, QSOs, multipliers, power (A = QRP, B = Low Power, C = High Power, D = Multioperator).

Asia

Japan

JH4UYB	2	1	1	A
JE1SPY	50	5	5	B
JH8KYU	32	4	4	B
JE3UHV	2	1	1	B
JA0QNJ	680	20	17	C
JA2ZJW	468	18	13	C
JI1NJC	126	9	7	C
JN1BMX	72	6	6	C
JH0ZHQ (JH1BBT,JH1GNU,JH1MDJ, JR1IJV,JF1DMQ,JJ1VKL,JK1GKG, JA0VSH,JG0PBJ,ops)	1,848	42	22	D

Asiatic Russia

RA0LQ/MM	40	5	4	B

Europe

Fed. Rep. of Germany

DF2PY	1,680	35	24	C

Belarus

EU6EU	2	1	1	B

Hungary

HA5JI	384	16	12	C

Bulgaria

LZ3AB	2	1	1	C

Finland

OH3GD	2	1	1	B

Slovakia

OM0WR	1,440	36	20	C

Netherlands

PA3AAV	96	8	6	B

Bosnia-Herzegovina

T90U	2	1	1	A
T99W	12	3	2	B

European Russia

RN6BN	360	18	10	C

North America

Martinique

FM5GU	52,416	416	63	C

Antigua & Barbuda

V26JT	52,460	430	61	B

Turks & Caicos Islands

VP5K (AA5B, K9RS,op)	141,450	943	75	D

South America

Aruba

P40RB (W9RB,op)	5,610	85	33	C

Venezuela

YV7QP	1,728	36	24	B

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Connecticut

NM1K	1,800	45	20	A
K1PX	93,184	722	64	B
NX1Q	8,942	130	34	B
K1RO	8,704	136	32	B
W1CTN	7,888	116	34	B
K1BTD	5,724	100	27	B
WA1LJD	5,184	96	27	B
K1VW	91,701	648	69	C
K1YR	34,650	312	55	C
W1WEF	18,810	206	45	C
W1AW (N4QX,op)	13,846	158	43	C
N4XR	10,716	111	47	C
NT1N	8,702	113	38	C
N1MD	10,800	147	36	D

Eastern Massachusetts

WG1Z	2,520	60	21	A
AD1B	2,300	50	23	A
K1DC	22,815	249	45	B
W1VIV	21,920	271	40	B
N1DM	18,080	223	40	B
K1NTR	17,960	226	40	B
W1TW	8,415	126	33	B
K1GU	3,872	88	22	B
K1NU	3,393	57	29	B
WO1N	2,184	52	21	B
W1MMM	768	24	16	B
K5MA	30,264	285	52	C
K1VK	14,238	168	42	C
K2LP	8,645	119	35	C

Maine

W1CEK	32	4	4	A
N1CGP	9,536	149	32	B
K1FK	25,500	247	51	C
K1PQS	15,762	213	37	C
AC1O	9,250	125	37	C

New Hampshire

AA1SB	1,406	37	19	A
KB1EAX	71,862	600	59	B
W1DAD	4,992	96	26	B
K0TV (+WO1N)	47,245	422	55	D

Rhode Island

K2MN	10,395	147	35	B
KS1J	66,410	565	58	C
K1DFT	22,275	243	45	C
W1OP(K1DT,K1JNJ,W1GS,W1IUX,ops)	34,560	314	54	D

Vermont

AA1SU	24,396	318	38	B
W1SJ	60,170	541	55	C

Western Massachusetts

N1RL	13,454	217	31	A
W1TO	38,555	346	55	C
K5ZD	34,140	280	60	C

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Eastern New York

N2IX	2,068	47	22	A
KG2H	1,716	39	22	A
K2UF	25,714	296	43	B
W2ENY	8,715	123	35	B
WB2PUH	2,332	53	22	B
KB2HZI	672	24	14	B
N1EU	51,425	463	55	C
W2FCA	12,144	126	46	C
W2RE	7,308	97	36	C
K2UG (KY2J, WA2JQK, ops)	109,277	805	67	D
W2XL (+ N2SA)	54,208	475	56	D

NYC-Long Island

NY6DX	1,036	37	14	A
W2JGQ	8,532	117	36	B
KA2D	3,822	72	26	B
K2OVS	1,700	50	17	B
WB2DLA	768	24	16	B
WA2YOW	468	18	13	B
K2QMF	10,115	140	35	C

Northern New Jersey

W2JEK	5,562	103	27	A
K2JT	2,596	59	22	A
K1NK	57,288	507	56	B
N2CG	4,020	67	30	B
W2CVW	2,883	45	31	B
N2ED	77,056	590	64	C
NO2R	67,512	573	58	C
W2NO	21,120	220	48	C
W2ZK	17,420	163	52	C
NA2AA	12,105	133	45	C
W2LE	9,360	114	40	C
N2LK	2,860	65	22	C

Northern New York

W2IB (+N4TW)	29,205	323	45	D

Southern New Jersey

W0MHK/2	7,080	118	30	A
W5KI	21,150	222	47	B
AA2WN	10,783	130	41	B
W2YC	31,680	282	55	C
NQ3N	20,650	202	50	C
K1JT (+K2PT)	61,047	531	57	D

Western New York

WA2QKF	10,710	153	35	A
W2RBA	2,000	50	20	A
W2LC	88,968	662	66	B
K2CDJ	67,413	481	69	B
K8FC	49,830	447	55	B
N2CU	49,131	462	53	B
W2TX	15,006	180	41	B
K2YW	7,067	94	37	B
N2UM	3,380	65	26	B
N2MG	418	19	11	B
K2AXX	159,715	917	85	C
K2ZR	31,728	329	48	C
N2WK	19,604	184	52	C
K2OS	19,600	193	50	C
K2UA	6,107	97	31	C
W2RW (+WB2KAO, WB2HJV, K9EEE)	42,018	444	47	D

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Delaware

N8NA	35,412	336	52	B
NY3C	7,452	102	36	B
AA1K	247,248	1167	10	C
W3PP	7,904	101	38	C

Eastern Pennsylvania

W3TS	34,028	362	47	A
K3TEJ	18,690	221	42	A
W3EHZ	16,968	199	42	B
WA3IIA	12,355	175	35	B
N3RM	3,600	60	30	B
W8IJ	140	10	7	B
K3SV	83,265	669	61	C
W3BGN	79,632	617	63	C
K3QIA	40,122	367	54	C
N3FA	31,185	342	45	C
AA3B	20,196	228	44	C
W3AP	14,832	153	48	C
K3WW	103,884	772	66	D
W3FV	47,641	383	61	D
KS3F	33,100	325	50	D
K3NZ	16,054	173	46	D
W3MF	14,300	161	44	D

Maryland-DC

WK3I	68,103	531	63	A
NG3K	6,300	105	30	A
AI3M	39,042	357	54	B
W2GG	31,850	314	50	B
W3CP	30,350	299	50	B
AD3F	18,500	179	50	B
K3DSP	9,452	139	34	B
W3DF	7,289	97	37	B
N3WK	3,640	70	26	B
W3OU	2,622	57	23	B
N3TJ	2,494	43	29	B
N3FX	2,352	56	21	B
AC3P	810	54	15	B
W3GN	80,703	633	63	C
N3HUV	38,563	388	49	C
K3DI	29,848	284	52	C
W3ERU	27,495	288	47	C
N3UM	27,196	260	52	C
N3OC	25,596	234	54	C
AK3Z	24,390	268	45	C
W3HVQ	22,631	209	53	C
N3SB	11,070	132	41	C
N3UN	11,029	133	41	C
N3OA	8,280	102	40	C
4U1WB (AJ3M,op)	780	26	15	C
W3UR	93,525	604	75	D

Western Pennsylvania

AA3GM	6,148	106	29	A
AD8J	24,196	260	46	B
NA3V	24,192	249	48	B
NB4J	14,250	138	50	B
N3UE	8,362	113	37	B
N3GJ	1,140	30	19	B
WA3GQU	72	6	6	B
W3GH	91,725	604	75	C
K3HX	42,282	390	54	C
W3SO (K4VV, op)	41,610	359	57	C

4

Alabama

KA9EKJ	56,666	484	58	A
W4DEC	14,835	171	43	A
K4KIP	6,300	90	35	A
AF4OD	29,450	293	50	B
K4IQJ	13,201	152	43	B
K4WI	10,277	115	43	B
KC4HCH	10,038	118	42	B
N4AX	2,880	60	24	B
W4NTI	15,717	200	39	C
KC3QU	12,505	151	41	C
KS4YT (+KV4T)	25,854	201	62	D

Georgia

W4WA	151,956	926	81	B
K9AY	55,556	404	68	B
N4DU	29,755	266	55	B
N4WD	21,892	206	52	B
W4ATL	17,178	203	42	B
NJ8J	1,273	32	19	B
W8JI (W4AN,op)	394,485	1434	11	C
K4BAI	55,388	448	61	C

Kentucky

KM4FO	46,400	396	58	B
AA2GS	22,790	215	53	B
K4FDK	19,642	212	46	B
K4WW	7,761	98	39	B
K4AO	109,719	744	73	C
N4GN	58,520	409	70	C

North Carolina

W4TMR	50,008	445	56	A
N2NFG	100,533	721	69	B
WJ9B	68,355	541	63	B
KE4QZB	4,920	82	30	B
WX4DX	4,710	74	30	B
W4WS (N4VHK,op)	4,650	79	30	B
N4AF	170,798	853	94	C
W4MR (AA4NC,op)	93,312	639	72	C

N4CW 65,453 532 61 C
K4MA 41,470 347 58 C
N4UH 17,934 177 49 C
N4TL 4,830 69 35 C
K4HA (+K4MA) 76,245 545 69 D
K3KO 75,208 544 68 D

Northern Florida

KQ4YY 750 25 15 A
W4AA 47,104 362 64 B
K9RB 39,060 321 60 B
K4LDR 24,100 238 50 B
NO4S 21,573 225 47 B
WB4IHI 16,826 176 47 B
WS4Y 67,452 456 73 C
N4EK 16,695 181 45 C
W3TMZ 13,846 158 43 C

Puerto Rico

NP3G 8,610 99 41 B

South Carolina

K4CNW 71,412 535 66 B
K4DLJ 9,512 104 41 B
AA4V 55,074 405 67 D

Southern Florida

K4CXX 4,795 67 35 B
K4FS 1,575 36 21 B
K4RFK 264 12 11 B
N8PR 28,670 226 61 C
W4OV 13,488 133 48 C
N4BP (+W4FMS) 87,932 556 76 D

Tennessee

KW4JS 5,536 85 32 A
W4TDB 900 25 18 A
K1KY 76,104 524 72 B
WO4O 41,044 328 62 B
W4DAN 34,349 349 49 B
NA4K 18,612 210 44 B
W4HZD 16,506 195 42 B
K4AMC 13,902 164 42 B
W4YGE 12,096 144 42 B
WB3JKQ 7,733 106 37 B
WA4AA 7,440 90 40 B
K4BP 3,304 59 28 B
K0EJ 153,636 895 84 C
N4IR 97,878 731 66 C
W9WI 82,455 593 69 C
AA4NU 44,756 331 67 C
N4ZZ 38,918 316 61 C
N4KN 13,494 173 39 C
W4OGG 5,487 87 31 C
N4VV 61,880 470 65 D

Virginia

N4ROA 31,631 335 47 A
K4OAQ 93,665 713 65 B
K4ORD 35,700 293 60 B
K3MT 31,217 290 53 B
WA4QDM 18,576 216 43 B
W4SNH 16,652 181 46 B
K4UK 13,818 163 42 B
W4VG 12,880 161 40 B
W4VC 10,255 145 35 B
WM3T 7,035 99 35 B
W4AU 5,916 100 29 B
K4MX 4,896 75 32 B
N3TG 4,554 66 33 B
K3MZ 3,942 73 27 B
W4HM 2,886 54 26 B
W4MYA 243,612 1158 10 C
W4NF 91,596 669 68 C
W4YE 72,640 563 64 C
N3JB 47,187 367 63 C
W4HJ 40,242 347 57 C
N4MM 38,367 297 63 C
K4ZW 26,775 258 51 C
NR4M 26,659 247 53 C
K1KO 9,963 120 41 C
K4IX 8,624 95 44 C
K4FOY 8,094 105 38 C
K4IQ 129,808 842 76 D
N4GU (+W4IQ) 40,590 366 55 D

Virgin Islands

KV4FZ 23,490 198 58 C

West Central Florida

K4FB 559 20 13 A
K4GKD 31,850 314 50 B
N4AO (WC4E,op)
21,870 195 54 C
K9HUY 8,968 112 38 C
W4JN 161 10 7 C

5

Arkansas

KJ5WX 57,553 425 67 B
K5GO 212,420 1049 95 C
WD5R (N5ECT,op)
165,968 997 82 C
W5ON 83,835 601 69 C
W5HUQ 24,400 241 50 C

Louisiana

K1DW 25,740 231 55 B
W5WMU 73,201 511 71 C

Mississippi

N5FG (WQ5L, W5UE, ops)
114,720 702 80 D

New Mexico

W6PU 76,368 507 74 C
N5UL 75,701 508 73 C
N7DF 62,480 435 71 C
N6ZZ 47,124 336 68 C
K5AM 15,147 144 51 C

North Texas

WA8ZBT 10,602 138 38 A
W0UO 93,758 629 74 B
W5CWQ 42,746 313 67 B
K5WO 40,828 343 59 B
KE5C 13,395 141 47 B
KY5S 7,446 108 34 B
WK5K 5,673 90 31 B
K5RX 161,962 830 94 C
N5PO 72,000 494 72 C
N5RG 65,320 451 71 C
K5RA 35,255 316 55 C
W5GN 10,412 133 38 C
N5TY 7,511 100 37 C
K5ZO (+KK7JS) 74,834 521 71 D

Oklahoma

K5KA 8,282 98 41 B
K5HP 69,828 526 66 C
N5OT 60,620 427 70 C
WA5RAT (N5OT,op)
17,442 147 57 C
W5TM (+W5AO)
199,916 1064 92 D
KN5TTN (+K5QNM)
6,144 96 32 D

South Texas

AF5Z 14,696 164 44 B
W5TA 13,948 160 44 B
AJ4F 13,200 147 44 B
K5LJ 9,400 97 47 B
W5XD 7,449 94 39 B
K5EJL 4 2 1 B
K5NA 218,644 1067 94 C
N1LN 70,956 477 73 C
W5PR 42,042 314 66 C
K5TR 37,950 269 69 C
AC5AA 10,076 113 44 C
NA4M 6,993 90 37 C
K5NZ (+W5MJ,N5XJ,NX5M)
156,400 878 85 D
K5IUA (+WA5SNL, K5QLP, WD5KBY)
61,060 424 71 D

West Texas

W5ZO 14,985 165 45 B
NZ5M 270 15 9 B

6

East Bay

N6WG 6,160 140 22 A
KE6QR 3,318 79 21 B
KK6F 2,414 71 17 B
N6RO 88,264 592 68 C
K6TS 10,108 133 38 C

Los Angeles

N6LL 8,772 129 34 A
KU6T 6,006 91 33 A
K0INT 11,098 179 31 B
N6OU 6,300 105 30 B
N6GL 5,564 107 26 B
K6RO 3,600 72 25 B
WA6BOB 696 29 12 B
K6SE 62,977 430 71 C
W6/KH6DX 56,490 390 70 C
W6YRA (WA6AYI, K6LDO, KU6T, ops)
15,717 201 39 C
K6LA 2,280 58 19 C
NB6I 468 18 13 C
N5BF 4,117 91 23 D

Orange

N6BM 31,122 267 57 B
K6NR 12,173 125 47 B
N6RT 3,312 69 24 B
W6MX 40,078 332 58 C
W6DF 39,798 291 67 C
N6PE 28,050 252 55 C
W6HG 17,888 208 43 C

Pacific

KH6/W7DRA 2 1 1 B
KH6ND (@KH7R)
72,870 453 70 C
KH6DX/M 58,940 406 70 C

Santa Barbara

W6WQC 6,120 102 30 B
W6JEO 3,000 75 20 B
W7CB 29,323 244 59 C

Santa Clara Valley

K6EI 7,700 154 25 A
KB6FPW 7,590 165 23 A
K6XX 3,108 74 21 A
K6III 840 35 12 A
N6NF 48,007 383 61 B
W6ISO 5,808 121 24 B
N6IV 3,500 70 25 B
N7FF 1,672 44 19 B
K2RDX 858 33 13 B
K6RB 20,202 239 42 C
W0YK 14,620 170 43 C
K6MO 11,440 143 40 C

San Diego

AK6R 1,050 35 15 A
W6JVA 6,400 100 32 B
K6AM 87,600 572 75 C
K6NY 23,140 221 52 C

San Francisco

N6ZFO 13,240 164 40 B
W8NF 528 22 12 B
K6CTA 12,321 165 37 C

San Joaquin Valley

K6MI 2,275 44 25 A
WA6YEE 25,676 259 49 B
N6BU 3,408 71 24 B
KI6PG 2,688 56 24 B
KA6BIM 30,785 323 47 C

Sacramento Valley

N6RK 20,930 226 46 B
K6LRN 6,664 119 28 B
W6RKC 1,518 33 23 B
K6SG 1,064 38 14 B
K6ME 20,553 200 51 C
K6TA 19,665 214 45 C
W6EU 15,211 184 41 C
W6IXP 11,084 163 34 C
W6AW 45,522 420 54 D
K6NO (+K6RC) 22,513 238 47 D

7

Alaska

KL7FAP 72 6 6 B

Arizona

N7IR 27,183 265 51 A
W7LUX 3,996 54 37 A
AC7A 34,709 283 61 B
KJ7WY 23,210 211 55 B
N7GP (N5IA,op) 99,461 616 79 C
KC7V 58,940 400 70 C
K7ON 40,504 329 61 C

Eastern Washington

W9LT 19,608 228 43 B
W7MY 8,283 121 33 C
W7LGG 6,048 81 36 C
W7UB 6,045 96 31 C

Idaho

K7TQ 7,552 118 32 A
WO7Y 27,391 278 49 B
KA7T 16,560 171 48 B
KG7H 36,879 319 57 C

Montana

AB7CE 924 33 14 A
KE7NO 8,184 132 31 B
KK7UV 3,432 78 22 B
K7BG 17,061 183 47 C
KS7T 5,168 76 34 C

Nevada

N7PU 17,343 177 47 B
NW7O 7,350 102 35 B
K7NV 24,090 219 55 C

Oregon

W7/AH8DX 2,200 55 20 B
W7GG 59,500 424 68 C
K4XU 28,620 267 53 C
K7ZUM 14,250 186 38 C
K0JJ 4,710 77 30 C

Utah

KD7AEE 11,395 131 43 A
WA7LNW 6,160 140 22 A
N7XJ 5,340 89 30 A
W0YSE 1,044 29 18 A
W7UT 40,610 317 62 B
W7HS 18,650 185 50 B
K7CA 170,343 954 81 C
K8EI 18,584 202 46 C

Western Washington

W7LD 6,348 138 23 A
NW7DX 2,948 67 22 A
K7SY 2,890 85 17 A
W7/JR1NKN 10 5 1 A
KI7Y 55,575 408 65 B
N4SL 6,665 106 31 B
AB7RW 4,738 103 23 B
K7II 702 27 13 B
W7RM (KI7Y,op) 55,315 400 65 C
W7QC 42,056 368 56 C
K7QQ 36,244 344 52 C
N7ETC 7,722 117 33 C
K7UU 6,090 105 29 C
N7KE (KB7N, N7VMV, ops)
22,032 228 48 D

Wyoming

WC7S 5,376 84 32 B
W7CW (+ WU7Y, W7CA, WG7Y, N7VWV) 85,702 581 73 D

8

Michigan

K8CV 5,824 104 28 A
NE8O 39,416 376 52 B
K8SIA 24,336 231 52 B
W8RU 23,712 225 52 B
K8GT 22,626 208 54 B
K8IR 12,892 145 44 B
W8WVU 3,276 57 28 B
WX3M 320 16 10 B
W8MJ 65,736 495 66 C
N8EA 55,503 436 63 C
ND5S 42,185 353 59 C
K8CC 37,526 319 58 C
KT8X 9,509 127 37 C
K8XXX (@N8CC) (N8CC,NU8Z,K8AQM, W8MJ,K8JM,K8KS,KG8CO,ops)
200,728 1121 88 D

Ohio

W8VK 55,448 475 58 A
WA8RCN 34,397 320 53 A
N8XA 4,488 68 33 A
K8FH 106,536 763 69 B
W8GN 35,620 338 52 B
KU8E 19,965 177 55 B
K8MR 18,676 200 46 B
K8AB 12,096 141 42 B
K8BL 12,054 144 41 B
W8DHG 11,950 115 50 B
ND8DX 11,172 130 42 B
K8KSN 10,234 119 43 B
W8IDM 9,972 137 36 B
W8GRP 6,384 114 28 B
N8WS 4,060 71 28 B
W8PN 3,224 52 31 B
AF8C 3,200 64 25 B
N8BJQ 82,218 570 71 C
K5ZG 38,114 317 59 C
N8TR 18,810 159 57 C
K8ND (+K1LT) 213,342 1111 93 D
W8VE (@K8DX) (+N8PW, K8DX)
127,366 703 86 D

West Virginia

KV8S 16,000 200 40 A
K8OWL 5,040 84 30 A
WA8WV 34,006 344 49 B
KG8GW 7,986 121 33 B
K2UOP 117,150 769 75 C

9

Illinois

N9UC (WO9S,op)
29,939 317 47 A
N9JF 125,780 823 76 B
WX9U 84,607 575 73 B
K9LU 80,065 596 67 B
K9MMS 64,021 434 73 B
K9BGL 37,524 315 59 B
W9SMC (K9PG @ K9QVB)
26,784 276 48 B
K9ZO 25,410 231 55 B
K9CW 21,696 223 48 B
N9EP 21,115 256 41 B
N9CO 17,685 195 45 B
W9YS 16,500 186 44 B
K9SB 15,876 159 49 B
N9TF 13,284 120 54 B
N9TK 12,669 153 41 B
KB9CRY 12,556 143 43 B
KX9DX 11,920 149 40 B
W9RM 10,125 108 45 B
K9PPW 6,336 99 32 B
AA9D 5,070 83 30 B
WK9O 4,094 89 23 B
W9LYA 2,772 63 22 B
K9PG 1,904 56 17 B
W9EV 1,848 44 21 B
W9QFV 1,360 34 20 B
N9IO 1,152 33 16 B
N9IJ 1,056 33 16 B
AD4OS 132 11 6 B
K9DX 207,955 1060 95 C
KI9A 72,030 508 70 C
KG9X 64,804 472 68 C
W9OF 56,875 433 65 C
N2BJ 30,195 246 61 C
AE9D 22,034 238 46 C
KS9W 19,176 201 47 C
W9OA 13,545 149 45 C
KG9N 10,250 125 41 C
K9SD 9,176 124 37 C
NA9D 3,915 66 29 C
K9NR (@WB9Z) (+K9CS, AK9F,K9FO, WB9Z) 215,520 1091 96 D
K9HMB 35,535 244 69 D
K9MOT (K9PW, K9RR, ops)
24,682 287 43 D

Indiana

N9SE 23,103 225 51 A
K9WJU (W9CG,op)
79,380 561 70 B
WB9CIF 61,404 444 68 B
W9ELI (KJ9C, op)
50,866 434 58 B
K9AF 31,027 214 71 B
WT9U 28,968 281 51 B
W9BS 16,371 159 51 B
K9MI 13,674 156 43 B
N4TZ 13,566 157 42 B
K9IG 13,050 145 45 B
K9WX 7,392 112 33 B
KC9FC 6,180 103 30 B
WA0JTL 4,640 80 29 B
K9EA 288 12 12 B
K9BG 50 5 5 B
KE9I 207,281 1139 89 C
K8JP 151,285 944 79 C
W9RE 100,125 657 75 C
W9IU 84,070 599 70 C
NZ9R 20,623 253 41 C
K9VV 4,263 72 29 C

Wisconsin

AA9PB 2,688 56 24 A
AF9J 288 16 9 A
WA1UJU 33,250 331 50 B
K9DAF 29,008 256 56 B
K0SN 16,416 215 38 B
W9LO 15,222 177 43 B
W9WUU 6,480 108 30 B
WD9GWH 3,900 75 26 B
KB9KEG 2,392 46 26 B
N9XX 154 11 7 B
WT9Q 111,948 732 76 C
WA9IRV 72,080 527 68 C
N9CK 58,357 431 67 C
W9XT 44,415 351 63 C
WA9TZE 42,159 286 69 C
W9OP 39,150 333 58 C
N9AU 35,786 304 58 C
N9FH 33,488 296 56 C
K9MA 32,205 281 57 C
WE9V 12,593 124 49 C
W0AIH (K0TG,W0BV, ops)
60,720 454 66 D
WA9CWX (+packet)
26,468 250 52 D

0

Colorado

K0FRP 15,453 150 51 A
W0AH 106,125 703 75 B
W0ETT 32,574 267 61 B
K0UK 19,992 190 51 B
W9KV 3,186 59 27 B
WV7T 1,216 32 19 B
K0RF 154,190 889 85 C
WV7U 48,573 384 63 C

Iowa

NO9S 910 35 13 A
N2BTJ 504 21 12 A
N0SM 65,208 491 66 B
KB0SK 12,402 159 39 B
N0AAA 11,400 150 38 B
WB0B 4,640 80 29 B
K0SRL 15,796 178 44 C
N0NI (+N0AC) 181,305 1053 85 D
KE0FT (+ KG9IE)
22,860 254 45 D

Kansas

N0JK 26,523 206 63 A
K0RY 17,719 187 47 B
W0NXS 9,766 127 38 B
W0WPL 5,282 68 38 B
K0BJ 1,260 35 18 B
W0UY 59,094 438 67 C

Minnesota

W3FAF 10,865 131 41 A
W0SEI 8,645 122 35 A
N0UR 4,140 90 23 A
N0OQW 53,676 372 71 B
W0OPW 53,199 384 69 B
N0XB 42,185 356 59 B
N0AT 33,390 312 53 B
AC0W 32,890 296 55 B
WA2MNO 24,150 240 50 B
NA0N 20,445 216 47 B
W0ZQ 20,205 223 45 B
KI0F 16,324 184 44 B
N0HJZ 12,950 185 35 B
K0AD 7,821 117 33 B
W0UC 6,913 110 31 B
K0CAT (K9WIE,op)
3,473 74 23 B
WB0BNX 2,553 54 23 B
WA0RBW 14,600 181 40 C

Missouri

N0TT 55,428 444 62 A
WD0FLJ 3,618 67 27 A
K0RWL 61,690 493 62 B
W0TY 16,027 168 47 B
N0AJ 4,060 70 29 B
WA0IYY 2,440 61 20 B
K0OU 21,736 206 52 C
AA0A 18,894 201 47 C
W0TT 10,062 117 43 C

North Dakota

K0VX 208 13 8 B

Nebraska

WN0L 1,890 45 21 B
KE5RX 22,412 214 52 C

Maritime-Newfoundland

VE1KB 4,140 69 30 B

Quebec

VE2AWR 4,480 80 28 B
VE2AQC (VE2AWR,op)
2,496 52 24 B
VE2OWL 126 9 7 B
VE2ZP 25,296 245 51 C
VA2CT 9,509 127 37 C
VE2OJ (VE3EDR, VE3FFK, VE3NJ, VE3OP,ops) 29,187 309 47 D

Ontario

VY2MGY/3 4,914 91 27 A
VE3BUC 2,814 67 21 A
VE3CSK 42,060 346 60 B
VE3OSZ 31,314 304 51 B
VE3STT 21,472 241 44 B
VE3KP 18,748 215 43 B
VE3UZ 10,491 133 39 B
VE3ZT 9,760 122 40 B
VE3WZ 9,112 134 34 B
VE3BNO 7,755 114 33 B
VA3IX 7,095 106 33 B
VA3UA 6,583 112 29 B
VE3MQW 6,150 101 30 B
VE3KZ 105,336 678 77 C
VE3PN 71,874 534 66 C
VE3QAA 58,410 435 66 C
VE3EJ 42,539 356 59 C

Saskatchewan

VE5SF 468 18 13 B
VA5DX 29,376 269 54 C

Alberta

VE6JY 5,365 71 37 B
VE6BF 3,180 53 30 B

British Columbia

VE7JKZ 7,560 126 30 B
VE7VV 27,183 262 51 C

Checklogs

AB5XP, AF4OX, K2DW, K2FU, K3OQF, K7OA, K8OQL, KB2DCE, N0IJ, N0JK, N3SEO, N4UL, W0HW, W3SE, W5TEN, W5ZN, W6UT, W7LR, W9OA, W9YYG, WA6FGV

SECTION NEWS

The ARRL Field Organization Forum

Field Organization Abbreviations

ACC	Affiliated Club Coordinator
ARES	Amateur Radio Emergency Service
ASM	Assistant Section Manager
BM	Bulletin Manager
BPL	Brass Pounders League
DEC	District Emergency Coordinator
DXFR	DX Field Representative
EC	Emergency Coordinator
LGL	Local Government Liaison
NCS	Net Control Station
NM	Net Manager
NTS	National Traffic System
OBS	Official Bulletin Station
OES	Official Emergency Station
ORS	Official Relay Station
OO	Official Observer
OOC	Official Observer Coordinator
PBBS	Packet Bulletin Board Station
PIC	Public Information Coordinator
PIO	Public Information Officer
PSHR	Public Service Honor Roll
SGL	State Government Liaison
SEC	Section Emergency Coordinator
SM	Section Manager
STM	Section Traffic Manager
TCC	Transcontinental Corps
TA	Technical Advisor
TC	Technical Coordinator
TS	Technical Specialist
VC	Volunteer Counsel
VCE	Volunteer Consulting Engineer
VE	Volunteer Examiner

ATLANTIC DIVISION

DELAWARE: SM, Randall K. Carlson, WB0JJX—There are times as Amateur Radio operators when we have the opportunity to make someone's life just a liitle better in some unexpected ways. Some Amateur Radio operators in upper New York have undertaken just such an activity. For the last couple of years just before Christmas time, they would go into a couple of nursing homes and collect holiday greeting messages from the residents and then pass them on via Amateur Radio. If a reply was received this was then delivered to the resident. This very simple act brought lots of joy to people who often don't often have much to be thankful for at that time of year. I think this is something to consider exploring. While this scenario might not be right for your club, there are many similar opportunities where we can use our skills and talents to bring a little joy to others. Give it some thought. Traffic (May) DTN QNI 150 QTC 26 in 23 sess. DEPN QNI 41 QTC 5 in 4 sess. K3JL 42 N3HMQ 5. 73, Randall.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL—SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. OOC Alan Maslin, N3EA. STM: Paul Craig, N3YSI. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO, Dave Heller, K3TX, George Law, N3KYZ, James E. Bear, WB3FQY, Harry Thomas, W3KOD. The summer Hamfest season is well under way, and I must admit that I am thoroughly enjoying the experience. The Atlantic Division Convention in Rochester was especially satisfying since I was able to be present to see Dennis Silagy, K3DS, receive the well deserved Technical Award. Congratulations Dennis. The Bloomsburg E. Pa. Section Convention was special too. The Bloomsburg Town Council presented a proclamation honoring the Bloomsburg area amateurs for their service and dedication during the past year. The Governor's proclamation making June Amateur Radio Awareness Month in the Commonwealth of Pa was also presented. The proclamation was presented to Bill Edgar, N3LLR. The proclamation will be given to W. Pa. Section Manager, John Rodgers, N3MSE. Perhaps it would be good to mention here that when the proclamation was received from the Governor's Office, George Law, N3KYZ, was able to get it copied into a computer file. The file was sent to me. I keep an e-mail group address of quite a few Hams in E. Pa. and some in W. Pa. Within a very short period of time, we were able to send a copy of the proclamation to quite a few people with the notation to send it to others. Hopefully any Pa. club, or individual that wanted it, had a copy of the proclamation. Congratulations and thank you go to Craig, WB3GCK, for his outstanding work during an exercise in Chester County for the Chester County ARES RACES (CCAR). Another outstanding effort is one being done by Bob Nice, N3TZW. Bob's on-line newsletter for the R.F. Hill ARC is very well done, including layout and pictures. Bob's edition of "MHZ Times" is done in PDF format and is outstanding. From the "W3OK Corral" newsletter Jim, KB3BYU, has two excellent articles on sparking interest in Amateur Radio through his involvement with the Boy Scouts. Great articles Jim. "The Dipole from Marple-Newtown ARC reports a merging of MNARC and TRIARC. The merge will aid in a specific maintenance program for two repeaters and some long range planning. Tfc: N3EFW 314, W3IPX 306, N3YSI 290, K2BCL 264, W3HK 165, W3UAQ 112, KB3CEZ 90, W3NNL 52, K3TX 47, N3SW 40, W3JKX 28, KB3BBR 26, KB3DCT 18, W3TWV 12, N3AS 11, KA3LVP 9, N8JSO 8, AD3X 7, KB3DDL 6, N3ZXE 5, KB3CVO 3, W3BNR 2, N3IRN 2, KB3CKD 1. Net Reports: EPA 166, EPAEPTN 132, PTTN 76, SEPPTN 39, PFN 21, D3ARES 11, MARCTN 5, LCARES 4, CATN 3.

MARYLAND/DC: SM, Tom Abernethy, W3TOM, 301-292-626, w3tom@arrl.org— MDC Section Web page: http://www.qsl.net/w3tom/. In the late afternoon of Friday, May 25, 2001, a tornado cut a swath 2.6 miles long just west of Waldorf in Charles County Maryland. The Southern Maryland Skywarn Sub-net was active at the time and received the first reports of severe weather damage. With over 100 homes damaged in the communities of Ashford Oaks and Stream View, the Charles County Office of Emergency Services activated Charles County ARES/RACES. Operations on Saturday were re-activated to assist with the Storm Assessment Investigation. Amateurs participating include: KB3FQE, K3GRG, KA3GRW, N3HJA, N2OMC, KE3RE, AA3RT, N7UH, W3TOM. ANAR EC N3QXW reports 40 members, 4 sessions of the ANAR ARES and 1 training session. The following ARES members provided communications for the "Tour De Cure" bike rally: N3WOF, KB3EFS, N3UXD, W3NI, N3TGC, AA3FB, N3MJI, KO4A, N8ECG, KB3CPV, WI3N, N3GT, KB3CJT, WB4OGP. Members providing communications for Chesapeake Bay Bridge walk/run: K3BMV, N3WOF, N6TAU, N3TLU, AND W2KBR. WASH EC KD3JK reports 49 members and five sessions each of the WASH ARES-RACES Net and the Four States Net. FRED EC N8AAY reports 10 members, four sessions of the FRED ARES Net, and the "HIKE ACROSS MARYLAND" public service event. CALV EC N3QHC reports 15 members. Formal traffic handling and net operations course was attended by: KR3A, N3AE, N3IDX, K3MZV, N3PH, WA4PRR, N3QHC, N1WR, N3ZIY, and N3ZIZ. PRGE EC WI3N reports 42 members and one drill during which they successfully used Packet Radio to pass messages between MEMA, CARR, ANAR, and PRGE thru the NIH node. 73, Tom. WITH THE NETS - NET/NET MGR/QND/QTC/QNI: MSN/KC3Y/31/39/284, MEPN/N3WKE/29/69/379, DD/WJ3K/53/184/506, MDD TOP BRASS: K3JL 171, AA3SB 167, AA3GV 130, BTN/AA3LN/27/43/287, APRIL MDD/WJ3K/52/275/520, MDD TOP BRASS K3JL 173, AA3GV 153, AA3SB 152. Tfc: KK3F 1127, AA3SB 202, AA3GV 148, W3YVQ 97, N3WK 83, KC3Y 54, W3CB 45, N3DE 39, N3WKE 36, N3KGM 34, N3ZKP 34, K3CSX 29, WA1QAA 20, KE3FL 5, WA3GYW 3. PSHR: KK3F 241, N3ZKP 151, W3YVQ 150, AA3SB 136, N3WK 128, AA3GV 124, W3CB 123, N3WKE 110, WA1QAA 105, K3CSX 91, KC3Y 83, KE3FL 82.

NORTHERN NEW YORK: SM, Thomas A. Dick, KF2GC—http://www.northnet.org/nnyham. E-mail: kf2gc@arrl.org. ASMs: WZ2T, WB2KLD, N2ZMS, KD2AJ, WA2RLW. ACC: WB2BAU. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: WN2F. STM: N2ZGN. TC: N2JKG. Our efforts to make the first NNYARA NNY – Hamfest 2001 continued with our last meeting. Flyers have been dispersed throughout the state. The last Hamfest/NNYARA meeting on May 5, we determined to have a member of each affiliated club in the section have one member who would be a liaison to that club & report the Hamfest committees progress. This can only result in a better flow of information and support among all the clubs in our section. Moreover this will expand their involvement in the upcoming event. I was told by N3EFN - Bernie Fuller, the Atlantic Division Director that he will be coming to the Hamfest at Lake Placid this October 13, and will be giving a seminar on the ARRL. We look forward to hearing what he has to say. I recently attended the Rochester Hamfest and convention and got to talk with amateurs all around our state. We must continue to be a force for spreading good will and helping where needed and to do that we need to be able to erect towers and antennas. Senate bill S.2893B is currently in the Rules Committee and can immediately be brought to the floor for a vote. Assembly bill A.1565B is in the Ways and Means Committee and must be "reported out" or moved to the Rules Committee. Please support the bills before our state's house and congress. More information can be found see http://www.arrlhudson.org for more information. 73, Thomas Dick, KF2GC.

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA) e-mail ka2ykn@voicenet.com—ASM: W2BE K2WB W2OB N2OO N2YAJ N2XYZ. SEC: KC2GID. STM: K2UL. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. TC: W2EKB. TS: W2PAU. WB2MNF AA2BN KD4HZW WB3IJB WA2NBL N2QNX N2XFM. Missed working NJ2BB on May 26, 2001? Look for weekend activity starting fall. May 26 W2MAS, Bob Wescott, put out the first call "NJ2BB calling CQ". Bob said it was wonderful to have been part of the experience. Each week more jump on the bandwagon "err, battleship". Last reminder about the Hamfest by the Shore, Sunday Aug 12, 2001 Bayville Fire House Rt 9, Bayville, NJ. With fall on its way, it's a good time to upgrade. Check existing antennas or put up a new antenna. Avoid snowy repairs. STM rpt: QNI NJM WA2OPY 113 NJN(E) AG2R 169 NJN(L) AG2R 172 NJPN W2CC 186 NJSN K2PB 160 (above joint with NNJ) JSARS:K2ATQ 408 SJTN KB2RTZ 47 SJVN WB2UVB 285. SAR: WA2CUW 98, K2UL 95, AA2SV 73, KB2RTZ 61, WB2UVB 40, K2UL-4 39, N2VQA 25, N2WFN 17, WJ2F 20, W2AZ 8, W2MC 3, KA2YKN 5, KA2CQX KB2VYZ 3, KB2YJD 2, N2ZMI KB2VSR KB2YBM KC2ETU 1. PSHR: KB2RTZ 203, K2UL 190, WB2UVB 172, AA2SV 121, WA2CUW 106, KA2CQX 94, N2VQA 86, WJ2F 73, KA2YKN 57, N2WFN 53, KB2YJD 28, N2HQL 26, W2MC 14. WORK SOME TRAFFIC!!

WESTERN NEW YORK: SM, Scott Bauer, W2LC— Congratulations to WNY ASM Don, W2AC, on his graduation from Elmira College with a BS in History! Congratulations to Kellie, KB2CHC, on winning the W2OMV/K4VOS Scholarship. Kellie is the daughter of proud dad, Vic, K1PY. Kellie started in Amateur Radio as a 10 year old Novice and now is a fine young woman working on her Masters degree. She was the RDXA Field Day novice operator for many years. Kellie, all of us in WNY are very proud of you! Hamfests: Aug 4, Ithaca Hamfest, TCARC at Tompkins County Airport; Aug 5, Greater Buffalo Summer Hamfest and WNY Section Convention; Aug 11, Rome Hamfest, Rome Radio Club, at Westmoreland Fireman's Field. Silent Keys: Dan Hunter KE2LD past member of the Lancaster ARC; Bob WA2FKA; Frank K2JWS. May Net Summaries:

Net	NM	Sess	QNI	QSP	Net	NM	Sess	QNI	QSP
BRVSN	N2OYQ	31	172	2	CHN	W2EAG	30	128	21
CHN	April	28	89	6	CNYTN	WA2PUU	31	343	64
EBN	WB2IJZ	22	362	0	ESS	WI2G	31	404	131
NYPHONE	N2LTC	31	242	290	NYPON	N2YJZ	30	368	108
NYS/E	WB2QIX	31	322	154	NYS/L	W2YGW	31	255	173
NYS/M	KA2GJV	31	201	69	NYSCN	W2MTA	4	17	1
NYSPTEN	WB3CUF	31	349	45	OARC	N2KPR	5	40	7
OCTEN/E	KA2ZNZ	31	1431	209	OCTEN/L	KA2ZNZ	31	642	228
OMEN	N2UC	4	22	1	STAR	N2NCB	31	268	19
TIGARDS	W2MTA	4	37	3	WDN/E	N2JRS	31	447	74
WDN/L	W2GUT	31	396	53					

Traffic (May 2001), * indicates PSHR, #indicates BPL: N2LTC#* 2053, KA2ZNZ#* 540, WB2IJH* 266, NN2H* 265, W2MTA* 256, KA2GJV* 271, WI2G* 161, KB2KOJ* 138, W2GUT* 48, W2FR* 146, WB2QIX* 84, KA2DBD* 42, KA2IWK* 30, N2CCN* 66, KG2D* 92, N2KPR* 68, KC2EOT* 67, W2LC* 80, KB2ETO* 22, AF2K* 18, KA2BCE* 13, W2PII* 48, K2DN* 15, WA2GUP* 19, WA2UKX* 13, W2RH 23, KB2WII* 25. Digital; Stn Rx/Tx: KA2GJV 25/7, N2LTC 832/750.

WESTERN PENNSYLVANIA: SM, John Rodgers, N3MSE. ASM: N3MYZ. SEC: N3SRJ. ASM-ARES: WB3KGT. ASM-Packet: KE3ED. OOC: W3ZPI. PIC: W3CG. STM: N3WAV. TC:WR4W. DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: N3BZW. DEC-Rapid Response: N3HJY. DEC-OES: K3TB. Recently, several of the section managers of the division and myself attended the Atlantic Division convention that was held in Rochester, N.Y. I found that there is an increasing amount of interest in operating QRP. Many of the vendors had equipment and countless books on the subject. Several of the forums were on the subject and were very well attended. I personally attended a couple of the forums and became very interested in the mode. I have built a tiny tuna tin 2 QRP transmitter and am enjoying operating it. With the many special rigs or just by turning down the output power of your rig you can put a new degree of fun into your operating activities. It has been fun making contacts while only using 4 watts. Even contacts with countries that had been worked many times became exciting again, when realizing that I was doing so with such low power. I would recommend that you give this mode a try. This year as part of the Butler County Amateur Radio Association Hamfest we will also conduct the Western Pennsylvania Section Convention. The hamfest/convention will take place on September 9, at the Butler Farm Show grounds. Card checkers for DXCC, WAS and VUCC will be available to confirm cards for the various awards. Several forums on various amateur radio aspects will be conducted throughout the event. More details will follow in next month's column. This months featured club web site belongs to Skyview Amateur Radio Association. Please visit their site at http://www.microconnect.net/~ggross/skyview.htm. 73 de John Rodgers, N3MSE, WPA-SM n3mse@arrl.org.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W: KB9AIL. The Metro AC had a nice program on telegraph keys presented by historian NE9H. MAC has decided to purchase a banner to be used at hamfests and other events. The club will operate K9Y from Grosse Point Lighthouse in Evanston during National Lighthouse Weekend, August 3-4. The 44th running of the Des Plaines River Canoe Marathon was extremely successful this year according to the Lake Co. RACES newsletter. Over 700 canoes traversed the 19-mile course. Club members were on hand to provide communications during the event. The Egyptian RC provided communications for the March of Dimes Walk America event in Edwardsville. Some ERC members who attended Field Day walked away with very nice attendance prizes. The club made it easier to sign up for Field Day by including a postcard with the newsletter. The Kishwaukee ARC has named N9ZNC a lifetime member for his extensive work on behalf of the club. Submarines on the Air event coordinator N9VOK reports the special event held at the Museum of Science and Industry in April was well received. The station made 550 contacts including 12 submarines and various surface ships. The group plans to operate the special event again next year. The Sangamon Valley RC supported a ride by the Springfield Bicycle Club in April. The 14-mile course meandered through Menard Co. The DuPage Amateur Radio Club, W9DUP operated a special event commemorating Armed Forces Day. The event took place at the First Division War Museum at Cantigny, in Wheaton. A number of stations and modes were set up, with operation outdoors among the tanks

Continued on page 128.

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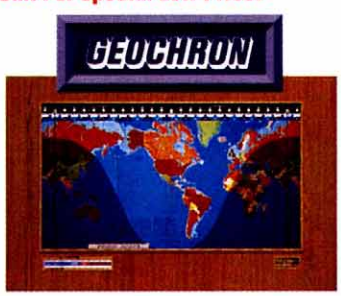

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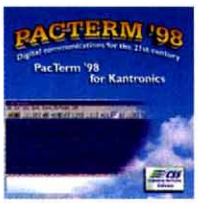

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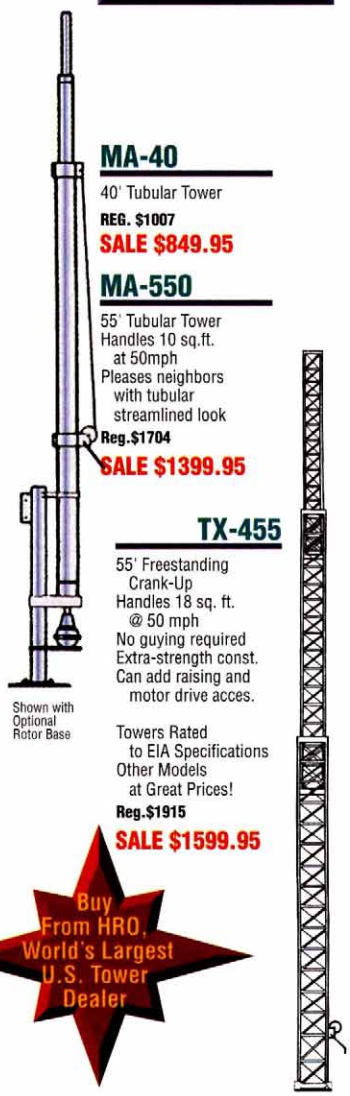
Digital Trio Get Pacterm '98, Log Windows and Wefax '99 all in one package for a special price. Great for the ham that requires the best. The Digital Trio lets you do all the popular HF modes, and logs your contacts at the same time. Supports PSK-31.

US TOWER



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Mounting Kit Included

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Dual Bands at a Single Band Price!

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- Auto repeater
- Includes AA Ni-Cad's & charger
- CTCSS encode/decode w/tone scan
- Mil spec 810, C/D/E*1

IC-W32A Dual Band Transceiver

- 2M/70CM
- 5W @ 13.5 V
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- CTCSS encode/decode w/tone scan
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- Auto repeater
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- Compact Transceiver w/detachable front panel
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- 300 Memories

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- 5W @13.8V ext DC • USB, LSB, CW, AM, FM
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- Compact 5.3" x 1.5" x 6.5", 2.6 lbs
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- 8 character alpha-num display

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- 5W output • Li-Ion Battery
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- CTCSS/DCS built-in

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- Built-in CTCSS/DCS Encoder/Decoder
- Less than 4" wide!

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Free FM-1! Limited time only

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- DSP, Auto-Notch • 99 Memories
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- Ultra Compact • 50w/35w 2m/440
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40/*20/15/10/6/2M/70cm
* optional coil

A 6M/2M/70cm whip that accepts 1,2 or 3 HF coils for up to 6 band operation. Simply screw on any combination of HF coils you choose.

Standard PL-259 connector allows easy mounting. Convenient fold-over hinge for entering garages, parking structures, etc...

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Length: 39 inches	Length: 43 inches
Max Pwr: 150W	Max Pwr: 150w
Conn: PL-259	Conn: PL-259

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OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12). Please mark your calendars for two important dates in the Ohio Section for late this month and mid-September. On Saturday, August 25, all members of the Ohio ARES will have their annual conference with the Section Emergency Coordinator, Larry Rain, WD8IHP. It begins 10 AM at the Franklin County Red Cross Center in Columbus. Then on Saturday, September 15, all Ohio hams are invited to the Ohio Section Conference which, this year, will include a special demonstration of PSK-31 mode (PSK-31 For Dummies). Starts at 9 AM at Ohio Emergency Management Agency facility, 2855 West Dublin-Granville Road or Ohio 161 in Northwest Columbus. Both events will feature pizza parties for lunch sponsored by the Ohio Section... The 10th annual Ohio Section Newsletter Contest is almost complete. Contact Scott Yonally, N8SY, Mansfield, the PIC immediately for the rules and your entry...The Ohio Single Sideband Net (OSSBN) has been using the traffic nets to assist local QSL Bureaus in getting cards to the rightful owners. Was it successful? Well, net traffic doubled the first month; tripled the second. You judge and thank John, K8PJ, for spearheading this...Treaty City ARA (Greenville) will operate W8UMD/90 to celebrate its 90th anniversary, August 4/5 in all General Class phone and CW bands. Commemorative certificates are available. OHIO SECTION CONGRATS TO (A) Richard Fletcher, N8CJS, for being named Ham of the Year at Mansfield; (B) Massillon ARC for being featured in the April 18th issue of the Canton Repository daily newspaper (C) Central Ohio Amateur Radio Emergency Service (COARES) for winning the top public service award winner from the Columbus Dispatch daily newspaper; (D) Mel Lippiatt, KA8OEB, and Columbianna County ARES for unique response to the Alliance area meningitis inoculation program in June; (E) Jack Thomas, K8DVK, Englewood, for saving the life of an elementary school principal with a quick application of the Heimlich maneuver last April ...OHIO AUGUST HAMFESTS: (4) Voice of Aladdin ARC, Columbus; (18) Portsmouth RC, Friendship, Ohio and (19) Warren RC, at Warren...de K8QOE.

Net	*QNI*	*QTC*	*QTR*	*Sess*	*Time*	*Freq*	*NM*
BN (E)	114	57	220	30	1845	3.577	WD8KFN
BN (L)	178	86	303	31	2200	3.577	NY8V
OSN	110	42	538	31	1810	3.708	WB8KQJ
OSSBN	1662	827	3041	93	1030, 1615, 1845	3.9725	KF8DO

Tfc: N8IO 501, WD8KNF 268, KB8KVM 259, N8OD 243, K8PJ 240, N8IXF 221, N7CEU 190, KC8HB 186, N8BV 159, W8STX 148, N8DD 116, N8TNV 116, KA8VWE 101, WA8SSI 93, KC8HJL 87, N7CEU 83, N8TNV 82, N8IBR 81, KA8FCC 80, WA8EYQ 72, NS8C 60, AB8KB 57, KC9K 53, KC4IYV 50, WB8HHZ 48, KC8HTP 47, N8CW 46, W8RPS 46, KB8SBK 41, KC8HPR 39, KI8IF 39, W8PBX 37, N8GOB 31, WD8KBW 29, K8QIP 29, N8GP 28, KB8SIA 28, W8VQV 28, NY8V 27, KC8DWM 27, N8YWX 24, W8RG 19, WB8SIQ 16, KC8PDY 12, K8RDK 12, W8BO 9, KC8KYP 9, N8RAK 7, K8WC 0.

HUDSON DIVISION

EASTERN NEW YORK: SM, Pete Cecere, N2YJZ— STM: Jim Peterson, K2CSS. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. Our section can be proud of the increasing number of amateurs getting involved in emergency communications. Let's help more members join in and be ready for an emergency situation. Make your voice heard. Write a letter on your position on antenna restrictions in New York State. Visit Web page for the most updated info and what you can do. 73 de Pete N2YJZ. MAY - PSHR: N2JBA 147, K2CSS 143, KC2DAA 143, WA2YBM 143, WB2ZCM 142, N2YJZ 138, W2AKT 135, W2JHO 119, WB2IIV 97, KC2HUV 87. Station Traffic: N2YJZ 168, K2CSS 94, N2JBA 50,WB2IIV 46, WB2ZCM 40, N2TWN 36, WA2YBM 33, KC2DAA 32, W2JHO 24, W2AKT 18, KC2HUV 12, WA2WMJ 7, K2AVV 6, KC2HUT 4, WA2BSS 2, N2AWI 2. Net Reports:QNI/QTC: AES 47/6 CDN 276/92, CGESN no report, ESS 404/262, HVN 605/140, SDN 510/124, NYPHONE 242/594, NYPON 368/226, NYS/E 322/344, NYS/M 201/141, NYS/L 255/359, NYSPTEN 349/90.

NEW YORK CITY / LONG ISLAND: SM: George Tranos, N2GA— ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SEC: KA2D. ACC: N2MUN. PIC: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. SGL: open. Summer is upon us and now is the time to work on those outdoor projects to get your station ready for the upcoming Fall and Winter activity. There will be a Section Staff meeting on Sunday, September 30, at Babylon Town Hall, North Lindenhurst at 9:30 am. All ARRL appointees are welcome to attend. The monthly NLI Section e-happenings newsletter is being e-mailed to all ARRL members in the section who have subscribed to Division / Section bulletins. If you have not received this newsletter, go to the ARRL Web site (www.arrl.org) and update your profile. Check the box that indicates you want Division / Section bulletins. Previous newsletters are available on the NLI site. Please e-mail me with your club's information and I will get it in the newsletter! Congratulations again to Bill WB2GTG who has again made the BPL. The NLI-cw traffic net is a working reality. Please check into NLI-cw (3630 kHz at 1930 local time Monday through Friday). August Events: Aug 18 & 19: Lighthouse Weekend - Fire Island Lighthouse, Fire Island National Seashore, Sponsored by Great South Bay ARC. ALL Amateurs welcomed! Setup at 7:00 AM, http://www.gsbarc.org/FI2001.htm. Contact: Tom, KA2D, 631-422-9594 or e-mail info@gsbarc.org. Horton's Point Lighthouse, Lighthouse Road, Southold, NY, Peconic ARC, Contact: Warren Melhado, KG2BI 631-734-6929 or Don Fisher, N2QHV, dofisher@suffolk.lib.ny.us, 631-765-2757. Aug 5: Manhattan Half Marathon 8 AM, contact Charles N2NOV, 718-876-7929. Annual TOBARES/GSBARC Picnic, Babylon Town Hall East Lawn, 200 East Sunrise Highway, North Lindenhurst, NY. Talk-in: 146.685 /R -offset 118.8hz. PL. Contact: Walter Wenzel, KA2RGI, ka2rgi@arrl.net, 631-957-0218. Volunteer Exam sessions, club listings, upcoming events and more are available on the NLI Web site - www.arrlhudson.org/nli. Report all changes to N2GA before the 12th of the month. Traffic: WB2GTG 642, N2AKZ 134, KB2KLH 88, WA2YOW 72, KA2YDW 28, W2RJL 26, WA2VZK 13, KA2D 8, KA2UEC 8, N2TEE 6, AB2IZ 4.

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This revealing 124 page book answers questions and dispels myths. The material is presented in a style that's easy to read and Jim, W4THU, is not beyond poking fun at jealously held concepts. However, at the book's heart are questions that hams ask over and over. Available now - $12.95 + $3 postage

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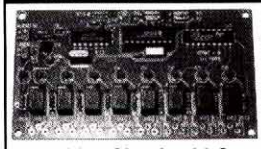

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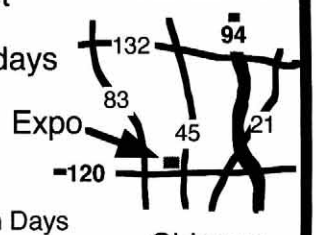

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NORTHERN NEW JERSEY: SM, Bill Hudzik, W2UDT—As the new SM, I would like to thank Jeff Friedman, K3JF, for his efforts in leading the section over the past 2 years. He has given me a section leadership staffed with dedicated volunteers who I have asked to remain on. We still have positions to be filled and I know there is a large talent pool in the section that is waiting to be tapped. This is your section and we can accomplish a great deal by working together. An example is our cell phone task force led by the 10-70 Repeater Association. The group was set up to monitor for any cell phone legislation which may be harmful to ham radio. In today's society we need to be activists. Get involved in local emergency management groups, scouting and youth groups, and schools. It will not only make you a good citizen but will keep your interest in radio alive! Also, I am open for invitations to club meetings and ask you to submit items for inclusion in our section column. And, don't forget to visit the NNJ web site run by N2WZB for other section news. After 40 years of being licensed, this is a level of the amateur service I have never experienced so I ask you to be patient while I learn the trade! 73, Bill Hudzik, W2UDT. Tfc: KB2VRO 56, N2GJ 55, WA2MWT 43, W2JG 42, N2OPJ 41, N2RPI 37, K2PB 22, KC2ANN 21, W2CC 19, KC2GZB 16, N3RB 10, K2DBK 5.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD—SEC: NA0R. ACC: N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. STM: KB0RUU. GCARC is dealing with emergency response time. That will always be a problem while dealing with volunteers. We aren't always available. DRAC notes that it is the time of year for nasty wx. GCARC is also doing a rewrite of parts of their club charter. When was yours last updated? It was nice to hear by e-mail from N7US, formerly WA0OTE, now of AZ. I used to check QST each month to see whether Jim or I had handled the most traffic! NIARC is loosing their newsletter editor. Who is the replacement? They will also need a new secretary for the coming year. Sorry to note the loss this month of K0JFG. Looks like CVARC has had a busy summer. Five public service events in June, one each in August, September, and October... so far. I know each of them is hard work... but also lots of fun. Siouxland has 2 in June, 1 in July, and 2 in September. Lightning may not strike the same place twice, but once is enough isn't it Dick? If I figured correctly, you will get this about the time of CVARC Summerfest. Hamboree and FD are over. Movin' on.. still. Newsletters were received from GCARC, DRAC, NIARC, OARC, CVARC, OARC, DMRAA, SA/S. Traffic: W0SS 200, KB0RUU 139, KC0IRB 46, WB0B 45, N0JL 22. Another one gone. 73, N0JL.

KANSAS: SM, Orlan Cook, W0OYH— ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. STM: Ron Cowan, KB0DTI. PIC: Scott Slocum, KC0DYA. TC: Rick Carver, WA0KS. Rick has also taken on the job of web master for our "KAR" Web site http://www.geocities.com/kansasamateurradio. This is not the final URL. I will keep you posted in the KAR Newsletter of changes. It's looking good, Rick, thanks. I noticed our EC reports to our SEC fell off badly this April. There are a lot of calls missing which makes this report look empty. Looks like we are down to 7 NTS stns. Dean, KX0I, one of our most faithful CW tfc handlers has suffered a stroke. It has effected his speech and his right side. He is just learning to walk again. Send him a card. See "KAR" for address and details. Larry, W0AIB, reports 36 hams participating in the 3 hr Amy Thompson Run to Daylight for Brain Injury benefit. Thanks for UR report; keep em coming. I wish everyone a good and safe Field-Day exercise. Look for some high scores in QST. Apr. Kansas Nets: sessions/QNI/QTC, KSBN 30/1012/76 KPN 22/313/30 KMWN 30/741/560 KWN 30/870/659 CSTN 25/1758/ 88 QKS 54/216/80 QKS-SS 6/13/3 SEC 42/454/13 QNS KB0AMY N0BTH WD0DVM KC0CIG KB0QGX KB0WEQ Joseph WD0DVM SEC. TEN 262 msg 60 sessions Kansas 85% w/KB0DTI W0EB AA0FO K0PY W0WWR NB0Z WB0ZNY W0SS/Mgr. BBS AA0HJ rec. 12 W1AW Bul, 332 Personal, 0 NTS. Ks tfc W0WWR 357, KB0DTI 36, K0PY 67, W0OYH 23, W0FCL 18, NB0Z 16, WA0DTH 16, N0ZIZ 14.

MISSOURI: SM, Dale Bagley, K0KY—ASM: John Seals, WR0R. ASM: Bill Coby, KB0MWG. ACC: Keith Haye, WE0G. BM: Brian Smith, KI0MB. OOC: Mike Musick, N0QBF. PIC: Dennis McCarthy, AA0A. SGL: E.B. DeCamp, KD0UD. STM: Charles Boyd, KE0K. SEC: Patrick Boyle, K0JPB. TC: Wayland McKenzie, K4CHS. Cliff Ahrens, K0CA DXCC Card Checker. For more news, checkout ARRL MO Web page http://www.qsl.net/arrl-mo. This month is a busy hamfest month in the MO Section. Southwest MO ARC host their Hamfest Aug 4. The Central MO ARC host the ARRL MO Section Convention at their Hamfest on Aug 25 and the St. Charles ARC Hamfest will be held Aug. 26. Please get out to one or more of these fine Hamfest and get those Amateur Radio Juices flowing. I had the pleasure of attending the St. Charles ARC meeting recently and making a presentation. It was great to see the energy and fun that their leaders and members bring to Amateur Radio. Ron Ochu, KO0Z, SCARC President and the membership were excellent hosts. If you have the opportunity to visit an SCARC meeting, don't miss it. At the North Central MO Hamfest Mel Whitten, K0PFX, presented a well-attended forum on digital communication. At the same event, Roy Parker, AA0B, demonstrated QRP construction techniques and designs. The Section is fortunate to have so many talented Amateurs who are willing to share their knowledge with others. The NCMO Hamfest was a fun event and a good crowd attended. Dan Miller, K3UFG, is the headline speaker for the ARRL Forum at the Aug 25th ARRL MO State Convention / CMRA Hamfest in Columbia, MO. Dan is the Certification and Education Program Coordinator for the ARRL, and will update us on many aspects of the ARRL programs. In addition to an ARES/NWS Forum, there will also be a meeting of the MO Repeater Council. For more information, contact Dale Huffington, AE0S, Dale@tranquility.net or k0ky@arrl.org. Net sess/QNI/QTC: N0ATH rpt 4/79/0; JCARES 5/56/0; ACARES 5/55/1; MTN 31/399/47; WAARCI 4/66/0; 10 RN 60/7; Rolla Billboard 30/330/1. Tfc: KE0K 16.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO: 46 Lincoln area Amateurs provided communications for the Lincoln Marathon on May 6th. Modes of operation included voice, packet and

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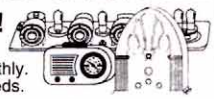

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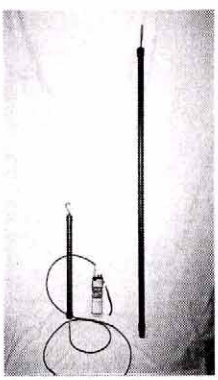

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APRS. Eight members of the Hastings ARC gave communications support to the Clay County Cruise on May 12th. The HARC also operated a Special Event Station at Pioneer Village in Minden on June 9-10. Net Reports: NE 40 Meter Net: QNI 360, QTC 9 & 27 sessions. NMPN: QNI 1585, QTC 15 & 31 sessions. NCHN QNI 263, QTC 10 & 29 sessions. SoCeNE-NoCeKS ARES: QNI 50, QTC 1 & 5 sessions. W0IRZ Memorial Net: QNI 59, QTC 1 & 4 sessions. MIDNE ARES: QNI 298, QTC 6 & 31 sessions. Traffic: K0PTK 93, KE0XQ 16, W0RWA 16, KA0DBK 4, W0WHY 4, WY0F 2, W0EXK 2, W0UJI 2.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—ASMs: NK1J, K1STM, KZ1Z, N1API. BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: WA1D. SGL: K1AH. STM: K1HEJ. TC: W1FAI. It was a pleasure and privilege for me to voluntarily attend as an observer the NTS meeting of area staffs in Denver. The chairs of the Eastern, Pacific and Central area staffs were there along with several Section leaders in the Denver area. Observers like myself were encouraged to participate in discussions of how NTS can be improved at the Section level. Training of ops and more national support for new NMs were stressed. I am sure that articles from Hq elsewhere will detail more of the proceedings. It was really fun to be among other Section leaders to talk about the area of the hobby in which I have been active for over 40 years. Now is the time to schedule yourself or your club to help out at the annual Big E Amateur Radio booth. This is a wonderful chance to tell the public about our hobby. For more information, contact Al, N1JWF aln1jwf@juno.com or Larry, K1HEJ, buckl@mail.ccsu.edu. As August approaches, I am planning to get back on schedule with the SM on-air net. I will be looking for more repeaters to link with the 145.29 and 147.505 repeaters. Please contact me if you can help. It sure was great to see some of you at the NARL Flea Market. Mark September 16 on your calendar for the CARA Ham Fest at the Edmundton Town Hall in Newtown. Summer is here, so don't forget good operating practice on VHF: pause between transmissions to allow mobiles or others needing info to break in. QRPers: Ask Jim, KD1YV, about his impromptu trip to The Appalachian Trail —kd1yv@arrl.net. You'll enjoy his story! Net sess/QNI/QTC/NM: WESCON 31/245/53/KA1GWE; ECTN 30/204/29/WA4QXT. NVTN 30/148/186/KB1CTC; CPN 31/203/57/N1DIO; CN 23/79/53/N1AEH; BOMN 25/48/311/NM1K. Tfc: NM1K 2064, KA1VED 541, WA4QXT 171, KA1GWE 99.

EASTERN MASSACHUSETTS: SM, Phil Temples, K9HI. ASMs: WA1ECF, N1GTB, WA1IDA, N1UGA, AA1MO. ACC: N1DHW. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SEC: W1MPN. SGL: K3HI. STM: NZ1D. TC: N1UEC. e-mail list: ema-arrl@qth.net, web: http://www.qsl.net/ema-arrl. Kudos to all the hard working Field Day volunteers across EMA who contributed their time and efforts. Was your Field Day both fun and educational? Did the general public have an opportunity to see and hear Amateur Radio in action? Did you conduct a post-op meeting to critique the overall event? The Braintree SKYWARN training class was attended by 83 people, many of whom were Amateurs. W1OG, WR1Y, N1QGE checked out the antique cars recently in Chelmsford. Capeway RC Net meets Mondays at 20:00 on 28.800 MHz. N1FDX and W1GMF responded to an emergency call from K1HTN on the Bridgewater repeater involving an injured bicyclist. Bridgewater police were summoned. Massasoit ARA members participated in the recent YMCA 5K Run and Fun Walk. Framingham ARA assisted in the town's recent road race and parade. The Minuteman RA conducts weekly live, competitive fox hunts in EMA at 10:00 each Saturday on the input of 146.61 Marlboro, and at 18:00 each Thursday on the input of 146.82 Weston. Join in, or listen in on the fun! Norwood ARC members participated in the recent Walk America March of Dimes walk. Check out the USS Salem ARC's Web site at http://www.qsl.net/k1usn/. USS Salem ARC boasts an impressive array of HF gear. And it regularly hosts visits from scouting groups! Looking for a fundraising idea for your club? Cape Ann ARA sponsors a "Cans for CAARA" fund-raiser by recycling soda cans and bottles. North Shore RA is sporting a new club call sign: NS1RA. Mass Emerg. Mgt. Agency is sponsoring a public safety festival on 9/22 from 09:00 to 15:00 at the Barnes ANG Base in Westfield, MA. Falmouth ARA's flea market was a huge success, thanks in no small part to KB1FYS and others. WA1YFV ATV repeater log periodic antennas were recently installed on the Provincetown water tower. Bristol County RA to hold its "Geek Fest" in Swansea. Boston ARC has its monthly breakfast on the 2nd Sunday of each month at 8:30 at the Old Country Buffet in the Watertown Mall. Want to try your hand at contesting? No HF station? Yankee Clipper Contest Club welcomes newcomers. Visit http://www.ycc.org for details. 73 de K9HI. Tfc: W1GMF 2364, KB1AJ 2075, N1LKJ 648, KW1U 520, NG1A 390, W2EAG 283, NZ1D 120, N1AJJ 76, N1MLO 63, WA1FNM 50, K1BZD 46, K1SEC 46, KB1EB 39, NC1X 33, N1IST 28, KB1CVH 21, KD1LE 10, N1TPU 10, WA1VRB 10, NK1L 8, N1TDF 3. (Apr) W2EAG 371.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: NX1A. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: N1RY. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: W1KX, KA1TKS, K1NIT. Web Site: N1WFO. The mild spring weather gave the Hams in southern Maine a chance to participate in the South Coast ADA Tour de Cure Bike Race. Amateurs taking part were: K1GAX, K1AOK, KB1FGF, NX1A, KB1GLW, N1GRO, KB1DUH, NX1C, KB1COX, N1DIH, W1AE, KA1KIX, KA1AIF, and KB1AQE. The time spent on events like this is an investment in the future of Amateur Radio. Not only does it put Hams in the spotlight, but also gives the participants an extra cushion of security by the Hams' presence. Hopefully by the time you read this article, all the Red Cross chapters that had radio equipment allocated will be on the air. The Auburn chapter is just about ready. It will have a fully functional Amateur Radio station for local Hams to stop by and use, and will be the new meeting place for the Androscoggin ARC, which holds its meetings on the first Wed. of each month at 7 PM. So, if you are in the area, stop in, the Red Cross building is located on Western Ave., behind Sacred Heart Church, by the rotary. 73, Bill, N1KAT. Tfc: W1KX 134, W1QU 54, W1JX 33, KA2ZKM 23, N1JBD 20, W1JTH 18.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org)—NH Web site (www.nhradio.org). It is not often that I

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have the opportunity to feature a single ham here in my column. Recently I had the pleasure of presenting a NH SMs Recognition Award to Dick Christopher, N1LT. Dick has continuously taught Amateur classes over the last 25 yrs plus and has been responsible over 200 new hams entering the ranks. Additionally Dick has been the major driving force behind the club's Field Day activities in addition to holding various club offices numerous times when called upon. It was only fitting that as I presented the award the club rose to its feet in appreciation. Thank you Dick for your support of ham radio and the League through the years. The results are in on the New Hampshire QSO party. Large Club: GBRA with 295,412 points. Small club CCDXC with 12,250 points. Individual high point winner in NH AA1QD -Strafford County. Non-NH winner K0CIE. Activity was down a bit with only 52 stations submitting logs. NH Stations:27 Stateside: 20 DX: 5. Be interested in your ideas on how to rekindle interest in the NH QSO Party. ARES continues to make strides in its renewal effort in NH. 603-487-3333. 73 Al.

RHODE ISLAND: SM, Armand Lambert, K1FLD— Your SM, K1FLD, is somewhere in W6 or 7 land as you read this. He would like to thank all of you who voted and returned him to serve another term as your Section Manager. As ASM, I also thank you for another term. The Rhode Island Diabetes Foundation held a bicycle tour fund raiser on May 20th in Narragansett, RI. The ride had 3 options, a 25k, 50k and a 100k tour. The Blackstone Valley Amateur Radio Club handled the communications for the fifth year. The following operators participated: WA1RI, N1MIU, WB1P, N1WWG, N1DO, N2PGD, NB1U. Sparky, WA1HAH made the use of his repeater available to the group. Many thanks to him and to the operators. The RIAFMRS (aka the '76 repeater gang) springtime flea market and auction once again dragged folks out to exchange their treasures and stories. It's great event promoting camaraderie and we're looking forward to the fall edition to exchange treasures again. As you read this, Field Day is history but I hope I met each of you during my state tour of operating sites during the event. At least a half dozen club groups were active this year handing out those rare RI QSOs. Planning for fall club activities is underway. Think creatively to stimulate increased attendance. Good DX to all and 73, Bob, W1YRC, ASM.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org. ASM: N1MAP. ASM (digital) KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1W. WMA section has become a leader again. John, AE1B, has organized a contest club. A contest club is not unique, but this one is. It is a training club with the specific purpose of training and critiquing operators that want to get involved operating in a contest atmosphere. If you plan to do any contest operating and want to learn what it is all about, contact AE1B. The summer doldrums are on the way. Club in the section are in the process of selecting new officers for the upcoming year. Activity on our bands has declined. Vacations are in progress. Even the traffic nets are showing a decline in traffic volume. Most of us are getting to know our families again. There are a number of hamfest/flea markets planned for the summer. Check the ARRL Web site for the times and dates. If you hear a strange callsign on your local repeater, welcome the operator to our area. Tray to make him feel at home. Kill the myth that New Englanders are a cold-reserved lot! Tfc (Apr): K1TMA 263, N1WAS 143, N1ISB 8, KD1SM 9, W1BMK 6, N1RLX 4, W1ZPB 121, W1UD 312.

NORTHWESTERN DIVISION

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—Students at Moran Prairie Elem. School in Spokane completed an on-the-air QSO with the International Space Station and astronaut Jim Voss on May 23rd. Tom Faulkner, W7TRF, Jack Tiley, N7RWJ, Lee Underkofler, W7MW, Jim Summers, KD7F, Dave Burgess, N7IQQ, and Mossab Abughalib, KD7KDD, of the Agilent Team provided the radio equipment that made the ISS contact possible. Hamfests: The Original Spokane Hamfest is August 4 & 5 at University HS. On May 12, Don, K7BFL, Harvey, K7GXZ, Bernie, N7YQQ, and Don, W7GB, assisted the Spokane Morse Telegraph Club in Wallace, ID, originating message traffic at the RR depot during the Wallace Festival. 73, KA7CSP. Net Activity: WSN: QNI 927, tfc 257; Noontime Net: QNI 9032, tfc 311; WARTS: QNI 3394, tfc 67. Tfc: W7GB 225, K7BFL 144, K7GXZ 97, KA7EKL 70, KK7T 14. PSHR: W7GB 138, K7GXZ 127.

IDAHO: SM, M.P. Elliott, K7BOI — OOC: W7ZU. SEC: AA7VR. STM: W7GHT. ARRL's major education initiative is becoming a reality. The objective is education for hams and education within school systems. School will be starting again soon. Have you considered offering your ham services to the schools in your area? Please consider offering your time and expertise to your local students. This hobby needs to attracts more young members and what better way than through local school systems. For ideas and suggestions of how to go about working with school systems please contact Rich Dees, W7BOI (Education ASM). Ham radio needs YOUR help and involvement! 73 - Mike, K7BOI. Tfc: W7GHT 158, WB7VYH 78. PSHR: W7GHT 126, WB7VYH 105. Nets: FARM 31/2707/40/W7WJH; NWTN 31/1179/52/ KC7VAH; IDCD 23/465/16/WB7VYH; IMN 31/389/ 138/W6ZOH. http://id_arrl.homestead.com/mainpage.html

MONTANA: SM, Darrell Thomas, N7KOR—Not much to report on activities in the Section During May. Some public service support handled by a few clubs, but I do not have the details. June is looking rather busy with ham activities with three large picnics and outings scheduled. Of course July is the Glacier Waterton Hamfest which is always a large event. Net/QNI/QTC/NM MSN 112/1 W7OW, MTN 1724/58 N7AIK, IMN 389/138 W6ZOH. PSHR: N7AIK 124.

OREGON: SM, Bill Sawders, K7ZM—ASM: KK7CW. SEC: WB7NML. STM: W7IZ. STC: N7LA. SGL: N7QQU. OOC: NB7J. ACC: K7SQ. Welcome to our new Oregon Section Technical Coordinator, Larry Ross, N7LA. I am pleased to say that he comes highly recommended by Bernard Fineberg, AB7HB, who held that position prior to be moving to his new job in Texas. Larry brings over 30 years experience in the electronic industry to this position. Holding nearly every FCC license available, Larry is looking forward to assisting you with your radio, and other electronic problems. Thanks for volunteering, Larry! ARRL President Jim Haynie, W5JBP, attended the 2001 ARRL Northwest Division Convention at

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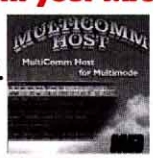

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Seaside. It was there, where he met with Oregon Section Emergency Coordinator, Lew Williams, WB7NML, Oregon Emergency Response System Manager, Tami Burroughs, W7TMK, and other Oregon ARES/RACES Officials. Oregon's ARES/RACES program is "tops in the nation," and President Haynie wanted to know "first hand" how we do it! ARES/RACES members should be proud of yourselves and your directors. We're the best-trained emergency prepardness team in the United States. Lew and Tami, are to be congratulated for their fine efforts in establishing and "bettering" this highly-recognized emergence response group. Keep up the excellent work! Oregon Section Traffic Manager, Scott Gray, W7IZ, reports that a need for more net controllers on all NTS level nets is present. If you're interested in message handling, and net control on all levels, maybe it's time for you to get involved! Keep in touch. NTS traffic totals for May: N7YSS 151, KK1A 126, N7DRP 118, KC7SRL 115, W7VSE 96, KC7SGM 92.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—During this spring and early summer, ASM Mary, W7QGP, & myself have been involved in teaching weekend classes and administering VE examinations. A class for the Shoreline Fire Department has produced new Amateurs (also employees of the department). A class at the Boeing Activities Center in Kent has generated additional QRM possibilities. A third class was taught primarily for NOAA employees and held at the old Sand Point Naval Base. Of note, however, are the classes taught at New Options Middle School in Ballard and Lakeview Elementary School in Kirkland. With Amateur Radio stations in the classrooms these pre-teen students usually score better on the VE exams than their parents. On a sad note, the radio clubs in the area simply do not generate Elmers to give personal assists to these next generation Amateurs. Reporting via SEC Ed, N7NVP, the Whatcom County RACES and ARES members provided communications for the Ski to Sea race. The relay consists of Cross-Country Skiing, Downhill Skiing, Running, Biking, Canoeing, Mountain Biking and Sea Kayaking. Approximately 396 teams, totaling 3168 participants in 8 different "legs," traveled the 85 mile course from Mt. Baker ski area to the finish on Bellingham Bay. Using various bands and frequencies, some 45 hams provided help with coordinating staging areas and participant's arrivals and departures. Congratulations and well done to all who made this a successful event. Special thanks to WA7ZWG Bob Johnson. With the advent of crash weekend Ham classes the newcomers seem to have a little problem staying within the bands allocated for their class of licenses, this according to the OO team headed by Renee (DeeDee) Eck, AA7KE. Perhaps you may be willing to lend a hand to your fellow ham by acting as and Official Observer. STM Pati, W7ZIW and others met the NTS players at Seaside, Oregon during the Division Convention to renew acquaintances and tell tall tales of the real world of traffic handling. The convention? Another success. 73.

PACIFIC DIVISION

EAST BAY: SM, Andy Oppel, N6AJO—ASMs: NJ6T, KE6QJV. SEC: KE6NVU. DECs: KE6QJV/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. OOC: KD6FFN. STM: W6DOB. ACC: NJ6T. EB Web Page: http://www.pdarrl.org/ebsec/. Webmaster is KB6MP. ROVARC operates on Historic Ships net 10:00 PDT Weds on 7245 kHz. MDARC auctions have been great fund raisers. ACSCT members KA6FIY, NJ6T, KF6CRZ, AD6ME, KD6FFN, W6RGG and KF6ZBH provided communications for the Oakland WalkAmerica. EBARC welcomed new members KG6GMA, KG6GLZ and KF6RIP. LARK congratulates K6TS on earning DXCC on CW after 20 years of effort and W6STW for upgrading to Extra. LARK provided 151 hours of public service communications for the Mt. Hamilton Bike Classic. May tfc: W6DOB 657, WB6UZX 23, KE6QR 13. 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, Jan Welsh, NK7N—ASM, SEC: Paul, NN7B. Hello and thanks to all NV amateurs that participated in the AB61 campaign to keep some of our amateur privileges. Without the support of you all we wouldn't have been able to get the necessary OKs. The bill made it through the Assembly and the Senate and was finally signed by Governor Kenny Guinn. Special thanks to Bob Beers, WB7EHN, NV Assemblyman, for proposing the bill and for keeping us informed on its status. I also commend Dick Flanagan- W6OLD, NV ASM for his up to the minute upkeep of the reflectors that kept us aware of the status. The advice on what to do when, to whom, and how and where to do it was invaluable. The State of NV has some pretty efficient amateurs. We also had another local antenna bill that Bruce Pfeiffer, N7CPP, NV SGL and Stan Brok, N7YQ, took care of up in the Carson City area. We can also thank Governor Guinn for making June, 2001 'AMATEUR RADIO AWARENESS MONTH', in recognition of the support the state receives from the AmateurRadio operators. Have fun on Field Day! From the mail, it looks like NV is going to have lots of participation this year. Look forward to seeing you, 73, Jan, NK7N. Tfc: W7VPK 87, N7CPP 41, W7TC 30, NV7YL 12, W7YDX 8.

PACIFIC: SM, Ron Phillips, AH6HN—The second planning meeting for the October Ham Convention at Pearl Harbor took place on 5 May. Walt, AH6OZ, says the ARRL approval for the hamfest is in its final step. Eight speakers are lined up for six slots, two on standby. The hamfest will go all day long from 8 to 4, which includes an ARRL roundtable discussion, and VE testing in the morning. Web pages need to be updated and put on line for this year's Hamfest. There is considerable material from the last two years that might be used. We are developing additional information for possible Japanese tour groups. Permission for a lunch wagon on site will be arranged, so that no one will have to leave the site and miss out on the noon time activities. A van with 2 meter capability will be available for talk-in. It will be stationed closer to the gate this year and the people taking admission will be stationed near the van. Kevin, AH6QO, will handle security and parking arrangements. Stu Johnston, NH6DR, and Jim Reid, KH7M, will be the program manager/stage manager to help keep the speakers moving along. Dan Spears will be program chair and will help Stu to

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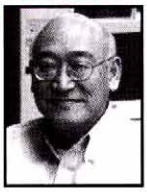
"As I got older, my high frequency hearing loss was destroying my ham radio for me . . ."



-- Martin F. Jue, K5FLU
President and Founder
MFJ Enterprises, Inc.

I know I'm not the only ham who can't understand all the speech in a QSO caused by high frequency hearing loss. I developed a solution that I want to share with my fellow hams.

I almost gave up my ham radio hobby

I have been a passionate ham radio operator for over 40 years ever since I was a teenager. I loved every minute of it. Still do, but I almost had to give it up.

As I grew older (I'm 56 now) I found myself asking "*What did you say?*" so often it got downright embarrassing. I can hear pretty good most of the time. I just can't always understand what people are saying and my left ear is weaker than my right ear.

It got to where I was having trouble carrying on QSOs. I could hear, but I just couldn't quite make out all the words.

My hearing problem almost put a stop to my lifelong hobby.

There was no way I was going to give up ham radio . . .

Research showed me what to do

I searched the literature and spoke to hearing and speech experts.

According to their research on the intelligibility of speech in hearing English words:

1. The frequencies important for speech intelligibility are the consonant sounds from 500 to 4000 Hz. They contribute 83% of word intelligibility.

Frequencies from 500 to 1000 Hz contributes 35% of word intelligibility and 35% of sound energy.

Frequencies from 1000 to 4000 Hz contributes *48% of intelligibility* but has *only 4% of sound energy!*

2. In contrast, frequencies from 125 to 500 Hz contributes 55% of sound energy but only 4% to word intelligibility.

***In** other words, nearly half the speech intelligibility is contained in 1000 to 4000 Hz frequency range with only 4% of the speech sound energy.*

On the other hand, the low frequencies 125 to 500 Hz have most of the speech energy but contribute very little to intelligibility.

How I improved my ability to hear and understand QSOs

The research showed me what to do.

First, drastically increase the speech energy above 500 Hz where 83% of intelligibility is concentrated.

Second, drastically reduce the speech energy below 500 Hz that contributes only 4% of intelligibility.

Amateur radio communications limit audio to about 300 to 2700 Hz.

I split the audio band into four overlapping octave ranges centered at 300, 600, 1200, 2400 Hz.

I could boost or cut each range by nearly 20 db to give me full control. This let me maximize speech intelligibility for most kinds of frequency loss.

My left ear is weaker than my right ear so I split the output audio into left and right channels with separate 2½ watt amplifiers. A balance control lets me equalize the perceived loudness to each ear. *Now both ears help in improving speech intelligibility!*

I couldn't believe my ears!

I built one and hooked it to my rig.

I boosted the high frequencies, cut the low frequencies, set the volume and adjusted the balanced control so I could hear each side equally loud.

I couldn't believe my ears! Speech that I could hear but barely understand before was now highly understandable. I got my ham radio back!

With this concept, you'll *understand* QSOs better and enjoy ragchewing and contesting more, even if you don't have high frequency hearing loss.

It helped me so much I wanted to share this with my fellow hams

I developed this into an accessory that any ham can use.

I made it immune to RFI, added a front panel phone jack, on/off speaker switch, two selectable transceiver inputs, a bypass switch for in/out comparison and built it into 10Wx2½Hx6D inch aluminum enclosure. Needs 12 VDC.

Other Uses

Replace your rig's audio section for superb audio. Eliminate hum, buzzes, poor frequency response, low audio power.

Works with SSB, FM, AM, CW -- any voice mode. Use any rig -- ham, marine, aircraft, CB. Use for PA systems, internet phone, radio talk shows.

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see that things are setup and ready for each speaker. Lee Wical, KH6BZF, has taken on the task of setting up a possible banquet on either Friday for Saturday evening (Oct 12/13). Further info will be forth coming. Many thanks to all who are working very hard to make this event successful. Dean Manley, KH6B, reports he attended the 50th Dayton Hamvention and the QRP and the Four Days In May (FDIM). Dale Fajardo, AH7D, reports the stats for the Emergency Amateur Radio Club Net (Diamond Head Rpt 146.88 and 444.5) for May are: Number of check-ins: 220; Total net time: 397 minutes. Aloha and Mahalo, Ron, AH6HN.

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ— With the soaring costs of gasoline, energy, and health insurance, it is becoming increasingly clear that ARRL dues are very reasonable. As a hedge against inflation, you may even want to consider a Life Membership. Speaking of the energy crisis here in California, alternative power sources particularly for emergency communications make even more sense than ever before. It's not just those of us who live out in the country that are now exploring solar and other means of keeping our stations on the air. As an experiment, I recently decided to try and work as many DX stations as I could with 5 watts of output instead of a KW or even 100. I acknowledge that good antennas make a lot of things possible, but I was pleasantly surprised at being able to work almost everyone I called on 5 watts. A 5 watt rig is easily powered by means other than the public utility serving your area. Congratulations to all the amateurs in the Section who already this summer have provided valuable public safety support.....and fire season isn't half over. I recently hiked to the top of Mt. Lassen and with a 5 watt HT worked simplex well over 150 miles away. I've worked others who have done the same thing, but this was my first time from a high mountaintop. What a blast! PACIFICON will be coming up before you know it. Hope to see many of you there. 73 for this month de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK— KH6GJV. ASM: KE6EAQ. SEC: The Level one emergency communications course is now available on line and open to ARRL members. Check the ARRL Web site for information on getting enrolled. This is an extremely interesting and needed course for all of you. It was good to see many section vhfer's on the air during the vhf contest. This is much like Field Day, and gives valuable training in setting up portable/emergency operating sites. Congratulations to all who participated. EARS had a very enjoyable breakfast in Santa Rosa and much local information was dispersed. W6PW group had an excellent 2001 campout with some training and social skills acquired. LCARS has been busy with local ARES events including a boat race on Clear Lake. WARS had speakers from Radio Shack about their local store and what they can do to help local hams. Many of their members attended SEAPAC in Oregon making a nice camping trip out of the event. With the many fires breaking out in the north coast, NOW is the time to double check that ready kit and make sure you are up to date with everything, including getting involved with your local ARES and ACS. Get their local training and make sure you are on their insured list. In most counties the working together is going very well and the local governments are aware of us and our capabilities. The SM has found an article about a YL in Marin County licensed in 1916. This information is being forwarded to the local club there. Have a safe summer and I hope to find you on the Tuesday evening emergency net at 1930 local time on 3915 kcs.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN— ASM: Mike Siegel, KI6PR. ASM: John Lee, K6YK. SEC: Kent LeBarts, K6IN. OOC: Victor Magana, N1VM. ACC: Charles McConnell, W6DPD. STM: Fred Silveira, K6RAU. The National Weather Service is looking for amateur radio operators in SJV Section to work with them as weather spotters. Skywarn is the name of a program mutually promoted by the ARRL and the National Weather Service to train radio operators in the recognition of potentially dangerous weather and how to report it to the NWS in Hanford. Specific repeaters have been designated to handle traffic to the office once the office has declared a spotter alert. Amateurs are trained by NWS in what to look for and how to report what they have seen. The forecasters at NWS then use the ground data to enhance what they are seeing on their radar screen. The importance of the program is that ground data reported can sometimes mean that NWS can issue warnings to the public earlier. The Skywarn program is very well tuned in the midwest where weather is more severe than in California but, the potential for life threatening weather exists here as well. So, what does it take to be a Spotter? A spotter must attend a training session by NWS to be certified and be willing to report bad weather conditions when alerts are issued. Mobile spotters are the most valuable resource as weather moves around often in rural areas where amateur operator resources may not be available. For those of you very interested in weather who have weather measuring instruments nets will pick up reports of readings to pass on to NWS in Hanford. Public service is part of the basis for amateur radio and this is an excellent way to become involved in public service. If you are interested in participating in Skywarn send me an e-mail, and I will forward it to the appropriate person at NWS. My e-mail address is w7wn@arrl.org.

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC. SEC: KE4JHJ. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl.org. Congratulations to Mike Lamb, NC4ML, on being appointed as the Net Manager of 4th Region Net, Cycle 2 (daytime). Mike has been a very active participant in our section traffic nets, and 4RN will benefit greatly from his efforts, I'm sure. The 4th Region Net is our conduit for traffic between North Carolina and the rest of the country, and is what makes us a part of the National Traffic System. We are still in need of liaison stations between nets, especially between our local and section nets. Without liaisons, a net becomes independent and has no reliable way to route traffic to the rest of the world. A few good people who volunteer for liaison duties only once per week is all that most nets will need. Consider volunteering and help out the National Traffic System. I hope Field Day was a success for all. Thanks to all who particpated in any capacity, whether an operator, logger, antenna expert or chef. We have need for many different talents when we are de-

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Large easy-to-read two line LCD screen and side-by-side meters clearly display your information.

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Find your antenna's true resonant frequency. Trim dipoles and verticals.

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ployed in the field and your contributions are appreciated. The Simulated Emergency Test will be here before you know it, and is a good exercise to test rapid deployment techniques and to evaluate how we work with the agencies we serve. Hope you plan to participate at the local or state level. Sad to report that Bill Hales, W4FNB, is a Silent Key. May Traffic: AB4E 334, W4EAT 305, NC4ML 237, K4IWW 181, AA4YW 136, KI4YV 122, W4IRE 83, KE4JHJ 70, W3HL 60, AD4XV 52, KE4AHC 37, KB5WY 36, W4CC 31, WA2EDN 30, N0SU 29, AC4DV 28, WA4SRD 17, KC4PGN 10, KE4YMA 9, KT4CD 9, NT4K 7, KB8VCZ 7, AE4HJ 7, N8UTY 5, KG4MBQ 3, N4NTO 2.

SOUTH CAROLINA: SM, Patricia M. Hensley, N4ROS - Hurricane awareness becomes important during the month of August. Statistically, our state is overdue for a severe hurricane. If this were to happen, we need to be in a state of readiness for emergency communications. During an occurrence, the SCSSB net (3915 kHz) will be directed to handle outgoing welfare traffic only. The ARRL numbered emergency traffic messages will be utilized for this purpose. Copies of these may be obtained from previously certified emergency communications operators or from me. The SC ARES/RACES net (3993.5 kHz) will handle all emergency traffic from the affected area. We will need to utilize all available resources. I encourage everyone interested in the welfare of the citizens of SC to contact those individuals who have previously been state and/or nationally certified for guidance. It is important to remember that a proclaimed state of emergency would have been declared prior to our requested involvement. Amateur radio is an integral part of the state emergency response plan. Our Governor and the state EOC would depend upon our cooperative efforts. I appreciate those clubs that are currently sending me their newsletters. I also welcome additional information from all of you. Tfc: AF4QZ 181, KA4LRM 88, KA4UIV 52, KG4FQG 44, W4DRF 31, K4JMV 25, WD4BUH 20, K4BG 12, WB4PCS 5. PSHR: KA4UIV 129, AF4QZ 128, KG4FQG 123, KA4LRM 110, K4BG 90.

VIRGINIA: SM, Carl A. Clements, W4CAC—SEC: N4NW. By the time you read this, Field Day will be just a memory. Hopefully you were able to participate with a club or maybe a group of amateurs, have fun, and make some new friends. Maybe you helped introduce this hobby of ours to someone new. Maybe you found out how well prepared you or your group would be in the event of an emergency. If emergency communications interest you, please get in touch with the SEC, Tom Gregory, at n4nw@arrl.net. Tom will be able to help put you in touch with the EC for your locality. Remember, we are in the middle of hurricane season! I have been trying to meet as many of you as possible by traveling around to the various hamfests in the section. If you know of a hamfest in your area that you would like me to attend, please let me know. If your club or organization is having a special event, send me the information and I will include it in the Section News. I can be reached at w4cac@arrl.org. Since this is my first appearance here in *QST*, I'll keep it short. I look forward to meeting as many of you as possible, and to working with the many dedicated amateurs in the Virginia Section. 73 de Carl, W4CAC. Tfc: KV4AP 357, WA4DOX 257, W3BBQ 250, K4YVX 192, W4UQ 130, K0IBS 106, WB4ZNB 98, W4CAC 70, K4MTX 64, AA4AT 58, WD4MIS 50, N4ABM 37, KE4PAP 34, WB4UHC 33, KV4AN 31, KU4MF 27, W4SEE 22, KU4TM 12, KB4CAU 7, W4YE 5, N4FNT 5, W4JLS 4, W4MWC 4, K4JM 3.

WEST VIRGINIA: SM, O.N. (Olie) Rinehart , WD8V— STM: KC8CON. SEC: W8XF. ASEC: KA8ZOO. SGL: K8BS. TC: K8LG. OOC: N8OYY. ACC: KA8ZGY. APRSC: W8XF. PIC: N8TMW. We all have a great deal to think about these hectic days and a lot of action needs to be instigated. The IRC "WARC" is shaping up to be an important function in that it will change our frequencies, style of operating, modes and systems. A very important part of this happening is what is coming to be known as "RADIO RAGE" the stupid, senseless and unpleasant use of the bands. These *almost* illegal sessions are the worst offenses on the air today. I can only plead to all of you to help rid the airwaves of this phenomena by *not engaging* in the practice or participating in any way. Those who foolish endanger our bands by practicing this folly are only aided by those that fall into their entrapment. The FCC thru Riley Hollingsworth, K4ZDH, and Bill Cross, W3TN, left no doubt from their talks at Dayton that the Amateur Community needed a uniform thought process and action plan to survive. Marcia is back from the Midwest and you can look for some new innovations in the NTS along the lines of new and more modern technologies. Looking forward to seeing all of you at "THE MILL." Tfc: KA8WNO 301, WD8V 183, WD8DHC 176, W8YS 97, KC8CON 70, W8WWF 54, WW8D 29, N8BP 13, N8NMA 24. PSHR: WD8V 297, W8YS 160, KC8CON 155, WD8DHC 128, KA8WNO 118, WW8D 97, N8MNA 70, WVFN 867/123/760 KC8CON; WVMDN560/20/389 WW8D; WVN E 103/57/258 W8WWF; WVN L 95/51/229 W8WWF; ARES/RACES 84/0/122.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Tim Armagost, WB0TUB— ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MYY. Colorado was host to a meeting of NTS leadership in late May and I was privileged to represent Tim and welcome Area Staff chairs Rob Griffin, K6YR (Pacific), Marcia Forde, KW1U, (Eastern) and Lynn Hyndman, W9FC (representing Central) with Steve Ewald, WV1X from HQ who organized the meeting and acted as secretary. Excellent discussions about traffic handling, with great suggestions about how to enhance the current system. Look for upcoming articles by Steve in the Public Service column of *QST* about the future of the NTS. Also attending were PAN TCC Cycle 4 director Jerry VerDuft, AD0A, Colorado STM Mike Stansberry, K0TER and Connecticut SM Betsey Doane, K1EIC. The PPRAA swapfest in early June was very well attended and I saw many friends from up and down the Front Range. RM director Walt Stinson, W0CP was on hand to talk about current events and provide insight into ham radio issues locally, nationally and internationally. I hope the good attendance is indicative of what we can expect at swapfests in the future. For you folks on the West Slope, if you have items for this column please email me at

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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

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Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

MFJ-949E *deluxe* 300 Watt Tuner

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More hams use MFJ-949s than any other antenna tuner in the world! Handles 300 Watts. Full 1.8 to 30 MHz coverage, 48 position *Precision48*™ inductor, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E *super value* Tuner

MFJ-941E **$129.95**

The most for your money! Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10½Wx2½Hx7D in.

MFJ-945E HF+6 Meter *mobile* Tuner

MFJ-945E **$119.95**

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $4.95,** mobile mount.

MFJ-971 *portable/QRP* Tuner

MFJ-971 **$99.95**

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6½x2½ inches.

MFJ-901B *smallest* Versa Tuner

MFJ-901B **$79.95**

MFJ's smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-16010 *random* wire Tuner

MFJ-16010 **$49.95**

Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 *6 Meter* Tuners

MFJ-906 **$79.95**

MFJ-906 has lighted Cross-Needle SWR/wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $49.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 *VHF/UHF* Tuners

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MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

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Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

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Creates artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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n0wpa@arrl.net. 73, de N0WPA. NTS tfc: AD0A 160, K0TER 99, KI0RP 32. CAWN: W0WPD 983, W0GGP 582, K0HBZ 526, W0LVI 428, K4ARM 407, N0NMP 391, WB0VET 334, W0NCD 261, WD0CKP 254, N0FCR 223, AB0PG 208, KI0ND 192, WB0TYT 170, N0DKK 80, AA0ZR 57.

NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5IBS, N5ART. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO, W5UWY. TC: W8GY. ACC: N5ART. Roadrunner Net handled 85 msgs with 1129 checkins. Breakfast Club handled 284 msgs with 1046 checkins. Yucca Net handled 33 msgs with 558 checkins. Caravan Club Net handled 2 msgs with 52 checkins. SCAT Net handled 10 msgs with 530 checkins. Four Corners Net handled 29 msgs with 324 checkins. GARS Net handled 5 msgs with 26 checkins. Rusty's Net handled 90 msgs with 820 checkins (with FB assistance for KA5EMH & K5TCU –Rusty, KD5SY, is not doing well). Valencia County Net handled 10 msgs with 90 checkins. Deming ARC Net handled 16 msgs with 90 checkins. Field Day is upon us and lots of planning going on. The Ft. Tuthill Hamfest will be held near Flagstaff on July 27-29. Hope to be there. The NM ARRL State Hamfest has lots of exciting programs for Aug 25-26. The Web site is www.qsl.net/dchf. Take a look and see the find job KC5NZR has done. W0CP, our RM Div Dir plans to be here, and an ARRL rep from HQ. Dee, KC5JBO, will operate talk in on 145.33 – with 100 Hz PL. The Alamogordo Hamfest is Sat Sept 1. See you there! ARES/RACES groups have performed well during the fires at Ruidoso. A unique VHF/UHF link was set up by W5BI & WA5WHN to assist fire communications while power and telephone lines were down. Vy best 73, W5PDY.

UTAH: SM, Mel Parkes, AC7CP—I would like to thank all the members of the Utah Hamfest Committee for organizing one of the best hamfests we have ever seen in Utah! If you missed this one plan on making sure you get to the Utah Hamfest next year. If you would like to help out, the Utah Hamfest committee would love to involve others in planing and organizing the 2002 Utah Hamfest. As I begin my second term as Utah Section Manager, I would like to thank those who have worked hard to make the Amateur Radio clubs, events and activities a success. Please e-mail me if you would like to make any suggestions or have questions about anything related to ham radio, we have many great programs in all areas of ham radio and I would love to provide anything that may help you or your group enjoy being active in Amateur Radio.

WYOMING: SM, Bob Williams, N7LKH—About 175 people attended the Wyoming State Hamfest and Convention, hosted by Tri-County ARC, at the Casper Radisson Hotel on May 26-27. The convention featured forums on fox-hunting, mobile radio installation, DX, ARES/RACES, the National Traffic System, and MARS, as well as the traditional ARRL forum and State Ham Meeting. 84 people attended the Saturday Banquet and were treated to an entertaining commentary by retired TV announcer Vic Miller. The Ham of the Year Award for 2000 went to Scott Harris, W7WRO. The 2002 Convention will be sponsored by Sweetwater Co. ARC, again at the Casper Radisson. Six members of the Casper ARC assisted Natrona County Emergency Management Agency in a simulated terrorist attack on May 12. Most county public service agencies participated in the exercise, which grew into four simultaneous incidents, including 2 real fires set for the purpose, fake shootings, and a fake chemical bomb. K7YE, KC7MJI, AB7BJ, NG7T, N7SEG, and W7BIG passed information to and from the exercise controllers as the incident evolved. Tfc: NN7H 199.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ — ASMs: W4XI WB4GM KB4KOY. SEC: W4NTI. STM: AC4CS. BM: KA4ZXL. OOC: WB4GM. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. PIC: KA4MGE. The Alabama Section Convention will be held at the Huntsville Hamfest on August 18-19. The Huntsville Hamfest will be at Van Braun Center's South Hall in Downtown Huntsville. For more information you can contact Don Tunstill at 256-536-3904 or you can visit their Web site at www.hamfest.org. In addition to the ARRL forum, where you'll have an opportunity to find out what's happening on both the national and section level, the Alabama Section will host an additional forum where all Alabama Amateur Radio Clubs are invited to participate. At the Birmingham Hamfest, we discussed ARES in Alabama, how to create a Station Activity Report and Public Service Honor Role report, and how to use the reports to stimulate growth in both the National Traffic System and Alabama ARES. At the Huntsville Hamfest, I hope to update everyone on the status of ECs and DECs in Alabama ARES, trade "War Stories" from this past Field Day, and plan this year's Jamboree On The Air. I look forward to seeing you there. God Bless & 73, Bill Cleveland KR4TZ. Tfc: WA4GQS 473, W4ZJY 179, W4CKS 166, WB4GM 148, AC4CS 91, KC4VNO 84, KG4KCC 64, WB4BHH 39, W4DGH 16, W4NTI 15, W4XI 9.

GEORGIA: SM: Sandy Donahue, W4RU—ASM/South Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. Asst SM/IT: Mike Boatright, KO4WX. SEC: Lowry Rouse, KM4Z. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JNL. ACC: Susan Swiderski, AF4FO. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. Web site www.qsl.net/arrl-ga. In June I visited the greatly improved Atlanta Hamfest. Years ago it was one of the biggest in the country before falling on hard times. Now it appears to be on the way back. After a years hiatus, the Albany ARC had a swapfest in June that was fairly successful, but attendance was held down by torrential rains caused by TS Allison. No hamfests in August but on Sept 15 the Paulding ARC is sponsoring a hamfest in Dallas, Ga. The same day the Ga SSB Assn will have its annual meeting. I regret to note the passing of Ross Pinson, W4TMK, a Life Member from Buena Vista. Our condolences to his family. The Albany ARC will sponsor a free basic level Skywarn training class on August 28 at the Albany Red Cross Ctr. Stan Halstead, W4GOD, is coordinating. A special event station, W0W, will be on the air from the Georgia Games Championships July 20-22. Look for them on 3975, 7275, 14275 and 21375 kHz. SASE #10 envelope to W4CNG for a QSL. Gwinnett County declared Field Day week last June as Amateur Radio Appreciation Week. Thanks to AF4FO and GARS for the proclamation. 73, Sandy. Tfc: W4WXA 168, AF4NS 125, KG4FXG 83, K4WKT 72, WB4GGS 69, K1FP 51, KE4R 46, K4BEH 34, W4AET 33, KA4HHE 20, K4ZC 9.

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Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Brightly illuminated 3 inch meters let you monitor load voltage and current.

A whisper quiet internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D in.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

NEW! 25 Amp MightyLite™

Super light, super compact switching power supply delivers 25 Amps maximum/ 22 Amps continuous at 13.8 Volts DC. Low ripple, highly regulated. *No RF Hash!* Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 3.5 lbs. 5½Wx2½Hx10¾D in.

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MFJ 35/30 Amp Adjustable Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

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MFJ's heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

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MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

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MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $34.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

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All are protected by MFJ's famous No Matter What™ one year limited warranty.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—ACC: WA4B. BM: N4GMU. OOC: KD4NLV. PIC: KF4HJC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. PACKET: N4GMU. The Governors' Hurricane Conference held in Tampa last month was attended by several of our ARES personnel from the East and West Central Districts. Rick Palm, KC1E, represented the Northern Florida Section as I was unable to attend due to illness. Unexpected surgery kept me at home. A beautiful plaque was presented to the Northern Florida Section by the Florida Commission on Community Service. Rick Palm accepted the plaque, and I have it in my possession, and will display it at hamfest so all may see it. The plaque reads " Presented to Amateur Radio Emergency Service, North Florida Section, In recognition and appreciation of your efforts on behalf of Amateur Radio and Emergency Management. Signed Fred Sanguiliano, Florida Commission on Community Service, Executive Director, and Joe Myers, Florida Division of Emergency Management, Director." It also has the Seal of the State inscribed thereon. I commend and congratulate all ARES personnel in the Section for their cooperation and support to achieve the respect and recognized by the State of Florida. Charlie Humber, WA4EYU, Jacksonville, Fl., retires as ARRL Official Bulletin Station. Charlie was licensed in 1962, and became a bulletin station shortly thereafter. He was faithful, and dedicated to serving the ham community. Charlie will be missed, but he desires a rest. Thank you for your friendship, as it has been my pleasure to know and work with you. The NOFARS ARES group activated 21 hams to cover failed 911 system. A water leak shorted out the Jax Fire Rescue Dept telephone and radio systems. The ARES Response Team was on scene within 30 minutes. As this is hurricane season, and one has already visited the Gulf, it is time to check all of our systems and be ready. This was one of the quickest to activate and to ashore. The damages seem to be with water not wind force. Last month, I reported a bill is in process of being written, and will keep you posted. As of this writing, I have nothing to report, but will do so on the arrl.net Web page. If you have an arrl.net e-mail address, you will receive the latest information. 73, Rudy, WA4PUP. Tfc: WX4H 2744, KE4DNO 469, NR2F 302, AG4DL 253, WD4GDB 247, KE4PRB 229, KF4WIJ 169, W4KIX 133, KG4EZQ 116, AB4PG 112, K1JPG 112, K4DMH 103, N9MN 94, AF4PU 72, W5MEN 66, W8IM 36, WA1VOP 29, KM4MC 27, KJ4HS 23, KB4DCR 18, KF4INJ 14, WB4GIU 13, WA4EYU 11, N4JAQ 9, WX4J 6, WB8NER 4, WD4ILF 3.

PUERTO RICO: SM, Víctor Madera, KP4PQ — Se completó el primer taller en español para certificación de Observadores Oficiales dentro del programa de "Amateur Auxiliary". Participaron KP4FBA, WP4MWE, KP4RY, KP4NNC, KP4RF, KP4AWX, KP4RAT, NP3GM, KP4IA, WP4AZT, KP4SQ, KP4ARN y WP4IZI. Todos están trabajando arduamente para obtener su acreditación. El próximo taller será en el área de Mayagüez. Si usted está interesado comuníquese con su "Section Manager", su dirección aparece en la página 12 de *QST*. Información en http://prarl.org/secmgr.html Esta es la primera vez que el ARRL ofrece este curso en español. El PRARL, la FRA y RODE llevaron a cabo el ARRL Field Day con grandes éxitos. La Federación de Radioaficionados celebró el Hamfest de Verano "Tierra Adentro" en el pueblo de Moca. La próxima actividad de la Sección de Puerto Rico será la reactivación del programa ARES. Este programa es de gran ayuda durante la temporada de mal tiempo en el Caribe. Aquellos radioaficionados interesados deben comunicarse con el SM. Necesitamos estaciones en las cabeceras de Distrito capaces de comunicar en HF. También estaciones de relevo en VHF para todos los pueblos si es posible. Interesados comuníquense con el Section Manager por correo regular, teléfono, o vía email a kp4pq@arrl.org.

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI—SEC: W4SS. STM: KJ4N. ACC: WA4AW. PIC: W4STB. OOC: K4GP. BM: KC4ZHF. SGL: KC4N. DEC/ASM: N4LEM, WB9SHT, AA4BN, KD4GR. Web Page: http://www.sflarrl.org. Thanks to the South Brevard, Dade, Ft. Myers, Indian River, Orlando, Vero Beach Clubs, and ECs for the newsletters and activity information. Over 400 people from around FL attended the memorial service of Silent Key, Gary Arnold, WB2WPA, on May 23. Gary worked all week at the Governor's Hurricane Conference then assisted at a Collier wild fire for 15 hours before the heart attack. EOC Coordinator in Collier County for 13 years, he was described by co-workers as an emergency management professional extraordinaire, highly respected, knowledgeable, dependable, and friendly. His loss will be felt throughout the state. On June 1, Amateur Radio operators of National Hurricane Center Station, W4EHW, in Miami received the Volunteer of the Year Award for 22 years of dedicated service. Accepting the award were KU4GY, WD4JR, and KI4T (JR & 4T are founding members). The SFL SET was declared a success as "Hurricane Walter" made landfall near Ft. Myers on May 18. SFL CATs were deployed from Broward keeping in touch on HF. They established a staging area in Lee Co. for 24 hours. Eighty-nine Stations in all three FL sections participated in special sessions of SFAN. KT4XK set up an SSTV station from which he sent SSTV photos to Ft. Lauderdale on HF with only 5 Watts QRP and an outbacker antenna. Jim, KD4GR, SET organizer and coordinator, thanks all amateurs around the state who participated. Our thanks to you, Jim. The South Brevard ARC worked with the Letter Carriers Union on their food drive May 12. Indian River's Sherri Brower, W4STB, SFL PIC, was featured as a speaker in the ARRL Forum "Public Relation's Success Stories" at the Dayton Hamvention. She also did a TV segment in Vero Beach to promote classes the club is starting. Congratulations, Sherri. Lee County lost a friendly 2-meter voice as Herb Warren, KF4HWY, became a Silent Key the end of April. He spent hours encouraging the students in the Caloosa Middle School ARC and will be greatly missed. Palm Beach ARES got good PR when EC, Dave, N4QPM, was interviewed for a half hour program on "The Use of Amateur Radio for the Up-coming Hurricane Season" which included ham radio in general and our help in many catastrophes around the world. May Traffic by STM, Jan, KJ4N: K4FQU 630, WA9VND 540, KA4FZI 255, KJ4N 218, KD4GR 146, KE4UOF 107, KC4ZHF 105, WA4EIC 81, AA4BN 71, KD4HGU 63, KE4WBI 42, K4VMC(club) 42, WB4PAM 38, KT4XK 37, W6VIF 32, WA4CSQ 27, KN4JN 23, KF4OMB 20, W4WYR 17, KG4CHW 14, K4ENA 13, KG4GZL 9, K4OVC 8, W3JI 5, KG4MLC 5. 73, Phyllisan West, KA4FZI, Section Manager, Southern Florida.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St Croix, ASM:

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LMR 600 (OD.590") SOLID CCA CNTR FOIL + BRAID 1.72dB @ 450 MHz WP/UV JKT	1.27/FT	1.25/FT	1.23/FT
LDF4-50A Andrew 1/2" Heliax® 1.51 db/1530 watts @450 MHz 450 MHz	2.38/FT	2.33/FT	2.25/FT

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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	.18/FT	.16/FT	.14/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.19/FT	.17/FT	.15/FT
RG223/U SOLID SC 2 95% BRD NC/DB/UV JKT 2.0 dB/600 WATTS @ 30 MHz	.69/FT	.62/FT	.56/FT
RG214/U STRD SC 2 95% BRD NC/DB/UV JKT 0.925 dB/2500WATTS @ 30MHz	.25FT/UP	1.75/FT.	
RG142/U SOLID SCCS 2-95% SILVER BRAIDS *Teflon®* JKT 8.2dB/1100WATTS @ 400MHz	.25FT/UP	1.75/FT.	

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1618 8/COND (2/16 6/18) BLK UV RES JKT. Recommended up to 200ft	.37/FT	.36/FT	.34/FT
1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300ft	.49/FT	.47/FT	.45/FT
1216 8/COND (2/12 6/16) BLK UV RES JKT. Recommended up to 500ft	.80/FT	.76/FT	.72/FT
1806 18GA STRD 6/COND PVC JACKET Recommended for Yaesu Rotors	.25/FT	.23/FT	.21/FT

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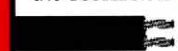
3/16" DOUBLE BRAID *"POLYESTER"* 770# TEST WEATHERPROOF	15.00ea	30.00ea	50.00ea	80.00ea
5/16" DOUBLE BRAID *"POLYESTER"* 1790# TEST WEATHERPROOF	20.00ea	42.50ea	70.00ea	130.00ea



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Drew, NP2E, St. Thomas. ASM: Mal, NP2L, St. John, Sect. Internet Mgr. SIM: Jeanette, NP2C, St. Croix. SEC: Duane, NP2CY, St. Thomas. PIC: Lou KV4JC, St. Croix. ACC: Debbie, NP2DJ, St. Thomas, NM: Bob, VP2VI/W0DX, Tortola. Director Frank Butler, W4RH, will be down in late June and will meet with folks on all three islands. Jimmy, KP2BH, and Manny, NP2KW, have discovered the wonders of PSK-31 and can frequently be heard warbling around 14.070. Drew, NP2E, has resigned as QSL bureau director and Bernie, NP2W, is picking up the chores. Thanks to Drew, NP2E, and XYL Christine, WP2AGQ, for their tireless efforts. New tower just installed at NP2B/NP2C to replace the old one prior to Newton and his gravity thing bringing it down in an impromptu manner. Dr. Gray has upped his hurricane forecast so all are getting ready now that the season is upon us. Repeaters - St. John 146.63, St. Thomas 146.81 and St. Correct 147.25. 73 all, John, NP2B.

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR, ae4mr@arrl.org http://www.wcfarrl.org—ASM: NA4AR. ASM-Web: N4PK. ASM-Legal: K4LAW. SEC: KD4E. TC: KT4WX. BM: KE4WU. STM: AB4XK. SGL: KC4N. ACC: AC4MK. PIC: AB2V. June marks the beginning of Hurricane season please keep an eye on the tropics as it could prove to be an active season. STM Chet Carruth, AB4XK, was seriously injured during a fall at work and is still in the hospital. He is looking forward to returning home soon. Robert "Rip" Van Winkle, AA4HT, has been taking PSHR, SAR and Net reports while Chet is in the hospital, and he is also taking get-well NTS traffic for Chet. Gary Hammel, AF4UD, TS also remains hospitalized. The K4WCF repeater system has a new section wide weekly ARES net on Mondays at 9:00 PM. It has been receiving many check-ins. The 8:30 PM daily NTS Eagle Net has also been doing well. The K4WCF repeaters operate on a frequency of 145.430 MHz and 442.950 MHz and 146.760 MHz in Pasco. All use a 100 Hz PL tone. SEC KD4E reports a small decrease of 3 ARES members for a new total of 420. In May there were 41 Nets, 8 Ops, 3 public service events, 8 drills and 0 emergencies. The total man hours reported for May is 264.8. May Net report is available on the section's Web page. PSHR: AA4HT 174, KT4TD 152, K4SCL 142, K4RBR 140, AE4MR 114, KF4KSN 108, WB2LEZ 97, KE4VBA 96, KF4OPT 88, W4AUN 72. Tfc: AA4HT 386, K4SCL 314, K4RBR 70, KT4TD 69, KE4VBA 28, KF4OPT 24, KF4KSN 22, AE4MR 9, WB2LEZ 8, K9EHP 5, W4AUN 3. 73, Dave AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—For all you who live outside of Pinal, Pima, Santa Cruz, and Cochise counties, your telephone area code has been changed to "928". It is going to take a few months getting my ARRL volunteer list changed. So please have patience. This last month has been very active for Amateur Radio in this state. Arcadia High School Amateur Radio club was host to astronaut Bill Shepherd, KD5GSL. Bill Shepherd graduated from Arcadia high school in 1967 and also talked with the school Amateur Radio Club while in orbit aboard the International Space Station earlier this year. Rose Tucker, AC7JO, the president of the club played host and arranged the visit. Gary Capek, K8BN, an Assistant State Section Manager, was also present and represented the ARRL. Bill Shepherd addressed the complete student body and answered many questions on space, training, etc. Mr. Shepherd used the club radio station making a few contacts with other school club stations again answering many questions on space travel. This event was covered by several TV stations and was broadcast on a few news programs in the Phoenix area. Thanks to Ross Tucker, AC7JO, for coordinating this event. It helped put Arizona in the limelight for a day. This month is normally the down month for community service projects. It seems that we don't want to go out in the heat. This is the month I envy the snow visitors who leave for cooler climate. Check with your local ARES/RACES people on future community service events, your help is needed. The state has an emergency net every Sunday morning at 0800 on 3990 kHz and PIMA County has emergency communications preparedness net at 0845 on 3995 kHz every Sunday. Other counties also have this type of communications preparedness so no matter where you live within Arizona, we can become prepared to provide communications during any emergency. The Arizona Web site is alive and doing well. Tom Fagan, WB7NXH, keeps this Web site for the Arizona section up and running and is always adding or changing material. The address is www.qsl.net/arrlaz/. At this time it has the recent club listings, hamfest information, the Arizona volunteer listings, and several links to other clubs and special web sites. As this Web site progresses, we will add more items of interest, to include the list of volunteers. If you have questions or ideas on how to improve this Web site, contact Tom at or myself. The 2001 ARRL SW Convention will be in Riverside at the Holiday Inn. Please reserve this time slot and make the necessary arrangements before you forget. This convention has many exhibits and presentations that provide us with new ideas on how to improve Amateur Radio. The Kingman Hamfest is scheduled for September 29 at the Mohave Community College. It will start about 0600 hours and talk-in will be on 146.76 (-), PL of 131.8. Additional information will be available next month. Call, write, or e-mail me if you need help or questions answered. 73, Clifford Hauser, KD6XH. Tfc: W7EP 82.

LOS ANGELES: SM, Phineas J. Icenbice, Jr. ,W6BF – Don't ever under estimate what you might hear on Amateur Radio. I was chatting with a (4S7) station, Sarath in Sri Lanka last Thursday on 15 meters. Sarath was telling me about the construction details of his cubical quad and delta loop antennas. One of the details was the use of one inch diameter aluminum tubing. He said that it was essential to build a strong antenna that could survive in an environment of monkeys. So, I suggested that he hire a monkey trainer to train the monkeys to help him construct antennas rather than tear them down. His answer was he didn't need a monkey trainer. He already had plenty of good "monkey climbers." I am not certain exactly what he meant, but monkeys in certain areas could be more destructive to antennas than wind, lightning and ice. – We have an active Professional Engineer who sent out an e-mail, indicating that he would be glad to present a program on "Automotive RFI Abatement." Since he is willing to travel to the Los Angeles area, it would seem logical to have several clubs host his presentation. Please e-mail me if your club would be willing to host this special program. This gentleman

HOT August Buys

is a ham, and he is writing a book on automotive interference abatement. – This could be a great attraction for increasing your club attendance. My e-mail is: w6bf@arrl.org. It is the end of an era, Hugh S. Allen, Jr., W6MFC (The Navy, Lt. Cmdr. in charge of Jeeps in the Pacific) has retired after 19 years as Secretary of the 50 Club. Edgar Brown, N6OU, is still President. Ken Henke, KE6AR, is the new Secretary. Jim Zimmerman, N6KZ, past President of the DX Club was the speaker in June. Jim is a"Dxer and IOTA" hunter/traveler. Jim is another speaker that your Club should contact. Dave Bell, W6AQ, our PIC, writes from Utah that he is working on a movie for Showtime and also putting the final touches on his documentary about Ham Radio in Slovenia. This movie will be distributed by ARRL. (THE HAM RADIO OLYMPICS.) Send me an e-mail if your club would like to see a great Ham Radio movie, and I will try to arrange a showing. Maybe throw in a little GPS technology presentation for free. Oh! Yes, Dave also said to look for his article in *QST* about his 9M6V, operation with K6IPV, in Malaysia. Vy 73, es good DX, de W6BF, Phineas.

ORANGE: SM, Joe Brown, W6UBQ, 909-687-8394— ASM Riv Co: Brett, N6NLN, 790 346 9291. ASM Orange Co: Art, W6XD, 714 556 4396. ASM SB Co. Jeff, KD6NXD, 909 886 3453. The Inland Empire Council of Amateur Radio Organizations, presents the 2001 ARRL SW Division Convention. For info, visit the Web site. www.qsl.net/arrl-2001swdc/. From the Circle City Communicator. The Amateur Radio Protection Act of 2001, House Bill H.R. 817 is attracting co-sponsors in the US House and Senate on both sides of the aisle. Let's write a letter thanking them for their support or send them an e-mail message. For more info, check out http//:www.arrl.org/govrelations/arspa.html. The Fullerton Radio Club Talk and Tech Net for members and visitors is headed for oblivion UNLESS we put some spark and a bit of RF in the activity. Ivan, KI6VAN, and Chuck, K4TAT, say, come on-jump in. Check into the net, you might find satisfaction in a long neglected activity. The Modulator sez Jim Eason will take over as VP, the rest of the Board stays the same. Pres Jeff W6JJR; Trea Ed WU6I; Sec Jay KD6TGH. HDSCS EC April WA6OPS states that volunteers are needed. Those interested in learning about or perhaps joining this exiting and rewarding public service organization contact April at emcom4hosp@ aol.com or 714-879-6895. ASM Fred, W6TKV, sez what's an e-QSL? Take a look at http://www.eqsl.org/card/ and maybe you are looking at the future of QSLing. Having QSLs in hand is what's needed to apply for DXCC, WAS, WAZ and most other awards. At the recent DX Convention, the ARRL's Wayne Mills, N7NG, said work is underway to evaluate the means by which e-QSLs can be accepted. Tests will be run by the end of the year to insure security. Look at the Web site and see what you think. The Orange Section Manager notes: The US Navy, Broadcasters, and industry have always wanted our Amateur Radio Spectrum. I do not think public service is enough to justify our spectrum needs. The commercial interests that want our freqs have unlimited funds. We do not. In order to effectively mount a campaign to protect our spectrum, we need more Amateurs and more ARRL members. Industry has changed the tactics. Now they want to SHARE. Think about it, 1 billion garage door openers, another million remote controls, not to mention key locks. All this on our two meter band. We must sell the Amateur Radio Service and ARRL membership. The numbers we need for political clout. An ARRL membership increase will enable us to fund and maximize our spectrum protection effort. STM report for April. Tfc: K6IUI 235, KC6SKK 232, K6CTW180, W6JPH 120, W6QZ NTS BBS 273.PSHR: W6QZ 159, W6JPH 129, KC6SKK 93. SCN/V NET MGR W6JPH, REPORTS 21SESSIONS. QNI 132, QTC 81, 15 mins avg duration. STM Report for May. QTC: W6JPH 166, KC6SKK 149, W6QZ 116. PSHR: W6QZ 162, W6JPH 107, KC6SKK 95, digital traffic:W6QZ NTS BBS 136. SCN/V Net Mgr. W6JPH Reports 23 sess QNI 137, QTC 66, avg time 16 mins.

SAN DIEGO: SM, Tuck Miller, NZ6T, 619-434-4211—As you may have heard already via my weekly Internet newsletter, or even observed on the first line, my phone number has changed. Please make note of the new number. Also, we do not accept BLOCKED numbers. Actually this is for your benefit. Many times, people call, and when they hear an answering machine, they hang up. When the person has to unblock their number, it appears on my caller ID, and I can then return their call. See how easy it is. Only 1 more month before the Southwestern Division Convention in Riverside, Ca. If you have not yet made your reservations for the either the convention or hotel, the time is NOW. Our hats off to Warren Dilley KT6A. Warren recently retired from the position of Section Traffic Manager, and for his many years of service, we give him our heartfelt thanks. With Warren's retirement, I am now looking for someone to step into his shoes, and big shoes they are. I prefer someone with traffic handling experience, and also with hf capabilities. If you feel that you can handle this position, please let me know. Have you ever been on a T hunt? If not, this is one aspect of Amateur Radio you have to try out. I am still a novice in this area, but am having a great deal of fun learning the various techniques. To get involved is easy. Just be at the Grossmont College parking lot on the 1st and 3rd Saturday evening of each month at about 5:30 PM when folks gather to set up their gear, and the transmitter goes on the air at 6. I would like to also take this time to congratulate former San Diego Section Manager Pat Bunsold, WA6MHZ, who is going thru the officer ranks of the El Cajon Elks. Pat was recently installed as the Lecturing Knight. One of the committees under his chair is the Elks radio club, K6ELK. It's great having someone in charge that knows something about ham radio. Remember, you can always send me e-mail at nz6t@arrl.org. The ARES Alert is now published ONLY online on the section Website. It is located at www.qsl.net/sdgarrl. All it takes is Acrobat Reader, and you can either print it out, or download it to a computer file. Listen to the ARES section net on Sunday nites at 7 PM on 146.265. Many hf nets are held on Sunday, AMs. Happy Birthday to my YL, Evelyn N6EVE, section Affiliated Club Coordinator. On to traffic, KT6A 1543, KD6YJB 88, KF6YVQ 63, WA6IIK 4 BPL: KT6A 1543, PSHR: KT6A138, KD6YJB 46. Until next month... Remember, Helping Others.....Always Worthwhile!! 73, Tuck, NZ6T.

SANTA BARBARA: SM, Robert Griffin, K6YR (k6yr@arrl.org or k6yr@arrl.net)—SEC: Jack Hunter,KD6HHG (kd6hhg@arrl.net). STM: Ed Shaw, KF6SHU (kf6shu@arrl.net). SGL: Paul Lonnquist, NS6V (paul@dock.net). ACC: Michael Atmore, KE6DKU (ke6dku@aol.com). OOC: Howard Coleman, N6VDV (N6VDV@arrl.net). PIC: Jeff Reinhardt, AA6JR (jreinh@ix.netcom.com). TC: Warren Glenn, KM6RZ (wglennrz@ix,netcom.com). ASMs: Ventura, Don Milbury, W6YN (w6yn@arrl.net). Santa Barbara, Marvin Johnston, KE6HTS (ke6hts@sbarc.org). San Luis Obisipo, Bill Palmerston, K6BWJ (bpalmers@fix.net) & for Internet, Jack Bankson, AD6AD (ad6ad@arrl.net) & DECs: Santa Barb-Dave Lamb, WA6BRW (wa6brw@arrl.net). SLO-Bill Peirce, KE6FKS (ke6fks@arrl.net) & Ven-Dave Gilmore, AA6VH (aa6vh@arrl.net). A special THANKS to W6WE, W6NS, KD6NDS & others for making a great K6YR showing in the June VHF QSO Party from the W6AB Club VAFB Site! Make plans to attend the 2001 SW Division Convention coming up on Sept 7-9 in Riverside, CA. Contact: w6ybs@arrl.net. FREE instant Section news updates? Join the SB Reflector! E-mail majordomo@qth.net the message subscribe arrlsb. SB Sec Web: www.qsl.net/arrlsb/. Join in our Section NTS traffic nets: SCN slow speed NTS Net, M-F, at 1915 local on 3598 kHz & SCN/SB at 2100 local on 147.000+(131.8), 224.90- (131.8) & 449.300-(131.8). That's 30 in memory of SK, KI6LA.

WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL—As I write this HamCom 2001 is now a memory. And a pretty good one at that at least the outdoor flea market did not get blown away like last year. Some vendors were very busy indeed; I know I helped keep the Rig blaster folks busy. I would like to thank the following: Steve Ewald,WV1X, and Joe Dorn, W5VEX, for putting on the first classroom Emergency Communicators Course. There were 63 people in the course. Jim Lawyer, AA5QX, taking the task of presenting the status of North Texas ARES. Don Mathis, KB5YAM, and Norm Jacobson, K5NHI, for their program on Traffic Handling. Don Gywnne, K5EVI, and company for another Wouff Houng. Maury, W5BGP, you and the other Volunteers of the HamCom organization did an outstanding job. I hope you plan on running it again next year. Something else we learned again during HamCom weekend is that the weather can change almost in an instant. Tropical Storm Allison should be a wake-up call to make preparations for not only Hurricane season, but also any potential disaster in which we could be called upon to provide communications. 73, KA5TXL.

OKLAHOMA: SM, Charlie Calhoun, K5TTT. ASMs: N6CL, W6CL, W5ZTN. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC: WB9VMY. SGL: W5NZS. STM: I certainly enjoyed seeing many of you at Hamcom this year. I also had a great time handing out grid squares in the VHF contest on the way back. We ran 6 grids on 6, 2, and 432, and had real good success from the mobile. Will probably do the same next year. Sorry I didn't make it to your site for Field Day. I had to stay near Tulsa this year due to a death in the family the week preceding Field Day. That also explains the brevity of this months column, please forgive me. More on Field Day next month. 73, Charlie. Tfc: KF5A 685, KK5GY 389, WA5OUV 371, N5IKN 352, WB5NKD 173, WA5IMO 142, K5KXL 112, WB5NKC 112, KE5JE 86, KI5LQ 80, W5REC 29, N5FM 3.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, and K5SBU. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. I hope everyone had a great time at Ham Com 2001. I missed being there due to a death in the family. However, the brighter side, I was able to be here to serve when Allison came aboard. Houston took the hardest hit in all of this. We had some real heroes in this event so far. It's still causing great problems at this writing. Some that really should be mentioned. N5ECP, has been up and running since Friday morning, helping escort helpers around the water areas to the locations they are needed, and installing equipment and installing antennas for the Salvation Army. Assisting in locating people to deliver H/W messages. This is for starters. W5ZX, the SEC for South, returned from Ham Com, and with out sleep, hit the ground running. The NCSs worked around the clock, in some cases taking a two-hour break and taking another shift. I don't have all their call signs at this time but will try to mention them in another writing. A special thanks goes to Verizon Wireless for the use of the comm van. KD5OEQ, finished with the water safari, an all day event and then drove the van to Houston, where it was used extensively Saturday night and Sunday, at which time KD5OEQ, had to return to Austin. That was really an asset to communication needs. You might say it saved the day. My latest information there have been 20 deaths due to the floods in Houston. Several were found in vehicles as the water abated. I just don't understand why people will drive into flood waters. It only takes three inches of fast moving water across the road to force a car to go down stream. I want to wish Ed Larose, KS5V, speedy recovery, after falling twenty feet, trying to install his antennas that were taken down during the storm we had May 21. Ed had broken ribs and a punctured lung. Our prayers are with you Ed. You can now give that new 756 Pro a good workout, while recovering. Again thank you all for your support. I hope all of you have a great August and hopefully we won't have any bad storms by the time you read this. God Bless. Tfc: W5SEG 1047, W5TUK 208, W5GKH 132, W5KLV 129, N5OUJ 74, W5ZX 71, KA5KLU 45, N5NAV 40, W5ZIN 54, KD5GM 24, K0YNW 14.

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HAM-IV, $529.95. *The heavy duty Ham-IV is the most popular rotator in the world!* It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower mast bracket. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New low temperature grease permits normal operation down to -30 degrees Fahrenheit. New wire-wound potentiometer gives reliable and precision directional indication, new ferrite beads reduce RF susceptibility, new Cinch plug connector plus 8-pin plug at control box (no screwdriver needed). Dual 98 ball bearing race for load bearing strength. Strong electric locking steel wedge brake prevents wind induced antenna movement. Easy-to-use Control Box has illuminated directional meter with North or South center of rotation scale, separate snap-action brake and rotation switches. Uses low voltage control for safe operation. Accepts masts up to $2^{1}/_{16}$ inches diameter. Rotator size is $13^{1}/_{2}$Hx8D inches.

T-2X, $619.95. *Extra heavy duty Tailtwister antenna rotator!* For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to $2^{1}/_{16}$ inches diameter. Rotator size is $14^{1}/_{16}$Hx$9^{3}/_{16}$D in.

CD-45II, $369.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to $2^{1}/_{8}$ diameter. Includes light duty lower mast support, Rotator size is $17^{3}/_{8}$Hx8 D inches.

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Wind Load capacity (inside tower)	20 sq. ft.	15 sq. ft.	8.5 sq. ft.	3.0 sq. ft.
Wind Load (with mast adapter)	10 sq. ft.	7.5 sq. ft.	5.0 sq. ft.	1.5 sq. ft.
Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
Brake Construction	Electric wedge	Electric wedge	Disc brake	Disc brake
Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
Mounting Hardware	Clamp plate	Clamp plate	Clamp plate	Clamp plate
Control Cable Conductors	8	8	8	5
Shipping Weight (pounds)	28	24	22	14
Effective Moment (in tower)	3400 ft/lbs.	2800 ft/lbs.	1200 ft/lbs.	300 ft/lbs.

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HOT!

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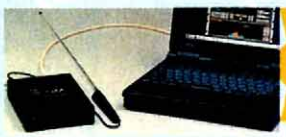

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Tech-Talk by Ten-Tec

Getting Past Sensitivity

by Allan Kaplan, W1AEL

Because nearly every modern radio receiver has more than adequate sensitivity, as we saw in the last Tech-Talk column, we must focus on how *little response* the receiver has to *unwanted signals*. It is really relative freedom from responses other than the signal of interest that separates good receivers from mediocre ones. Major Edwin Armstrong's invention of the superheterodyne receiver in the 1920s was a great step forward in radio communication, but although this architecture made modern receiver performance practical, it is the source of impairments such as image signals, reciprocal-mixing products, spurious mixer products, and receiver intermodulation products. This time we examine reciprocal mixing – a receiver handicap in bands loaded with strong signals.

While an oscillator produces a single pure frequency in our minds, a real-world version is actually a narrow band noise source – the narrower the better! Reciprocal mixing happens because the output of a mixer bears any modulation from both its receiver and LO ports. A strong signal, removed from the desired frequency acts as an unwanted local oscillator by mixing noise sidebands from the real local oscillator into the IF passband, thereby raising the noise level and potentially covering up reception of weak signals. Each strong signal in or near the passband contributes more LO noise to the IF!

The VHF synthesizers in many HF transceivers have substantial noise sidebands. The "dynamic range measurement is noise-limited" reports in ARRL reviews are evidence of the problem because they highlight reciprocal mixing performance. Because multiplication of the reference frequency to high VHF aggravates synthesizer phase noise absent elaborate (expensive) design measures, Ten-Tec uses a first IF in the HF range, hence a lower frequency LO with lower phase noise. We sacrifice HF general coverage to achieve less reciprocal mixing in our Omni-VI Plus transceiver. It is interesting to note that radios that lead the ARRL dynamic range testing at 5 kHz tone spacing are similar in that aspect of design. More on strong-signal performance next time. 73 de W1AEL.

Allan Kaplan, W1AEL, joined Ten-Tec as an RF engineer after retiring as Senior Staff Engineer at Raytheon, Falls Church, VA, where he designed high performance receivers. He holds a MSECE degree from the University of Massachusetts.

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2210G	5-10	130	20	14/0.8	Standard	346
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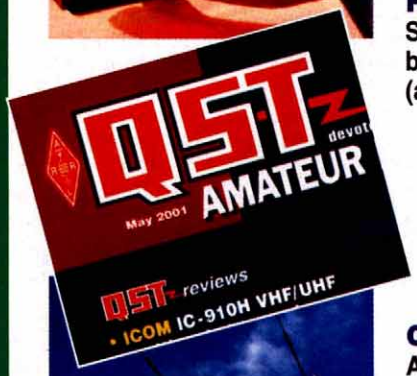

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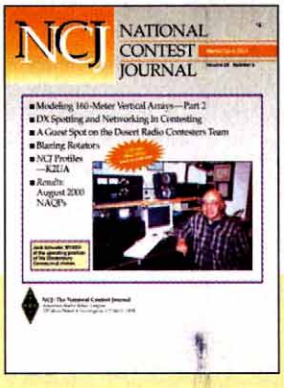

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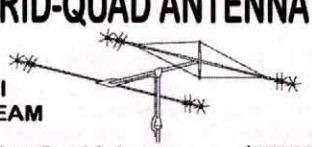

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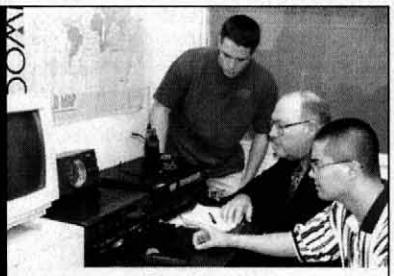

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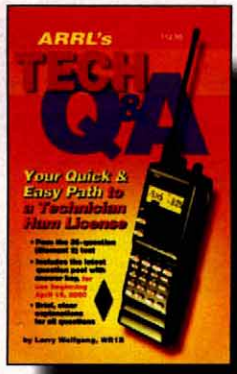

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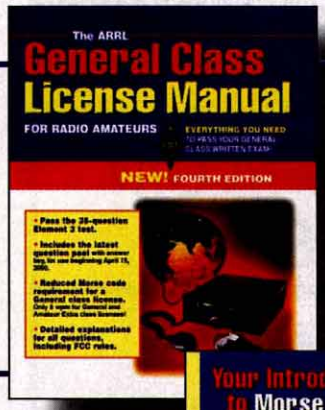

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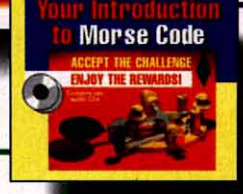

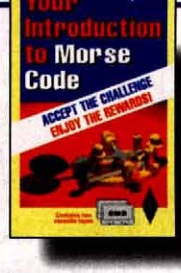

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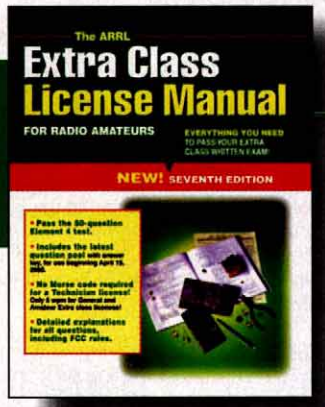

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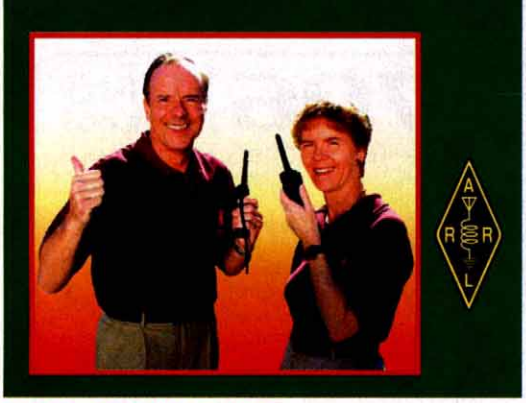

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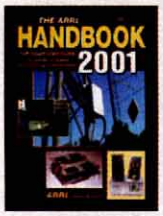

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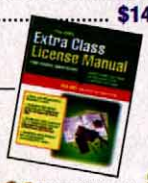

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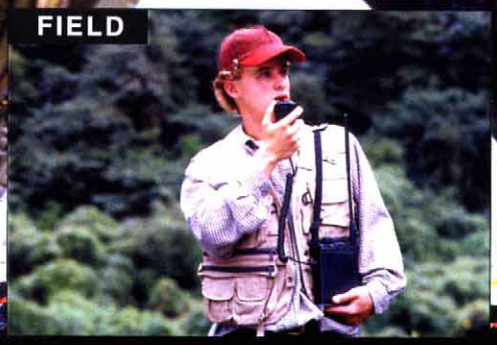

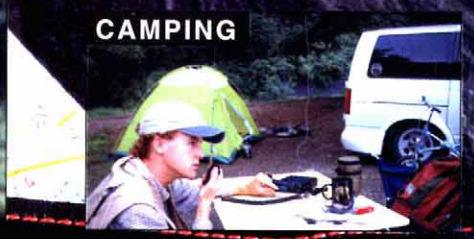

Actual Size

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

- **ULTRA COMPACT:** Measuring just 5.3"x 1.5"x 6.5" WHD (135 x 38 x 165 mm) and weighing about 2 1/2 pounds (1.17 kg, including the supplied antenna and alkaline cells), the FT-817 is small and light enough to take along wherever you're going.
- **WIDE FREQUENCY COVERAGE:** 160-10 meters on HF, plus the 50, 144, and 430 MHz Amateur bands. Plus FM Broadcast, AM Aircraft, and Public Safety receiver coverage.
- **MULTIMODE DESIGN:** Ready for action on SSB, CW, AM, FM, FM-Wide (Rx), 1200/9600 bps Packet, and Digital, including dedicated USB and LSB PSK-31 configurations.
- **5 WATTS POWER OUTPUT:** Using a new-technology all-band MOS FET power amplifier, the FT-817 provides 5 Watts of power output when using a 13.8 Volt DC source. When using Alkaline batteries or the optional FNB-72 Ni-Cd Battery Pack, power is automatically set to 2.5 Watts;via Menu, this can be changed to 0.5 Watt, 1 Watt, or up to 5 Watts.
- **WIDE CHOICE OF POWER SOURCES:** The FT-817 is equipped with an alkaline "AA" cell battery case, and a 13.8 volt DC cable is also supplied. Available as an option is the FNB-72 Ni-Cd Battery Pack (9.6 V, 1000 mAh), which can be recharged using a 13.8 Volt power supply while the radio is being operated.
- **TWO ANTENNA PORTS:** A "BNC" connector is provided on the front panel, and a type "M" connector on the rear panel, with Menu selection of which connector will be assigned for operation on HF, 50 MHz, 144 MHz, and 430 MHz.
- **OPTIONAL COLLINS® MECHANICAL FILTERS:** An optional filter slot is provided, accommodating either the YF-122S (2.3 kHz) 10-pole SSB filter or the YF-122C(500 Hz) 7-pole CW filter. You get "base station" performance even from a mountain top.
- **INCREDIBLE MEMORY RESOURCES:** You get a total of 208 memories, including 200 "regular" memories which may be separated into ten groups of up to 20 channels each. And you can append an Alpha-Numeric "Tag" to each memory to aid in channel identification.
- **A CW OPERATOR'S DREAM MACHINE:** You get a built-in Electronic Keyer with adjustable weighting, adjustable CW Pitch, CW Normal/Reverse frequency tuning, and you can even use the microphone's UP and DOWN keys to send CW via the Keyer.
- **BUILT-IN CTCSS AND DCS:** The built-in CTCSS and DCS Encoder/Decoder systems provide you with the versatility you need for repeater access or selective calling.
- **DUAL - COLOR LIQUID CRYSTAL DISPLAY:** Select from Blue or Amber display illumination, which can also be switched off to conserve battery life. And while you're away, the Spectrum Scope will provide you with a visual record of activity ±5 channels from your current operating frequency.

ALL MODE PORTABLE TRANSCEIVER

FT-817

HF/50/144/430 MHz Multimode Transceiver

YAESU
Choice of the World's top DX'ers℠

Vertex Standard
US Headquarters
17210 Edwards Road,
Cerritos, CA 90703 (562)404-2700

For the latest Yaesu news,
Visit us on the Internet: http://www.vxstd.com

See the exciting new FT-817 at your Yaesu Dealer's showroom today!

144 220 +440

Everything adds up: Kenwood's new FM Tribander (144/220/440MHz) offers dual-channel RX capability and prime performance in a superbly compact design.

- Receives 2 frequencies simultaneously even on the same band
- 0.1~1300MHz high-frequency range RX (B band)[1]
- FM/FM-W/FM-N/AM plus SSB/CW receive
- Bar antenna for receiving AM broadcasts
- Special weather channel RX mode
- 435 memory channels, multiple scan functions
- 7.4V 1550mAh lithium-ion battery (std.) for high output[2] and extended operation
- 16-key pad plus multi-scroll key for easy operation
- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Large frequency display for single-band use
- Automatic simplex checker
- Wireless remote control function
- Battery indicator • Internal VOX • MCP software

[1] Note that certain frequencies are unavailable. [2] 5W output

"Specifications subject to change without notice."

NEW

TH-F6A

FM TRIBANDER

KENWOOD
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