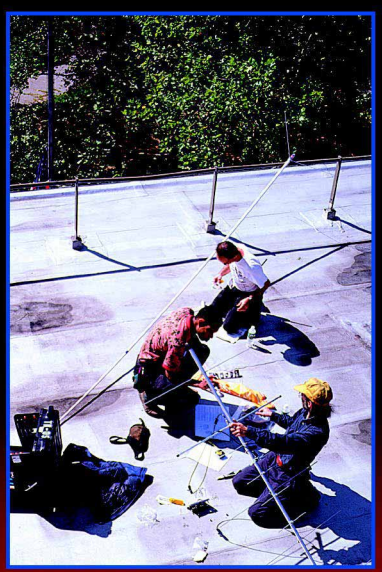
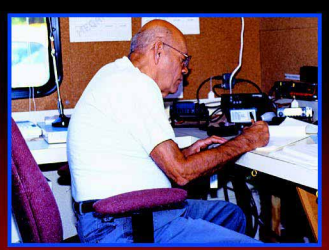
Official Journal of
ARRL
The national association for AMATEUR RADIO

QST

devoted entirely to
AMATEUR RADIO

November 2001





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

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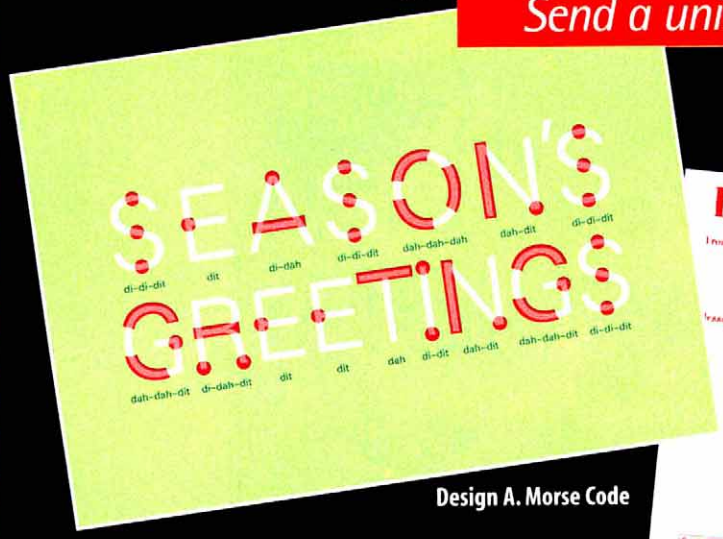
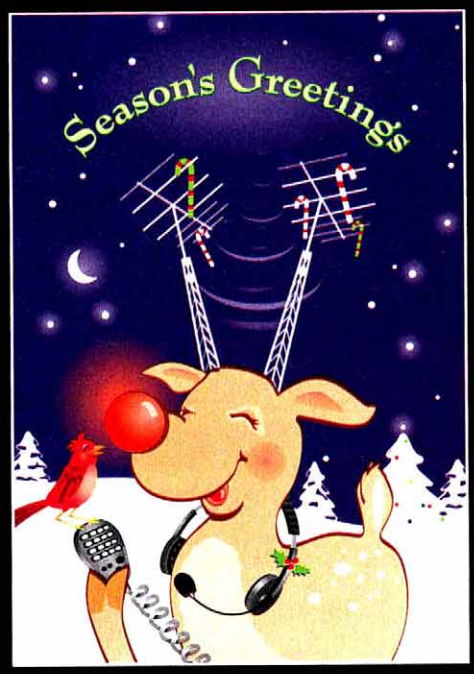


Design A. Morse Code

Reverse side for all cards



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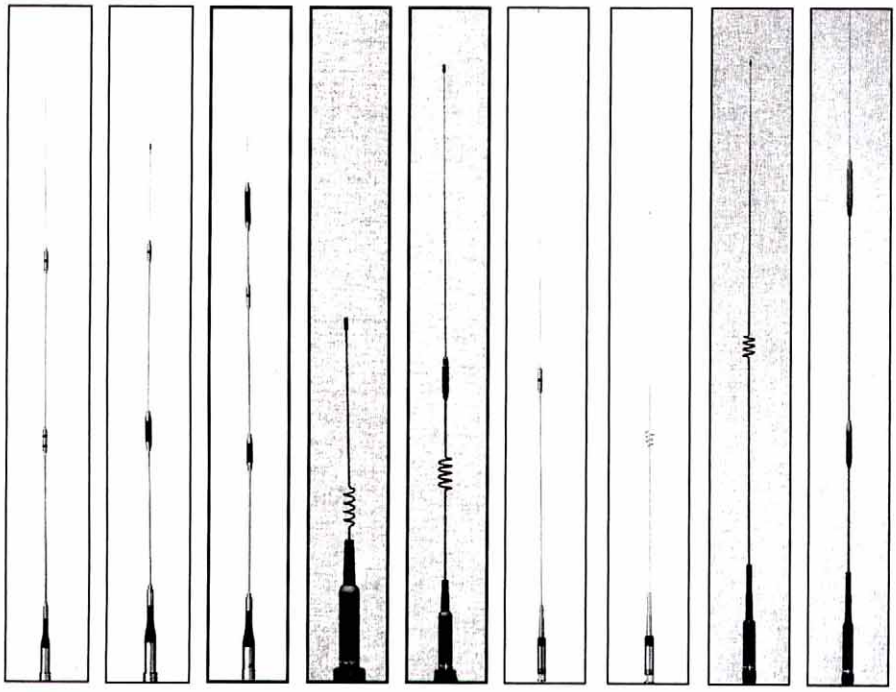

SG2000HD | SG7500A SG7500NMO | SG7900A | NR72BNMO | NR73BNMO | NR2C | NR770HA NR770HB | NR770HNMO NR770HBNMO | CR627B CR627BNMO

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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.

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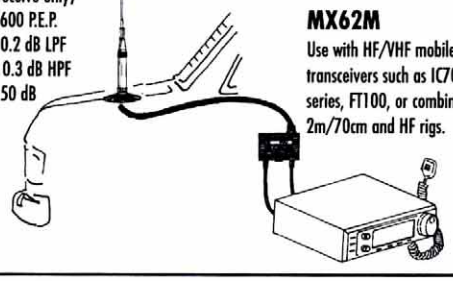
Mount Connection:	UHF
Length:	54"
SWR:	1.5:1 nominal

MX62M

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



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

* 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

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See page 10 for detailed contact information.

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QST (ISSN:0033-4812) is published monthly as its official journal by the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494, USA. Periodicals postage paid at Hartford, CT, USA and at additional mailing offices. POSTMASTER: Send address changes to: *QST*, 225 Main St, Newington, CT 06111-1494, USA

QST Workbench

54

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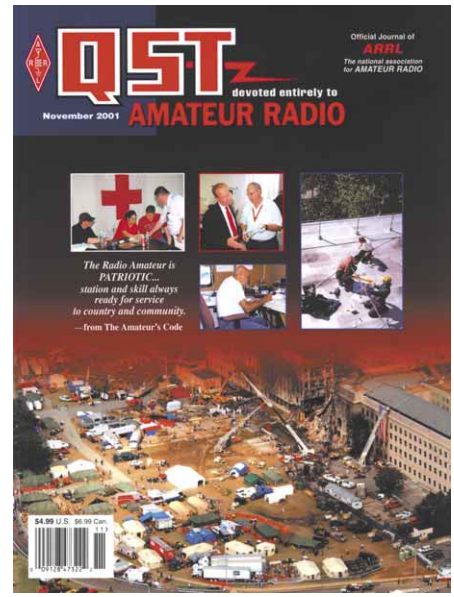
Operating

Departments



Our Cover: Whether it was at and around the World Trade Center site in New York, at and around the Pentagon in the Washington, DC area, or at the Pennsylvania crash site, Amateur Radio volunteers served selflessly—in some cases for several weeks. The story begins on page 28. Related items appear on pages 9 and 24.

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 rate of $20. 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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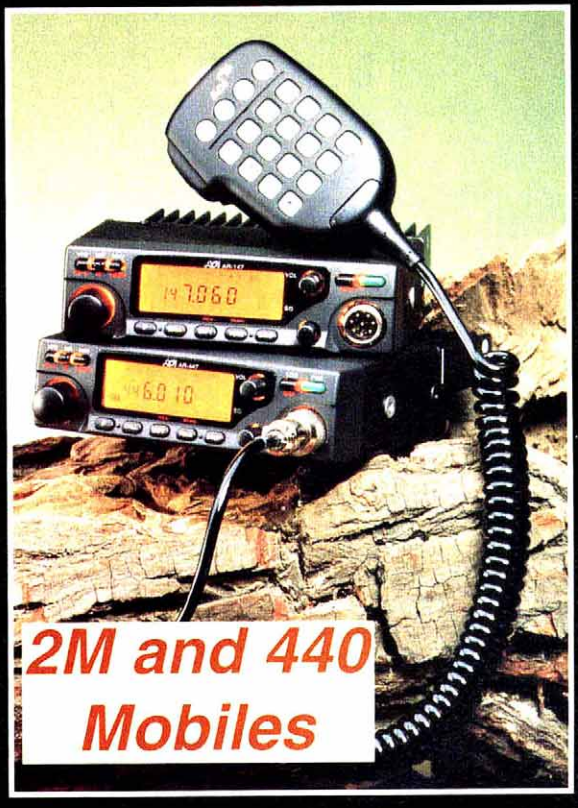

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"Of, by, and for the radio amateur," the ARRL numbers within its ranks the vast majority of active amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs.

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

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

"IT SEEMS TO US..."

We Are Not Alone

The day dawned perfectly in the northeastern United States. It was the sort of late-summer morning that heralds the imminent arrival of that most glorious of seasons: autumn, with its iridescent foliage and crispness in the air that makes the drawing of every breath a pure delight. It was a great day to be alive.

At 8:48 AM all that changed. The world changed, probably forever.

There is no need to describe here the horrific events of that second Tuesday morning in September, not that mere words possibly could. The images are burned into our minds and will stay with us as long as we live.

For those who lost loved ones the void can never be filled. For the rest of us, time may take some of the edge off the pain. Passing years may cause us to forget how helpless we felt as we experienced a chain of catastrophes unprecedented in American history, utterly incapable of knowing when or whether they would end. This may happen, but for now it seems impossible. Nothing, it seems, can ever be the same.

The attacks occurred on American soil, but it was not simply a national tragedy. We now know that it was an international tragedy, with people from more than 60 countries and every major faith tradition counted among its victims. But in the first moments of that terrible morning it was natural for Americans to feel isolated from the rest of the world. Our own jetliners, symbols of American technological prowess, had been turned against us. If we could not even trust our own mechanical creations, who and what could we trust? Were we alone in a world that suddenly had turned unimaginably hostile?

The answers soon began to arrive. Here in Newington they came in the form of emailed messages of condolence and support from radio amateurs throughout the world that began to arrive that very same morning, first as a trickle but soon as a flood. They came from our sister societies and individuals in countries as diverse as Japan, Madagascar, Germany, Turkey, Iceland, Egypt, Suriname, Lebanon, Oman, Pakistan, Syria, Yugoslavia, Hong Kong and dozens of others. Some shared their stories of why the United States occupied a special place in their hearts—stories of great sacrifices made by GIs, of aid given when it was most needed after World War II, or simply of kindness shown by an individual American that reflected the best values of our open society. Thanks to the thoughtfulness of our unique, global Amateur Radio fraternity, before that awful day had ended we were privileged to know what many Americans would not discover until later in the week: We are not alone. The entire civilized world shares our grief and our outrage.

Less than a lifetime ago the United States and its allies were fighting a two-ocean war against ruthless, implacable enemies. Today we count these former enemies among our closest friends. Some of the first messages offering comfort and support came from countries that experienced their own brush with the Apocalypse delivered by American bombers. Their friendship today did not spring from defeat and subjugation. Rather, it sprouted from seeds planted by what Tom Brokaw calls The Greatest Generation—my father's generation, the generation that not only won the war but equally importantly, also won the peace. Will my own generation do as well? Decades from now, will our children and grandchildren live in a world where today's enemies are friends? Or will they be forced to retreat into armed camps, suspicious of differences, unable to know the wondrous diversity the world has to offer?

As the war on terrorism is launched it is difficult to hold such lofty thoughts for long. The wounds are too fresh and too deep. Living one day at a time is challenge enough. Yet, as radio amateurs we can at least do this much. As the terrorists and their few sympathizers look for evidence that the civilized world is tearing itself apart, let them draw no comfort from what they hear on the ham bands. We are communicators. Let us communicate our resolve that the world must remain united in the face of terrorism. Let us communicate our respect for one another across the boundaries of nationality, religion, cultural background, and the other myriad ways society seeks to group us. Let us communicate our desire to increase our understanding of one another.

And let us remember the radio amateurs who died on that terrible Tuesday morning. Even as we look with hope toward the future, we know that our fraternity is the poorer for their loss.—*David Sumner, K1ZZ*

We regret to report that the following Amateur Radio operators are listed among those missing from the World Trade Center and Pentagon disasters:

Steven A. "Steve" Jacobson, N2SJ, 53, of New York City.

William V. "Bill" Steckman, WA2ACW, of West Hempstead, New York.

Michael G. Jacobs, AA1GO, 54, an ARRL member from Danbury, Connecticut.

Robert D. "Bob" Cirri, Sr, KA2OTD, 39, an ARRL member from Nutley, New Jersey. A Port Authority police officer, Bob was helping to evacuate workers from the building when it collapsed.

William R. "Bill" Ruth, W3HRD, of Mt. Airy, Maryland, who died in the Pentagon attack.

Gerard J. "Rod" Coppola, KA2KET, 46, of New York City.

Winston A. Grant, KA2DRF, 59, of West Hempstead, New York.

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

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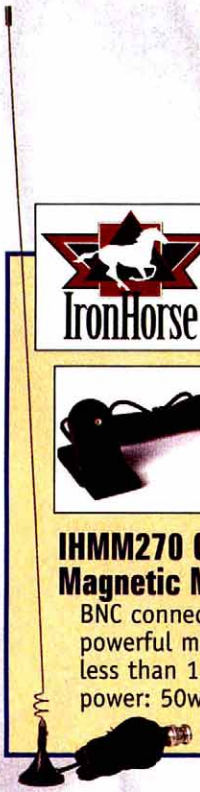

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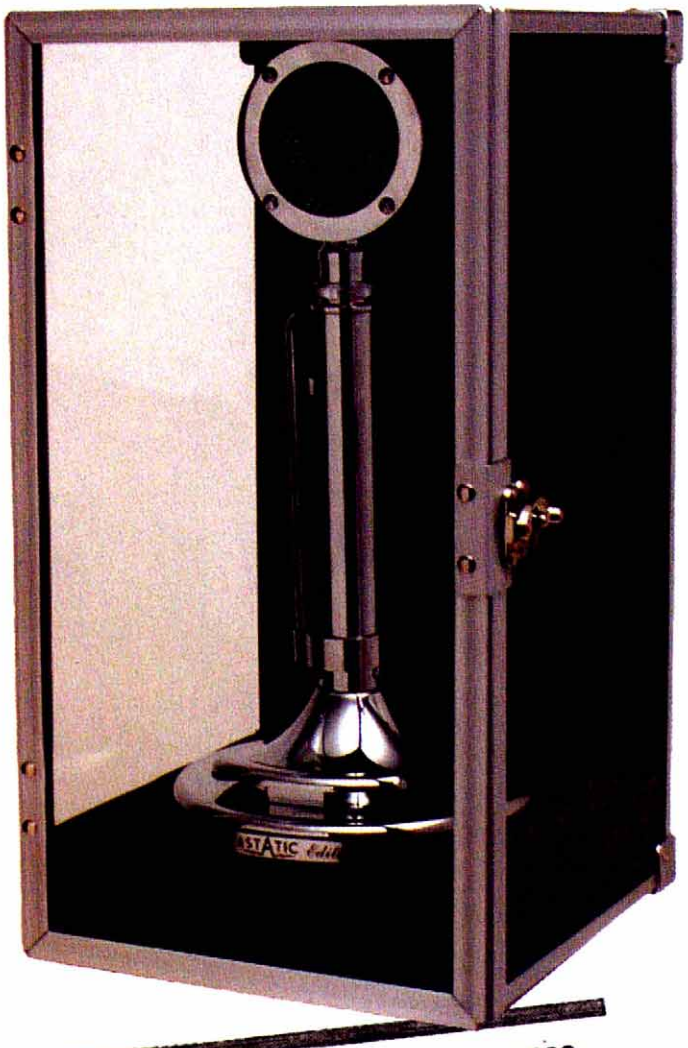

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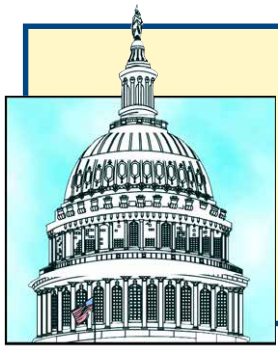

DC Currents

By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs

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

ARRL "Amateur Radio Demo and Education Day" Wows FCC

Over the years ARRL has worked with various people and departments within the Federal Communications Commission (FCC) on highly specialized topics such as frequency allocation, antenna regulation, amateur operating rules and enforcement. But with a regulated service as specialized as Amateur Radio, it seemed useful to ARRL President Jim Haynie, W5JBP to try to ensure that all of those in the Commission held the same positive view, particularly the three new commissioners who might not have been familiar with the details of Amateur Radio. That is why ARRL recently presented its first-ever Amateur Radio demonstration in a conference room near the FCC Commissioner's offices at the FCC's 12th St (Portals) headquarters in Washington.

"The FCC is inundated with paper every day in the form of filings, briefings, backgrounders and other print materials," says ARRL president Jim Haynie, W5JBP, who masterminded the demonstration. "So our purpose was to let the commissioners and their staff get out of the 'paper chase' for a while and see Amateur Radio up-close." Haynie was able to spend most of the day chatting about Amateur Radio issues with FCC commissioners and key staff.

ARRL First Vice President Joel Harrison, W5ZN, who along with Technical Relations Manager Paul Rinaldo, W4RI, Technical Relations Specialist Jon Siverling, WB3ERA, and ARRL staff member Dave Patton, NT1N, also represented ARRL at the event, was equally enthusiastic and noted that all four commissioners currently in office stopped by for a visit.

"We wanted to show the continuing, and maybe even growing importance of Amateur Radio to the nation's telecommunications infrastructure, and to demonstrate our role in technological development and emergency communication," Harrison said.

PHOTOS BY BROOKS BLUNCK, W3BCW

In front of a display showing school children learning from hamming, FCC Commissioner Michael K. Powell listens attentively to ARRL President Jim Haynie, W5JBP, who outlines the scope of the "Big Project," involving Amateur Radio deeper in education. Looking on from the background are First Vice President Joel Harrison, W5ZN and Powell's Senior Legal Advisor Peter Tenhula, who helped ARRL put on the exhibit.

ARRL General Counsel Christopher Imlay, W3KD (right), explains the "hows" and "whys" of how Amateur Radio antennas can be reasonably accommodated even in communities regulated by private land use regulations (CC&Rs). Paying careful attention is Bruce Franca, Acting Chief of the FCC's Office of Engineering and Technology.

Recently appointed Commissioner Kathleen Abernathy looks on in fascination as ARRL First Vice President Joel Harrison, W5ZN, explains the workings of PSK-31, the new digital mode that might help revolutionize the size and configuration of antennas in limited spaces.

An antenna in a planned residential community needn't stick out like a sore thumb, explains ARRL President Jim Haynie, W5JBP to new FCC Commissioner Kevin J. Martin, using clear photographic evidence of how antennas can be integrated into the landscape.

FCC staff members Jennifer Burton and William B. Cross, W3TN, review an ARRL exhibit on Amateur Radio's long and successful role in emergency communication. The exhibit lists many, many instances of participation in recent years.

And that aspect did raise a somber note, as the Amateur Radio demonstration took place shortly after the World Trade Center and Pentagon catastrophes. But ARRL was asked by FCC Chairman Powell to go "on with the show" because of his commitment to keeping the FCC running on a business-as-usual basis during the national crisis, to ensure both continuity of communication and the spirit of the employees. News of the tragic circumstances still pouring in in the background underscored Amateur Radio's potential for emergency communication.

In Haynie's view, the highlight of the event was the interest and involvement of Chairman Powell and his staff, as well as the opportunity personally to meet the other three new commissioners. Haynie expressed special gratitude for how smoothly the demonstration was coordinated within the FCC by Powell's Senior Legal Advisor Peter Tenhula and Associate Chief of Technology Mike Marcus.

ARRL President Jim Haynie, W5JBP explains PSK-31 to new FCC Commissioner Michael J. Copps. Note QST article open on the table. QST was available to all visitors to the event.

Displayed throughout the room were professionally produced posters depicting Amateur Radio disaster communication, SAREX and ARISS Amateur Radio space programs, and the home of a ham in Florida with antennas carefully integrated into the landscape and invisible to neighbors. Other displays included microwave technology, kids having fun hamming, a surprisingly popular poster on radio wave propagation, and a poster outlining the Amateur Radio position on CC&Rs as they affect hams living under private land use regulations. A videotape loop on Kids Day ran all day long.

Haynie reports that some commissioners seemed particularly interested in information on Amateur Radio antenna installations that had been erected under the "reasonable accommodation" provision of PRB-1, as well as displays of equipment provided by ICOM, Yaesu and MFJ. Equipment included a demonstration model of a complete HF station, a selection of small profile antennas, a PSK 31 demonstration, and a DSP-10 software defined radio built and loaned to ARRL by Bob Larkin, W7PUA. (The DSP-10 was featured in September, October and November 1999 *QST*; see **www.proaxis.com/~boblark/dsp10.htm**.) Also available were books, information kits, food and beverages.

Haynie was particularly happy that the event was attended by every commissioner, almost every department head, and many FCC staff members. He reports that the Chairman spent considerable time examining every display, and asked for a personal demonstration of PSK 31 equipment. He was also interested in Amateur Radio involvement in rescue efforts at the World Trade Center and Pentagon disaster sites and how ARES operates.

ARRL General Counsel Chris Imlay said he was pleased to see that people did not just "cruise through," but that many conversations developed in front of different displays, and many FCC staffers asked very good questions. Imlay felt that the demonstration set the stage for more productive discussions with the FCC on a number of important Amateur Radio issues.

"The FCC people wanted to talk about all kinds of things," said Imlay, and we got the chance to get together with the right people about the right issues, often with the right equipment to show what we were talking about." In fact, Imlay feels that several followup meetings may evolve from the demonstration, based on the number of FCC staff who expressed interest in discussing tough topics like CC&Rs, the OTARD ruling, and other land use issues. Imlay said he got the impression that some points were made by the demonstration, "particularly when it comes to showing how hams and homeowners associations can easily coexist." Imlay estimates that about 100 FCC employees stopped by to talk.

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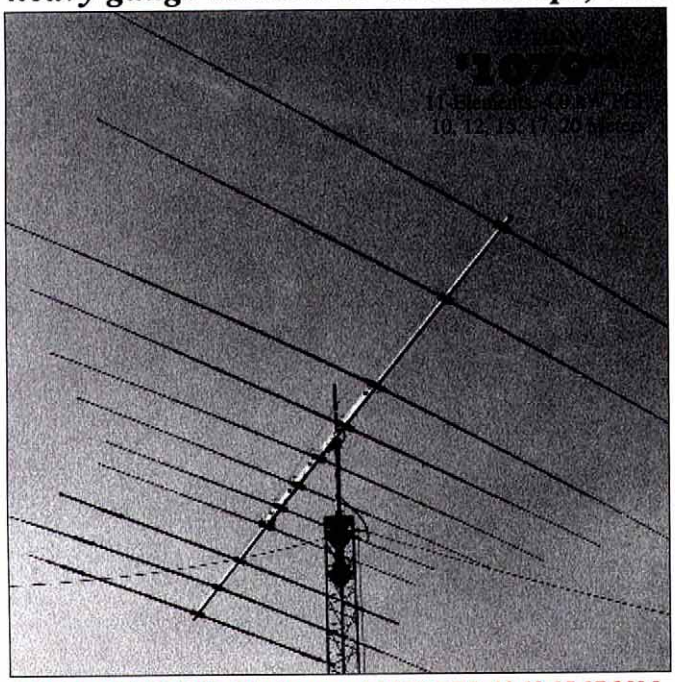
Why? Hy-Gain uses durable tooled components -- massive boom-to-mast bracket, heavy gauge element-to-boom clamps, thick-wall swaged tubing -- virtually no failures!



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Fits on average size lot with room to spare -- turning radius is just 15.3 feet. Four piece boom is ideal for DXpeditions. Rotates with CD-45II or HAM-IV rotator.

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Revolutionary 4-element compact tri-bander *lets you add 40 or 30 Meters!* Has 14 foot boom and tight 17.25 feet turning radius. Fits on roof tri-pod, mast or medium duty tower.

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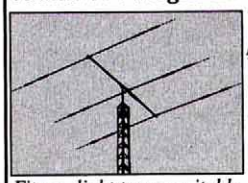

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TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	7			1500	10, 15, 20	9.4	100	24	31	20	75	1.5-2.5	HAM-IV	$819.95
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	3	• Hy-Gain catalog		1500	10, 15, 20	4.6	95	14	27.42	15.33	35	1.9-2.5	CD-45II	$439.95
TH-3JRS	3	• Call toll-free		600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	2	800-973-6572		1500	10, 15, 20	3.25	80	6	27.3	14.25	20	1.9-2.5	CD-45II	$339.95
EXP-14	4			1500	10,15,20 opt. 30/40	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

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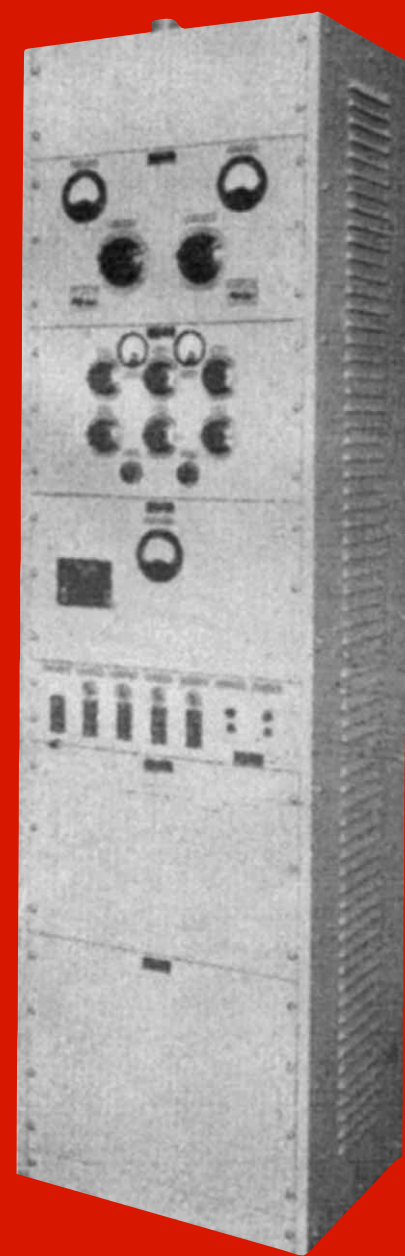
JOHN ROLAND, WB7SWB

Ham radio helped! As she graduated from Evergreen High School in Vancouver, Washington, Emily Roland, KC7ABE, was awarded a trophy for overall scholastic achievement. She credits Amateur Radio, which she discovered at age 10, with helping her also earn plaques from the Math and Science Departments for outstanding achievement.

HIROYUKI MIYAKE, W1VX/JF1OCQ

Bicycle mobile, JA-style: Masako Deto, 7N4DEV, is QRV on 21.200-21.250 MHz. She uses a Pico-21 QRP transceiver.

He kept them humming: "That picture of an SCR-522 (Mar 2001 *QST*, page 104) brought back a few stored memories," writes Harry Kroll, Jr, WB4NFI, of Knoxville, Tennessee. His recollection continues: "I didn't know the 522 by that number; it was a TR-1132. That was the number given by the British Air Ministry to a fine VHF transmitter-receiver designed for use by fighter planes in the Battle of Britain." Harry, as one of a number of technically trained Americans who had been recruited for non-combatant work before Pearl Harbor, helped service the radios. He also provided the accompanying photo.



WB4NFI explains: This was the type of VHF transmitter used at an RAF base to communicate with fighters. The output was 100 W AM.

Ann Smetona, AA3LV, of Pottstown, Pennsylvania, at home in the shack she shares with John, K3SLJ.

RUTH GRUGEL

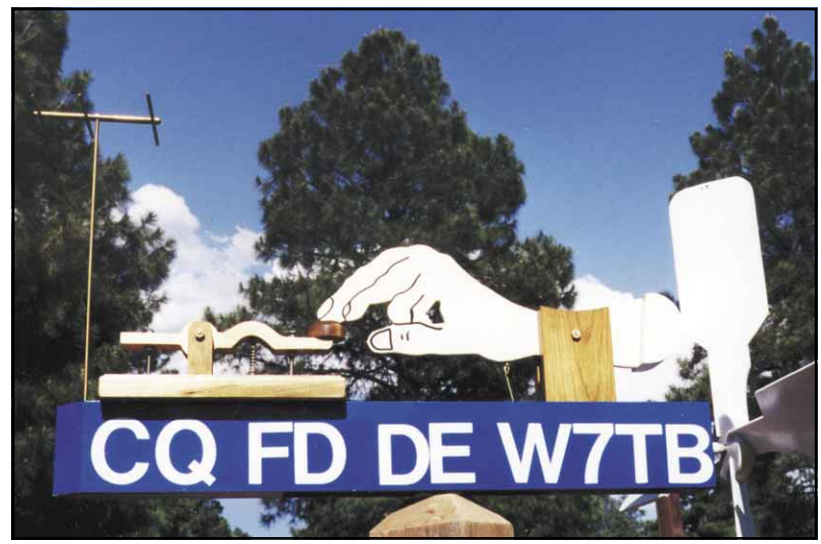
Eyeball WAS: Ann Smetona, AA3LV, visited all 50 states in the 1950s and 1960s, and she can prove it! OM John, K3SLJ, took the photos. Ann recalls now: "When we first started out, we were just sightseeing and photographing points of interest and highway signs. After John became a ham, he enjoyed giving signal reports to the county hunters. We would park on a county line (sometimes two or three). I would keep the log. Whenever we got home after a trip we would find a box of QSL cards waiting for confirmation. Traveling in the lower 48 presented no problems, but going up to Alaska was quite an experience. The Alcan Highway at the time was a gravel road and our car had to be 'Alcanized.'" The only drawback to their subsequent trip to Hawaii: "We came home 5 pounds heavier!"

Hawaiian high: Chris Grugel, KB9TXD, of Kenosha, Wisconsin, at the summit of Mauna Kea, the highest point in Hawaii. Using a Yaesu FT-50 H-T, Chris made several contacts with other islands. Summit visitors leave offerings to the volcano at the altar in the foreground. Astronomers from around the world use the observatories in the background to study the skies—taking advantage of a pollution-free environment 13,796 feet above sea level. Chris reports a temperature of 45° F when the photo was taken—about 40° chillier than the sunny beaches that ring the Big Island.

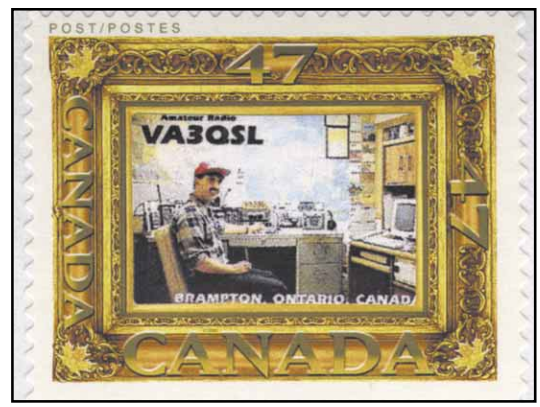
RV screwdriver: Although Doug Tyson, WA9FFV, of Ashland, Wisconsin, is justifiably proud of his screwdriver antenna, he admits "there are a lot of improvements that can be made." For example, he describes the power window motor as "pretty slow—there has to be better." Top, WA9FFV's mobile operating position. Below, the screwdriver antenna, originally mounted on the ladder at the back of the RV, was moved it to this more accessible spot.

At August's West Virginia State Convention at Weston, Roanoke Division Director Dennis Bodson, W4PWF (left), presents Garry Ritchie, W8OI, of Huntington, West Virginia, with his official appointment as an ARRL Assistant Director.

Morse observes telegraphy: Judge Robert F. B. Morse, great-great grandson of Samuel F. B. Morse, observes as Morse Telegraph Club member Jim Wilson, K4BAV, taps out a message. Judge Morse flew in from Texas for the grand opening of a year-long exhibit at the National Library of Medicine in Bethesda, Maryland, "The Once and Future Web—Words Woven by the Telegraph and the Internet." Several Amateur Radio operators and members of the Morse Telegraph Club (dressed in authentic costumes from the 1840s) volunteered for the public event.



Sendin' in the wind: Bob Wertz, NF7E, of Flagstaff, Arizona, has devised this unique way to show the world that he's a practitioner of the radio art. "What better way," he asks, "to tell anyone who happens by what is going on?" Indeed!



Roll your own (perfectly legal) QSL stamp? They can do it in Canada, as Jeff Richardson, VA3QSL, of Brampton, Ontario, demonstrates with this 47-cent stamp. "Canada Post now offers 'Picture Post,'" Jeff writes. "These are legal stamps made from a personal photo, for about twice the cost of regular postage. You have a choice of borders."

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Today's elite-class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics on the front panel save you seconds in a pile-up or a contest "run," and Yaesu's HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

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Features

■Frequency Coverage: (RX) 100 kHz-30 MHz; (TX)160-10 m Amateur Bands ■Dual In-band Receive w/Separate "S" Meters ■Ten Pole Collins® Mechanical Filter Built-in ■RX DSP Noise Reduction and CW Peaking Filter ■High-speed Automatic Antenna Tuner ■Two TX/RX Antenna Jacks plus RX-only Jack ■TX Microphone Equalizer ■RF Speech Processor ■Direct Digital Synthesis ■CW Spot and Two Key Jacks ■Two Headphone Jacks (1/4" and 3.5 mm) ■Low-Level Transverter RF Drive Jack ■Separate FP-29 Power Supply (30 V/13.8 V DC Output)

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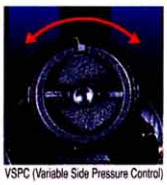

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Specifications

Frequency Range:	50-54 MHz
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Spurious Emissions:	At least 60 dB down
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CORRESPONDENCE

"OUR HEARTS GO OUT TO OUR AMERICAN FRIENDS"

As he toured "Ground Zero," the site of the World Trade Center in New York, United Nations Secretary General Kofi Annan spoke for many when he said: "This is not just an attack on New York or the United States but on the whole world." Those sentiments are underscored by the outpouring of support we at ARRL Headquarters received in the aftermath of the events of September 11. A representative sample of the messages received from abroad follows.

♦ Our heartfelt condolences to the families and friends of the victims.—*Shozo Hara, JA1AN, Japan Amateur Radio League*

♦ On behalf of the radio amateurs of the UK and the Radio Society of Great Britain, I am writing to you at the ARRL to express our deep shock and sadness at the terrible events of today. In common with the rest of the civilised world, we send you our deepest sympathies at what appears to be a huge loss of life.

The ARRL and all the American people are in our thoughts at this tragic time.—*Don Beattie, G3BJ, President, RSGB*

♦ My family and I as well as all the hams in Germany will stand by your side in solidarity in the struggle against terrorism. I think it is good to know that numerous hams all over the world are in thoughts with you in this darkest hour of America.

Today, I am 60 years old and I will always remember your GIs who gave me at the end of World War 2 in 1945 the first chocolate in my life as a present. Still today I want to express my thanks for this.

My wife and I will also always remember that is was your people who made it possible (Marshall Plan and Care Package) that we as schoolchildren got a warm lunch every day from 1945 onwards.

I visit your country very often and I know about the great freedom and how beautiful your country is. May the Lord protect you and your country.—*Manfred, DL4DKM*

♦ I, on behalf of all the members of the Egypt Amateur Radio Assembly (EARA) and all Egyptian families, deeply express our condolences for the victims and their family and all the US people. This event is not only the disaster of the US, but of mankind in the 21st century. We strongly condemn this terrorism! —*Mohamed El Kafrawi, SU1KM, General Secretary of the Egypt Amateur Radio Assembly*

♦ I have not yet been able to come out of the shock the terrorist attacks on USA have given me. It's a strange coincidence that Sept 11th is celebrated as International Peace Day. The earthquake here in January this year was a natural calamity but this nasty act of men is unforgivable. I feel very much concerned and express my sincere condolences to all Americans and others living there.—*Praveen Manani, VU2XMX, Gujarat, India*

♦ On behalf of all the members of the Ukrainian QRP Club I offer condolences to you and the American people because of barbaric acts of terrorism which caused considerable human losses.

We believe that the United States of America will bravely overcome this grief and the terrorists will be punished. With respect, *Peter Grytsay, US1REO, President of the UR-QRP Club*

♦ Our hearts go out to our American friends.—*Jean-yves, F8LDX, in west Normandy near Utah Beach*

♦ I am very pained and saddened by what has arrived at your country. It is incredibly, unimaginably cruel—I do not have words to qualify these acts of horrible terrorism! All the American people [have] my sincere condolences and all my support from France.—*Laurent, F8BBL*

♦ We present our condolences to the American people and wish you courage to stand this pain.—*Jerry Sidorov, UA9AR, Chelyabinsk, Russian Federation*

♦ My condolences to all Americans in this moment.—*Jorge Ortiz, LU6HI*

♦ Our most heartfelt sympathy from all radio amateurs to the victims of the brutal terrorist act that you have suffered. —*EA3NP from Spain and 25,000 more radio amateurs*

♦ At this horrible time, we are all Americans.—*Bernd Haefner, DB4DL, Deutscher Amateur Radio Club*

♦ On this very sad occasion marking the recent disastrous terrorist attacks on the symbol of democracy and human civilization of the 21st century, we express our most heartfelt feelings of sorrow and sadness and extend our support [to] the great nation of USA. We have forwarded to you the enclosed letter which we have written in Arabic, our native language, to ensure that our feelings are profoundly presented as they occur in the depth of our hearts.—*Mohamed Abbas Al-Holi, 9K2DR, Manager, Kuwait Amateur Radio Society*

♦ Please accept our deepest sympathy for the terrible tragedy of the American people. Our thoughts are with you.—*Dimiter Petrov, LZ1AF, President, The LZ CW Club*

♦ I want to express our deepest regret about the tragic incidents. Please accept our sincere condolences for the nation of the United States of America. We all deeply condemn this ugly terrorist attack. May God have His Blessings and Mercy on all victims.—*Aziz Sasa, TA1E*

♦ Deepest sympathy from Indonesia to the victims and families. May God bless them.—*YB0CRT*

♦ We Icelandic amateurs send our deepest condolences to our ARRL friends because of the tragic events taking place in your country.—*Vilhalmur Sigurjonsson, Secretary, IRA (Islenzkir Radioamatorar)*

♦ To all the people of the United States, I send my most sincere condolences. I hope that the perpetrators of these atrocities will be very soon brought to justice.—*Charlie Blake, M0AIJ*

♦ Our condolences for the tragedy suffered by the American people today and particularly any radio amateurs who might have been affected.—*Pedro Seidemann, YV5BPG, Radio Club Venezolano*

♦ I just want to express my condolences to the American people for your great loss and tragedy. You all have my support and prayers in this time of need. I really wish I could be of assistance, rather than just following the news reports, but at least I can send you my thoughts.—*Chris, SM2UJW*

♦ On behalf of CP1AA, the Radio Club Boliviano and myself, please convey our feelings of sorrow.—*Mario, CP1AA*

♦ It is hard to find words to express the shock, the horror, and the profound sadness of the terrible events of last week. It seems that physical distance offers no protection from the gnawing sense of horror. Just want you to know that we are all with you in fighting this thing.—*Martin Potter, VE3OAT*

♦ A brief message to send my condolence to the US people. God bless freedom. —*Pascal Grandjean, F5LEN*

♦ Condolences from all Swedish hams to the victims of this terrible and unbelievable act.—*Hawk, SM5AQD*

♦ Today, here, we all are Americans. Please accept my heartfelt sympathy. God bless you and yours.—*Jean-Marc, F5SGI*

♦ On behalf of the members of the Hungarian Amateur Radio Society (MRASZ) I would like to express the deepest sympathy of Hungarian radio amateurs to our fellow radio amateurs in the United States and to the families and the loved ones of the victims of this horrific tragedy. We share in your grief, our hearts are with you.—*Lazlo Berzsenyi, HA5EA, President, MRASZ*

♦ On behalf of the Wireless Institute of Australia (New South Wales Division) I offer our condolences for your members affected by the heinous act just past in NYC. We know your members will be doing all they can to help out in this situation which has left me, personally, feeling horrified, stunned and empty. Please pass on our thoughts in support of your members. —*Patricia Leeper, VK2JPA, VK2 Divisional Secretary*

♦ What sort of deranged minds can plan and carry out such indescribable, inhuman atrocities at such magnitude in cold blood leaves me bereft of suitable words. Having had a much smaller taste of it three years ago in Nairobi and Dar es Salaam we have had experience of such an event and have special feeling for you all. I, all officers and members of ARSK send our sympathy and condolences and join you in your national grief.—*Ted Alleyne, 5Z4NU, Chairman, ARSK, Nairobi, Kenya*

♦ Please receive my condolences for the terrible loss of life that those terrible terrorist acts have inflicted to your people. Be assured that here in my nation, our thoughts are with all the families that have lost their relatives and next of kin. We monitored the emergency net frequencies posted via the Internet just to be on standby in case any ionospheric skip relay might be needed on 40 or 20 meters.—*Arnie Coro, CO2KK, Havana, Cuba*

♦ I, on behalf of all the (ASTRA) Tunisian Amateur Radio Assembly members, and all Tunisian families, deeply express our condolences for the victims and their family and all the US people. God bless you and all US families.—*Mustapha Landoulsi, DL1BDF, DARC Amateur Radio Coordinator for Arabian countries and Brazil*

♦ We are in a state of shock after the indescribable act of terrorism inflicted on your country. What hurts Americans is painful for all of us. We share the sense of outrage with people across the world at the terrible events last Tuesday in New York and Washington and we send to all Americans our deepest sympathy and our prayers at this time.—*Tadek Raczek, SP7HT, Kielce, Poland*

♦ On behalf of the executive committee and all the members of the VERON, the Netherlands section of IARU Region 1, I would like to express our deep condolences for the victims and their families and to the US people in general. We strongly condemn this terrorism.—*Kees Murre, PA2CHM, IARU Liaison Officer, VERON*

♦ On behalf of the members of LPRA (Liga Panamena de Radioaficionados), we would like to express our deep condolences for the victims of this tragic incident. We condemn any such terrorist activity against humanity.—*José Garcia A., HP8AJT, LPRA, Coclé, Panama*

♦ On behalf of the whole Swedish community of Radio Amateurs we wish to convey the shock felt by all your friends here in view of the horrendous crimes committed by some reckless terrorist group and that we all have been watching in horror on our television sets.—*Gunnar Kvarnefalk, SM0SMK, President of Foreningen Sveriges Sandareamatorer (SSA); Eric Lund, SM0JSM, Office Manager, SSA*

♦ I, on behalf of the members of the Executive Committee and the general members of Union de Radiaficionats Andorrans (URA) would like to express our deep condolences for the victims of this tragic incident. We hope the amateur community will successfully extend their hands of cooperation towards mitigation of the sufferings of the distressed and their families. —*Joan Sauri, C31US, President of URA*

♦ On behalf of all the PARS members, we would like to express our deep condolences for the victims of this tragic incident. We condemn all such terrorist activities against humanity. This event is not only a disaster of the US, but of the whole mankind and world.—*Nasir H. Khan, AP2NK, President, Pakistan Amateur Radio Society*

♦ TARL members express deep condolences to all US citizens.—*Nodir Tursoon-Zadeh, EY8MM, Tajik Amateur Radio League*

♦ To all Americans, deep condolences. —*Hrane Milosevic, YT1AD, President of SRJ, Amateur Union of Yugoslavia*

♦ On behalf of my family and myself please accept words of the deepest sympathy and solidarity at the very moment when your nation is under attack of those who again ignore moral principles of human beings.—*Wojciech Nietyksza, SP5FM, IARU Region 1*

♦ To everybody involved in any way, may I offer my sympathies and let all Americans from whatever origins know that England and the rest of the United Kingdom will stand beside you in whatever action our governments decide is appropriate. As a medically retired (lost a leg) Police Officer, specialising in anti-terrorist work, I really do understand what you have to deal with. May I also pass on sympathies on behalf of the International Police Association Radio Club (GX4IPA) as Chairman.—*Thomas J. Reilly, G0NSY, Emergency Radio Liaison Officer, RSGB*

♦ For now just my tears to all your people. God bless you all. We need as soon as possible to rethink what kind of world we will leave to our children.— *Jorge Luiz Lunkes, PT2HF*

♦ Be sure of our understanding, our compassion, and our support.—*Tim Hughes, G3GVV, IARU Region 1*

♦ On behalf of the members, staff, volunteers, directors and executives of Radio Amateurs of Canada, I personally wish to express our sincere condolences to our American friends. In particular, our thoughts go out to the many Radio Amateurs and their families that may have lost their lives while helping others during this sorrowful event.—*Ken Oelke, VE6AFO, President, Radio Amateurs of Canada*

♦ On behalf of the Executive Committee and members of the Jamaica Amateur Radio Association (JARA) I send you and all US amateur radio operators our condolences for the victims of this tragedy and our feeling of great indignation.—*Gerald Burton, 6Y5AG, President* QST

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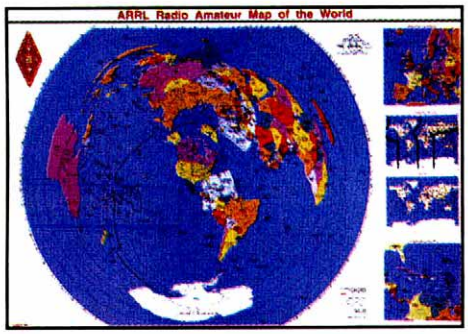

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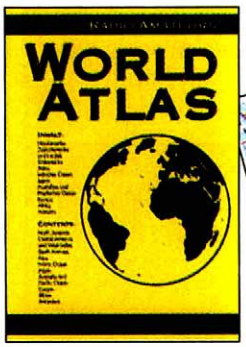

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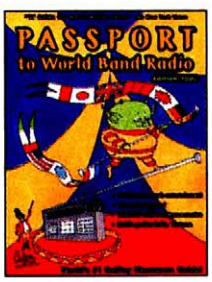

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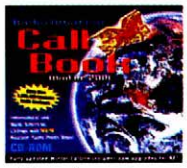

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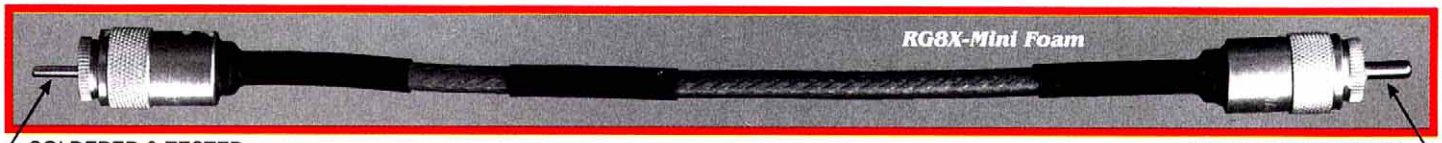

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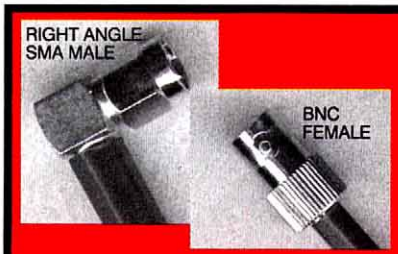

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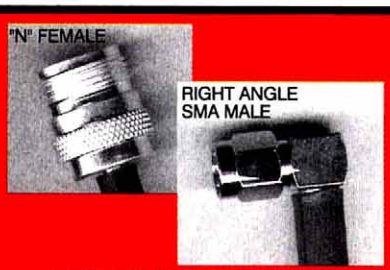

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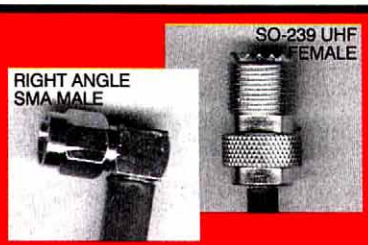

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By Rick Lindquist, N1RL and Diane Ortiz, N2DO

9/11/01: "This is *Not* a Test."

Amateur Radio operators mobilized within minutes of the first attack on the World Trade Center, then responded magnificently in the Washington, DC, area and Pennsylvania.

On September 11, 2001, and in the days and weeks since, Amateur Radio operators have demonstrated their readiness, perhaps as never before. While Amateur Radio Emergency Service and Radio Amateur Civil Emergency Service training might not have readied them to fully comprehend the terrible events of that day, Amateur Radio operators were among the first to volunteer their stations, their skills and themselves.

"The SET is cancelled; this is the *real thing*!" said ARRL New York City-Long Island Section Emergency Coordinator Tom Carrubba KA2D, who only weeks earlier had been outlining plans for his section's Simulated Emergency Test in October. The events of September 11 changed all of that, and without the luxury of the sort of advanced warning that might occur in a weather-related disaster. Amateur Radio was up against its greatest challenge ever.

"We found ourselves faced with a disaster that no one in their wildest dreams could have ever imagined," Carrubba said. "And this one was right in our own backyard."

"This is Not a Test!"

Providing emergency communication tops the list of reasons that validate Amateur Radio in the eyes of the FCC. Given the ubiquity of the cellular telephone these days, some have predicted this particular mission would evaporate. When the terrorists struck in New York City and Washington September 11, however, commercial telecommunications systems—wired and wireless—were severely compromised. New York City broadcasters using the World Trade Center antenna went dark.

As soon as the nature of the threats was recognized, federal, state and local officials declared states of emergency. Along with other federal agencies, the FCC shut down. No one knew what to expect. RACES teams found themselves suddenly and unexpectedly activated, not just in the immediately affected areas of New York City and Washington, DC, but across the US. ARES groups went on alert everywhere.

Montgomery County, Maryland, Deputy RACES Officer John Creel, WB3GXW, said nothing in his experience had prepared him for "the feeling that went through my mind when I picked up

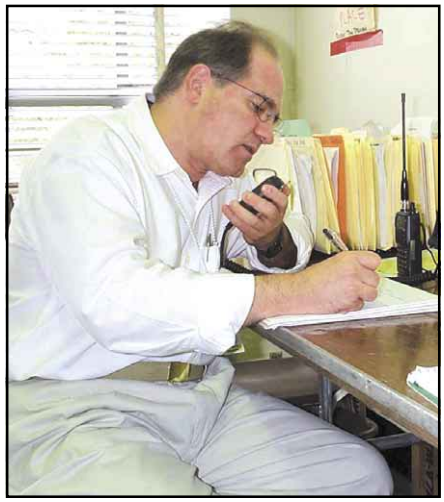
ARRL

American Red Cross Disaster Telecommunications Staff Partner Jay Ferron, N4GAA (right), points to Ground Zero as ARRL President Jim Haynie, W5JBP (center), and ARRL Hudson Division Director Frank Fallon, N2FF, look on.

ARRL

At the American Red Cross radio room in Brooklyn, Daytime Shift Manager Mark Dieterich, N2PGD (standing), checks the volunteer shift schedule. Simone Lambert, KA1YVF, handles schedule management from the World Trade Center Disaster Relief Communications registration Web site. Both volunteered from Rhode Island.

ARRL



John Allocca, WB2LUA, was among the operators at the Red Cross Brooklyn headquarters.

the microphone and said the words, 'This is not a test!'"

Americans were just learning of the events unfolding at the World Trade Center when the Pentagon attack occurred and a fourth aircraft crashed in rural western Pennsylvania. In the immediate aftermath of the crisis, telephone lines were jammed, and cell systems overwhelmed. Chaos reigned.

Amateur Radio played a role in helping to restore order. "Never have I felt more strongly about what a great privilege it is to be part of the extraordinary global community of Amateur Radio," declared ARRL President Jim Haynie, W5JBP, as amateurs sprang into action to do their part.

New York City-Area Amateurs Respond to "The Real Thing"

Terrorists had crashed two airliners into the World Trade Center. The famed Twin Towers then collapsed, setting off a chain of events that involved all of New York City's rescue services. With air travel suddenly suspended, countless passengers found themselves stranded with nowhere to go.

The first to respond were New York City firefighters, police and other rescue workers. Many of them were lost as the buildings fell. Most are still unaccounted for. As this is written, the total number of people missing stands at more than 6400.

As it turned out, New York City's Office of Emergency Management had been located on the 21st and 22nd floors of the World Trade Center. Many local officials had been evacuated to the mayor's "bunker" nearby. It also became unusable in the hours after the attack.

ARRL Hudson Division Vice Director Steve Mendelsohn, W2ML, works for ABC News and was in Manhattan during the World Trade Center attacks. He called the scene there "surreal," with police checkpoints set up along highways and military jets criss-crossing the skies above the city.

Former ARRL Headquarters staff member Warren Stankiewicz, NF1J, was in Manhattan from the West Coast on business when the attacks occurred. "The damage is unbelievable," he reported the evening of the attacks. "Grand Central was a panic, and the trains were packed beyond belief. I talked to one woman who had walked four miles with borrowed shoes to get to the train."

But, as Mendelsohn was to later observe, "A city thought of by many as cynical pulls together as few others have in times of crisis."

With a state of emergency in effect, Amateur Radio's resources soon mobilized. Ivan Rodriguez, KC2CHE, of Brooklyn, told ARRL that the New York City ARES net came alive within five minutes of the first plane attack. "It's the first thing I thought about," he said. "We may be needed."

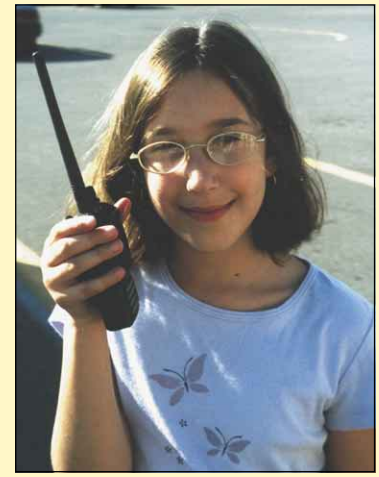
Answering the Call

As lower Manhattan quickly took on the look of a war zone, New York City ARRL District Emergency Coordinator and RACES Radio Officer Charles Hargrove, N2NOV—who served as the ARES/RACES incident commander—put out a call to the ARES and RACES leadership. Hargrove and his staff found themselves thrust into the midst of the activation.

New York City-Long Island Section Manager George Tranos, N2GA, huddled with Carrubba at the SEC's Long Island home as the activation got under way. ARES and RACES concentrated their efforts to provide support for the New York City OEM and for American Red

The Youngest Volunteer

FRED HOLTZ, K2PSY



Beverly Holtz, KC2IKT

Ten-year-old Beverly Holtz of Huntington, Long Island, New York, was distraught after hearing of the tragedy at the World Trade Center.

"I slowly explained what the news footage meant," said her father Fred Holtz, K2PSY. "The first thing she said was that she wanted to help."

Neither of them realized just how soon she would get the chance.

About six years ago Fred Holtz had revived his interest in Amateur Radio. Soon his young daughter showed an interest in the hobby. Together they studied the electronics, and Beverly was especially interested in the questions on emergency procedures.

"I told her that they were very important and you never knew when you would need them," Holtz said.

Father and daughter joined the local radio club and started going to meetings. Eventually she took the FCC exam for the Technician license and passed! She couldn't wait for her license to arrive and was ready to get on the air.

Beverly's new ticket finally arrived Friday, September 14, and she was officially KC2IKT. The next day she and her dad were running errands in the car, listening to an emergency net on a local repeater, when they heard a call go out for volunteers to staff a shelter as part of the response to the World Trade Center attack.

"We can do that!" Beverly told her dad. Fred Holtz called net control and explained that his daughter was only 10 and wanted to help.

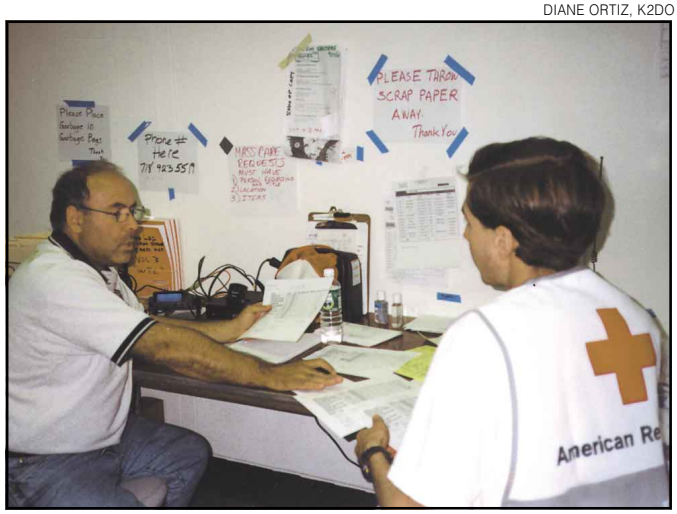
"No problem," they were told. That afternoon they reported to the Red Cross shelter in Valley Stream, New York. Some 40 European students were staying at the shelter after being stranded when flights were cancelled at the nearby airports in New York City.

Using her dad's hand-held transceiver, Beverly answered questions from net control, relayed health-and-welfare traffic and was the only radio operator for the entire eight-hour shift.

"I was very impressed that [net control] treated her as an equal and that she was able to do it," her dad said. "She really had a trial by fire!"

Beverly said that the eight hours seemed like one hour. "I can't wait to do more," she said. "It made me feel good to help."—*Diane Ortiz, K2DO*

DIANE ORTIZ, K2DO



David King, AA2KV (right) gets an assignment from Dave Pizzino, WB2EAR, who's handling radio duties at the Red Cross Headquarters in Brooklyn.

DIANE ORTIZ, K2DO

ARRL Manhattan Emergency Coordinator John Kiernan, KC2UN, works the phones during the New York City activation.

New York City Broadcasters Regroup

The collapse of the World Trade Center brought down the master TV transmitting antenna that served most New York City broadcasters as well as amateur and other repeaters. "The broadcast community is in absolute shock," said Hudson Division Vice Director Steve Mendelsohn, W2ML, who works for ABC News. "We all knew transmitter engineers, we all knew people who worked up in those towers near those big television transmitters, and they're gone."

TV and radio stations that had sites on the World Trade Center rushed to make other accommodations, Mendelsohn said. WCBS, channel 2, which maintained a backup transmitter site on the Empire State Building, offered assistance and space to help the other stations get back on the air from its site, he said.

"None of the other transmitters exist anymore. They're in the rubble along with the master antenna system, hundreds and hundreds of two-way radio system antennas, and boxes and, of course, untold thousands of people who perished."

One antenna site now being used by some New York City broadcasters is the Alpine, New Jersey, tower erected decades ago by Major Edwin Armstrong, the inventor of FM. The 425-foot tower is located on the Palisades overlooking the Hudson River. Several stations were operational with low power from the Alpine site. Other stations switched to back-up sites elsewhere in the city, but a permanent central site to replace the World Trade Center remains under study.

MICHAEL FENICHEL, KB2OLW

WPIX transmitter engineer Steve Jacobson, N2SJ, shown here atop the World Trade Center, was among those lost when the building was attacked and collapsed.

Cross relief and recovery efforts. The logistics were unbelievable.

Hundreds of Amateur Radio operators from the Greater New York City area answered the call for assistance. Some of the first deployed were from Long Island. In the hours after the attack telephones, cell phones, pagers and other wireless devices were rendered unusable. For as much as a 50-mile radius there was difficulty getting a dial tone, and Internet service was spotty.

Hams communicated via the area's main repeaters, most of which were unaffected by the disaster. Nets were established, and the trained cadre of volunteers, experienced and ready, were organized and dispatched under Hargrove's and Carrubba's joint leadership.

The common ARES/RACES emergency net established on Manhattan's WB2ZSE 147.000 MHz repeater promptly became the primary conduit for emergency traffic. "It made things seamless, and everyone knew what was going on," Carrubba explained. "You don't have to monitor several radios."

Amateurs also shadowed some New York City officials, handled medical traffic, stood by at hospitals and prepared to assist the American Red Cross Headquarters. Other ARES units stood by at local emergency operations centers. The American Red Cross Emergency Communications Service in Queens—one of the many area clubs and organizations that contributed the use of repeaters and spread word that volunteers were needed—activated an emergency net on its WB2QBP repeater. A New York State RACES net was operational on 7.248 and 3.993 MHz handling emergency and government-related traffic.

The Red Cross Role

The Red Cross opened a command center in its Brooklyn headquarters, which became a staging area for the Red Cross Emergency Response Vehicles—or ERVs—as well as for volunteer personnel and supplies. A dozen Red Cross shelters soon were up and running around the clock, with Amateur Radio providing operators, equipment and expertise. In the early hours and days of the response, finding victims trapped in the rubble was foremost on everyone's mind.

Hams were assigned to Red Cross headquarters, the various shelters and other subsidiary Red Cross sites around the area, including the five New York City boroughs—Manhattan, Queens, Brooklyn, Staten Island and the Bronx—plus New York's Westchester, Nassau and Suffolk counties and across the Hudson River in New Jersey. ARES-staffed nets provided the needed communications support, coordinating shelter health-and-welfare traffic and logistics.

Carrubba said the high call volume continued to tax the telephone system in lower Manhattan. Telephone service was available, but it often took 15 or 20 tries to get a call through, so ham radio was bridging the gap. "American Red Cross communications are overloaded, and traffic from the shelters is coming into the New York City net at a rapid pace," he said on Day Two of the response. "The Amateur Radio ops are doing a great job under very difficult and strange conditions, but this is what they have trained for; they are getting it done well."

SM Tranos made announcements and helped coordinate the efforts of the ARES staff. Key players in addition to Tranos, Carrubba and Hargrove, included Manhattan ARES Emergency Coordinator John Kiernan, KE2UN, and the Red Cross's Jay Ferron, N4GAA.

ARRL

New York City-Long Island SEC Tom Carrubba, KA2D (left), and New York City ARRL District Emergency Coordinator and RACES Radio Officer Charles Hargrove, N2NOV, compare notes on the ARES/RACES effort.

Other ham radio volunteers were dispatched to staff, establish and maintain communications among the World Trade Center disaster site, Red Cross on Amsterdam Avenue in New York, Red Cross Queens Chapter, the multiple Red Cross shelters in Manhattan and Shea Stadium—home of the New York Mets—where a staging and relief area for the thousands of emergency workers had been set up.

At least in the early going, ham volunteers being transported from the Brooklyn Red Cross facility had to be self-sufficient. Dual-band (VHF/UHF) mobile radios, power supplies, magmount antennas, coax, power cables, boots, dust masks and even respirators, latex gloves, bottled water and snacks were among the requirements for those stationed near "Ground Zero," as it came to be called, where conditions were frequently described as hellish and protective equipment and clothing were a necessity. Shift after shift of volunteers trekked to and from assignments burdened with bulging backpacks.

"This requires a big commitment," Tranos advised. The shifts were 12-plus hours, and often it required considerable time to get credentials and transport in and out of restricted areas, especially at Ground Zero.

Amateur Radio operators volunteered from as far away as Canada, Maine, Texas and California. Several visiting hams from outside the area rolled up their sleeves, including Robert Gissing, VE3ZLV, who assisted the Red Cross in Brooklyn. Suresh, VU2LOT, an Indian ham who was already in Northern New Jersey offered his services. Professional firefighter Wayne Souza, KA1LH, from Fall River, Massachusetts, had hoped to volunteer with his New York City brethren but was told his unit was not needed. Souza decided instead to get involved in the ham radio effort. "It was one way that I could still help," he said. ARES initially turned away most long-distance offers of help because there were no provisions to house the volunteers, entry into New York City was difficult, and parking next-to-impossible.

Even so, many wouldn't take no for an answer and said "I'm coming," despite the requirements and risks involved. SEC Hargrove said the outpouring of people who wanted to help was tremendous. "It's

ARRL

Volunteer Robert Gissing, VE3ZLV (left), briefs ARRL President Jim Haynie, W5JBP, at Brooklyn Red Cross headquarters.

DIANE ORTIZ, K2DO

NYC-LI SEC Tom Carrubba, KA2D (left), and NYC-LI SM George Tranos, N2GA, check the volunteer grid for openings.

been hard to keep people away," he said. "That's the kind of disaster it was." The Red Cross's Ferron agreed. "The Amateur Radio community has come out very big and very strong," he observed.

Tranos put it more succinctly. "I'm very proud of my section," he said.

Across the River

New Jersey amateurs also mustered their resources as the emergency unfolded. Hospitals had been designated and shelters set up across the Hudson River to handle any overflow from New York City.

ARRL Northern New Jersey SEC Steve Ostrove, K2SO, said that dozens of amateurs from his section helped with emergency communications following the attacks. Amateur Radio operators were stationed at four Red Cross shelters in New Jersey, helping to back up the spotty telephone communication. Among other things, the shelters provided a haven for those unable to return home because of restricted traffic into Manhattan. Northern New Jersey operators also supplemented and relieved the New York City ARES team.

A Red Cross emergency net ran on the NO2EL 145.37 MHz repeater, and an ARES net was activated on the WS2Q repeater, with liaison to New York City's ARES/RACES net on 147.000 MHz. The nets were able to coordinate volunteer efforts and blood donations. Several Red Cross chapters in New Jersey were linked by Amateur Radio.

According to Rich Krajewski, WB2CRD, the Jersey City Amateur Radio Club was called on to assist the Red Cross after their repeater atop the World Trade Center was lost in the building's collapse. Club member Stan Daniels, KB2FY, and John Hunter, KE2ZZ—who drove from South Jersey to help—were the backbone of an effort that set up a 2-meter station that allowed communication with local emergency officials and a Red Cross net. Hams also added 2-meter capability to Red Cross emergency vehicles to help them keep in touch as they delivering cots, meals and supplies to shelters in Hudson County.

About a dozen members of the David Sarnoff Radio Club voluntarily activated N2ARC on the 146.46 MHz repeater September 11 to help the American Red Cross Central New Jersey Chapter in Princeton Junction.

Doing The Iron Man Act

A regular cadre of volunteers—two dozen or more per shift—settled into a routine. Hundreds of prospective volunteers signed up via the World Trade Center Disaster Relief Communications registration Web site, developed at the suggestion of Suffolk County DEC Bill Scheibel, N2NFI, by Joe Tomasone, AB2M. "It allows us to make the best use of the volunteers," Carrubba said. The system worked superbly.

Ham volunteers provided their own protective gear and arranged transportation to and from dispatch locations, often carpooling and sharing resources. Yaesu, ICOM, MFJ and other suppliers came forward with loans of transceivers and accessories.

Amateur Radio volunteers were rotated in and out of areas and duties in an effort to equalize the stress. The mood remained largely positive as the response extended past Day 10, Carrubba reported. Still, volunteers were getting tired, and some needed to return to their normal lives and jobs. Shifts scheduled to run 12 hours typically were much longer. "The first 30 or 40 hours everybody does 'the iron man act,' I call it, because they're running on adrenaline," Carrubba said. After that, he said, everyone realized they need some rest and unwound a little bit. "The people that are going back are fresh."

One early volunteer, ARRL member John Stuart, K1OE, of Rowayton, Connecticut, found himself inspired by the experience. After signing up and reporting, Stuart found himself part of a group of hams from eastern Long Island. "We each became the 'communications person' for shelters throughout lower Manhattan, reporting needs of the shelter to Red Cross headquarters through a net and also reporting, on hourly intervals, the personnel status of the shelter," he said. All told, Stuart spent about 20 hours in New York. "It was a great experience," he said. "I met a lot of wonderful people, the shelters are providing an important function, and the hams are *the* communications backbone of the operation."

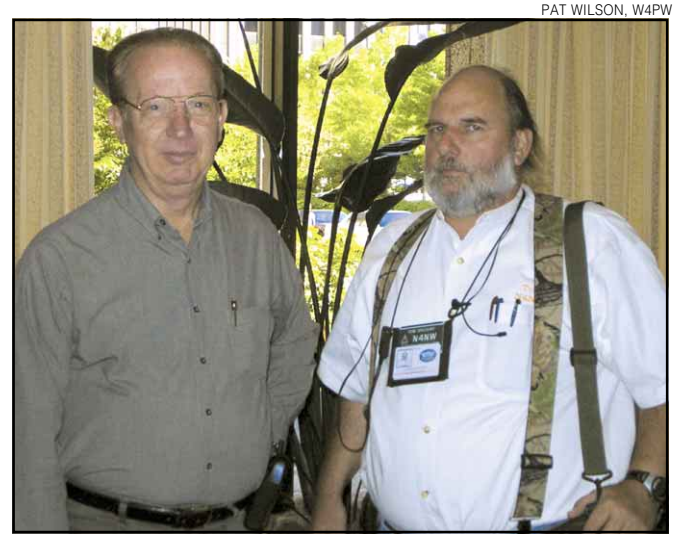
ARRL President Haynie took an opportunity September 21 to visit with some of the New York-area hams at the heart of the communication effort. "On behalf of the 680,000 ham operators in the US, thank you for doing such a fine job," he said.

ARRL Hudson Division Director Frank Fallon, N2FF, accompanied Haynie on his visit. "From the very first day I have been proud of the way ARRL members in the Hudson Division responded in overwhelming numbers," Fallon said. "So many responded that many, unfortun-

TOM GREGORY, N4NW

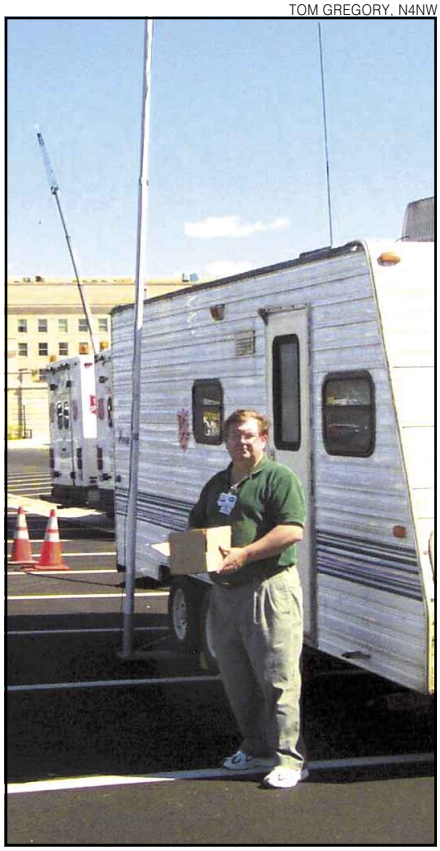
Shift change at Salvation Army Arlington Headquarters, where Jerry Shadle, WA3UTL (left), and Spike Boyd, K9MX, were among the operators for the ARES Pentagon recovery support.

PAT WILSON, W4PW



ARRL President Jim Haynie, W5JBP, and ARRL Virginia SEC Tom Gregory, N4NW.

TOM GREGORY, N4NW



Lewis Cheek, K4HR, assisted in configuring the repeater and duplexer on the temporary repeater on loan from the Stafford Amateur Radio Association to Virginia ARES to support the Salvation Army Disaster Relief operation. Tom Harmon, AK1E, who served as incident commander, provided the small trailer housing the machine. The south face of the Pentagon is in the background. This photo was captured prior to US Department of Defense restriction on photography in the vicinity of the recovery operation.

ately, were turned away." Ultimately some 500 amateurs would answer the call for volunteers.

"It really has been our finest hour! It has made us all very proud to be Amateur Radio operators," Fallon said.

John MacInnes, a Red Cross communications officer based in Tucson, Arizona, approached Haynie with high praise for the Amateur Radio community and for ARRL. "We wouldn't be where we are today without the ham radio operators," he said. He told Haynie that he should be very proud of his organization and asked him to relay his message of thanks throughout the amateur community.

The New York City ARES/RACES operation in support of the American Red Cross stood down the week of September 23.

Washington, DC-Area Hams Rally to Support Pentagon Response

In the Washington, DC, area, Amateur Radio rallied in response to the attack on the Pentagon. Montgomery County, Maryland, RACES was activated right away and remained on alert for about a day, as local governments provided what support they could to the Pentagon disaster site. In the immediate aftermath, Montgomery County RACES Deputy Radio Officer Creel characterized the mood of the Amateur Radio community as "somber but professional."

Amateurs provided reliable communication among five civilian hospitals in Montgomery County in anticipation of casualties. Later, the RACES team aided the American Red Cross to overcome telephone system overload. Creel reported that the telephone and cellular telephone system in the DC area was rendered useless within a short time. "It just didn't hack it," he said.

A Federal Emergency Management Agency team was among those that checked into the RACES net the day after the attack to seek possible communication support.

"If you're not a member of an ARES or RACES group, now's the time to seriously consider joining," Creel said, adding his voice to the growing chorus of those recommending that Amateur Radio operators be ready to respond and react. He said it was difficult for him to turn away offers of help from non-members who would not have been allowed access given the "lock-down" situation that followed the attack on the Pentagon.

ARES Marshals Support for Salvation Army Effort

In response to a request from the Salvation Army, Virginia Section Emergency Coordinator Tom Gregory, N4NW, put out a call for hams in the Washington, DC, area to support the Salvation Army's volunteer effort. Amateurs were needed to provide communication to coordinate trucks and supplies. Maryland-DC SEC Mike Carr, WA1QAA, assisted in recruiting volunteers, and Chuck Rexroad, N4HCP, assisted Gregory in the early stages to coordinate the volunteer response.

Gregory said many of the more than 100 volunteers who reported for duty between September 11 and September 18—when the ARES group stood down—gave up time with their families and their jobs. In a few cases, he said, he even wrote letters to employers requesting that volunteers be allowed time off to work the incident.

At the peak of the activation, Gregory reported an "upbeat" crew of about two dozen Washington, DC, area amateurs staffing six Amateur Radio stations in the immediate vicinity of the Pentagon. Yaesu arranged to loan equipment to the operation.

The ARES activation—with Virginia ARES District 4 Emergency Coordinator Tom Harmon, AK1E, as incident commander—provided logistical support between the Salvation Army's relief and recovery effort on site and the agency's Arlington headquarters. The Salvation Army was providing food and refreshments to the crews engaged in the Pentagon investigation and recovery.

Initially, a portable repeater was set up in a parking lot. The unit let hams run H-Ts at their lowest power settings to conserve batteries. A net was established on the Alexandria 145.17 MHz repeater for the canteen units, and an operator was detailed to the Salvation Army headquarters in Alexandria.

Operating conditions were less than ideal. "What we're finding is that communication is very difficult because of the tremendous amount of noise from the construction-type equipment and the generators providing power for the lights and support staff," Gregory said as the response was ramping up. Because of the noise level, on-site managers opted to rotate operators in and out of the immediate vicinity of the attack as frequently as possible.

"There's the emotion of it, and there's the tremendous amount of noise, and it's very grating on you because you can hardly hear the radio to communicate," Gregory explained. In addition, the cellular telephone network was swamped, and, because the Pentagon remained open, there was a lot of other RF in the vicinity to complicate matters.

But Gregory said what shocked him the most was the devastation visible 100 meters from the building. "The destruction is total," he said.

Gregory described the entire area as "very crowded with people" inside and outside the Pentagon. "People and equipment cleaning up, finding bodies, finding plane parts, firefighters still checking for hot spots, hoses, equipment," he said. "The damage to the building looks worse when you are right next to it than it does on TV."

The site remained under an umbrella of tight security, and soldiers armed with M-16s and police controlled entry to the fenced-in compound. A temporary road was constructed from Washington Boulevard extending several hundred feet to the hole in the building in order to move

heavy equipment. Hams who volunteered had to run a strict security gauntlet. "Candidly, if you have outstanding parking tickets or some other issue where you may be wanted, you will not get an access ID but may get taken into custody!" Gregory warned potential volunteers.

Harmon put it another way: "Security is so *tight* that the wind does not blow across the parking lot without approval."

Gregory said that newcomers viewing the ghastly damage for the first time often were speechless. "I found that it took me a few minutes to realize the gravity of what was going on and the importance of what we hams are doing in our own small way to help out," Gregory said. "The devastation of that building is awesome, and it puts things in perspective and it certainly made me proud to be an Amateur Radio operator and serve the people of the United States by offering this support."

ARRL President Haynie briefly visited the ARES Pentagon team September 17. Gregory said he appreciated Haynie's encouragement at a difficult time. Accompanying Haynie were ARRL First Vice President Joel Harrison, W5ZN, FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth, and ARRL Virginia Section Manager Carl Clements, W4CAC.

Haynie spoke briefly on the net and thanked the amateurs on hand for volunteering. Hollingsworth—initially called in to check into the possibility of interference to the Pentagon site repeater—volunteered to operate, if needed, and offered to loan the ARES team the ham gear he had in his vehicle, Gregory said.

Gregory said amateurs who volunteered did not let their emotions get in the way of doing a good job. "It's helping them to help out," he said. "It's part of the healing process."

As the Salvation Army regained the ability to manage its own support operations via telephone, the need for Amateur Radio ended September 18, and the supporting ARES operation terminated.

"Amateur Radio performed exactly as it was supposed to," Gregory said afterwards. "We responded to the need to provide communications where none were available." He said the Virginia ARES organization stands ready to jump in again "at a moment's notice" if the need arises. "If someone calls on us, we're ready to respond," he said.

Harmon said he continued to be impressed throughout his time at the Pentagon site by all those who volunteered. "Position and job are relatively unimportant," he said, since *all* folks there are required to make that small town function."

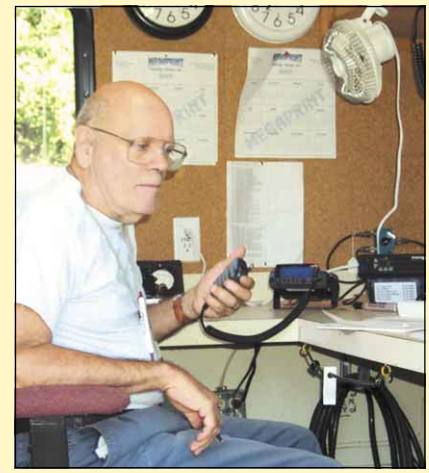
Georgia Amateurs Travel "Up North" to Help

A group of Georgia amateurs accompanied Southern Baptist Convention Disaster Relief crews to the New York City area in the wake of the September 11 terrorist attacks on the World Trade Center. The hams provided communication support to the Convention's mobile kitchens and shower units, deployed at the request of the Federal Emergency Management Agency.

The communications van of the Chattahoochee Baptist Association Amateur Radio team was stationed at a staging area at the Raritan Valley Baptist Church in Edison, New Jersey. Operating as W4CBA, the volunteers in Edison utilized the nearby New Jersey Institute of Technology Amateur Radio Club's K2MFF 147.225 MHz repeater in Newark to communicate with deployed kitchens and showers in the old Brooklyn Navy Yard and near Ground Zero in Manhattan. Amateurs were accompanying volunteers from eight states into the field as they served meals to relief workers and displaced residents.

According to Jackie Whitlock, N4JJW, the call from FEMA came the day after the attacks. By September 14, two kitchens had been deployed, with a third unit in reserve at Edison. In their first 36 hours on the scene, 89 volunteers had served more than 7500 meals at the Manhattan and Brooklyn sites.—*Brennan Price, N4QX*

ARRL



Ed Cravey, KF4HPY, at the controls of the Chattahoochie Baptist Association's W4CBA mobile unit in Edison, New Jersey. Cravey is an ARRL member from Gainesville, Georgia.

Another amateur team consisting of Vienna Wireless Society and Arlington County Amateur Radio Club members and other amateurs provided communication and technical support to the American Red Cross relief effort at the Pentagon site. Arlington County ARES Emergency Coordinator Alan Bosch, KO4ALA, said his team was able to stand down September 22.

Hams Support Western Pennsylvania Crash Site

At the so-called "fourth" plane crash site in rural Somerset County western Pennsylvania, Kevin Custer, W3KKC, reported a busy scene as the investigation continued. Custer, who lives nearby, had arranged preliminary repeater communication into and out of the crash site to help the Red Cross, Salvation Army, Pennsylvania State Police, the FBI and other state and federal agencies on the scene.

"I have communications in place for hand-held coverage of the crash site to our local emergency operations center and three surrounding counties," he said. Eric Hegerle, N3VOC, of the Salvation Army Team Emergency Radio Network reported that SATERN used three linked repeaters for communication between Pittsburgh and the crash site.

"Things have calmed down since the FBI has taken over the site and has secured it as a crime scene," Custer reported a few days into the response. "This place has literally turned into a small city."

Amateurs Contribute to SHARES, SATERN

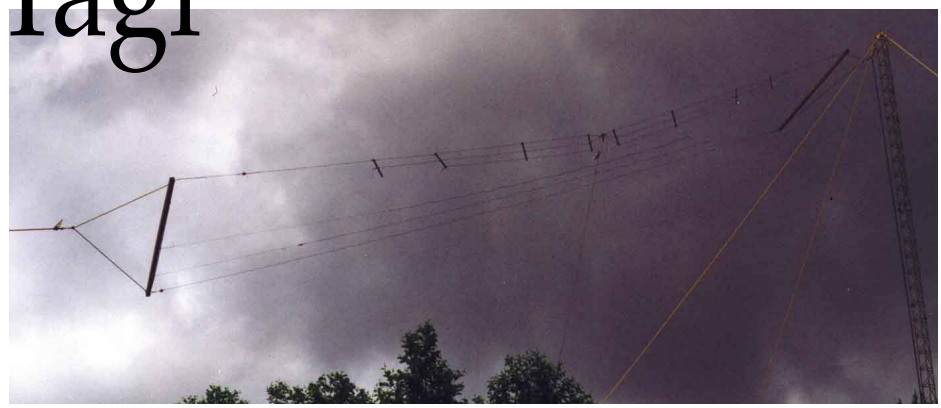
The World Trade Center attack prompted an immediate response from the SHARES network of federal agencies assisted by the Amateur Radio operators who participate in MARS—the Military Affiliate Radio System. A little-known emergency service, SHARES—the HF "Shared Resources" program of the National Communications System, US Department of Commerce—allies MARS-certified amateurs with federal agency operators when normal communication breaks down. SHARES nets operate on government frequencies outside the amateur bands.

MARS and SHARES rely heavily on the availability of hundreds of trained volunteer operators throughout the 50 states provides as one of the keys to needed connectivity. Amateur participants—selected by Navy-Marine Corps, Air Force and Army MARS managers—provide skilled net control stations as

[Continued on page 59]

By Markus Hansen, VE7CA

A Portable 2-Element Triband Yagi



Have you ever dreamed about a portable beam you could use at your summer cottage, while camping or on Field Day? Dream no longer. This portable beam can be rolled up and stashed in your car's ski boot!

Several years ago I entered the ARRL November Sweepstakes CW contest in the QRP category, operating from a portable location. It turned out to be a very frustrating experience with only 3 W of output power and dipole antennas. After the contest I decided that the next time I entered a QRP contest it had to be with gain antennas.

My philosophy has always been to try to keep life as simple as possible. In other words, I look for the easiest way to accomplish a goal that guarantees success. Don't get me wrong: Dipoles work particularly well considering the time and effort put into making them. But adding a reflector to a dipole antenna increases the overall gain about 5 dB, depending on the spacing between the elements. This extra gain makes a significant difference, especially when you are dealing with QRP power levels. My 3-W transmitted signal would sound like a 9.5-W powerhouse just by adding another piece of wire! And it would be inexpensive too.

With Solar Cycle 23 in full swing, having an antenna with gain on 15 and 10 meters also became a consideration. Another parameter was the sale of the family van, which meant the new antenna had to fit into the ski boot of our car. Keeping these constraints in mind, I used a computer antenna-modeling program,

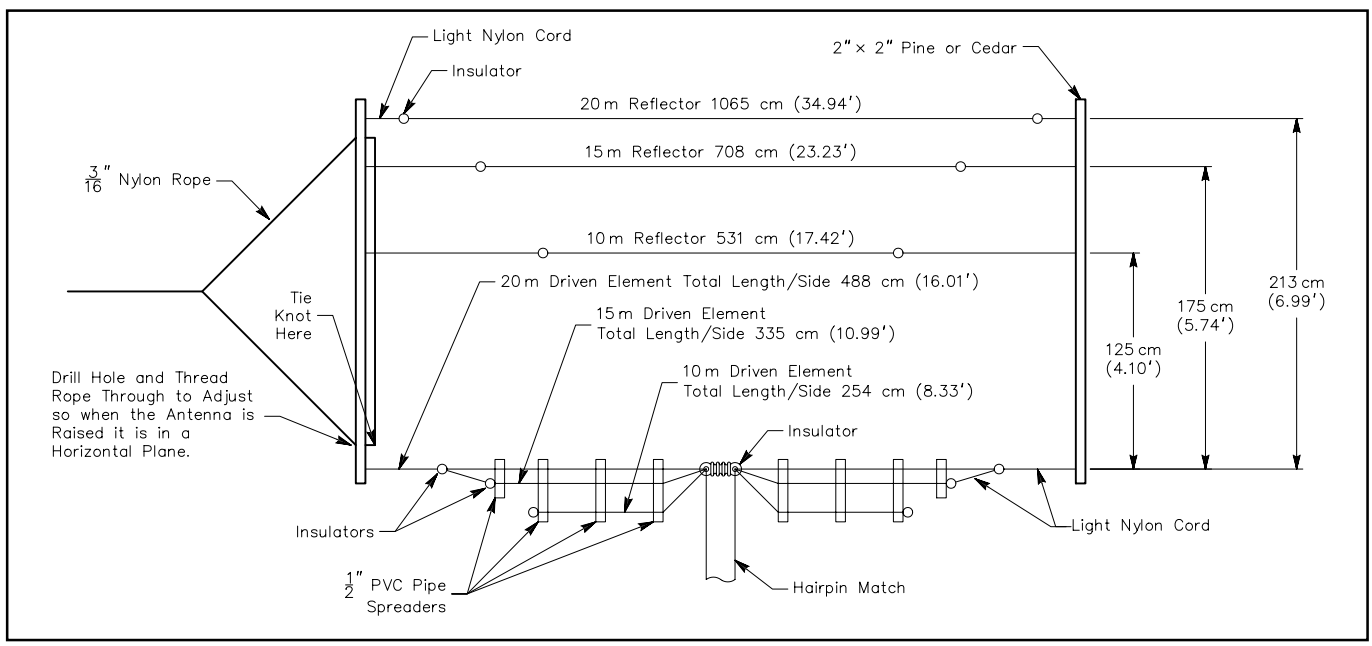


Figure 1—Dimensions for VE7CA's 2-element wire triband Yagi.

trying different design parameters to develop a triband 2-element portable Yagi using wire elements.

The basic concept comprises three individual dipole driven elements, one each for 10, 15 and for 20 meters tied to a common feed point, plus three separate reflector elements. The elements are strung between two 2.13-meter (7-foot) long, 2×2-inch wood spreaders, each just long enough to fit into the ski boot of the car. Use the lightest wood possible, such as cedar, pine or spruce to keep the total weight of the antenna as light as possible. Fiberglass poles would also work, or PVC pipe reinforced with maple doweling to ensure they don't bend. (Wood has the benefit of being easy-to-find and very affordable).

Adding a reflector element relatively close to the driven elements lowers the feed-point impedance of the driven element, so a simple hairpin match was employed to match the driven elements to a 50-Ω feed line. Figure 1 shows the layout and dimensions of the antenna.

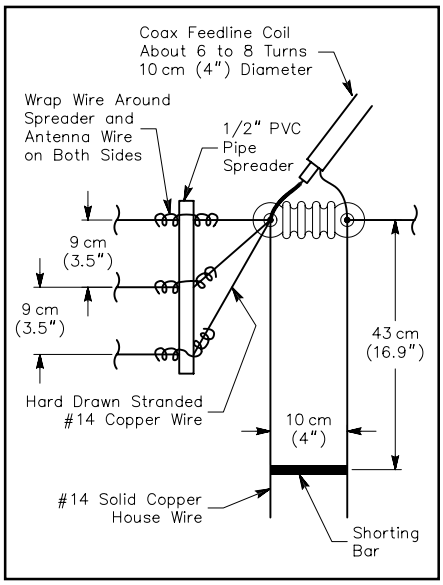


Figure 2—Close-up view of the feed point.

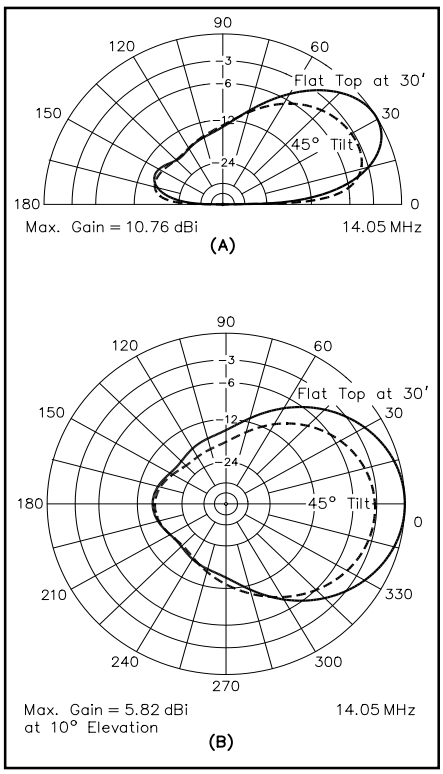


Figure 3—At A, comparison of elevation patterns for VE7CA Yagi as a horizontal flat top (solid line) and tilted 45° from vertical (dashed line). At B, comparisons of azimuth patterns for a 10° elevation angle.

The Hairpin Match

The matching system is very simple and foolproof. You should be able to copy the dimensions shown in Figure 2 and not need to retune the hairpin match, unless you plan to use the antenna in the top portions of the phone bands. The dimensions in Figure 2 produced a very low SWR—under 1.3:1 over the CW portions of all three bands. However, even in the lower portions of the SSB bands, the SWR doesn't rise above 2:1. SWR measurements were made at the end of a 25-meter (82-foot) length of RG-58 coax feed line.

Some may wonder why I used such a long feed line. First, when operating from a portable location it is better to be long than short. Nothing is more frustrating than finding that the coax you took along with you is too short. Further, when I change beam direction I walk the antenna around the antenna support, thus requiring a longer length than if I went directly from the antenna to the operating position.

If you are concerned about line loss you can run RG-58 down to the ground and larger-diameter RG-8 or RG-213 to the operating position. You may also find that in your particular situation a shorter length of coax will do. An 18-meter (59-foot) long piece of RG-58 has a loss of about 1 dB at 14 MHz, which is entirely acceptable considering the convenience of using coax cable.

Adjusting the Hairpin Match

If after raising the antenna the SWR is not as low as you want in the portion of the bands you plan to operate, first double-check to make sure that all the elements are cut to the correct length and that the spacings between the driven elements and reflectors are correct. Next you can adjust the hairpin match. Connect either an antenna SWR analyzer or a transmitter and SWR meter to the end of the feed line and pull the antenna up to operating height. Determine where the lowest SWR is on 15 meters. By moving the shorting bar on the hairpin match up or down you can adjust the lowest SWR point to the middle of the portion of the 15 meter band you prefer. If your preference is near the top end of 15 meters you may have to shorten the 15-meter driven element slightly. After adjusting the 15-meter element and hairpin match, adjust the 10 and 20 driven-elements lengths separately, without changing the position of the shorting bar on the hairpin match.

The hairpin match is very rugged. You can attach the feed line to it with tape, roll it up, pack the antenna away and even with the matching wires bent out of shape it just seems to want to work.

Antenna Support

Adhering to my constraint to keep things as simple as possible, I only use one support for the antenna, typically a tree. When the antenna is raised to its operating position it is a sloping triband Yagi. To achieve this, attach a rope to each end of the 2×2's to form a V-shaped sling, as shown in the Figure 1. Attach a length of rope to one sling and pull the antenna up a tree branch, tower or whatever vertical support is available. Tie a second length of rope to the bottom sling and anchor the antenna to a stake in the ground. By putting in two or three stakes in the ground around the antenna support, you can walk the antenna around to favor a particular direction. To change direction 180°, give the feed line a pull and the array will flip over. So simple but very effective!

Local or DX

One of the features of a sloping antenna is that you can adjust the take-off (elevation) angle. For example, if you are interested in North American contacts (whether for casual QSOs or the ARRL SS contest), then sloping the antenna away sideways from the support structure at 45° with the feed point approximately 8 meters (26 feet) above the ground, will yield a 20-meter pattern similar to Figure 3A. Here, the maximum lobe is between 10° and 60° in elevation. The pattern of the antenna in a flat-top horizontal configuration at 9.1 meters (30 feet) is overlaid for comparison. You can see that the tilted beam has better low-angle performance, but at higher angles has less gain than its horizontal counterpart. Figure 3B shows an overlay of the azimuth patterns for these two configurations at a 10° takeoff angle.

If DX is your main interest, then you want to position the antenna even closer to vertical to emphasize the lower elevation angles. Figure 4 shows the pattern

on 20 meters when the antenna is tilted sideward 10° away from vertical, again compared with the other orientations in Figure 3A. The feed point is 6 meters above ground and the model assumes fresh water in the far field, which is the case at my portable location.

Remember that the radiation pattern is quite dependent on ground conductivity and dielectric constant for a vertically polarized antenna. A location close to saltwater will yield the highest gain and the lowest radiation angle. With very poor soil in the near and far field, the peak radiation angle will be higher and the gain less.

I have had the opportunity to test this out at my portable location. Using two trees as supports, I am able to pull the antenna close to horizontal with the feed point about 7 meters above the ground. In this position, with 20 meters open to Europe, I have found it difficult to work DX on CW with 3 W of output power. However, when I change the slope of the antenna so that it is nearly vertical I not only hear more DX stations, but I find it relatively easy to work DX.

I have tried this many times, since it is simple to lower one end of the antenna to change the slope and hence the radiation take-off angle. The sloping antenna always performs much better for working DX than a low horizontal antenna. Recently, I worked nine European countries during two evenings of casual operating, even though the highest end of the antenna was only about 10 meters high, limiting the slope to about 45°.

Figure 5 shows the elevation pattern on 28.05 MHz for the beam sloped 10° from vertical at 45° from vertical, with the feed point at 8 meters height, again compared with the beam as a flat top at 9.1 meters (30 feet). With a steeper vertical slope, the 10-meter elevation pattern has broken into two lobes, with the higher-angle lobe stronger than the desired low-angle lobe.

This demonstrates that it is possible to be too high above ground for a vertically polarized antenna. Lowering the antenna so that the bottom wires are about 2.5 meters (8 feet) above ground (for safety reasons) restores the 10-meter elevation pattern without unduly compromising the 20-meter pattern.

Portable It Is

A winning feature of this antenna is that it is so simple to put up, take down, transport and store away until it is needed again. When I am finished using the antenna and it's time to move on, I just lower the array and roll the wire elements onto the 2×2's. I put a plastic bag over each end of the rolled-up array and tie the bag with string so that the wires don't come off the ends of the 2×2's. I then put it in the ski boot of a car, or in the back of a family van and away we go. At home, it takes very little space to store and it is always ready to go—No bother, no fuss.

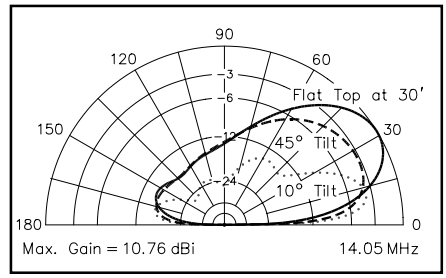


Figure 4—Comparison of elevation patterns for VE7CA Yagi as a horizontal flat top (solid line), tilted 45° from vertical (dashed line) and tilted 10° from vertical (dotted line).

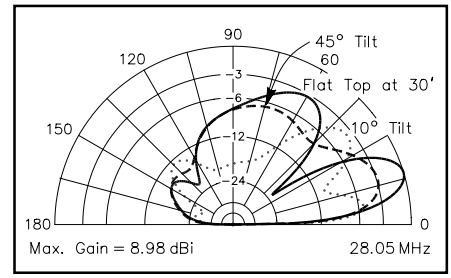


Figure 5—Same antenna configurations as shown in Figure 4, but at 28.05 MHz. On 10 meters, the flattop configuration is arguably best, but the 45° tilted configuration is not far behind.

Testimonial

How well does it work? It works very well. On location I use a bow and arrow to shoot a line over a tall tree and then pull one end of the array up as far as possible. For DX I aim for a height of 20 to 30 meters if possible. For the Canada Day, Field Day and Sweepstakes contests I aim for a height of about 15 meters. This antenna helped me to achieve First Place for Canada, in the 1997 ARRL CW Sweepstakes Contest, QRP category.

The ability to quickly change direction 180° is a real bonus. Late in the 1997 ARRL SS CW contest with the antenna pointed east I tuned across KH6ND. He was the first Pacific station I had heard during the contest and obviously I needed to work him. After trying many times to break through the pileup and not succeeding, I flipped the antenna over to change the direction 180° and then worked him on my next call. Figure 6 shows the azimuth pattern at 21.05 MHz for the beam mounted with a 10° slope from vertical. There is a very slight skewing of the azimuthal pattern because the slope away from purely vertical makes the antenna geometry asymmetrical.

VE7NSR, the North Shore Amateur Radio Club, has used this antenna sloped at about 45° for the last two years on 20 and 10 meters on Field Day with good success. The title photo shows the antenna attached to a tower during Field Day.

As they say, the proof is in the pudding. If you need a 20 to 10 meter antenna with gain, this has to be one of the simplest antennas to build, and it will work every time!

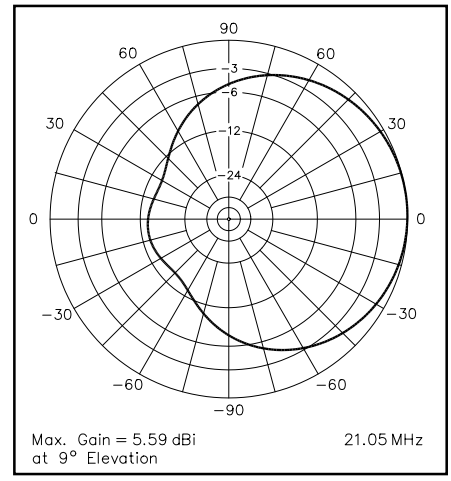


Figure 6—Azimuthal pattern for VE7CA Yagi tilted 10° from vertical on 15 meters.

Markus Hansen, VE7CA, was first licensed as VE7BGE in 1959. He has been a member of ARRL since he received his license. His main interests include DX, collecting grids on 6 meters, contesting and building his own antennas and various types of ham-radio equipment. He is also an ardent CW operator. Markus has had two previous articles published: "The Improved Telerana, with Bonus 30/40 Meter Coverage," in The ARRL Antenna Compendium Vol 4 *and "Two Portable 6-Meter Antennas" in* The ARRL Antenna Compendium Vol 5. *You can contact Markus at 674 St Ives Cres, North Vancouver, BC V7N 2X3, Canada, or by e-mail at* **ve7ca@rac.ca**.

You can download the EZNEC input-data files as ***VE7CA-1.ZIP*** *from ARRLWeb* (**www.arrl.org/files/qst-binaries/**).

By Dr H. Paul Shuch, N6TX

A Moonbounce Odyssey 2001

To fill an obscure yet important niche formerly filled by space probe Pioneer 10, radio amateurs built an EME calibration beacon that serves professional and Amateur Radio astronomers worldwide. As these hams discovered, calibrating ultra-high-gain receiving systems requires a special signal source.

On many occasions during the past four decades, several of the world's largest radio telescopes have been used to reflect interesting microwave signals off the Lunar surface, introducing hundreds of the world's Amateur Radio operators to the exotic world of EME (Earth-Moon-Earth) communications, or moonbounce. Operating under club call sign W2ETI, radio amateurs at the nonprofit, grassroots SETI League recently had an opportunity to return the favor, by providing astronomers at the Arecibo Observatory with a highly stable, precisely calibrated moonbounce signal with which to test their equipment. In the design, construction and operation of the Lunar Reflective Calibration Beacon for radio astronomy and SETI (funded in part by a NASA small equipment grant administered by the American Astronomical Society), these hams have demonstrated that the difference between amateur and professional is primarily fiscal.

Moonbounce

Radio amateurs have been exploiting the Earth-Moon-Earth (EME, or moonbounce) communications path for 40 years, using the Lunar surface as a passive reflector to extend the range of VHF, UHF and microwave signals. As a communications satellite (affectionately known as OSCAR 0), our Moon represents a low-gain transponder with only about 6 percent surface reflectivity. Its distance from the Earth is about 10 times greater than that of satellites in the Clarke geosynchronous orbital belt. The resulting high free-space isotropic path loss, coupled with various fading mechanisms, makes EME communications a challenge for the advanced amateur. Nevertheless, the ease of visually tracking this satellite makes the Moon a popular target.

The first successful amateur EME communications occurred in the 23-cm ham band at 1296 MHz, which is still a popular frequency for contemporary moonbounce activity. A significant portion of amateur and professional radio astronomical research is conducted in the adjacent 21-cm spectrum, at the 1420.40575-MHz emission frequency of neutral interstellar hydrogen. The typical hydrogen-line radio telescope (Figure 1) strongly resembles the low-power, low-cost (receive) half of a 23-cm EME station. Thus, many radio astronomers are

Figure 1—A typical hydrogen-line radio telescope.

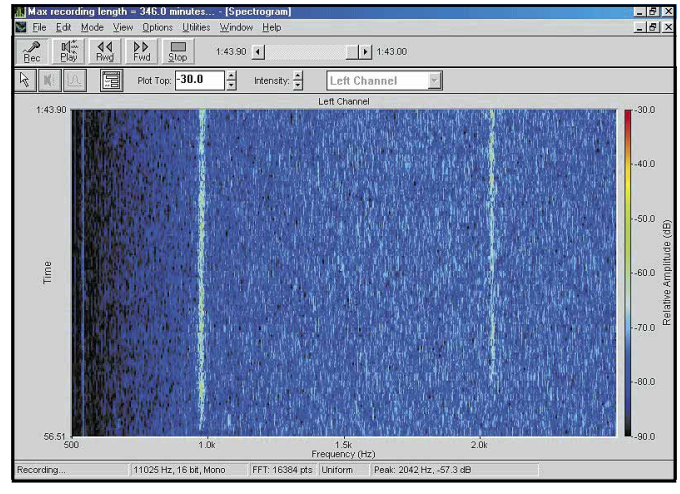


Figure 2—Amateur 1296-MHz EME signals received on an amateur 1420-MHz radio telescope (after digital signal processing).

able to receive amateur 23-cm EME emissions merely by tuning their receivers slightly lower in frequency (see Figure 2). In fact, members of the SETI League (who have collectively put 107 small radio telescopes on the air worldwide) frequently use weak amateur moonbounce signals to verify the proper operation of their equipment.

Searching for a Pioneer

Professional radio astronomers also require stable, weak extra-terrestrial signals to calibrate their much more sensitive receiving systems. For the past quarter century, a popular calibration source has been the weak microwave telemetry beacon aboard NASA's Pioneer 10 interplanetary space probe (Figure 3). Even over distances exceeding the radius of our solar system, this weak beacon has been detectable in waterfall spectrograph displays (Figure 4) using sensitive receivers on the world's great radio telescopes, such as the famed Arecibo observatory in Puerto Rico (Figure 5).

In March 2000, SETI League President Richard Factor, WA2IKL (Figure 6), chanced to be visiting colleagues at Arecibo as they were conducting observations in the SETI Institute's Project Phoenix targeted search for intelligently generated signals of extraterrestrial origin. For the first time, those radio astronomers found themselves unable to receive the trusty old Pioneer 10 beacon.

Table 1
Link Analysis of Pioneer 10 Beacon (March 2001)

Transmitter Output	8 W (+39 dBm)
Transmitter Freq	2320 MHz
Antenna Gain	+33 dBi
EIRP	+72 dBm
Path Loss	301 dB
Incident Power	–229 dBm

The spacecraft was now at a distance of about 11.5 billion km from Earth. Link analysis (Table 1) revealed the Pioneer 10 downlink signal to be about 1 dB weaker than the detection threshold of the Project Phoenix digital signal processors.

Remembering the numerous occasions on which Arecibo and other giant radio telescopes had been activated for EME DXpeditions over the years, Factor suggested that radio amateurs might be in a position to return the favor by developing an amateur EME beacon to provide a weak, stable calibration signal for the use of amateur and professional radio astronomers alike. The resulting system received modest NASA funding through the American Astronomical Society's small equipment grant program, and went on the air just one year later. With the exception of minor outages for maintenance and redesign, the beacon has been on the air ever since, illuminating the Moon at 1296.000 MHz any time it is above the horizon from Factor's New Jersey QTH.

Beacon Basic Blocks

A block diagram of the W2ETI 23-cm EME beacon is shown in Figure 7. To prove useful as a calibrator for radio telescopes, the utmost in frequency accuracy and stability is required. This is accomplished by locking all frequency-determining stages to a Thunderbolt GPS-disciplined reference oscillator (Figure 8) generously provided by Trimble Navigation (through the good offices of member Art Lange, W6RXQ). This drives a Hewlett-Packard synthesized signal generator with its own frequency counter for cross-verification (Figure 9), both obtained at pennies on the dollar through the eBay internet auction site. A cascade of linear solid-state amplifier stages from Steve Kostro, N2CEI at Down East Microwave (seen in Figure 10 atop a dc power supply) bring the transmit level up to 20 W. After feed line losses, half of the output signal reaches the antenna.

The antenna (Figure 11) consists of an array of four 15-turn RHCP helices (for transmitting), courtesy of SETI League member David Clingerman, W6OAL, of Olde Antenna Labs. A second quad helix array, this one LHCP, allows for reception of the mirror-reversed EME echoes. Each

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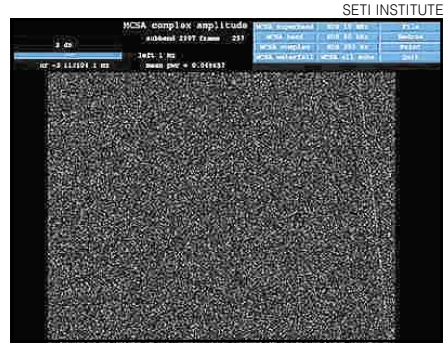

Figure 4—Pioneer 10 beacon as received at Arecibo, displayed on the Project Phoenix spectrograph (faint trace on right side of screen).

SETI LEAGUE

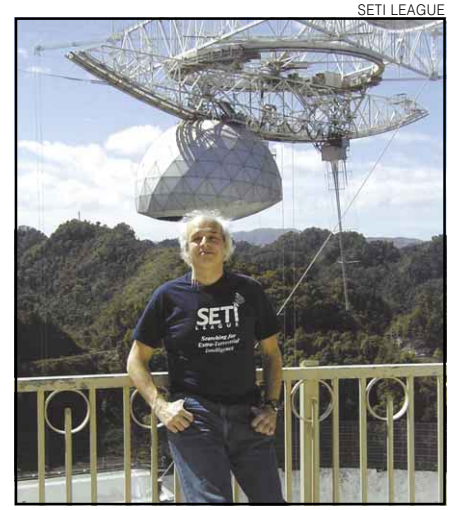

Figure 6—SETI League President Richard Factor, WA2IKL, visiting the Arecibo Radio Observatory.

JPL

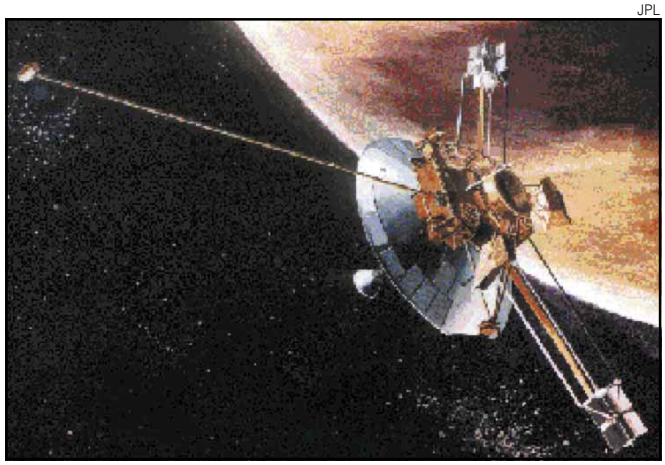

Figure 3—NASA Pioneer 10 interplanetary probe.

NAIC

Figure 5—The impressive Arecibo Radio Observatory.

quad array produces +24 dBic of gain. A parabolic reflector of even modest size would produce higher gain and stronger echoes. Because of the resulting narrow beamwidth, however, this approach would require precise Lunar tracking. By using more modest antennas, tracking precision is reduced—an important consideration for the continuous, unattended operation that this beacon requires.

The antennas do, in fact, track the Moon in real time, rotated in azimuth and elevation by a set of Yaesu G-5600B rotators under computer control via an L. L. Grace Kansas City Tracker board obtained through AMSAT. The *Nova* software suite contributed by Mike Owen, W9IP, locates the moon and does much more, as we'll see

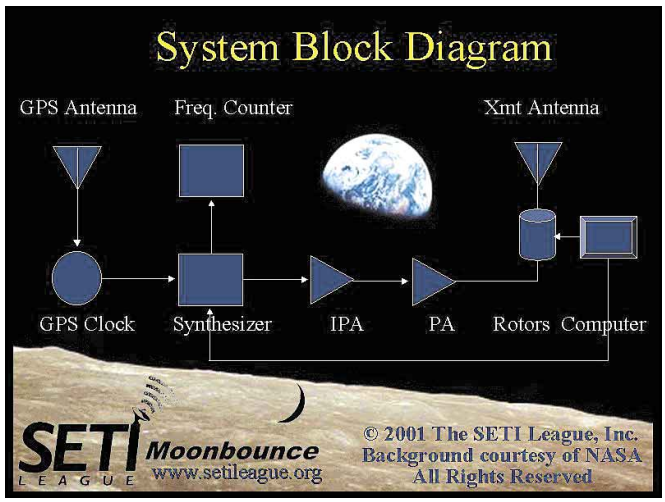

Figure 7—A block diagram of W2ETI's 1296-MHz EME beacon.

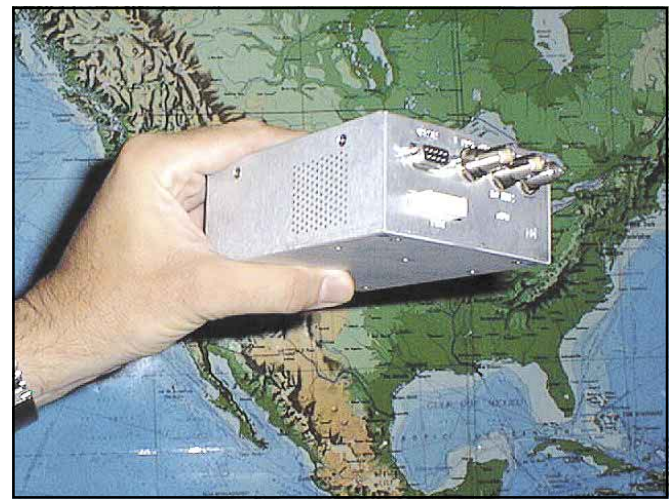

Figure 8—Trimble Thunderbolt GPS-disciplined clock.

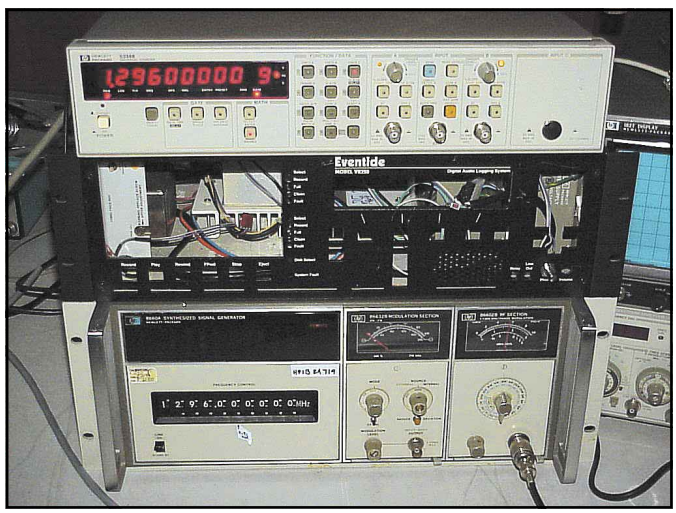

Figure 9—EME beacon exciter (see text).

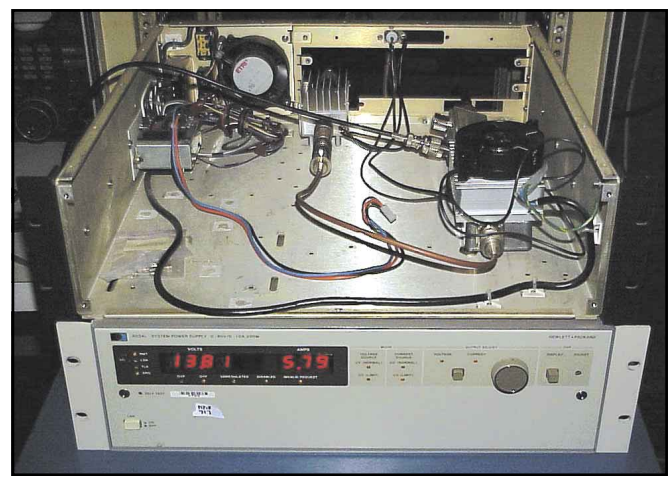

Figure 10—EME beacon intermediate power amplifiers (see text).

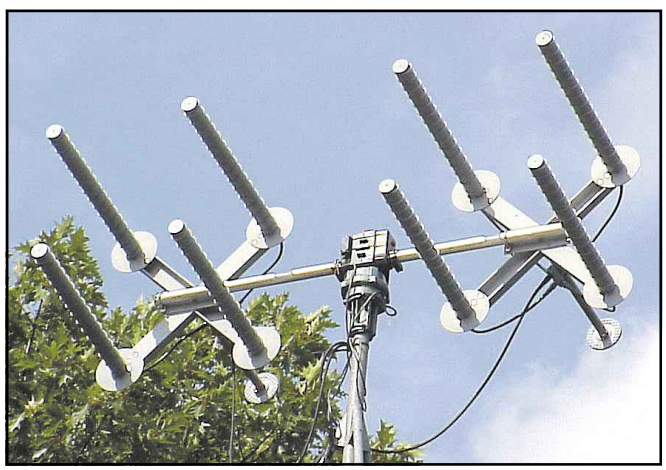

Figure 11—EME beacon antennas: four RHCP and four LHCP helices.

Figure 12—W2ETI station computers (see text).

Table 2
Link Analysis, W2ETI EME Beacon (March 2001)

Transmitter Output = 10 W (+40 dBm)
Transmitter Freq = 1296 MHz
Antenna Gain = +24 dBi
EIRP = +64 dBm
Path Loss = 271 dB
Incident Power = –207 dBm

below. Figure 12 shows the station computers, yet another eBay acquisition.

Note the power amplifier indicated in Figure 7, a stage not implemented in the EME beacon's initial configuration (but to be discussed later). Without it, the SETI League 23-cm EME beacon achieves an effective isotropic radiated power of +64 dBm, and its echoes illuminate the Earth at an isotropic power level of –207 dBm, as indicated in Table 2. Compared to the Pioneer 10 beacon specifications in Table 1, this is a signal about 22 dB stronger than the calibrator previously used at Arecibo.

First Light

Project Phoenix, which purchases dish time at Arecibo, had scheduled a four-week-long observing run to begin in early March 2001. Because the EME propagation path varies widely over time, it was desired to schedule First Light (initial testing of the EME beacon) for a date and time that would maximize our success potential. Fortunately, *Nova* facilitated such optimization, as shown in Figures 13, 14, 15, 16, 17 and 18.

Because the Moon's orbit is elliptical, its distance from Earth varies over the course of a moonth—er, month. Figure 13 is a *Nova* plot of how this distance varied during March 2001. It indicated Lunar perigee (closest approach to Earth) for March 8 to March 9, and apogee (greatest distance) for the 20th. Because greater distance translates into increased free-space isotropic path loss, an operating period about one week into the month appeared optimum.

The 23-degree inclination of the Lunar orbit also influences EME scheduling. Because the 305-meter-diameter cylindrical reflector at the Arecibo observatory is fixed and looks straight up, the antenna's steering is limited and Lunar passes directly overhead are favored. This suggests operating when the Moon is near its maximum northern declination, which Figure 14 suggests was to occur March 5. Perigee and maximum Lunar declination coincide only occasionally, and this time we seem to have gotten lucky.

Figure 15 shows the combined effects of declination and Earth-Moon distance. It allowed us to select March 8 as the optimum date for running EME tests with Arecibo. In fact, we did not achieve success until March 9, as the 8th saw the US Northeast gripped firmly in the arms of a blizzard, which encased the helix antennas in a coating of ice. There are some things that *Nova* cannot predict!

Because striking the Lunar surface with a grazing blow causes polarization scattering of the reflected signal, EME success is maximized when both stations view the Moon straight-on. That would occur at Lunar zenith if both transmitting and receiving stations were situated on the same meridian of longitude. Such is not the case for Arecibo and New Jersey. Fortunately, *Nova* calculates polarization scattering loss over time (Figure 16). Adding all of these temporal considerations (Figure 17), we see that for March 9, success

NOVA PLOTS

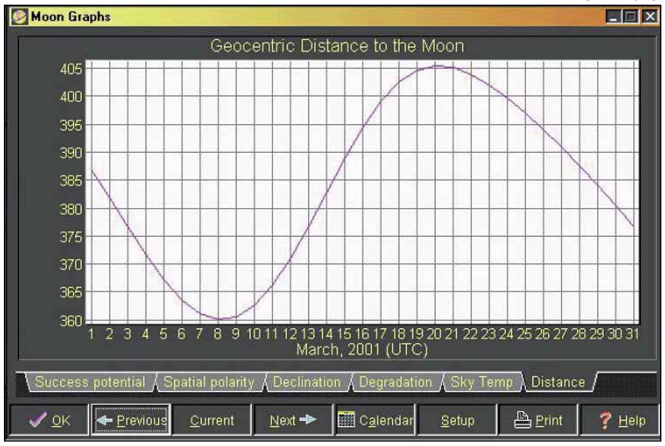

Figure 13—Earth-Moon distance for March 2001.

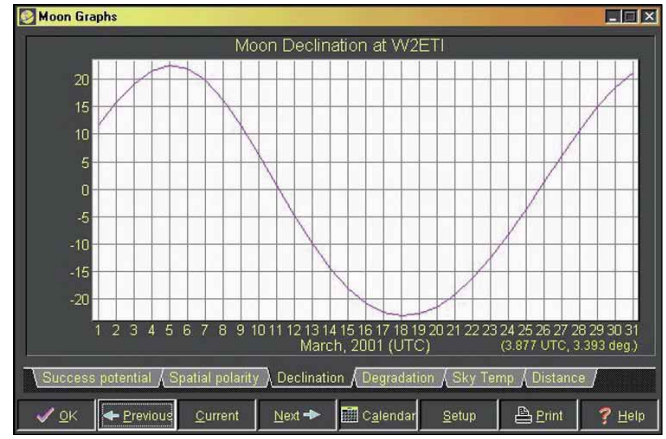

Figure 14—Lunar declination for March 2001.

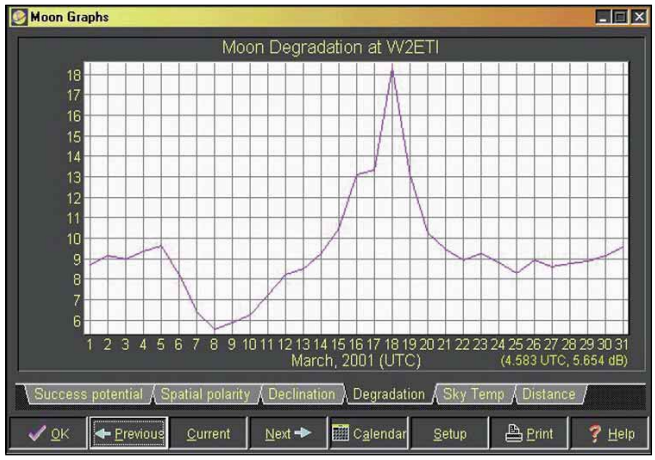

Figure 15—Moon path degradation for March 2001.

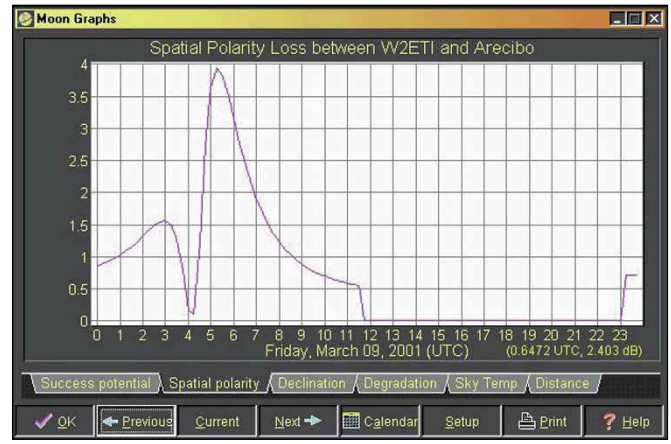

Figure 16—Spatial polarity loss for March 9, 2001.

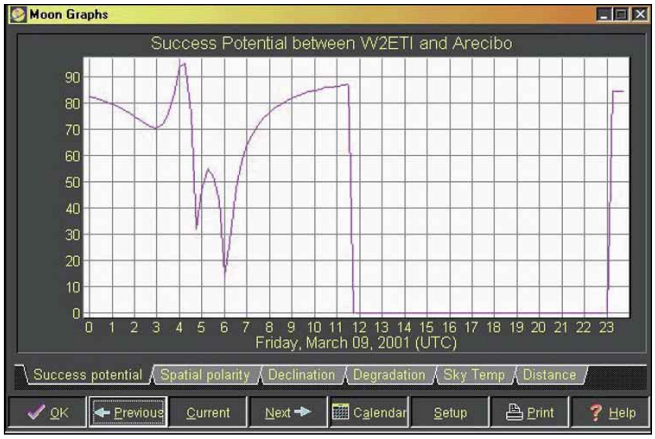

Figure 17—EME success potential for March 9, 2001.

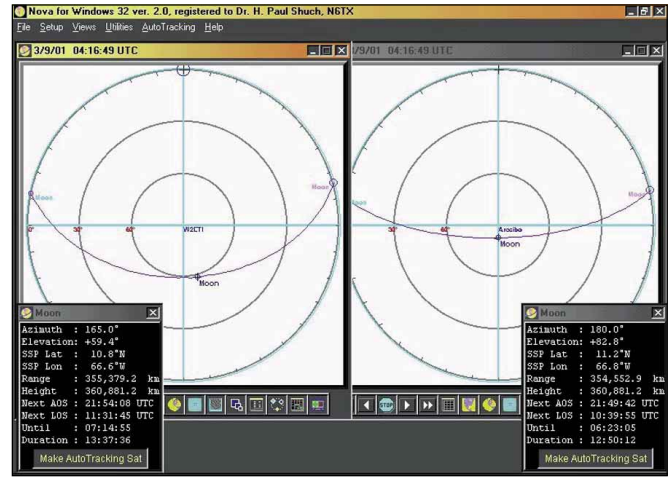

Figure 18—Lunar position during first detection of beacon.

potential was maximum at 0400 UTC, and that's when we set up our EME sked.

Persistent blizzard conditions in the US Northeast nearly scuttled the tests. For days WA2IKL was snowed in at work, and I was snowed in at my northern Pennsylvania home. Neither of us was able to reach the location of the W2ETI beacon. Fortunately, all of the beacon equipment was wired for IEEE-488 bus control, and Richard was able to operate the beacon remotely, via the Internet. I was able to coordinate the experiment from home, monitoring the position of the Moon at both locations (Figure 18) in real time and, using a Webcam (Figure 19), to follow Arecibo's progress.

At 0400 UTC on March 9, 2001, precisely as predicted in software, a slowly Doppler-shifted carrier representing the weak W2ETI beacon appeared on Arecibo's spectrographic display (see Figure 20). First detection was achieved by astronomer Seth Shostak, N6UDK. Two weeks later at the California Academy of Sciences, I presented Seth with the very first W2ETI EME beacon QSL card (Figure 21).

Under-Illumination Loss

Interestingly, although the software predictions were accurate and the equipment worked well, the signal shown in Figure 20 was scarcely discernible and hardly stronger than the former Pioneer 10 beacon signals shown in Figure 4. How could this be, considering that Tables 1 and 2 predicted that our beacon should have nearly 4 S-unit advantage?

It turns out that Arecibo's greatest advantage—its huge size and impressive gain—worked to our detriment. Like jam on a soda cracker, our broad uplink beamwidth spread the W2ETI signal smoothly across the $^1/_2$-degree Lunar disk. But Arecibo, with its 0.05-degree beamwidth, was only able to lick up about 1 percent of that jam (see Table 3). The rest of the jam ended up missing Arecibo completely, merely sticking to the tablecloth. Now if we factor in Arecibo's 20 dB of under-illumination loss, we see in Table 4 that our beacon signal, as available to Arecibo, was only 2 dB stronger than Pioneer 10. Because that transmitter was estimated at 1 dB below Arecibo's threshold, it's no wonder that our EME echo was received a scant 3 dB above mental telepathy!

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Figure 19—This Webcam image shows the action at Arecibo. Left to right: Dr Seth Shostak, N6UDK (at edge of frame), software scientists Gerry Harp and Rob Ackermann, astronomer Dr Jill Tarter, and Congressman Lamar Smith (just off camera with only his leg visible).

N6UDK

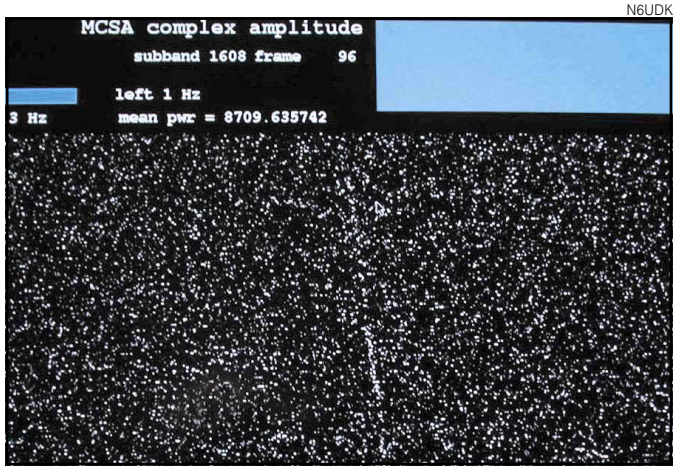

Figure 20—EME beacon first light at Arecibo.

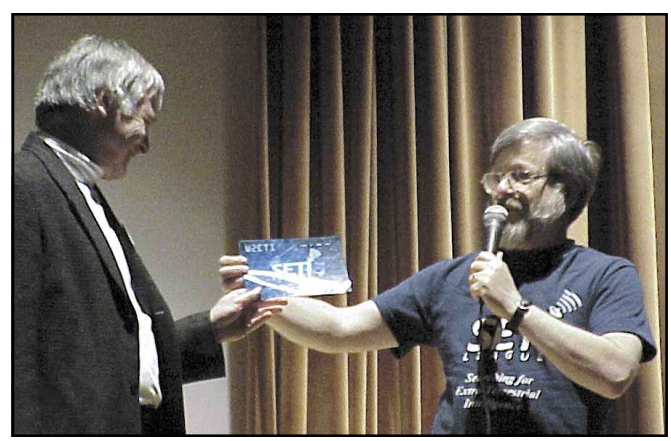

Figure 21—The author (right) presents Dr Seth Shostak, N6UDK, with the very first W2ETI EME beacon QSL card.

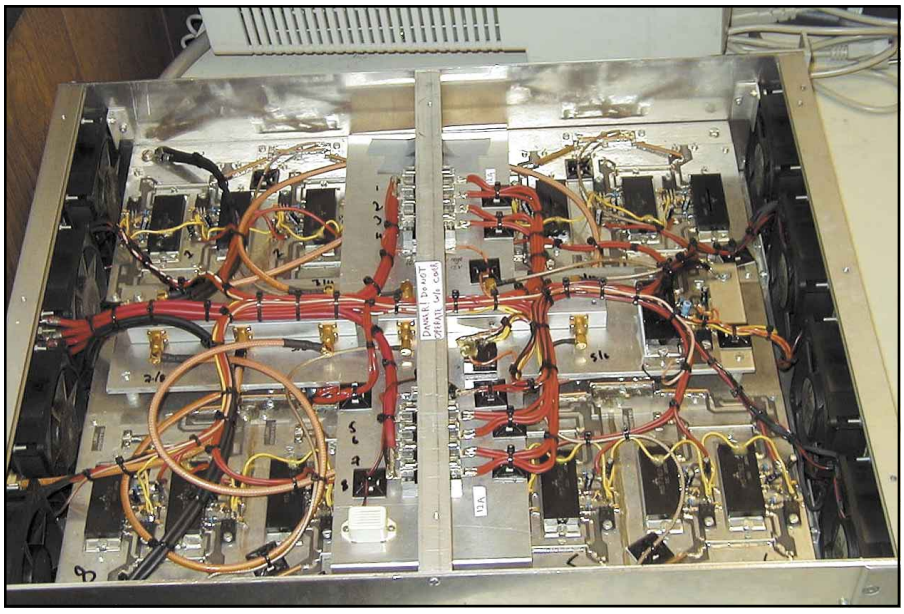

Figure 22—K3AX's 225-W solid-state power amplifier (see text).

Table 3
Under-illumination Loss
Moon Subtends: 0.5 degree
Arecibo's Beamwidth ≃ 0.05 degree
Loss = 10 * $\log_{10}$ $(\theta 1/\theta 2)^2$ ≃ 20 dB

Table 4
Comparison of Effective Isotropic Incident Power for Pioneer 10 vs W2ETI EME Beacon, as Received at Arecibo
Pioneer 10 = –229 dBm
W2ETI Beacon = –227 dBm

Well, we had promised Arecibo a *weak* calibration signal, and that's what we delivered. The 250-foot-diameter Lovell Telescope at Jodrell Bank in the UK received us somewhat better; at four times the beamwidth of Arecibo, it actually had about a 12 dB advantage. And Jay Liebman, K5JL, with his 30-foot homebrew dish, fared better than either of these monster radio telescopes. With a beamwidth, slightly wider than the Lunar disk, he recovered the lion's share of our feeble roar.

Going QRO

Still, not everyone has access to a 30-foot dish. If our objective was to provide a calibration signal that could be received by the average Amateur Radio astronomer, we were going to have to go QRO. Harry Price, K3AX, came to the rescue with the 225-W, solid-state linear amplifier shown in Figure 22 (one standard brick driving four bricks driving eight), with which he had made dozens of 1296-EME contacts years earlier. Back to eBay, and WA2IKL acquired an 80-A, 14-V dc power supply to feed this amplifier's voracious appetite.

After nearly five months of continuous operation, the W2ETI beacon was taken off the air in late July 2001 for total refurbishment. (At this writing it is still off the air.) With the K3AX power amplifier derated to a modest 100 W for continuous operation, we anticipate continuously illuminating the moon at +74 dBm of EIRP, for an isotropic power on Earth of better than –200 dBm. This should put reception of The SETI League's EME Beacon well within the grasp of our members.

Conclusion

At 17:27:30 UTC on Saturday, April 28, 2001 (seven weeks after the Arecibo tests described here), the signal from Pioneer 10 was received at NASA Deep Space Tracking Station 63 in Madrid, the first contact with the spacecraft in nearly a year. It appears that Pioneer 10 has life, albeit in another mode (only in a two-way, coherent mode). NASA and Project Phoenix had been listening for the Pioneer 10 signal in a one-way, non-coherent transmission mode with no success. Apparently, in order for Pioneer 10 to talk to Earth, Earth needs to talk to it. Pioneer 10 may well have outlived its usefulness. Thus, the W2ETI EME beacon will continue to serve as an invaluable calibration aid for the world's radio observatories, proving the dedication and professionalism for which radio amateurs have long been noted.

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[1]Chuck MacCluer, W8MQW, "A Pathloss Primer," *Symposium 99 Proceedings*, Syracuse EME Symposium, Aug 1999.

[2]H. Paul Shuch, N6TX, "SETI sensitivity: calibrating on a Wow! Signal," *Proceedings of the AMSAT-NA Fourteenth Space* Symposium, pp 130-141, American Radio Relay League, 1996.

Paul Shuch, who serves as executive director of the SETI League, is a retired engineering professor credited with designing the first commercial home-satellite TV receiver. A Fellow of the British Interplanetary Society, he is the author of nearly 300 articles and other publications, has received numerous honors and awards and (as N6TX) has operated in all 20 ham bands between 1.8 MHz and 24 GHz. Paul served as director, technical director and chairman of the board of Project Oscar Inc, predecessors to AMSAT. He lives on a radio-quiet hilltop in northern Pennsylvania with his biologist wife, five of their seven recombinant DNA experiments, 10 networked computers, three motorcycles, two radio telescopes and an antique MG-TD. You can reach the author c/o The SETI League, Inc, PO Box 555, Little Ferry, NJ 07643; **n6tx@arrl.net**.

STRAYS

JOTA IN WASHINGTON

◊ One of the most anticipated events at the Military Affiliate Radio System (MARS) Naval Air Station, Whidbey Island, Washington is the yearly Jamboree-on-the-Air (JOTA) the third weekend of October. For the past several years we have had the good fortune to have the call sign K2BSA/7 and will have it once again this year. Scouts, scouters, and parents come to visit, have cookies and hot chocolate, but most of all to talk on the radios and especially to make faraway contacts. They also enjoy calling home and friends on the local 2-meter repeater autopatch. I don't know how many times I have heard, "Mom, it's me—I'm on the radio and everyone can hear you" then the room fills with laughter—including Mom. It is wonderful seeing nonhams, shy at first, becoming comfortable on the radio—going from "I don't think I want to touch that thing" to someone having to tell them, "you have to let someone else have a turn." So join in the excitement and make some scouts (and nearby hams) happy. You can make a sked with us—our email is **marswi@galaxynet.com**. Hope to hear you on the JOTA frequencies.

Next Strays

By Joel P. Kleinman, N1BKE

Results, 2001 Messy Shack Contest

Those with good memories will recall the first annual Messy Shack Contest. The results were published in the April 1987 issue of *QST*. Herewith, the results of what must be the *second* annual Messy Shack Contest.

Our thanks to all who entered, and all who entered on behalf of their friends and family. We have no way of knowing if they *remain* friends and family, but we sure hope so!

What a mess!

What are friends for, anyway? "World's worst ham shack" is the way Bob Benna, N3LWP, describes his friend's radio room. Unlike most of the other entrants, Rey Whanger, W3BIS, of Cheswick, Pennsylvania, had the moxie to actually pose for the camera. Good job, Rey!

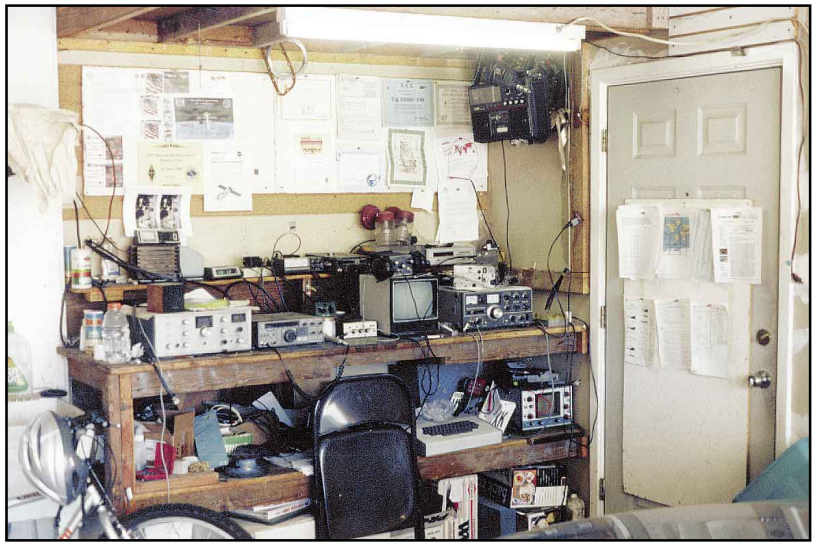
And he's proud of it, too! George Boehm's son, who sent us the photo, claims that dad (WB2NKO, of Coram, New York), is proud of his shack. And who could blame him!

Best garage mess. Richard McGee, KF6DKV, of Downey, California, has clearly grasped the spirit of the MSC, as he's made excellent use of every level. The judges don't really want to know what's in the drawers. Steven R. Luper, KF6TLE, sent in the photo—anything for a friend.

Where do *I* go? asks J. E. Mendenhall, KE6WHN, of Des Moines, Washington, whose mobile shack is just aft of his *other* operating position—the driver's seat of his over-the-road truck. Good question!

"**There's a TR-2400 behind the roll of paper towels,"** writes Herschell Sax, VE3JBU, of Ottawa, Ontario. Some would argue that this shack needs more than what paper towels can provide. "Needless to say," he continues, "no one goes in that corner of the basement but me and the cats." Brave cats!

Best confined mess. Dennis Mason, K4DAM, of Raleigh, North Carolina, brought tiers to the judges' eyes with this vertically oriented entry. Where exactly do the feet go, Dennis?



Best organized mess goes to Dan Delaplain, WB7QBO, of Reno, Nevada. In case you're wondering, as we were, "No, the two porch lights above the video screen are not dummy loads," Dan explains. If the truth be told, that wasn't our only question.

Best DX mess belongs to Christoph, DK9JW/AA9XB, of Kempen, Germany, who explains: "You find also messy shacks in Germany!" Gee, we had *no idea!* One can imagine that Chris does a great deal of operating, as it's just too much trouble to leave the room.

Deepest mess. Dennis, N9WDQ, operates from this QTH . . . But does he need a shovel to get to the radios?

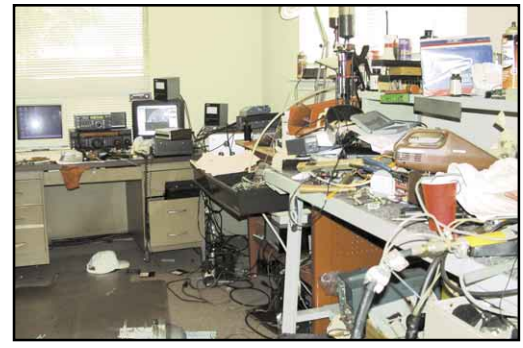
Our hats are off to Art Minazzoli, WB6NSE, of Newbury Park, California, who seems to have accumulated enough stuff to win the "whoever dies with the most toys, wins" contest.

Five floors of a silo, each with its distinct odor—the judges were duly impressed. "Most of the mess," writes Jeff Barstow, WD8DLK, of Rodney, Michigan, "is associated with projects in progress." The judges wonder if some of what you see here will wind up in a future issue of *QST*.

You've got to hand it to Ray Calhoun, W5ZGZ, of Waxahachie, Texas. He thoughtfully listed every last item at his operating position. "Original Western Union practice set with sounder on right and key on left, three speakers in back, spare hand, stack of business cards. . ." We'll spare you the rest. Not shown in the photo is a 1:1136 scale model of the RMS *Titanic*. Seems fitting, somehow . . .

"Finally," writes Mike Sewell, K0CRX, of Lindstrom, Minnesota, **"a contest I feel I *belong* in!"** The judges were quite taken with Mike's consistency—everything seems to have its place, even if its place happens to be under five layers of mess.

"How's this for clutter?" asks Charles Arnold, W3PRG, of York, Pennsylvania. Charles clearly flunked Cable Management 101, and the judges loved his collection of cigar boxes—reminded us of our long-gone baseball card collections. A ham since 1949, Charles has a challenge ahead of him—filling that wasted space between the top row of his mess and the ceiling.



And finally: Messiest celebrity shack. We're not telling who operates from this station (or attempts to…), but we can say that what you're seeing is *Jim's best photo*. QST

By Brad Wyatt, K6WR

Remote-Controlled HF Operation over the Internet

If you can't get on the air from home, the Internet may provide the answer.

Over the last several months I have enjoyed the opportunity to operate HF by remote control over the Internet using my desktop and laptop computer from several different locations in the US.

Consider my situation: I live in a condominium that prohibits towers or outside antennas. With this remote-control capability, I can now operate HF almost as I did before when I lived in a single-family home with a tower and beam. It also happens that I was temporarily in Atlanta, Georgia for medical treatment from Thanksgiving 2000 to mid-January 2001 and in Charleston, South Carolina for the 2000 Christmas holidays. In both locations I was able to remain active on the air with just my laptop and an Internet connection. Imagine the possibilities for handicapped amateurs, new hams without equipment, club stations and more.

It has been a very interesting and exciting experience, and one new to me in my 50 plus years of hamming. On SSB, I have operated 75 and 40 meters locally and worked significant DX on 20, 17 and 15 meters. While it is not quite like having your own rig, tower, beam antenna and so on, it is certainly superior to not being on the air at all.

One of the goals of this article is to encourage not only use of these existing stations, but to motivate others to build similar stations. For those of you interested in developing your own similar Remote-Controlled HF station, I know that Keith Lamonica, W7DXX, at **keith@lamonica.com**; Bob Arnold, N2JEU, at **n2jeu@ralabs.com**; and Stan Schretter, W4MQ, at **w4mq@hotmail.com** would be very willing to offer guidance and assistance.

A Remote Fascination

I have been interested in HF remote control operating for many years, going back to the late 1940s when I was first licensed. Among the first HF remote-controlled stations was one owned and operated by John Knight, W6YY (SK), then Chief Engineer for TV channel 4 in Los Angeles. He installed a 20-meter station at the transmitter site on Mt Wilson several thousand feet above his home in the La Canada, California area. John controlled the station over telephone lines. The advantages of remote control were recognized early and innovative hams have been exploiting them ever since.

I'm aware of several remote-controlled HF stations, and there are probably many more. One typical system is the single-operator-to-remote-site configuration. Examples include W6BH in Southern California (**www.w6bh.com**), W6RJ and KD6UO[1] in Northern California, and OH2BH in Finland. Another popular configuration is essentially a repeater system with an HF output. Examples of these include WB6MZS in Northern California (**wb6mzs@telocity.com**) and the WA6TWF "Super System" in Southern California (**www.wa6twf.com**). All of these stations are a substantial challenge to construct and are usually controlled over UHF and/or local telephone links.

Until just recently my interest in remote-controlled HF operating consisted of musing and talking, and not much doing. All of this changed abruptly when I learned through a casual conversation with another local ham of the W7DXX HF remote-controlled station, which I understood to be controlled over the Internet.

W7DXX

It did not take long to find the Web address—**www.lamonica.com**—and access it to learn more about the station and its function. I discovered that Keith Lamonica, W7DXX, who lives in North Easton, Massachusetts was the owner of the station. Through a set of interesting circumstances, Keith learned of Bob Arnold, N2JEU, in Canastota, New York, who had been working with remotely controlled receivers over the Internet. They decided to collaborate. Keith supplied the site and hardware (with assistance from other sources) and Bob supplied the soft-

[1] P. Winter, N6BIS, "Remote Operation Comes Home," *QST*, Jan 1996, p 46.

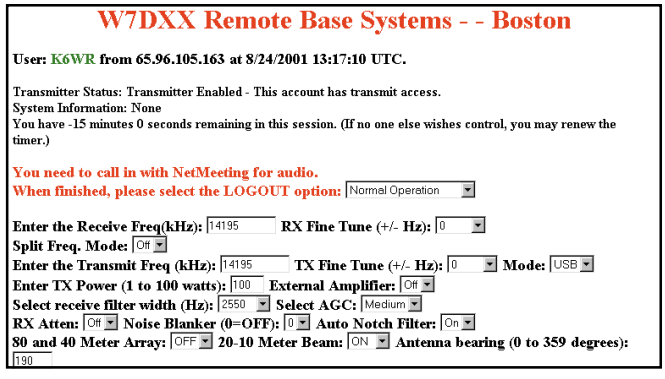


Figure 1—This is what I see on my computer screen when I access the W7DXX remotely controlled station. As you can see, you set up your operating parameters with a fill-in-the-blank form.

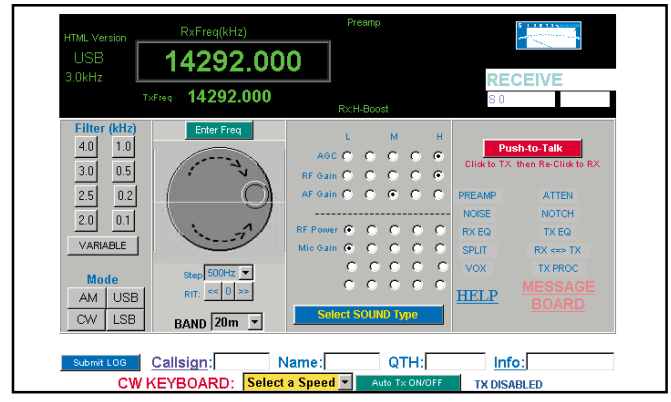


Figure 2—This is what I see on my computer screen when I access the W4MQ "Standard Web page."

ware to make it work. They started with a Kachina 505DSP transceiver, which has now been replaced with a Ten-Tec Pegasus radio and currently moving to a Kenwood TS-2000 transceiver. Their implementation approach was to make the interface to your computer through a Web browser for ease of use and maintenance for the end user. Just recently, Carl Moreschi, N4PY, has joined the team to provide software enhancements.

Currently the W7DXX HF remote-controlled station, although still in the development stage, is fully operational on SSB on 75-10 meters as an SSB only, VOX-controlled station. It has many operators from all over the US and overseas. A visit to the Web site will bring you all the details about becoming an operator and instructions written by K6WR on how to set up and operate the system. Future plans include UHF/VHF and other capabilities.

W4MQ

I've also explored a second HF remotely controlled station—the W4MQ Web Radio. The owner and developer is Stan Schretter, W4MQ, in Reston, Virginia. The address for this site is **www.w4mq.com**. Stan's creation has different characteristics. It supports SSB in VOX and "push-to-talk" modes. You can also operate CW—interestingly, using the VOX function. Future plans include the addition of PSK31, UHF/VHF and satellite communication.

Although he started with a Kachina 505DSP, Stan has since moved to a Kenwood TS-2000 transceiver. Stan has developed two distinct approaches for control: one is to connect to the end user via Internet browsers (both *Netscape* and *Internet Explorer*); the other is a "standalone" peer-to-peer approach that does not use Internet browsers. Both approaches provide an "image" of a radio that you control, although the images are slightly different depending on which approach you choose. The key difference is that the Internet browser approach uses unique software at the host while the standalone approach requires that the user install and maintain some unique software on his own computer.

Currently the W4MQ HF remote-controlled station, although still in the developmental stage, is fully operational on SSB and CW on 160-10 meters. A visit to the Web site will bring you all the details about becoming an operator and instructions written by K6WR on how to setup and use the system.

From the Operator's Point of View

Figure 1 shows the control screen for the W7DXX remotely controlled station illustrating the various features and functions of the fill-in-the-blank, nonpictorial

Figure 3—This is what I see on my computer screen when I access the W4MQ standalone "Peer to Peer" control screen.

format. Figure 2 is the W4MQ control screen for the "Standard Web page" version showing the various features and functions. Figure 3 shows the W4MQ standalone peer-to-peer version. You can readily see many common elements among the three pictures, but there are also unique features in each.

From an operator's perspective, there appear to be advantages and disadvantages to both the browser and standalone interfaces, and the ways they are currently implemented. Clearly, the browser interface is easier for many users because the software is all maintained at the host end. On the other hand, the W4MQ standalone implementation requires programs to be resident and updated on the user's computer. These current implementations provide an interesting set of trade-offs between speed of interaction, appearance of the "transceiver" or fill-in-the-blank approach and whatever end user software maintenance is required.

One of the key issues for satisfactory operation, from an operator's point of view, is the timeliness of transmission and stability of the Internet audio transmission system itself, Voice over Internet Protocol—VoIP. Essentially, VoIP converts the analog audio into digital packets for transmission, sends the packets, and reconverts them to analog audio at the other end. The current implementation of VoIP contains some inherent "packet latency" within Internet itself, due to the multiple paths the packets may take. Unfortunately, currently you cannot really control this latency regardless of the equipment at the host or operator ends. At times these problems can result in noticeable delays between the time the operator's voice is sent and when it is actually transmitted (but nothing is lost) and similarly in the receive mode; however, overall the result generally works quite well. It is hoped that future implementations of VoIP will minimize this problem.

You don't need a sophisticated computer system to use remote stations like these. My home computer system is an IBM Aptiva E3N (a 300-MHz system) with a 56-kbaud dial-up modem, a good sound card, a RadioShack combination headset and boom mike. My laptop has essentially this same configuration. Originally, for software I used *Windows 98*, *Netscape 4.51* and Microsoft *Netmeeting 3.01* (NM) for audio on both my home and laptop systems to operate the browser-oriented versions on both stations. In late July 2001, I began testing and using *Internet Explorer 5.0* to operate the browser-oriented versions on both stations. Both browsers provide the same function, but each has its own characteristics, which makes operation of the remote station slightly different in each case. Of course, neither browser is used with the W4MQ stand alone peer-to-peer version.

But is It Legal?

One of the questions that usually comes up while I'm engaged in a QSO through one of these sites is, "Is it legal?" Keith, W7DXX, has researched this matter extensively with FCC. The short answer is "yes." Of course, US operators must abide by their own license privileges since they are, in effect, the control operators. This means, for example, that Technician licensees who have not passed a 5 WPM Morse code test cannot use these systems below 30 MHz. (And Technicians who *have* passed their code tests can only operate in designated portions of the 80, 40 and 15 meter bands using CW, and on portions of the 10 meter band using CW, voice and digital modes.) Think of an Internet remotely controlled station as a transceiver with a *very* long microphone cord and you'll get the picture. (It's *not* a repeater.) These stations must abide by the US FCC rules in Part 97. An e-mail message from Bill Cross, W3TN, of the FCC that elaborates on this matter is posted on the W7DXX Web site.

Regarding operators outside the US, they can use these stations as long as there is a reciprocal licensing and operating agreement, such as CEPT, IARP, or bilateral agreements between their country and the US. You might also read FCC Part 97.3(a)(12) and (38) dealing with the definition of "control operators" and "remote operation."

Try Them!

As antenna restrictions become more severe throughout the country, remote-controlled stations like these offer a viable alternative for enjoying Amateur Radio—either by using sites that already exist or even creating one of your own. Do you want to put your station on the Web? Keep watching—N2JEU and W7DXX plan a follow-up article on that topic.

You can contact the author at 18400 Overlook Rd, Apt 5, Los Gatos, CA 95030-5850; **k6wr@arrl.net**.

By Jean Wolfgang, WB3IOS

ARRL 2001 Technical Awards

Call for Nominations

Do you count yourself among those who know that technical advancement is not a lost ideal in the amateur community? If so, now is the time to nominate yourself or your colleagues for one or all of the awards described below. ARRL members are encouraged to send nominations to ARRL Headquarters. Please include basic contact information for both you and the nominee. Submit support information along with a nomination letter, including endorsements of ARRL affiliated clubs and ARRL officials. Nominations should thoroughly document the nominee's record of technical service and accomplishments.

The nomination form for these awards can be found at **www.arrl.org/ead/award/application.html**.

ARRL Technical Service Award is to be given annually to the licensed radio amateur whose service to the amateur community and/or society at large is of the most exemplary nature within the framework of Amateur Radio technical activities. These include, but are not limited to:

- Leadership or participation in technically oriented organizational affairs at the local or national level.
- Service as an official ARRL technical volunteer: Technical Advisor, Technical Coordinator, Technical Specialist.
- Service as a technical advisor to clubs sponsoring classes to obtain or upgrade amateur licenses.

The Technical Service Award winner will receive an engraved plaque. In addition, the winner may request ARRL publications of a value up to $100.

ARRL Technical Innovation Award is granted annually to the licensed radio amateur whose accomplishments and contributions are of the most exemplary nature within the framework of technical research, development and application of new ideas and future systems. These include, but are not limited to:

- Promotion and development of higher-speed modems and improved packet radio protocols.
- Promotion of personal computers in Amateur Radio applications.
- Activities to increase efficient use of the amateur spectrum.
- Digital voice experimentation.

The Technical Innovation Award winner will receive a cash award of $500 and an engraved plaque.

ARRL Microwave Development Award is given each year to the amateur (individual or group) whose accomplishments and contributions are the framework of microwave development, i.e., research and application of new and refined uses and activity in the amateur microwave bands. This includes adaptation of new modes both in terrestrial formats and satellite techniques.

The Microwave Development Award winner will receive an engraved plaque. In addition, the winner may request ARRL publications of a value up to $100.

Nominate Now!

Send nominations to ARRL Technical Awards, 225 Main St, Newington, CT 06111. Nominations must be received at Headquarters by March 31, 2002. Send any questions to Headquarters or e-mail **jwolfgang@arrl.org**.

QST

SPECIAL EVENTS

Claremore, OK: Rogers County Wireless Association, W5R, 1600Z **Nov 3** to 0100Z **Nov 4**, Will Rogers Days, 14.280 21.330 28.385. Certificate. RCWA-W5R, PO Box 1922, Claremore, OK 74018.

Arlington Heights, IL: Armored Force AR Net, KA9NLX, 1500Z **Nov 9** to 2000Z **Nov 11**, to honor all veterans and to remember those who have died. 7.283 7.030 14.325 21.375. Certificate. John Paskevicz, 1423 North Ridge Ave, Arlington Hts, IL 60004.

Brainerd, MN: Brainerd Area Amateur Radio Club, W0UJ, 1500Z to 2300Z **Nov 10**, Brainerd MN—Paul Bunyan's home town. 28.450 21.350 14.250 50.125. Certificate. BAARC, PO Box 801, Brainerd, MN 56401.

Arcadia, FL: DeSoto Co Amateur Radio Club, W4MIN, 1500Z to 2100Z **Nov 10**, Smithsonian Institution traveling exhibit's visit to Arcadia. 14.265. Certificate. Vern Erickson, PO Box 1401, Nocatee, FL 34268.

Whitefish Point, MI: Stu Rockafellow Amateur Radio Society, N8F, 1400Z **Nov 10** to 2000Z **Nov 11**, operating from the Great Lakes Shipwreck Museum commemorating the sinking of the *Edmund Fitzgerald*, 7.270 14.270 21.270 28.370. Certificate. John Ebejer, K8DSL, 15855 Winchester Dr, Northville, MI 48167.

Colorado Springs, CO: Rocky Mountain Navy Amateur Radio Club, K0USN, 1400Z to 2300Z **Nov 11**, Veteran's Day operation honoring our service men and women. 14.275 50.150. Certificate. Mike Anderson, WV7T, CPO, USN, Ret, 2815 Main St, Colorado Springs, CO 80907.

Hackensack, NJ: 10-70 Repeater Association, NX2ND, 1400Z to 2230Z **Nov 11**, USS *Ling* SS297 Veterans Day, anniversary of NX2ND. 14.260 7.260 14.070 7.039. Certificate. William Stagg, 38 Rutgers Dr, Oakland, NJ 07436.

Bay Pines, FL: METRO Repeater Association, W4BPH, 1500Z to 0000Z **Nov 11**, Veterans Day. 28.430 21.330 14.230 7.230. QSL. George Baustert, W3BL, 5037 88th Ave, Pinellas Park, FL 33782.

Nutley, NJ: Robert D. Grant United Labor Amateur Radio Association, N2UL, 1200Z to 2400Z **Nov 11**, "CQ Veterans Day" dedicated to all veterans who served our country. 28.420 21.375 14.260. Certificate. R.D.G.U.L.A.R.A. c/o WA2VJA, 112 Prospect St, Nutley, NJ 07110-0716.

Baton Rouge, LA: USS Kidd Amateur Radio Club—Baton Rouge ARC, W5KID, 1500Z to 2300Z **Nov 11**, Veterans Day. 28.440 21.340 14.240 14.060. QSL. W5KID, 305 River Rd, Baton Rouge, LA 70802.

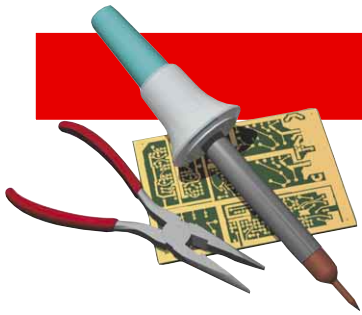
Edmond, OK: Edmond Amateur Radio Society, K5EOK, 1500Z to 2300Z **Nov 17**, celebrating 94th year of Oklahoma Statehood Day. 14.289 21.289 28.389. Certificate. EARS, PO Box 48, Edmond, OK 73083.

Gold Rock Ranch—Glamis, CA: Yuma ARC, K7YA, 1500Z **Nov 23** to 0100Z **Nov 24**, Camp Fire Boys & Girls Fund Raiser. 7.248 14.250 21.350 28.375. Certificate. Yuma ARC—K7YA, 13329 E 47 St, Yuma, AZ 85367.

Plymouth, MA: Whitman Amateur Radio Club, WA1NPO, 1400Z **Nov 24** to 0100Z **Nov 25**, the first Pilgrim Landings at Plymouth, Massachusetts. 3.890 7.250 14.260 28.360. Certificate. Whitman ARC, PO Box 48, Whitman, MA 02382.

Goodland, KS: National Weather Service, N0A, 0000Z **Nov 30** to 2400Z **Dec 2**, National Weather Service / ARRL SKYWARN Recognition Day. 7.250 14.280 21.350 28.480. Certificate. National Weather Service, 920 Armory Rd, Goodland, KS 67735. QST

George Fremin III, K5TR ♦ 624 Lost Oak Trail, Johnson City, TX 78636 ♦ k5tr@arrl.org



The Doctor is IN

Q Donn, WB4ZWT, asks, What's the difference between a regulated and unregulated power supply?

A An unregulated supply is the most basic form of power supply possible. It consists of a transformer, rectifier and filter (plus a case with a switch and a fuse, of course!). Lacking any kind of regulator circuit, the output voltage can change quite a bit from a small load to the rated load. For example, if you have a supply that is rated as "12 volts, 3 amps, unregulated," that means that the voltage is 12 V at the rated current of 3 A but can be higher (perhaps 15 V or more) with a small load like 0.5 A.

A regulator circuit keeps the output voltage of a supply to a nearly constant level over a wide range of loads. A typical regulated supply for amateur use is rated for 13.8 V at 20 A. At 1 A or less, the voltage may still go up, but only by a small amount, such as to 14.2 V. How much of a swing depends upon the type of regulation circuit used. "Precision" or "Lab" type power supplies typically keep the output voltage within a $^1/_{10}$ of a volt over the full range of loads the supply can handle.

So why would anyone want an unregulated supply? The reason is cost, but your device being powered must be able to handle a wide range of voltages. In addition to the basic cost of the parts, there is also the cost of designing the regulator circuit and the additional cost (labor) in manufacturing.

Many types of devices are designed to be powered off batteries. Since batteries change voltage quite a bit from full charge to discharge, the devices attached to them have to be able to handle the change. These same devices can often be powered by an unregulated supply.

Radios designed for mobile use can be powered by unregulated supplies, but many folks prefer to use regulated supplies since radios will often have reduced output at lower voltages. Also, as the total cost of a power supply increases, the regulator circuit becomes a smaller fraction of that cost. So although there is a substantial difference in the cost of a 12 V, 3 A regulated supply compared to an unregulated one, there is very little difference when the supplies are 12 V, 10 A models. That's why most high current supplies are regulated.

Q Bob, N7PTM, writes: I have an ICOM IC-706 in my van. It is connected directly to the battery. If I start scanning the memory channels before I start the engine, the scanning stops when I start the engine. I think the radio briefly shuts down when the engine is being cranked. Why is this happening when I'm connected directly to the battery (it's not only the 706 that does it; other radios have, too)?

A First, you should turn off all your radio equipment (and anything else possibly plugged into the cigarette lighter, like a GPS unit, portable CD player, etc.) before starting the engine. There are spikes produced by the electrical system at this time that could severely damage your power supply.

The reason your ICOM stops functioning properly is because there is a tremendous voltage drop when the starter motor draws almost all the available current from the battery to turn the engine. Since the resulting voltage is below the minimum required by the radio, it momentarily stops functioning. Remember, when your radio is connected directly to the battery, it is in parallel with the rest of the car's electrical system.

Q Maury, WB6RLP/0, writes: As I recall in the vacuum tube transceiver days, the maximum power was determined during tune-up in the CW mode. I believed that the maximum peak envelope power at full modulation in SSB would be the same as the maximum power obtained during tune-up in the CW mode.

I purchased a 100 watt transceiver and a 300 watt tuner. It has worked fine for several months. Two weeks ago I purchased a linear amplifier. I assumed I could drive the amplifier to 300 watts output in the CW mode for tune-up into the tuner and then switch to SSB. This seemed to work for about a week and then I noticed that if I kept the power at 300 watts in CW the VSWR would slowly start to rise, then more rapidly and the meters would peg. This included the plate and grid current meters on the amplifier. I didn't hear arcing in the tuner. I eliminated a bad load as the problem. I called the manufacturer of the tuner and their technician said on CW you can only input 150 watts and that 300 watts was the peak envelope power for SSB. He said he though it was an arcing problem, but didn't know where.

As I understand the definition of peak envelope power it is the average power of one RF cycle at the peak of the modulation envelope. If I am fully modulating why isn't this average power for one cycle the same as the average power of a maximum power CW signal. Where am I going wrong?

A The gradual change in SWR sounds more like an overheating than an arcing problem. Usually if a tuner arcs over, you can hear it and the SWR goes sky high while the arc is occurring. It is possible that continuous power of 300 W CW is causing one of the coils or capacitors in the tuner to overheat, and thus change value.

You are correct; PEP is the average power of a single cycle of RF at the modulation peak. Thus a 300-watt CW signal has a 300-watt PEP. But any heating effects in the tuner will be dependent on the average power, with a time period based on the time it takes the overheating component to either change value or reach thermal equilibrium. So, with typical dit/dah ratios, a Morse CW signal has an average-to-peak ratio of about 40%. An SSB signal can range from 10% to 30%.

For more info, see **www.arrl.org/tis/info/pdf/9505088.pdf**. This *QST* article, "Power: Watts It All About" is from the May 1995 "Lab Notes."

Q Dave, KO4KL, writes: I am confused by an apparent resistor value in an internet schematic provided by a Russian ham. The value given is 4K7 and another value for a different resistor is 3K which of course is 3000 ohms. What value in ohms is 4K7? I found this in several different locations in the schematic so it isn't a typo.

A The European standard for electronic component values is to list the multiplier in place of the decimal point. So a 4K7 is a 4.7 k ohm resistor. For values of a multiplier of one, the letter R is used (so 4R7 would be 4.7 ohms).

Q Jim Jolly, W6RWI, writes: Is there a device available to enable two transceivers to use a single antenna and one will be protected while the other is transmitting?

A It depends on exactly what you are looking to do. If you merely want to switch back and forth between two radios using a single antenna, but would only be using one radio at a time, then a very basic coax type antenna switch will suffice. These typically provide more than 60 dB of isolation from one port to another and at power levels up to 100 W, this would be a level of 100 microwatts (–10 dBm) or less into the transceiver that is not being used.

If you want to use both transceivers at the same time, then that is another matter altogether. You did not mention what frequencies would be involved, so I will outline the different possibilities. First, I would note that, with one particular exception, the transceivers would either have to be on different bands or on fixed frequencies within the same band.

The solution for the former would be to install bandpass filters on the output of both transceivers. If the transceivers under discussion are both multiband HF rigs, note that switchable bandpass filters are available from a couple of sources. For VHF/UHF, the solution is known as a diplexer (although some manufacturers call it a duplexer).

For two transceivers on the same band, a very large amount of rejection is needed with a very narrow filter spacing. Such rejection can be achieved only with tuned cavities (as in a duplexer) and these are not readily adjustable. Because of this, the frequencies used would have to be fixed. Duplexers are of reasonable size at VHF and UHF, but then to be impractically large (and expensive) at HF.

The exception mentioned above is, when you have two transceivers but they will only be confined to separate parts of the same band (such as having one on SSB and one on CW during Field Day), very narrow bandpass filters can be made to isolate one from the other. These are not available commercially, however—you would have to build your own. Plans for an 80 meter version appeared in the September 1998 issue of our experimenter's magazine, *QEX*. The 40 meter version appeared in November 1998 *QEX*.

Q David L. Muse, KD4FEB, writes: I have an older computer that I would like to use for HF digital communication like PSK31. The computer is an IBM with a 133 MHz processor. I am having trouble with it shutting down on its own while it is running. It used to momentarily shut down and then reboot by itself. I changed the hard drive in hope of fixing this problem but now it just shuts down by itself like it's turned off. Would changing the processor in it fix this problem?

A Phantom shutdown can be caused by several things-the hard drive and CPU being near the bottom of the list. If you are running *Windows*, try a format of the hard drive and reinstallation of *Windows* (this you may already have done when you replaced the HD).

Look for a thermal problem-the fan on your CPU has failed or your power supply fan has failed or insufficient ventilation around you computer. Overheating will cause the computer to shut down as a self-protection scheme.

Determine that your computer is not loaded with more cards and drives, etc. than your power supply can handle. Some older computers came with a 150-200 W PS that may not be adequate if you have added several components.

Q Joe Nehm, W1JN, writes: My 80 meter dipole is installed as a horizontal "L" (fed at the corner). What are the trade-offs compared to installing the dipole in a straight line? I know I should be able to answer this question myself with antenna modeling software, but I am not set up yet. Thanks for your help.

A Your horizontal L, or more commonly called the horizontal V, will radiate slightly more in the direction that the open arms of the V are facing.

On 80 meters, you will find the difference very slight unless you have your antenna at 1/2 wavelength above ground-over 60 feet. Most hams do not have their dipoles this high and so in your case the ground effect of a low mounted antenna is causing your antenna to radiate, rather than out toward the horizon, somewhat up toward the sky and scatter back down in all directions. This is affectionately called a "cloud warmer" antenna. But on 80 meters for mostly local communications (several hundred miles out at night) this is just fine.

Q Kwame E. Davis, K2RMC, writes: From my home location in northern New Jersey, I am having a very hard time breaking through the QRM/QRN on CW contacts. I also have difficulty breaking through pileups. Would it be advisable to incorporate a 600-watt HF amp to my setup?

I don't want to go higher than that for fear of interfering with the neighbors' televisions and radios. What type amp would function best with the Kenwood TS-850S and a Butternut HF9V vertical antenna?

A An amplifier may well help overcome QRM and QRN, although sometimes when propagation is not there or when there are a lot of "big gun" stations in a pileup, that amplifier may not solve all of your problems. And you are right—adding more power can cause more RFI problems.

First, analyze how much the amplifier will do to help. If I assume you are running 100 watts RF output right now, by going to a 600-watt amplifier, you will add 7.8 dB to your signal. If an S unit is 6 dB (the old Collins standard), then using a 600-watt amplifier would add just over an S unit to your signal strength. In bad conditions or heavy QRM, this can make a difference.

You can also add about the same amount of signal by improving your antenna system. Unless you are in an area with excellent ground, a vertical antenna can operate at a significant disadvantage compared to a horizontal antenna up a reasonable height. For an example comparing a vertical antenna and horizontal antenna on 7 MHz, see Figure 1.

This figure shows the vertical elevation pattern of a vertical with a modest ground system and a horizontal dipole up 30 feet on 7 MHz. As can be seen, at the very lowest angles (i.e., DX), the vertical and dipole are about the same, but at somewhat higher angles (i.e., up to about 500 miles on 40 meters), the dipole shows a distinct advantage.

Changing to a Yagi antenna will give you even more "gain." Here is the pattern of the same vertical antenna compared to a Yagi up 40 feet on 14 MHz. See Figure 2.

As you can see, going to the Yagi antenna gives you more than the 7.8 dB that the amplifier will give you. It has an additional advantage that the gain you get is on both transmit and receive and the additional advantage that the front-to-rear ratio of the gain antenna reduces QRM coming from other directions. The final advantage is that it is only an increased RFI potential in the direction it is pointing.

All things considered, the antenna may represent a better bang for the buck.

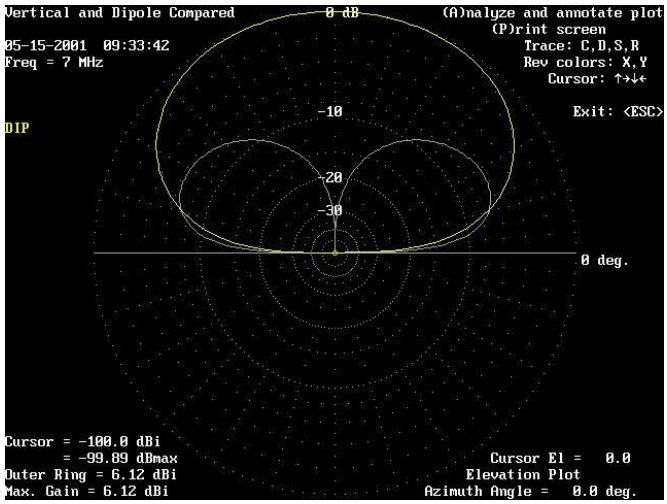


Figure 1

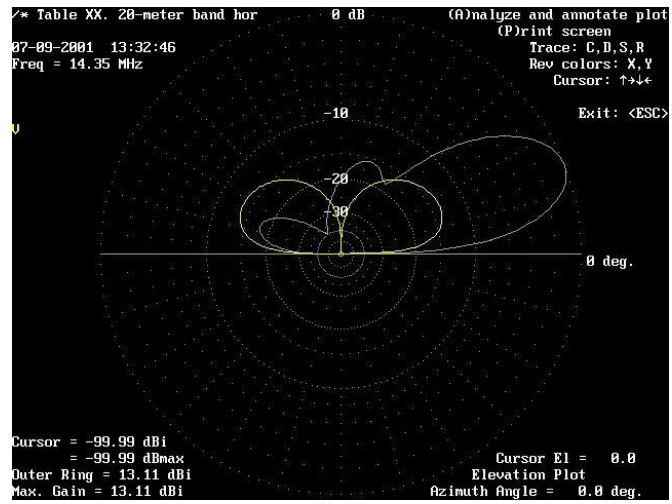


Figure 2

Q George Tyler, N8KJD, asks: When grounding equipment how does copper strap coxmpare to copper tubing? Is one better than the other or should I pound the tubing flat? Locally, tubing is easier to acquire.

A For a given surface area, strap is theoretically a slightly better choice for grounding than tubing. However, the difference between the two is slight enough that it wouldn't be worth your while to go out of the way to get strap if it isn't readily available. Likewise, it isn't worth the work involved to flatten the tubing (unless you really want to for the sake of easier mounting).

In any case, just make sure the tubing or strap is a good size for the application (for a "back of the desk" ground, 1/2 inch or larger pipe would be good).

Q Tom, KB3FCH, asks, "What is the difference between a low-pass filter and a common-mode filter?"

A The difference between the two filters has more to do with how the signal you are trying to filter travels, rather than in the way they work. A low-pass filter, the one we are normally accustomed to dealing with, works in a circuit where the signal travels down one side of a transmission line (this can be coax, balanced line, ac line cord, whatever) and down the other. If you are trying to filter something that is using this path, you need to block the signal by presenting a high impedance in series with the signal or a low impedance shunting the signal. Either remedy prevents a significant portion of the signal from reaching where you don't want it to go. An example of this would be the low-pass filters we use on our HF rigs. They pass the frequencies we are trying to use and block the harmonics and spurious signals that we are trying to keep from reaching the antenna.

The common-mode filter uses is a bit different approach. If you think of any pair of conductors exposed to RF, you can see that the conductors act like a wire antenna and the signal induced will be essentially at the same amplitude and phase on both conductors. This is true whether we are dealing with coax or other types of lines. When we experience RFI, it may be a result of large amounts of RF entering the victim device via these conductors acting like an antenna. Hence, we need a "common-mode" filter to present a high impedance to the undesired signal traveling on these conductors while allowing the desired signal to pass. An example of this would be installing a common-mode filter (sometimes also called a common-mode choke) on a pair of speaker leads for a stereo that is having problems with RFI. The benefit of the choke would be that it blocks the RF from reaching the circuits where it is causing the problem while, at the same time allowing the audio to flow unimpeded to the speakers, thus eliminating the RFI problem.

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/. Add your comments: "The Doctor is On-line" at www.arrl.org/members-only/qst/doctor/. QST

NEW PRODUCTS

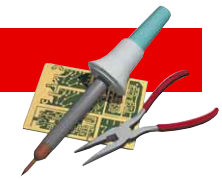
TINY TRI-BAND FM HAND-HELD FROM KENWOOD

◊ What can get lost in your pocket, work three VHF/UHF bands and receive from 0.1 to 1300 MHz? Kenwood's new TH-F6A, that's what! This split-personality mini radio transceives on 144, 222 and 440 MHz FM (with scads of features) and receives from dc to daylight on FM, AM, SSB and CW. Able to receive on two frequencies simultaneously and powered by a long-life lithium-ion battery, the radio features 435 memory channels, multiple scanning modes, CTCSS, DSS, high and low power output modes, keypad frequency entry, an intuitive interface, a backlit LCD and more.

Built to withstand shock, vibration, humidity and even light rain, the 3.5-inch-tall TH-F6A is said to be equally capable in the field or in your shack. At press time the TH-F6A was undergoing type-acceptance testing. Price: $450. QST

Next New Products

THE HELP DESK



Q Signals

Q signals, used as abbreviations on CW, are useful for both casual contacts and in nets. (Q abbreviations take the form of questions only when each is sent followed by a question mark.)

QRA What is the name of your station? The name of your station is _____.

QRG Will you tell me my exact frequency (or that of _____)? Your exact frequency (or that of _____) is _____ kHz.

QRH Does my frequency vary? Your frequency varies.

QRI How is the tone of my transmission? The tone of your transmission is _____ (1. Good; 2. Variable; 3. Bad).

QRJ Are you receiving me badly? I cannot receive you. Your signals are too weak.

QRK What is the intelligibility of my signals (or those of _____)? The intelligibility of your signals (or those of _____) is _____ (1. Bad; 2. Poor; 3. Fair; 4. Good; 5. Excellent).

QRL Are you busy? I am busy (or I am busy with _____). Please do not interfere.

QRM Is my transmission being interfered with? Your transmission is being interfered with (1. Nil; 2. Slightly; 3. Moderately; 4. Severely; 5. Extremely).

QRN Are you troubled by static? I am troubled by static _____ (1-5 as under QRM).

QRO Shall I increase power? Increase power.

QRP Shall I decrease power? Decrease power.

QRQ Shall I send faster? Send faster (_____ WPM).

QRS Shall I send more slowly? Send more slowly (_____ WPM).

QRT Shall I stop sending? Stop sending.

QRU Have you anything for me? I have nothing for you.

QRV Are you ready? I am ready.

QRW Shall I inform _____ that you are calling on _____ kHz? Please inform _____ that I am calling on _____ kHz.

QRX When will you call me again? I will call you again at _____ hours (on _____ kHz).

QRY What is my turn? Your turn is numbered _____.

QRZ Who is calling me? You are being called by _____ (on _____ kHz).

QSA What is the strength of my signals (or those of ____)? The strength of your signals (or those of _____) is _____ (1. Scarcely perceptible; 2. Weak; 3. Fairly good; 4. Good; 5. Very good).

QSB Are my signals fading? Your signals are fading.

QSD Is my keying defective? Your keying is defective.

QSG Shall I send _____ messages at a time? Send _____ messages at a time.

QSK Can you hear me between your signals and if so can I break in on your transmission? I can hear you between my signals; break in on my transmission.

QSL Can you acknowledge receipt? I am acknowledging receipt.

QSM Shall I repeat the last message which I sent you, or some previous message? Repeat the last message which you sent me [or message(s) number(s) _____].

QSN Did you hear me (or _____) on _____ kHz? I did hear you (or _____) on _____ kHz.

QSO Can you communicate with _____ direct or by relay? I can communicate with _____ direct (or by relay through _____).

QSP Will you relay to _____? I will relay to _____.

QST General call preceding a message addressed to all amateurs and ARRL members. This is in effect "CQ ARRL."

QSU Shall I send or reply on this frequency (or on _____ kHz)? Send or reply on this frequency (or _____ kHz).

QSV Shall I send a series of Vs on this frequency (or on _____ kHz)? Send a series of Vs on this frequency (or on _____ kHz).

QSW Will you send on this frequency (or on _____ kHz)? I am going to send on this frequency (or on ____ kHz).

QSX Will you listen to _____ on _____ kHz? I am listening to _____ on _____ kHz.

QSY Shall I change to transmission on another frequency? Change to transmission on another frequency (or on _____ kHz).

QSZ Shall I send each word or group more than once? Send each word or group twice (or _____ times).

QTA Shall I cancel message number _____? Cancel message number _____.

QTB Do you agree with my counting of words? I do not agree with your counting of words. I will repeat the first letter or digit of each word or group.

QTC How many messages have you to send? I have _____ messages for you (or for _____).

QTH What is your location? My location is _____.

QTR What is the correct time? The correct time is _____.

QTV Shall I stand guard for you? Stand guard for me.

QTX Will you keep your station open for further communication with me? Keep your station open for me.

QUA Have you news of _____? I have news of _____.

ARRL QN Signals

QNA* Answer in prearranged order.

QNB Act as relay between _____ and _____.

QNC All net stations copy. I have a message for all net stations.

QND* Net is Directed (controlled by net control station).

QNE* Entire net stand by.

QNF Net is Free (not controlled).

QNG Take over as net control station.

QNH Your net frequency is High.

QNI Net stations report in. I am reporting into the net. (Follow with a list of traffic or QRU.)

QNJ Can you copy me?

QNK* Transmit messages for _____ to _____.

QNL Your net frequency is Low.

QNM* You are QRMing the net. Stand by.

QNN Net control station is _____. What station has net control?

QNO Station is leaving the net.

QNP Unable to copy you. Unable to copy _____.

QNQ* Move frequency to _____ and wait for _____ to finish handling traffic. Then send him traffic for _____.

QNR* Answer _____ and Receive traffic.

QNS Following Stations are in the net.* (Follow with list.) Request list of stations in the net.

QNT I request permission to leave the net for _____ minutes.

QNU* The net has traffic for *you*. Stand by.

QNV* Establish contact with _____ on this frequency. If successful, move to _____ and send him traffic for _____.

QNW How do I route messages for _____?

QNX You are excused from the net.*

QNY* Shift to another frequency (or to _____ kHz) to clear traffic with _____.

QNZ Zero beat your signal with mine.

Notes

*For use only by the Net Control Station.

Notes on Use of QN Signals: These QN signals are special ARRL signals for use in amateur CW nets *only*. They are not for use in casual amateur conversation. Other meanings that may be used in other services do not apply. Do not use QN signals on phone nets. *Say it with words*. QN signals need not be followed by a question mark, even though the meaning may be interrogatory.

By Erik Westgard, NY9D

Updating the W1FB 80-Meter "Sardine Sender"

Ingenuity is still the mother of invention. Follow this tale of determination and use NY9D's results to build your own 80-meter QRP transmitter.

Not long after acquiring a nice stock of RF parts from some old VCRs and television sets, I started wondering if it was possible to build a QRP (low power) rig with the parts they could provide, and possibly a few from the nearest RadioShack store. Each TV and VCR you take apart will reward you with transistors, capacitors, RF chokes and a color-burst crystal, which is in the 80-meter CW band. With that crystal and a common 2N2222 transistor you can build an oscillator. The difficulty lies in adding a power amplifier to that tiny transmitter so you can make some headway on 80 meters, which is not an easy place for milliwatt power.

In many published RF amplifier designs that use bipolar transistors, you have to contend with the impedance mismatch between oscillator outputs and RF amplifier inputs. In QRP construction books, there are schematics for transmitters with broadband matching transformers. Depending on the band, you can take the right toroid core, wind the correct number of turns for the primary, and use the square of the turns for calculating the impedance of the secondary.

A Toroid Alternative?

Would it be possible to accomplish the matching without a toroid? (Bear in mind that I wanted to keep the entire project as simple as possible without resorting to mail-order shopping.) I recalled that the classic 40-meter Tuna Tin 2 by Doug DeMaw, W1FB, worked its impedance-matching magic with 10-µH RF chokes. I soon discovered, however, that RadioShack no longer carried 10-µH chokes. These chokes weren't available in my VCR/TV scavenger assortment, either. Scaling Doug's design for 80 meters looked complicated as well.

Some more digging in my article archives revealed the 80-meter W1FB Sardine Sender transmitter (see Figure 1). This was exactly what I needed. All of the parts came from RadioShack, except the all-important 10-µH chokes, which were also used for the broadband transformer. Back to the books this time. How to adapt the currently available 100 µH Radio Shack 276-102 choke to be the broadband transformer?

There is a lot buried in the W1FB books the League publishes. In the original 1986 *QRP Notebook* (now out of print) there is a good discussion of broadband transformers and how to use the "A_L factor" to wind toroids. With that information and the permeability factor, you can calculate the right number of turns for a given inductance. There was no mention of how to do to this with rods instead of toroids, or what to do without the A_L factor.

An e-mail response from **Radioshack.com** provided the permeability (220) for the core used in the 100 µH RadioShack 276-102 choke. No A_L was available. A helpful break occurred at the Midwinter Madness Hamfest in St Paul, Minnesota. One of the vendors was selling a Doug DeMaw book I had not seen before—*Ferromagnetic Core Design and Application Handbook* published by MFJ. On page 42 there was a critical bit of information: "It is difficult if not impossible to construct a set of A_L factors for rods and bars." This is because the location of windings on the bar or rod and the spacing of the turns had a big impact on the inductance. The identical number of turns spaced differently or on a different place on the rod, say at the end, might cause the inductance to change.

Doug provided, as usual, a hint for getting out of the dilemma. In a November 1974 *QST* article on building a 160-meter transmitter, he says it is okay to experiment your way out of design problems you can't solve by mathematics and theory, using "empirical effort," as he called it. So how do you measure inductance down to at least one decimal place?

I thought the answer could be found with an old Heathkit

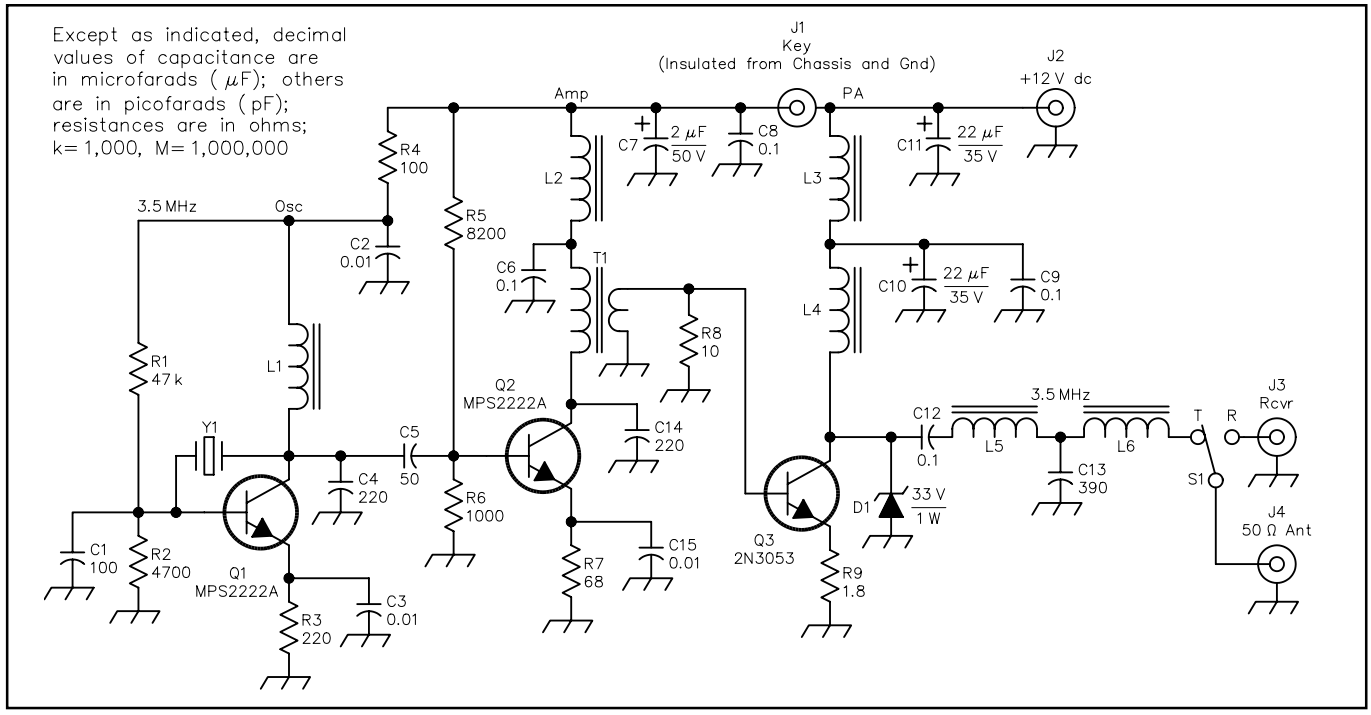


Figure 1—Schematic diagram of the updated W1FB Sardine Sender transmitter.

C1—100 pF ceramic.
C2, C3, C15—0.01 μF ceramic.
C4—220 pF ceramic.
C5—50 pF ceramic.
C6, C8, C9, C12—0.1 pF ceramic.
C7—2 μF electrolytic, 50 V.
C10, C11—22 μF electrolytic, 35 V.
C13—390 pF ceramic.
C14—220 pF ceramic.
D1—33-V, 1-W zener diode.
J1-4—Single-hole phono jacks.
L1—100-μH choke (RadioShack 273-102).
L2-L4—10-μH choke. Unwind the RadioShack 273-102 to 15 turns close-wound near the center of the choke for about 10.6 μH. Or use some 10-μH chokes (brown/black dots with black on the side) from an old TV or VCR.
L5—12-μH choke. Unwind all but 16 turns from a RadioShack 273-102 choke for 11.8 μH.
L6—8.9 μH choke. Unwind all but 14 turns from a RadioShack 273-102 choke for 8.9 μH.
Q1, Q2—MPS2222A transistors.
Q3—2N3053 transistor, heat sinked.
R1—47 kΩ.
R2—4.7 kΩ.
R3—220 Ω.
R4—100 Ω.
R5—8.2 kΩ.
R6—1 kΩ.
R7—68 Ω.
R8—10 Ω.
R9—1.8 Ω.
S1—SPDT toggle switch.
T1—Broadband impedance-matching transformer. See Figure 2 and caption.
Y1—Color burst crystal, 3.579545 MHz, or other 80-meter frequency of your choice.

IB-5281 impedance bridge that I picked up for $20 at an earlier hamfest. However, this one only provided a rough guess at the inductance of the RadioShack choke as I removed the windings. I tried for a few minutes to calculate how many turns I would need, but gave up. My saving grace appeared in the latest Ramsey Electronics catalog. That's where I found a new gadget—the $99 DMM 240 LCR meter, which could measure inductance down into the microhenry range. Sure, you can get multimeters that measure capacitance and inductance, but you need the smallest possible range for QRP designs where coils and chokes had microhenry values. The DMM 240 fit the bill.

Doug thoughtfully provided the μH values for most of the coils and windings in the Sardine Sender. I just took a stock of 100-μH RadioShack chokes and started unwinding and measuring. Once I reached my target, I scraped and soldered the wire end back on and I was done. The broadband transformer is shown in Figure 2. The test leads cause the readings to be a little high, but you can use the contact set on the body of the meter for greater accuracy.

The Sardine Sender Lives Again

The rest was pretty easy. I used a RadioShack universal board, which is a little larger than a sardine can. I saved board space by using some 10- and 100-μH chokes from scrap VCRs. I was a little nervous about the 10-μH VCR chokes—they were tiny and used fine wire.

For the first time I took the often-given kit-building advice and tried the oscillator stage first—it was fine. The big test was the transformer, output stage and filter coils. These were fine, too, but the resulting signal sounded grungy on my receiver. The power output was right on—slightly more than 1 W. I did some poking around, and shortened up some connections. On a hunch I tried my larger station power supply; the grunge was gone!

Figure 2—A close-up view of T1, the broadband transformer. I created my version by using a RadioShack 273-102 choke, unwound to 15 turns (10.6 μH) for the primary. Save the wire! The secondary windings consist of two turns of the removed wire.

The RadioShack disk capacitor assortment (272-809) is a useful resource. You can make up odd values by putting capacitors in series or parallel, such as the 390 pF made from a 56 pF and a 330 pF in parallel. Almost all the resistors are in stock, and you can make a 1.8-Ω out of two 1-Ω parts in series. I used mostly 1/4-W resistors throughout, but don't substitute wirewound resistors as these are made from wire coils, which are inductive.

Conclusion

So there you have it—a classic updated, with all parts still available from RadioShack. It is interesting to note that RadioShack is still stocking the 2N3053 RF transistor after all these years. My only caveat concerns color-burst crystals. Beware of poor quality units. In fact, it may be best to order a crystal for popular 80-meter CW frequencies. I had trouble finding many stations active on 3.579545 MHz.

Above all, enjoy!

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DeMaw, Doug, "Build This Sardine Sender," *QST*, October 1978.

DeMaw, Doug, *Ferromagnetic Core Design and Application Handbook*, MFJ Publishing, Starkville, MS

DeMaw, Doug, "More Basics on Solid-State Transmitter Design," *QST*, November 1974.

DeMaw, Doug, *W1FB's QRP Notebook*, ARRL, second edition, 1999.

Ramsey Electronics, 793 Canning Parkway, Victor, NY 14564; 716-924-4560; **www.ramseyelectronics.com/**.

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Shoreview, MN 55126
ewestgard@worldnet.att.net

STRAYS

CONGRATULATIONS!

◊ Bill Godden, W0JRJ, and his wife, Billie, of Kansas City, Missouri and John Tomasiewicz, W1QAJ, and his wife, Ann, of Waterbury, Connecticut are celebrating their 61st wedding anniversaries this year.

Bill and John went to the same Technical school, they stood up at each other's weddings and kept weekly skeds for 50 years. It's not very often two couples stay married 61 years and are still able to celebrate each other's anniversaries together and enjoy every minute of it!—*Bill Godden, W0JRJ, 8328 Willow Way, Raytown, MO 64138-3448*, **bgkc@juno.com**.

COAST GUARD REUNION

◊ The Coast Guard CW Operators Association Third Annual Reunion will be held in Charleston, South Carolina, Oct 17-21 at the Holiday Inn Riverview, 301 Savannah Hwy. Master Chief Petty Officer of the USCG Vincent W. Patton III is scheduled to be the banquet speaker. All former CW operators are encouraged to attend.

The weekly Coast Guard CW net (noon Eastern Time on 14,052 kHz) will he held aboard the USCG Cutter *Ingram* at the Patriots Point Naval Maritime Museum. Fred Goodwin, K7LF, will be NCS. Commemorative QSL/Certificate will be issued to all check-ins to the Coast Guard CW Net October 20.

For reunion details please contact Jim Huffman, Box 55388, North Pole, AK 99705, tel 907 488-6528; e-mail **bird63@alaska.net**.

ATHENS TAXI ADVENTURE

◊ My cousin, who hails from Westport, Connecticut and speaks Greek, was in Athens recently. While trying to get to the airport to return home, she was having trouble finding a cab. Finally, a cab pulls up to the curb and she told the driver that she wished to be taken to the airport immediately. The cabbie replied, "I'm sorry Madam. This is a number 2 cab and it is out of my fare zone; you will have to hail a number 1 cab." Disappointed, she asked the driver to "bend the rules" a little. He refused. "Do you want me to be fined?" he asked her.

"By the way," he asked "are you an American?" She replied in the affirmative and added, "I'm from Connecticut." He promptly shot back, "Do you know Nick Georgis?" Astounded, she said "Why, he's my cousin!" The cabbie changed his mind: "Get in the cab I'll take you right now, and tell K1MAR that SV1ABU sends his 73.—*Nick Georgis, K1MAR, Huntington, Connecticut*

Previous • Next Strays

NEW PRODUCTS

CABLE PRO CRIMPING SYSTEM FROM LIBERTY WIRE AND CABLE

◊ If you've always wanted a single tool to strip and crimp BNC, RCA and F connectors, take a look at Liberty's new Cable Pro Multimedia Crimping Tool. Connectors attached with the new tool have an 80-pound "pull-off" rating, are AT&T approved and are virtually waterproof. For more information, contact Liberty Wire and Cable at 4630 Forge Rd, Suite A, Colorado Springs, CO 80907; tel 719-260-0061, fax 719-260-0075, **www.libertycable.com**.

NEW 10-10 QSO PARTY PROGRAM

◊ N3FJP's 10-10 QSO Party Contest Logging Program 1.0 is now available. This program is designed to support the five 10-10 QSO Party contests throughout the year. This program checks for duplicates (including partials), lists the states (color changes when worked), lists countries worked (a database of countries is included), lists all contacts, prints and writes ASCII log, dupe and summary files, calculates heading and distance to DX contacts from your QTH and provides many current statistics. The program can be downloaded at no charge from **www.n3fjp.com/**.

MINI KEYER PADDLES FROM GERMANY'S PALM RADIO

◊ Morse Express now offers a new miniature dual paddle keyer system from Germany's Palm Radio. Designers DL9SCO and DJ6TE have produced a small (1×1×3-inch) and lightweight paddle system designed for portable, mobile, and shack operation.

The system consists of a retractable paddle mechanism and housing (available in three versions), a snap-in mount that can be attached to a radio or other surface (with screws, magnets, or adhesives), a molded connecting cord and a set of powerful magnets.

Model PG has gray levers and an "Elecraft gray" powder-coated housing; Model PB has black levers and a gray housing; and Model P817 is all black to match Yaesu's FT-817 transceiver.

With three adjustments on each rigid lever, the Palm Mini Paddles perform like standard, larger paddles. Each lever has its own adjustable tension spring, and contact spacing and lever stop positions are independently adjustable. The contacts are gold plated for reliability. The paddle mechanism slides all the way into its extruded aluminum housing for safe storage and transport.

Price: $69.95 ($74.95 for Model P817) plus shipping and handling. For more information, contact Morse Express, 2460 South Moline Way, Aurora, CO 80014; tel 800-238-8205, **www.MorseX.com**.

Previous New Products

HamAlyzer 2.0

Some signals should be heard and *seen*—and that's the allure of *HamAlyzer*. Looking at a visual representation of a signal will reveal characteristics that you may have only guessed by ear alone.

In the good old days many hams used oscilloscopes to view signal waveforms; many still do. But oscilloscopes often were beyond the financial reach of the common amateur. Those days are gone—at least for measuring audio-frequency signals—now that the vast majority of stations include sound-card equipped computers. The computer sound card can take audio from your receiver and convert it to data so that you can analyze it with nifty software such as *HamAlyzer*.

Versatile Software

The *HamAlyzer* package is based on a high-performance digital audio spectrum analyzer originally designed for engineers. Dr Chris Brown created *HamAlyzer* to be user-friendly, and to run on a variety of PCs using as little processor muscle as possible. It will run on just about any Pentium-class PC under *Windows 95, 98, ME* or *2000*.

With *HamAlyzer* I enjoy the ability to select the free running, averaging or peak display modes (or all three together). Free running gives you a constantly changing look at the output of your receiver, second to second. I noticed very little latency. The peak display shows the plot of peak signal energy, while the averaging selection shows average signal power.

With *HamAlyzer* I could study the entire audio output spectra of my receiver and, not surprisingly, I discovered right away that most of the signal energy is concentrated between about 300 and 3000 Hz when I'm not using narrow IF filters. *HamAlyzer* showed that the receive audio from my ICOM IC-706 transceiver peaked between 500 and 700 Hz, then gradually ramped downward, dropping about 15 dB to 3000 Hz.

Easy to Use

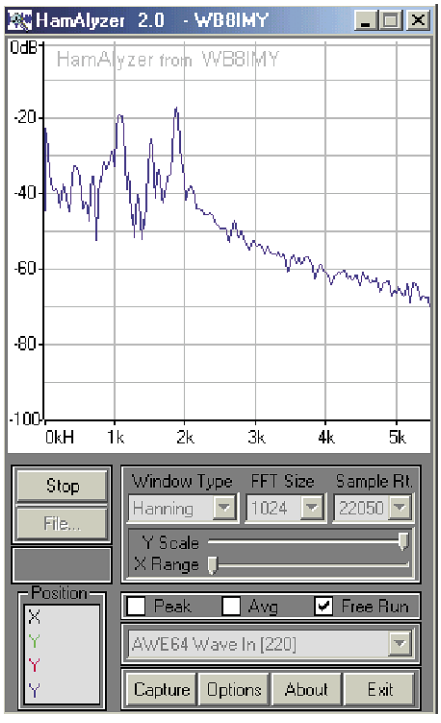
Using *HamAlyzer* is as simple as booting up the software and clicking your mouse on the **START** button. *HamAlyzer* will instantly begin displaying whatever signal is coming into the sound card at that moment. *HamAlyzer* can also analyze a previously recorded WAV file. You can even adjust the amplitude scale for a finer look at the signal.

You can analyze audio directly from your radio by connecting a shielded cable between the fixed-level audio output (usually available at the accessory jack) and either the **LINE** or **MICROPHONE** input of your computer sound card. Cable hookup takes all of about 30 seconds.

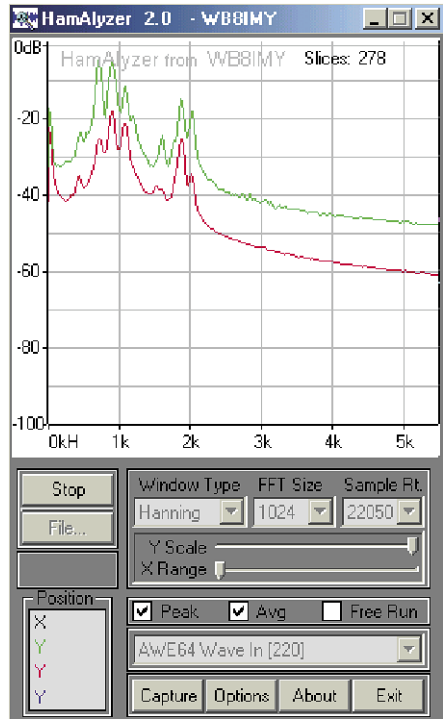
If you'd like to share your analysis of a fellow amateur's signal, *HamAlyzer* makes it easy. Just click on the **CAPTURE** button and *HamAlyzer* will save a snapshot of the display in JPG or BMP format that you can attach to an e-mail message.

Registration

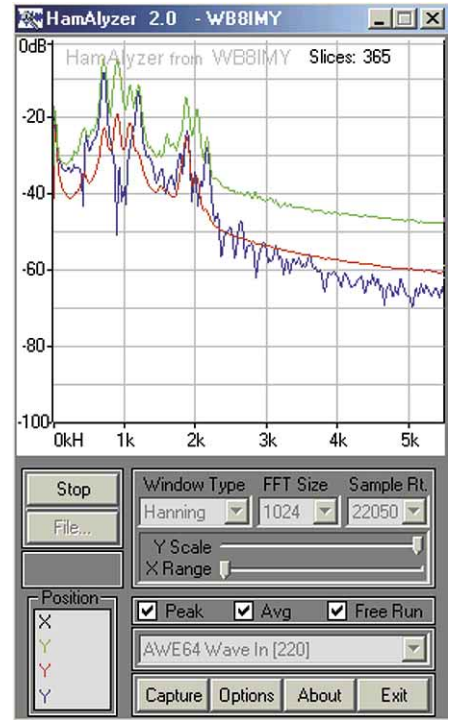
HamAlyzer is shareware. You can download it freely at **www.HamAlyzer.com**, but this is just a 10-day demo version. After the demo period expires, you must register *HamAlyzer* at a cost of $25. You can do this electronically through PayPal, or by check or money order. See the Web site for details.



A *HamAlyzer* view of three PSK31 signals in the free-running mode.

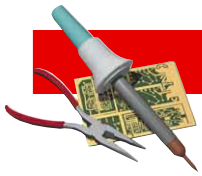


***HamAlyzer* looks at three PSK31 signals in the peak (top trace) and averaging modes.**



All three *HamAlyzer* display modes running simultaneously.

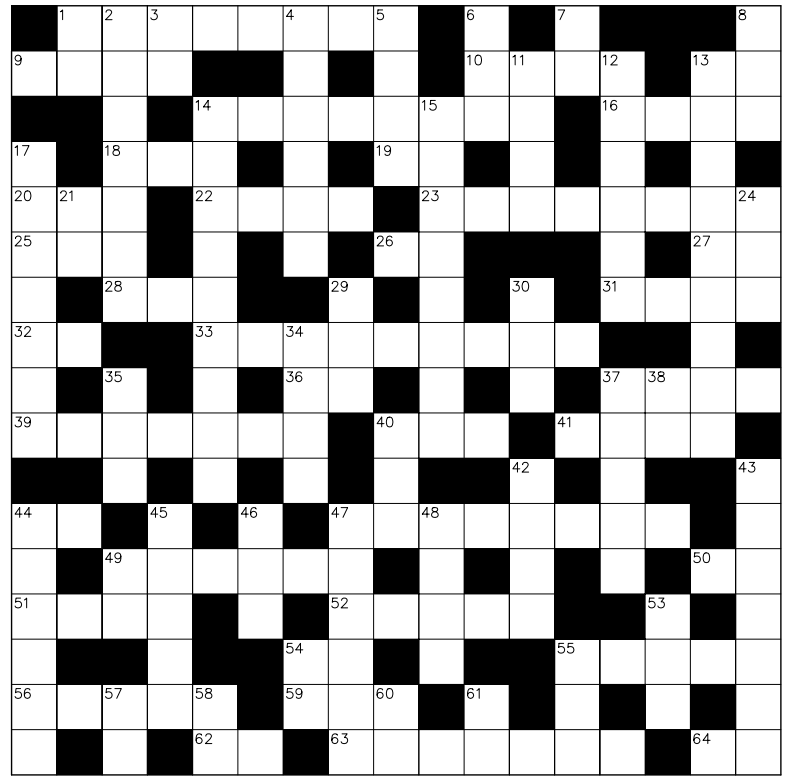
Steve Ford, WB8IMY ♦ *QST* Editor



By H. Ward Silver, N0AX

Test Your Knowledge!

This puzzle will "draw" on your graphic expertise with words pertaining to geometry and drawings.

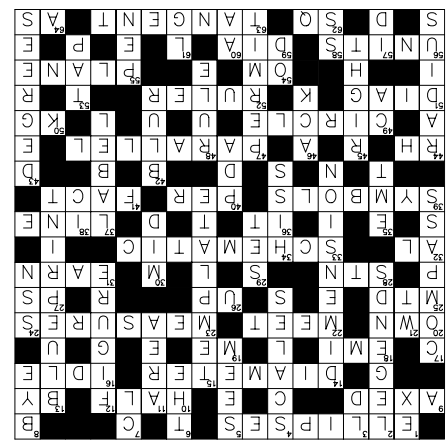


Across

1. Kepler discovered planetary orbits are these figures
9. Cut loose
10. One of two equal parts
13. You betcha, __ golly
14. Across a circle
16. Not active
18. Interference (abbr)
19. I've gotta be __
20. Possess
22. To achieve specified performance
23. A surveyor __ land
25. Mounted (abbr)
26. Direction of rising objects
27. Postscript (abbr)
28. Station (abbr)
31. To obtain respect
32. Aluminum (abbr)
33. Electrical drawing
36. Pronoun
37. Straight distance between two points
39. These represent components in a drawing
40. Rate or ratio
41. Just these, ma'am, just these
44. Right-hand (abbr)
47. Lines that never meet
49. Simplest closed curve
50. Metric weight (abbr)
51. Across the corners (abbr)
52. Linear measuring device
54. Old Man (CW abbr)
55. Two-dimensional surface
56. The quantities in which a measurement is specified
59. Width of a round hole (abbr)
62. Four equal sides (abbr)
63. Just touching a circle
64. __ right __ rain

Down

1. Prefix denoting previous or no longer
2. Explanations of a drawing's symbols
3. Load (abbr)
4. Specify relationship of drawing size to actual size
5. Things aren't always what they __
6. Not in __ log
7. Center-line (abbr)
8. See ya later
11. Measure of enclosed surface
12. To calculate
13. Drawing for construction
14. Specification of size on a drawing
15. Guide used for drilling
17. Used to draw circles
21. Weight (abbr)
24. Sunspot number (abbr)
29. Concrete does this when it cures
30. Center or __ -point
34. Receiver output with no signal
35. Electrical conduit (abbr)
37. Text identifying a symbol
38 Integrated circuit (abbr)
40. Hand-held computer (abbr)
42. If the text is too small, it becomes a __
43. Angular units of measure
44. Half of 14 Across
45. A 3-4-5 triangle has this kind of angle
46. Acknowledge (abbr)
47. Get one of these before you put up a tower
48. Requirement for behavior or performance
49. Most populous US state (abbr)
53. Cuts thread in a hole
54. Outside measure of a tube
55. Indelible marker
57. Inside measure of a tube
58. Steel that won't rust (abbr)
60. Type of 1.5 V battery
61. Large (abbr)



22916 107th Ave SW
Vashon, WA 98070

[Continued from page 34]

well as broad geographical coverage.

Within 15 minutes of the first incident in New York City, the first of many alert messages was transmitted by a MARS member to the Pentagon. Within an hour, a coast-to-coast backup net formed. Among the participants were Federal Emergency Management Agency outposts, Federal Aviation offices, the American Red Cross, and state emergency operations centers, as well as MARS members enrolled in SHARES. Regional SHARES nets also activated across the country, bringing in many additional hams.

Interestingly, one of the first government agencies to require emergency communications was SHARES itself. Located in an office near the Pentagon, the SHARES staff was immediately evacuated. Operations chief Ken Carpenter, KD6DBX, a retired Marine Corps communicator, quickly returned to the air with portable equipment from a safe Northern Virginia location.

The SHARES emergency activation ended September 12. During its 15 hours of operation, the National Communications System headquarters received more than 800 station availability reports from across the US.

Reporting on the parallel Army MARS operation, US Army MARS Chief Bob Sutton, N7UZY, said that 23 state and regional nets had been activated with 229 individual stations participating. These figures do not include numerous Air Force and Navy-Marine Corps members activated.

During the two-day period there was no attack on communication lines—although a massive surge of calls had the effect of blocking normal connections into much of Washington and New York in the initial hours. But MARS and its allies in NCS SHARES had demonstrated their effectiveness in a genuine emergency of international scope. Sutton thanked all that were involved in the MARS support. "You have done a great job," he said.

SATERN—the Salvation Army Team Emergency Radio Network—activated its HF net on 14.265 MHz shortly after the attacks. The net initially served as a backup communication link to Salvation Army headquarters and units throughout the nation. SATERN helped to coordinate blood supplies across the US and handled health-and-welfare inquiries.

Immediately after the terrorist attack, Salvation Army Major David Dalberg, National Disaster Services Coordinator, requested a SATERN operation at SATERN territorial headquarters. Bill Davidson, W9SWW, Greg Buttimer, N9SA, and Harry Gilling, W9IB, set up a G5RV dipole above the building's eighth story and snaked the feedline 350 feet down to the disaster services area.

The SATERN net operated from the onset of the disaster for two days, then reduced its activity to the regular 1400 UTC net time. SATERN asked Amateur Radio volunteers to continue to monitor the net frequency to pass any needed information.

"It seemed on Tuesday that the entire nation's amateur corps was there supporting the endeavor," said National SATERN Director Major Pat McPherson, WW9E. "It speaks to the spirit and 'can do' reflex of all those dedicating their time and resources to help. It also speaks to the patriotism of amateurs in our nation."

REACT's Role

At press time, Radio Emergency Associated Communication Teams—REACT International—was seeking additional Amateur Radio operators and licensed GMRS users, primarily to support the Salvation Army's relief efforts in New York City. REACT is a participant of the National Volunteer Organizations Active in Disaster (NVOAD) to help provide coordinating communications and support to the other members of this organization. The ARRL and REACT have a memorandum of understanding.

REACT International Secretary Lee Besing, N5NTG, told ARRL that some shifts had gone unfilled as volunteers started burning out or having to return to their jobs. He said REACT was running 20 volunteers per shift. Jeff Schneller, N2HPO—who's also a SATERN liaison—was helping to coordinate the New York City response.

Charles Bessels of the Southern New York REACT Council reported that REACT teams were assisting the Salvation Army in Manhattan. "REACT units are making rounds to the different canteens around Ground Zero and at other positions," he said. These included the medical examiner's office, the Javits Convention Center—where volunteers were signing up to help—and the Armory on Lexington Avenue, where families of victims met with officials to give DNA samples and provide additional information. The REACT units were making sure the Salvation Army canteens had all the supplies, fuel and personnel they need. They also handled emergency deliveries of needed items.

"There was a very good working relationship between all parties involved," Fred Lanshe, N3QLU, a REACT International vice president, said in a report posted on the REACT Web site, **www.reactintl.org**. "Good communication has been established."

Federal City REACT volunteers in Washington, DC, equipped with GMRS, also staffed barricades in the Capitol Complex, freeing up uniformed police for more pressing duties. Montgomery County, Maryland, REACT members were said to have assisted the American Red Cross relief and recovery effort.

Staying the Course

In New York, SEC Carrubba urged those who volunteered but were not ARES members to get involved in their local ARES programs. That way, he explained, not only could they take advantage of the various training opportunities, they wouldn't have to wait in line to volunteer, because they'll be assigned from the outset.

The Red Cross's Ferron said hams "do whatever it takes to do the job—and they're doing it." He advised amateurs everywhere to be preparing now for disaster. "If you know your plan, you're ahead of the game," he said. "Practice, practice practice."

Carrubba estimated that it would take many weeks and maybe months before the missing could be identified and the served agencies get back to normal. "This is the *real thing*," he said, "and Amateur Radio has proved itself to be a valuable resource and service to the community in this time of need."

In the wake of the Pentagon ARES activation, Virginia ARRL Public Information Coordinator Patrick Wilson, W4PW, reflected that all the amateurs who volunteered were ready and willing to go where asked and stay as long as they were needed. "This is what we do," he said. "Everywhere we went at the site, people stopped us and thanked us for what we were doing to help the effort. It embarrassed me a little, because compared to what some others were doing, our jobs were a piece of cake. Did and does ham radio play a part where needed? A resounding 'yes' is the answer."

Authors' note: *Our thanks to Jennifer Hagy, N1TDY, Brennan Price, N4QX, Jennifer Stocker and Bill Sexton, N1IN, for their assistance in the preparation of this article. We also express our gratitude to the many amateurs and organizations that went unmentioned in this summary account but whose contributions were nonetheless important to the overall success of these activations.*

HINTS & KINKS

ELIMINATING KEY-CLICKS IN MFJ-93XXK QRP-CUB TRANSCEIVERS

[This item was first published by QRP ARCI in the July 2000 *QRP Quarterly*. Thanks to Craig Behrens, NM4T, for permission to use it in Hints and Kinks.—*KU7G*]

◊ I noticed with interest the comment about the possibility of key clicks in Rich Arland's review of the MFJ-9340K (*QST*, Sep 2000, p 74). I built the 15-meter version of the kit and did indeed notice some key clicks when monitoring the output on another receiver. Looking at the Cub's output on a 'scope, it was immediately obvious that the keying-envelope rise time was much too fast—about 0.1 ms. After a little experimenting, I came up with a simple modification that fixes the problem. The keying rise and fall times are now about 2 ms, resulting in very nice keying.

The modification consists of adding a 0.22-µF capacitor between the base and collector of Q8 and a 2.2 kΩ resistor between the base and emitter of Q8 (see Figure 1). The two added components are highlighted in the accompanying figure. Don't be intimidated by the small surface-mount components in the Cub; the modification is actually quite easy to perform. First, solder a 2.2 kΩ resistor between the front of R28 and R29 (immediately to the left of C27). The pads to which you will solder the resistor are the ones that connect to Q8. The resistor should be positioned on top of R28 and R29 with the leads bent to touch the two solder pads. A $^1/_8$-W resistor works best for this, but a $^1/_4$-W resistor could also be used. Be careful not to heat the pads too long and keep the solder neat. When you have the 2.2 kΩ resistor in place and the leads trimmed, locate the two feed-through holes between R19 and C27. The hole nearest R19 (just to the left of C28) connects the "+T" line from the top to the bottom of the board. Solder one lead of the 0.22-µF capacitor to this feed-through and the other lead to the front pad of R29 (the same one to which the 2.2 kΩ resistor is attached).

Check your work to make sure the resistor and capacitor are installed correctly and that there are no solder bridges. Now, no more key clicks!—*Larry East, W1HUE, 1355 S Rimline Dr, Idaho Falls, ID 83401;* **w1hue@arrl.net**

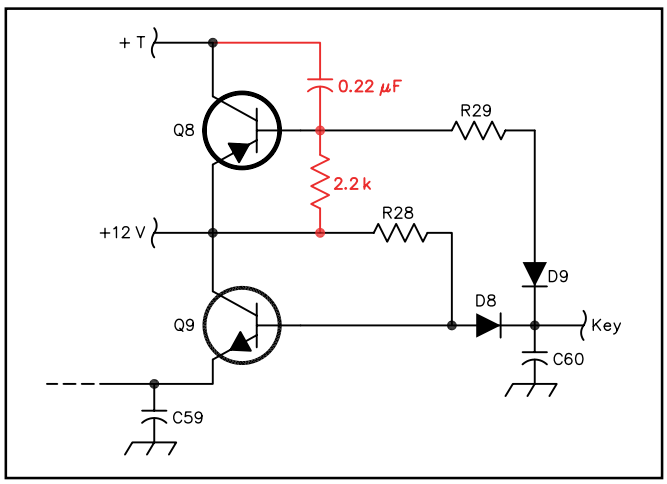


Figure 1—A schematic of W1HUE's cure for key clicks in the MFJ Cub transceiver.

A BATTERY-SAVING TIMER CIRCUIT

◊ My shack is cluttered with homebrew projects and helpful little gadgets that operate from 9-V batteries. Most consume only a few milliamperes and operate for only a few minutes at a time. Theoretically, an alkaline battery in that kind of application should last for years—unfortunately this theory does not consider forgetfulness. If I don't remember to turn off the power switch, the battery is stone dead within a day or two. It happens with every piece of battery-powered gear I have, eventually. Besides the cost factor, I don't like the idea of picking up a piece of equipment, finding that the battery is dead, looking around the house in vain for a fresh one and finally robbing one from another gadget.

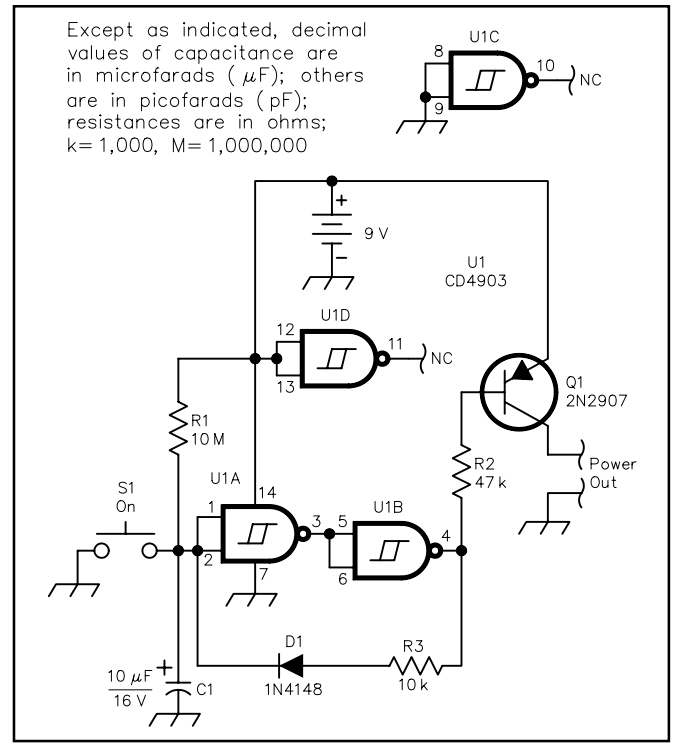


Figure 2—K0LR's battery-saver provides an automatic-power-off function for low-power accessories. Mouser Electronics, 958 N Main St, Mansfield, TX 76063; tel 817-483-4422, fax 817-483-0931; e-mail sales@mouser.com; Web www.mouser.com. RadioShack, National Parts Department, 900 E Northside Dr, Ft Worth, TX 76102; tel 800-442-2425, fax 817-870-5751, Tech Assistance 817-878-6875; www.RadioShack.com

C1—10 µF tantalum capacitor, RadioShack #272-1436 or Mouser #80-T350E106K016
D1—1N4148 diode, RadioShack #276-1122 (10-pack) or Mouser #78-1N4148
Q1—2N2907 or equivalent PNP transistor, RadioShack #276-2023 or Mouser #610-PN2907A
R1—10 MΩ resistor, RadioShack #271-1365 or Mouser #291-10M (10-pack)
R2—47 kΩ resistor (see text), RadioShack #271-1342 or Mouser #291-47K (10-pack)
R3—10 kΩ resistor, RadioShack #271-1335 or Mouser #291-10K (10-pack)
S1—Pushbutton switch, normally open, RadioShack #275-1547 (4-pack) or Mouser #103-1012
U1—CD4093 IC, RadioShack #RSU 11482239 (special order) or Mouser #511-4093

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

The simple circuit in Figure 2 takes care of my memory problem by providing a few minutes of operation and then automatically putting the circuit to sleep. With the component values shown, pushing S1 gives two or three minutes of operation, which is often as long as the circuit is needed. If a good-quality tantalum capacitor is used for C1, the time can be extended considerably; for example, increasing C1 to 100 µF provides an operating time of approximately 20 minutes. Capacitor leakage eventually becomes a problem, so I would not use a simple circuit like this if longer operation is required. Nevertheless, as long as you push S1 before the timeout has expired, operation can be extended until your finger gets tired or the battery goes dead, whichever happens first.

One CMOS integrated circuit, a garden-variety PNP transistor and a few other components make up the entire circuit. Operation of the circuit is very simple. When the normally open pushbutton switch S1 is pressed, it discharges C1, bringing the input of gate U1A near 0 V and causing its output to go high. U1B is also an inverting stage, so its output goes low, pulling down the voltage on R2 and turning on Q1. After S1 is released, C1 charges slowly until the gate threshold voltage on U1A is reached, at which point the output of U1A goes low and the output of U1B goes high, turning off the PNP transistor.

R3 and D1 are not essential to circuit operation, and their purpose may be a little obscure. The CD4093 is a Schmitt trigger with hysteresis. This means that even if the gate voltage is changed very slowly, the output will change state abruptly as soon as a threshold voltage is reached; it does not hover in indecision between "high" and "low" states. However, the CD4093 continues to draw current even after the output has changed. On the chip I used, the "excess" current isn't very high, starting at about 100 µA and decreasing gradually to essentially zero. This probably would not have any noticeable effect on battery life, but it bugged me, so I added R3 and D1 to reduce the transition time by forcing C1 to charge rapidly once the threshold is reached.

In applications requiring only a few milliamperes, there will be very little voltage drop across Q1 when it is turned on. For higher current applications, the value of R2 should be decreased proportionally. For example, if the circuit being controlled by the timer requires 20 or 30 mA, R2 should be reduced to something like 10 kΩ. This battery-saver circuit can also be used at other voltage levels from less than 5 V to about 15 V, as defined by the operating voltage limits of the CD4093. Circuits drawing much more than 30 mA would require a beefier transistor for Q2 and a smaller resistor for R2. If necessary, the drive current capability of U1 can be increased by putting the unused sections U1C and U1D in parallel with U1B. (This circuit could also be used to power a relay that activates high-power devices, too.—*KU7G.*)

Figure 3 shows the battery-saver circuit installed in the ICOM direct-frequency-entry keypad described by John Hansen in *QST*.[1] This is an extremely useful accessory for my IC-706, by the way. The CD4093 is installed dead-bug fashion on an unused portion of the main circuit board with double-stick tape, with the rest of the components suspended from the IC's pins. The toggle switch that was previously used to turn the unit on and off has been replaced by a pushbutton, and the battery-power leads have been routed through the timer circuit.—*Lyle Koehler, K0LR, 30141 Oriole Ave, Aitkin, MN 56431;* **k0lr@arrl.net**

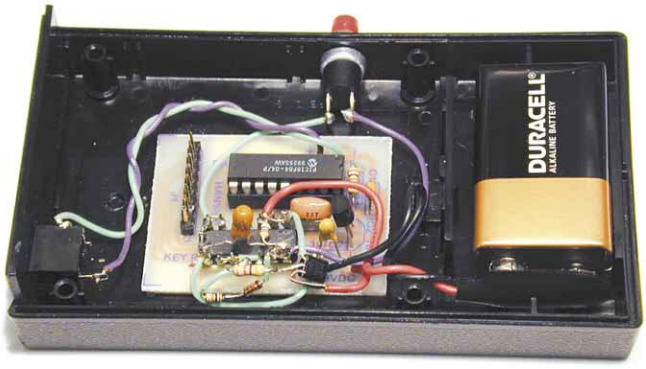


Figure 3—The battery-saver circuit installed in a shack accessory.

MORE ON RESTORING PLASTIC WINDOWS ON RADIOS AND GEAR

◊ Like so many hams, often I acquire a piece of old gear which has some haze, light abrasion or discoloration on the plastic display windows. I use a product made by Maytag called "Cook Top."

It is a cleaning cream for ranges with smooth cooking tops. It contains silica, alcohol and a detergent. Apply it with a cotton ball or soft cloth using a circular motion and keep rubbing until the surface becomes almost dry. Two or three applications are usually sufficient to do a good job. To finish, wipe the surface well several times with a damp paper towel or cloth to remove any of the leftover cream.

It works well on plastic windows and polycarbonate materials. In addition, I have used it on unpainted plastic radio cabinets to bring back a clean-vibrant finish.

While this method does not remove deep scratches, it does a great job quickly to make the display window clear and "like new."

"Cook Top" is available from most appliance dealers that carry glass-ceramic cooking tops. Otherwise one can contact the Maytag Customer Service, 240 Edwards St SE, Cleveland, TN 37311.—*Mike Grimes, K5MLG, 3805 Appomattox Cir, Plano, TX 75023;* **grimesm@flash.net**

MORE ON AN IMPROVED CONNECTION TO RG-6 CATV COAX

◊ In his April 2001 hint, AF4JX recommends that we use four setscrews to secure a PL-259 to the shield of RG-6 CATV coax.[2] I'd like to suggest that using four setscrews is actually worse than using one. I learned this when I had my first job at MRC Corporation, where I helped design LASER bar-code readers. I put two setscrews on opposite sides of an optical mount and the thing kept falling apart after a bit of vibration. Removing one of the setscrews made the thing much more secure.

If you use setscrews in pairs opposite one another, you have only two (or four) points of contact (for two or four setscrews) because the parts ride on the points of the screws. If you use only one setscrew or two in adjacent holes, the force securely clamps the part against the side opposite the screw(s), where there are numerous points of contact.

My suggestion is to lose two of those setscrews! Ask any mechanical engineer who's dealt with them on a regular basis.—*Phil Karras, KE3FL, 3305 Hampton Ct, Mt Airy, MD 21771-7201;* **ke3fl@arrl.net**

MEASURING AN UNKNOWN AF IMPEDANCE

◊ Figure 4A shows how to obtain an approximate impedance value of an unknown component at audio frequencies. Set the audio-oscillator frequency at midrange, then adjust the potentiometer until the ac voltage across it equals that across the unknown. Then kill the circuit, and measure the resistance of

[1]J. Hansen, W2FS, "A Direct Frequency Entry Keypad for ICOM Transceivers," *QST*, Dec 1999, pp 38-39.

[2]J. Sever, AF4JX, "An Improved Connection to RG-6 Coax," *QST*, Apr 2001, p 74.

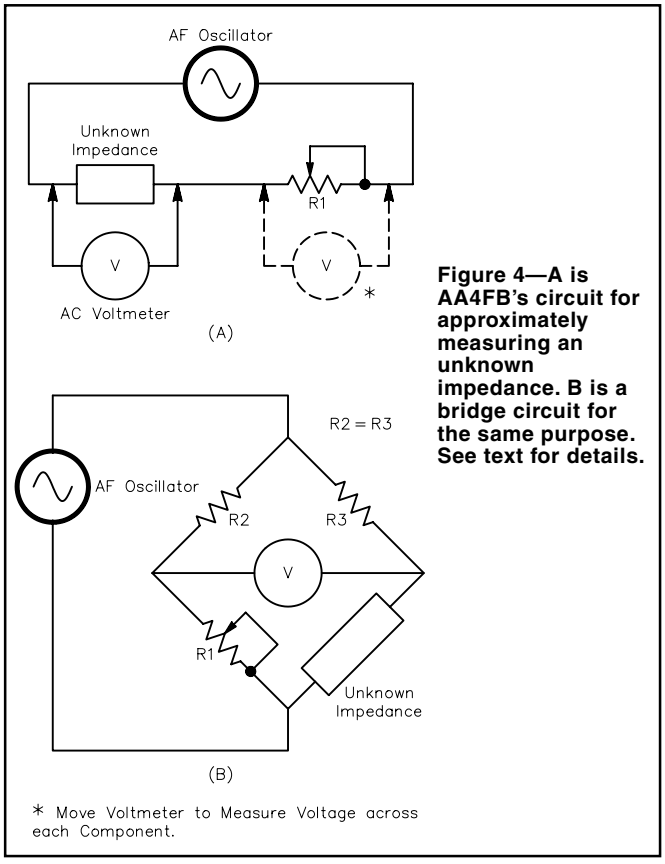


Figure 4—A is AA4FB's circuit for approximately measuring an unknown impedance. B is a bridge circuit for the same purpose. See text for details.

the potentiometer. Its resistance will equal the magnitude of the unknown impedance.—*Bert Kelley, AA4FB, 2307 S Clark Ave, Tampa, FL 33629-5707;* **aa4fb@mindspring.com**

[This technique will work, but be careful. Each adjustment of the potentiometer changes the voltages across both the potentiometer and the unknown. Thus, it may take several tries to get the voltages equal. By adding two more resistors, we can form a bridge and connect the meter across the bridge as shown in Figure 4B. This lets us monitor the voltages across the unknown and potentiometer simultaneously. Adjust the potentiometer until the meter reads a null, and the voltages are equal. Remember that this only reveals the magnitude of the unknown impedance. To learn more, use a reactance bridge or network analyzer.—*Bob Schetgen, KU7G, Hints and Kinks Editor.*]

FINDING A BREAK IN MULTICONDUCTOR CABLE

◊ Sometimes there is a break in a conductor of a multiconductor cable. Such breaks are usually near one of the cable ends. Here is how to locate the break without disassembling the plugs at both ends: First, disconnect the cable and determine which conductor is broken with an ohmmeter. Use a capacitance meter to determine the capacitance between two of the cable's good conductors. Then measure the capacitance of the broken wire to the same good conductor. The end with very low capacitance has the break. A break that is not at either end can be approximately located by measuring the capacitance from each end. Divide the capacitance from one end by the total capacitance and multiply the result by the cable length. This gives the approximate distance from that end to the break (see Figure 5).—*Bert Kelley, AA4FB, 2307 S Clark Ave, Tampa, FL 33629-5707;* **aa4fb@mindspring.com**

AN ADDITION TO THE KENWOOD TM-261A MANUAL

◊ The popular Kenwood TM-261A mobile 2-meter transceiver allows the user to assign names to channels. That is, the location or call sign of a repeater can show up on the display instead of just the frequency, but the manual leaves out a vital step in

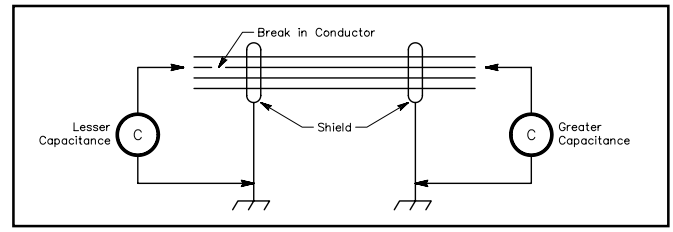


Figure 5—AA4FB's setup to estimate the location of a cable break by measuring capacitance between conductors.

explaining how to do this.

As I found out from other hams, the way to assign a name to a channel is to:

1. Select the channel
2. Switch the power off;
3. While holding down the MN button, switch the power on again;
4. Immediately press the REV button (the step omitted in the manual);
5. Choose letters or digits with the tuning knob, pressing MN after each character;
6. Press the F button to exit.

The manual also omits the "wireless clone" feature that allows you to transfer the entire memory of a TM-261A to another TM-261A. However, that is documented online at **216.133.235.165/Amateur/AmateurApplicationNotes/AAN0019.JPG**. During cloning, the "master" radio sends DTMF tones to the others for about five minutes. Using a dummy load on the transmitter is recommended because a range of only a few yards is generally sufficient.—*Michael A. Covington, N4TMI, 285 St George Dr, Athens, GA 30606-3943;* **Michael@CovingtonInnovations.com**

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

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

FEEDBACK

◊ In Table 1 of my article in October *QST* ("An LPDA for 2 Meters Plus," p 45), the element lengths and half lengths *in millimeters* (only) are one-half their correct values. To obtain the correct values, double the numbers in these two columns. The element spacing in millimeters is correct.—*L. B. Cebik, W4RNL*

◊ **Clarification:** In response to our review of the Ten-Tec Model 526 6N2 transceiver (October 2001 *QST*, page 70), a reader pointed out that radios utilized in MARS and CAP (Military Affiliate Radio System and Civil Air Patrol) must comply with National Telecommunications and Information Administration (NTIA) standards. While *nonparticipants* in MARS and CAP may use the 6N2 (or any radio) to monitor these signals, participants must use approved equipment, and the 6N2 is not approved. The CAP equipment standards, which will become effective for MARS on December 31, 2001, may be found at **www.ntc.cap.gov/comm/ntc**.

◊ **Update:** Author Bob Lewis, AA4PB, reports that he is sold out of PC boards for his charger (see "An Automatic Sealed-Lead-Acid Battery Charger," May 2001 *QST*). Boards are available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118, tel 847-836-9148 (voice/fax). QST

ICOM IC-V8 2-Meter FM Handheld Transceiver

Reviewed by Michael Tracy, KC1SX
ARRL Lab Test Engineer

I've always been a fan of elegant simplicity. When I was a Novice, my first transceiver was a 222 MHz handheld that was about as simple as you can imagine; three thumb-wheel dials and a pushbutton controlled the operating frequency, a three-position slide switch selected the offset and a pair of knobs handled volume and squelch. The rig did have its drawbacks, however (a tiny battery, low RF output and a near total lack of features—to name a few), so it has been succeeded by other H-Ts, each one having advantages and disadvantages.

Modern handheld transceivers are very feature-laden, but they also tend to be somewhat complex to use (or perhaps I should say a challenge to remember how to use!). When operating the H-T I currently own (admittedly 6 years old) I often confuse the button combination used to access the settings menu with a diabolically similar combination that performs a full reset—which clears all of the memories and settings! Needless to say, it's in times like these that I long for those simpler days.

A few of the more recent H-T offerings have promised ease of use, at least in regard to working the more basic features. When I saw the relatively uncomplicated façade of the ICOM IC-V8 2-meter handheld, I was intrigued enough to volunteer to take on this review. The fact that the radio's enclosure is green (my favorite color) just added to the attraction.

A Tough Exterior

The first thing that I noticed when I took the IC-V8 out of its box was its rugged look and feel. Some browsing around on ICOM's Web site revealed—as I had suspected—that the 'V8 bears a striking resemblance to a series of handhelds in their "Land Mobile" communications product line.

Although the rig is a bit tall and deep when compared to some other contemporary H-Ts, it is somewhat narrow in width, so it fits well in average size hands. With its rounded case edges, gripping it feels very much like holding a flashlight. At slightly more than 12 ounces, it's a bit too heavy to carry in a shirt pocket. A large plastic clip that snaps onto the back of the battery pack is supplied, and does a good job of securely holding the radio on a belt.

The 'V8's simple appearance belies its well-rounded list of features. These include, but are not limited to, 100 regular memory channels, alphanumeric memory naming; scan edge memories; a "Call" channel; CTCSS and DTCS (most often referred to as DCS) encode, decode and tone scan; automatic repeater offset; 5.5 W of RF power output; DTMF autodial memories; multiple scan modes and extended receive.

Bottom Line

The ICOM IC-V8 is a tough, easy-to-use single-band handheld with a full range of features.

An Overview

The top of the rig supports a standard BNC antenna connector and a single knob. VOL is molded into the case adjacent to the knob, and this is indeed its default function, but this assignment can be changed via a menu setting (more on this later). The right side of the rig has separate three-conductor speaker and microphone jacks. The "ring" of the speaker jack is normally not used, but serves as the connection point for a "cloning" cable. The "ring" of the mike jack supplies a 5 V output (for providing power to optional speaker-mikes).

There are three rubberized buttons located on the right side of the rig. The top button is a red power button. Beneath that is a large oblong push-to-talk button, and just below that is a small monitor button (both of these are black).

A large speaker grill takes up the top third of the front panel. The LCD display is a bit on the small side, and while the frequency digits or alphanumeric characters that appear in the window are of sufficient size to be reasonably legible, the various icons and the four-segment receive signal strength indicator are downright tiny. The display background can be illuminated. In the default setting the light remains on for 5 seconds after any button is pushed, but it can alternatively be disabled or set to stay on continuously.

Four buttons are located in a row below the bottom edge of the display window. These include a function button and three additional keys that are used for call channel, memory and VFO mode operations. These same keys are used to generate DTMF "digits" A, B, C and D. A four-row/three-column DTMF keypad is located below these. The keys are large and their assignments are marked in black directly on their surfaces. They are not backlit, however. Keypad buttons are used to directly input frequencies, manually transmit DTMF tones and control

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1
ICOM IC-V8, serial number 01702

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: Receive, 136-174 MHz; transmit, 144-148 MHz.	Receive and transmit, as specified.
Power requirements: 6.0-10.3 V dc[1]; receive, 0.25 A (maximum); transmit, 2.0 A.	Receive, 0.17 A (maximum volume, no signal); transmit, 1.9 A, tested at 10 V.
Size (HWD): 5.2 × 2.1 × 1.4 inches; weight, 12.3 ounces.	
Receiver	**Receiver Dynamic Testing**
Sensitivity: 12 dB SINAD, 0.16 μV.	For 12 dB SINAD: 0.13 μV.
Adjacent-channel rejection: Not specified.	20-kHz offset from 146 MHz, 64 dB.
Two-tone, third-order IMD dynamic range: 65 dB, (spacing not specified).	20-kHz offset from 146 MHz, 64 dB*, 10-MHz offset from 146 MHz, 93 dB.
Two-tone, second-order IMD dynamic range: Not specified.	86 dB.
Spurious and image rejection: 75 dB.	IF rejection, 105 dB; image rejection, 73 dB.
Squelch sensitivity: 0.1 μV.	0.11 μV at threshold.
Audio output: 300 mW at 10% THD into 8 Ω.	410 mW at 10% THD into 8 Ω.
Transmitter	**Transmitter Dynamic Testing**
Power output: 5.5 W high, 0.5 W low.	5.4 W high, 0.4 W low (batteries), 6.0 W high, 0.4 W low (at 10 V dc).
Spurious signal and harmonic suppression: 60 dB.	70 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 200 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	124 ms.
Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.	

*Measurement was noise limited at the value indicated.
[1]Using ICOM's battery packs only.

those settings that are varied often (duplex direction, tone, RF power output level and scan settings, for example).

A pair of small triangular up/down buttons is positioned to the left of the display window. By default, these are used to change the operating frequency or memory channel, or to scroll through the menu selections while in the set modes. Due to their size and placement, I found them inconvenient to use—in spite of my somewhat skinny fingers. Fortunately, the operating assignments of these buttons can be swapped with those of the top-mounted VOL knob. I find that I typically don't adjust the volume as often as I change frequency, so I performed the exchange as soon as I read about it in the *Instruction Manual*.

Some Preliminaries

Speaking of the manual, it's compact and concise—at 4 × 6 inches and 68 pages. This makes it very easy to bring along (it fits nicely in a shirt pocket), but its brevity does come at the expense of user-friendliness. While nothing important is left out, there aren't any detailed repeater operating tips for beginners, nor are there any whimsical diagrams of H-T-shaped cartoon characters to guide you along. There has been a noticeable trend toward larger, more detailed manuals in recent years. It should be said though, that the ARRL Lab has received a good number of requests for assistance from folks having trouble finding the desired programming steps in some of those lengthier manuals!

As with most handhelds, before you can initially put this rig on the air, you'll have to charge the battery pack. The supplied charger is a "drop in" trickle charger. A slide-in plastic adapter is included that allows you to charge the battery pack when it's removed from the H-T (of course, you'll need a second pack if you intend to operate the radio and charge a battery simultaneously).

The BP-222 battery pack that's supplied with the rig is a 600 mAh NiCd. Among the optional packs listed in the manual are a 1650 mAH NiMh and a battery case for alkalines. The high-capacity rechargeable pack would significantly extend your operating time between charges, and a battery case is always a valuable accessory to have on hand—especially when you find yourself out in the field with expired rechargeable batteries.

All of the available rechargeable packs are 7.2 V, although the rig's published specifications allow for supply voltages up to 10.3 V (but since you get a full 5½ W at 7.2 V, there isn't any particular reason to feed it a higher voltage). While on the subject of power source options, it's important to note that the IC-V8 lacks a dc input jack for powering the rig from an external supply or vehicle cigarette lighter socket. A few of the after-market replacement battery manufacturers offer "battery eliminators" for the 'V8. These are essentially an empty battery pack enclosure with a built-in regulator and a cigarette lighter cable attached.

My Way

Once I got the batteries charged up, I programmed a number of local repeaters into the memories. I like to set the memories up in order of frequency (yes, I know it's a compulsion, but it's one I can live with...). I made a mistake with

the ordering and thought that I'd have to go through a lot of reprogramming to fix it, but then I discovered a neat programming feature that makes repositioning memories easy—"memory copying." This feature allows you to copy the contents of a memory directly from one location to another without having to use the VFO. I think this is a great capability for folks like me who like to keep things "organized."

Creature Features

There are 100 standard memory channels, three pairs of scan edge limits and one call channel, for a grand total of 107. Memories hold the frequency, offset, RF power output setting and tone information and can also be assigned alphanumeric names up to five characters long.

I consider direct keypad frequency entry a must, and the 'V8 supports this feature. The 100-MHz digit has to be punched in each time (although "1" is your only choice). This took some getting used to as my current 2-meter rig accepts the first button press as the 10-MHz digit. You skip the decimal point (the keypad doesn't have one anyway) and you can alternatively hit the # ENT key if the remaining digits to be entered are all zeros (so 147.000 is most efficiently entered by pressing 1, 4, 7, # ENT).

The keystrokes required for moving between memory mode, call channel and VFO mode all seem logical and are easy to remember. Just one caveat here though—the key used to enter the VFO mode is labeled D CLR. (This key is also used to cancel a key entry, so the legend makes sense.)

As with many recent transceivers, there's a "set mode" and an "initial set mode." The set mode is entered by pressing the A FUNC button and the 8 SET button. This menu contains commonly varied settings such as the tone frequency, the offset, the tuning step, etc.

The initial set mode is entered by pressing and holding the up and down arrow buttons while turning the power on. This procedure is easy to remember once you've done it a couple of times, but it is somewhat awkward. Fortunately, you won't need to make changes to the settings in this menu very often. Features activated or adjusted here include automatic repeater offset, automatic power off, time-out timer, DTMF autodial speed, top knob function assignment and display type (frequency, channel number or alphanumeric name). Most of the mnemonics for the menu selections in the two menus are reasonably decipherable, but you'll probably want to keep the manual handy for your first few forays into them—a few are initially somewhat cryptic.

Extended Receive and Scanning Tools

Should you ever grow tired of chatting it up on the 2-meter ham band, you could always use the IC-V8 to monitor the NOAA Weather Radio or the public service and commercial bands located just above and below our frequencies. The lower limit of the receive coverage is 136 MHz, though, so you won't be able to listen to aircraft band activity (the AM receive mode is not included anyway). The upper frequency limit is 174 MHz.

Scan types include "programmed scan" (VFO scanning between the scan limit memories), "memory (skip) scan" (scanning the standard memory channels in sequence, omitting any you've marked to be skipped), "priority watch" (briefly checking memory channel number 3 every 5 seconds) and "priority memory channel scan" (which is similar to priority watch, except that the "priority" channel changes to the next higher standard memory channel on each memory channel check). The scan resume condition can be set to either "timer" (the scan remains on an active channel for 5, 10 or 15 seconds) or "pause" (the scan remains on the channel for 2 seconds after the squelch drops). The scan speed is a brisk 40 channels per second.

Tone and Code Squelch

The 'V8 includes CTCSS encode and decode (aka "tone squelch"), and can scan for the tone on signals it receives for those occasions when you don't have your *ARRL Repeater Directory* handy. I tried this out on a handful of repeaters. As long as the receive signal was strong and clear the tone would be identified within a couple of seconds. Marginal receive signal strength can prevent the system from finding a proper match.

Fifty CTCSS tones are supported, and different tones for transmit and for receive can be assigned to the same frequency or repeater pair. For those who plan on traveling abroad, the rig can even generate the standard 1750-Hz tone used to open the "tone burst" squelch systems in use on some of those repeaters.

The IC-V8 is set up for digital code squelch operation as well. Most of the other manufacturers refer to this as "DCS," but for some reason ICOM has decided to use the abbreviation "DTCS." (Have no fear; the systems are compatible.) The manual provides very little specific information on this feature, but its operation is similar to that used for CTCSS. All 104 of the standard DCS codes are available, and codes can be "inverted."

There's also an optional board—the UT-108—that adds a DTMF "Pager/Code Squelch" system. This uses three-digit DTMF codes to control the squelch.

A "Pocket Beep" paging feature is included. This system works in conjunction with the CTCSS, DTCS or DTMF tone squelch systems to silence the radio until a signal from a calling station containing the proper tone, code or DTMF sequence is received. At that point the radio will emit a beeping sound for thirty seconds and a small flashing icon will appear in the display. The icon continues to flash until the PTT button is pressed.

Five DTMF memories for autopatch and remote control applications are provided. Each of these memories will hold up to 24 digits.

Up and Running

Several folks I spoke with on the air reported that the transmit audio "sounded very good," and one of these comments was completely unsolicited, so I'll award the rig high marks in this area. Receive audio clarity was also very good, although operating mobile in a fairly noisy vehicle still warrants use of an external speaker. With 300 mW of available audio output, there is sufficient audio on tap. (We measured over 400 mW of audio output on our unit.)

Transmit power on high is 5½ W, which is pretty respectable for a 7.2 V battery pack. Low power is about ½ W. The lower output level is often sufficient to work nearby repeaters and will greatly extend the operating time between charges. The voltage level or battery state indicators that are found on many of the other H-Ts is absent on the 'V8, so you won't get any warning when the battery is about to run out of steam.

Lab test data for 10-MHz spacing IMD dynamic range performance for this rig was higher than any other 2-meter handheld we've tested in recent years (see Table 1). This is a good indication that the 'V8 will be particularly resistant to interference from out-of-band signals that can result from nearby VHF commercial communications and paging systems. This type of interference is known to plague H-T users that live and work in urban areas.

In My Opinion...

Overall, I found the ICOM IC-V8 a pleasure to use, and—at its current price—it seems to be good value in a "basic" handheld. In spite of the fairly extensive list of included features, the radio is easy to program and operate. Un-

like some recent handheld transceivers I've encountered, the buttons on this rig typically perform only two functions, and those are clearly marked on the button face, so there are few operations that involve pressing buttons that are not labeled accordingly.

While the IC-V8 is certainly not as simple to operate as my first handheld, I feel the advantage of having access to such a good selection of tone, scanning and convenience features made the short time I spent becoming familiar with its simple control and programming operations seem well worth the effort.

Manufacturer: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004; 425-454-8155, fax 425-454-1509; **amateur@icomamerica.com**; **www.icomamerica.com**. Manufacturer's suggested list price: $199.99. Typical current street price: $165. List prices of selected optional accessories: BP-208 alkaline battery case, $18; BP-210 NiMH 7.2 V/1650 mAh battery pack, $80; BC-144 desktop rapid charger, $101; CP-12L mobile charging adapter, $24; CS-V8 *Windows 95/98* programming software (on CD-ROM), $35; OPC-487 computer programming cable, $45; OPC-474 radio-to-radio cloning cable, $18.

Super Antennas MP-1 Portable Travel Antenna

Reviewed by Ed Hare, W1RFI
ARRL Lab Supervisor

When Vern Wright, W6MMA, the owner of Super Antennas, and Vern Dawson, K6RRC, came up with the concept for the MP-1, they clearly had one goal in mind—an antenna for all types of portable operation! The result is a family of compact antennas that can be configured for use in nearly any situation. The kit and its optional accessories allow assembly of a variety of antenna systems that range from one that breaks down into a handful of pieces under 12 inches long, to somewhat larger—and more efficient—fixed and mobile antennas.

Whether you're a business or vacation traveler, a backpacker or an apartment dweller, it's likely that this system can be configured to fit your site requirements. Though designed primarily with temporary operation in mind, the antenna could conceivably be employed in more permanent installations by hams who just can't put up bigger, more conspicuous antennas.

The MP-1

The basic MP-1 kit covers 40 through 6 meters and is rated for up to 150 W of RF power (see Figure 1). An 80-meter add-on coil is one of several available options (see Figure 2). Don't let the word "kit" scare you though, assembly is simple. It is a kit only in that it quickly breaks down into several small components that can be tucked into a briefcase, suitcase or backpack. The MP-1 package includes an 8½-inch aluminum rod base section; an adjustable coil (more on that later); a 4-foot telescoping whip; a radial kit and a support bracket that Super Antennas dubs the "universal base." The universal base, the base section, the coil and the whip all thread together like a pool cue. A conventional C-clamp is provided to secure the assembled antenna to nearly anything.

The Universal Base

Figure 3 is a close-up of the universal base. This photo shows it mounted to a balcony railing. The provided clamp has a jaw span of 2 inches, but a trip to the nearest hardware store would net you a larger version if necessary. The radial kit connects easily. The radial wires are spread out around the balcony and serve as a ground plane.

In most instances, you'll want to set the antenna up as near to vertical as possible. The universal base has two adjustment points that can be used to compensate for any unusual angles that result from the mounting surface. This feature also facilitates mounting in locations where you need to tilt the antenna at an angle—on a windowsill or below an overhang, for example. During this evaluation, the antenna was set up in several hotel, apartment and portable situations, and this capacity for adjustment almost always came in handy.

There are two large (#3) Phillips-head machine screws that must be loosened to allow adjustment. A screwdriver is not included with the kit, so for portable operations you'll want to remember to bring one along. Make it a hefty one though; the screws must be locked down tight to secure the antenna at an angle.

Bottom Line

The MP-1 and its accessories make up a portable antenna system that's designed for the backpacker, traveler or condo dweller. With a maximum power rating of 150 W, it can serve the needs of both QRPers and "barefoot" operators alike.

The Adjustable Coil

The mounting base is the foundation of the antenna, but the coil is its heart. As with any short vertical antenna, inductance is needed to bring it to resonance.

The MP-1 coil borrows an idea from the popular "screwdriver" mobile antennas (like Super Antennas own KW-3 mobile screwdriver antenna). It uses an aluminum cylinder with finger stock contacts inside that is moved up or down over a coil to achieve the desired amount of inductance. The mobile screwdriver antennas use a motor to make this adjustment from the driver's seat. But in true "minimalist" style—adopted by nearly every backpacker—the MP-1 is adjusted manually. One end of the cylinder has a collar that supports a wing nut set screw. When this is loosened, the cylinder slides freely over the coil. Once properly posi-

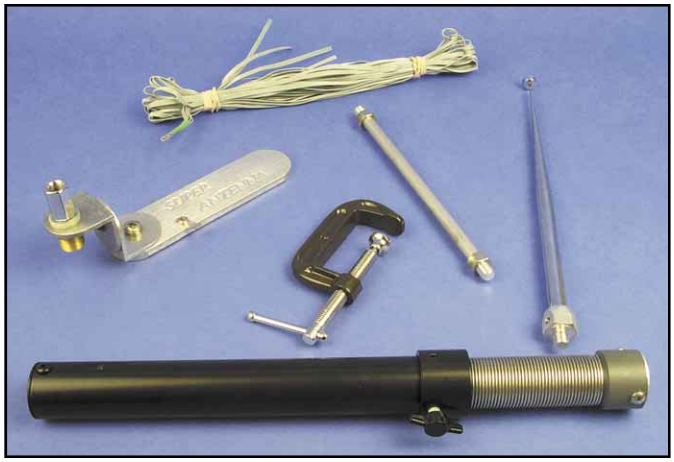


Figure 1—The components provided in the basic MP-1 kit. The package includes a universal base, a C-clamp, an aluminum rod base section, an adjustable coil, a telescoping whip and a radial kit.

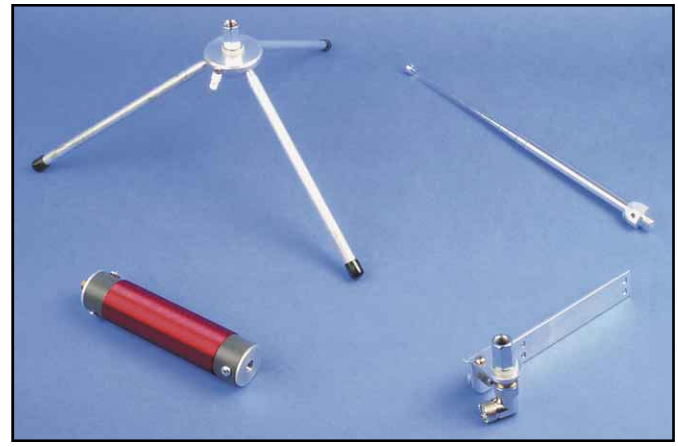


Figure 2—Some of the optional accessories for the MP-1. These include a tripod mount, an 80-meter add-on coil, an FT-817 mounting bracket and a replacement telescoping whip. An additional accessory pack that contains a longer (2-foot) aluminum base rod and a thin stainless steel whip is also available.

tioned for resonance, the set screw is tightened to retain the setting.

Adjusting the MP-1 for resonance has been reported by some to be very easy—by others as somewhat difficult. Super Antennas provides a template that shows the approximate position of the collar on the coil for each band. I found that the template settings worked out nearly exactly in most cases, and close enough in others. A few minor adjustments and some SWR checks at various points on the band usually got me tuned up in relatively short order.

Of course—as Murphy would have it—there was an occasion when I forgot to pack the template in my suitcase, so I had to resort to a bit of ham ingenuity. In that instance, I found it fairly easy to tune the antenna using a good ear and my rig's SWR meter. I turned the rig on and cranked up the receive volume a bit. I set the rig to the desired operating frequency, adjusted the coil for maximum band noise and then used the rig's built-in SWR meter for the final touchup.

Those who own an antenna analyzer can put it to good use here. I brought along an MFJ-259B on one of my trips; it greatly simplified tuning. The analyzer eliminates a lot of the "back and forth" of making adjustments and taking SWR readings. The analyzer method is particularly handy on the lower frequencies, where the tuning becomes rather sharp.

While tuning the coil manually is not as convenient as motorized tuning, it is a lot easier to backpack a manual system than a motor-driven system and the power source needed to run it. The manually adjustable coil is certainly a simple and economical alternative.

The Ground Plane

As is the case with all electrically quarter-wave verticals, the MP-1 needs a good ground or ground plane to function well. The radial kit that's included with the MP-1 is as simple as it gets—it consists of four multi-conductor wires that all terminate in a single female spade connector. Each wire is a bit longer than 16 feet—around a quarter-wave on 20 meters. The radial kit connects to the uni-

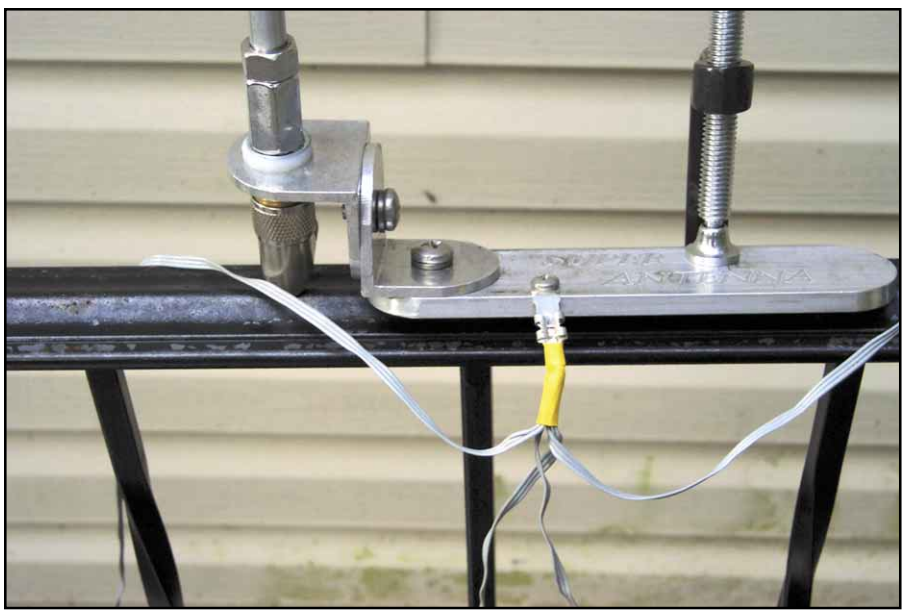


Figure 3—A close up of the universal base. In this instance, the antenna system is attached to a balcony railing. The radial wires are spread out on the floor below.

Figure 4—The MP-1 set up on the optional tripod in a portable application.

versal base via a spade lug. The radials are then spread out in whatever space is available below the antenna.

On the 20-meter band and above, this radial kit provides a sufficient RF ground for the antenna. On the 30-meter band and below, however, the radial wires are not long enough to serve as a good ground plane. I tried using the antenna with the stock radial kit on 40 meters, but I encountered some "RF in the shack." At the QRP level I was using, this wasn't really a problem, but I did notice that the SWR changed when I put my hand near the rig or the feed line. I found that adding a single 33-foot radial cured the stray RF problems, although the floor of the hotel was a bit crowded with wire when I tried this test. I pretty much stuck to 20 meters and above when I was operating from hotels.

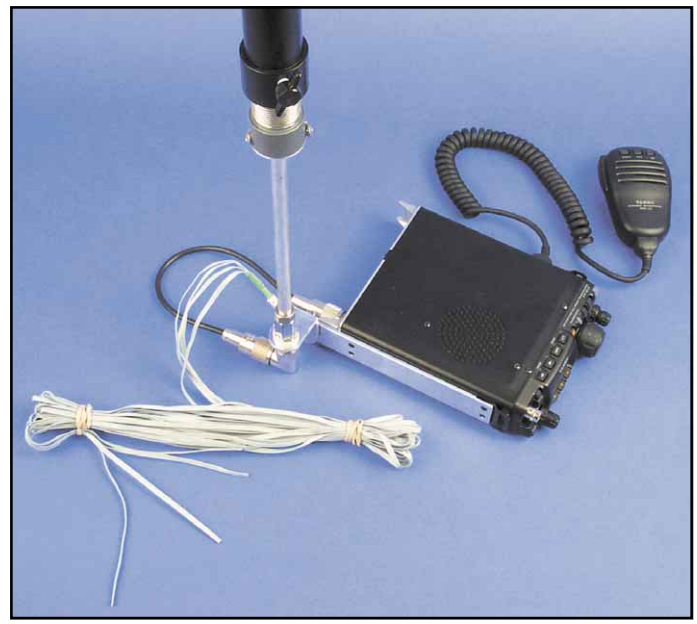


Figure 5—The MP-1 FT817MBT. This option package includes replacement screws that are used to secure the mount to the Yaesu FT-817. The short length of coax is not supplied.

Whip Section

I especially like the 4-foot telescoping whip that's supplied with the MP-1. Not only does it make it convenient to transport the dismantled MP-1 system, but it also makes it simple to fine tune the SWR. The whip looks very sturdy, but in the event that it does get damaged, Super Antennas offers replacements at a reasonable price. (I may purchase a few of these to use in the construction of some entirely unrelated antenna projects.)

Options

The MP-80

The optional 80-meter add-on coil—the MP-80—is shown in Figure 2. This is installed just below the adjustable coil section. I used it to make a few 100-W contacts on that band, but—as I would expect for such a short antenna—signals were not very strong.

The Tripod

Super Antennas also offers a neat little tripod kit—the TRPD—that breaks down into briefcase-size components (see Figures 2 and 4). It easily held any of the antenna configurations I tried. As with the other bases, this mount has a spade lug on it for attaching the radial kit.

I've had it set up on a small table and also directly on the ground. It might get a bit tippy in a strong breeze, but it worked out okay under the conditions I encountered. A single tent stake and a short piece of cord could be used to secure the mount to the ground in windy locations.

Bigger is Better

Old timers probably already know this, but for new hams, it must be said—when it comes to antennas, there is usually no magic. This antenna is no exception. The very nature of physics, ground losses and inductor Q make short, inductively loaded verticals relatively inefficient. This is especially true on 80 and 40 meters, where efficiencies of a few percent for short verticals are the norm.

Although the ARRL lacks the antenna range facilities to make any quantified measurements, I did a bit of antenna modeling that predicts that this antenna will not fall outside the expected range. Even on 20 meters, the overall efficiency won't be much better than about 50% or so. This is not a bad thing—it just tells you that the antenna works as should be expected for a short vertical. At 50% efficiency, that means that if you run 100 W into this antenna, it should work about as well as if you were running 50 W into a "perfect" quarter-wave vertical antenna.

The majority of the radiation from an inductively loaded antenna occurs from the section below the inductor, and the $8\frac{1}{2}$-inch base rod doesn't represent much radiator.

But wait, Super Antennas also offers the MBKT "mobile kit." This option package includes a 2-foot replacement base rod and a thin 4-foot stainless steel whip. These components allow you to convert the basic MP-1 into a taller antenna that's better suited for vehicle mounting and longer-term fixed operations (where extreme portability may not be a major consideration).

As noted above, adding length to the base rod section improves the efficiency of the antenna. I got creative and used a $\frac{3}{8}$-24 coupling to string two 2-foot base rod sections together. Once the coil and the 4-foot stainless steel whip were attached, the overall length was about 9 feet. For some types of fixed and portable operations, this setup could make a lot of sense. The 2-foot sections still fit easily into my suitcase and the mobile whip is flexible enough that I can bend it around and pack it into the same suitcase. I brought these pieces along on some of my trips.

Since the ends of all of the base rods are threaded for $\frac{3}{8}$-24, many of the common mobile mounting systems—such as ball mounts, heavy-duty trunk-lip mounts and multiple-magnet mounts—can be used to secure the basic MP-1 or the MP-1/MBKT combination on a vehicle.

The FT-817 Bracket

At the QRP Four Days in May event in Dayton, Vern (W6MMA) had an opportunity to show off all of his new products. It seemed to me that he was especially proud of one of them, though—the FT817MKT bracket he designed for mounting an MP-1 directly on a Yaesu FT-817 (see Figures 2 and 5).

To install it, one removes the side screws from the '817 and attaches the bracket using slightly longer screws that are supplied (Vern thought of everything). The MP-1 then screws into the $\frac{3}{8}$-24 SO-239 adapter on the back end of the bracket, which in turn is connected to the transceiver's antenna jack through a short length of coax with PL-259s on both ends. The coax is not supplied (okay, Vern thought of *nearly* everything). This

bracket also has a spade lug for connecting the radial kit.

The antenna mounting point pivots, allowing the antenna to be swung up along the side of the rig. This makes it possible to transport the assembled system using the FT-817's shoulder strap. The setup does a sufficient job of supporting the MP-1 with the short base section and the 40- through 6-meter coil, but I'd be hesitant to add the optional longer antenna base section.

Testing 1-2-3

This antenna system can be used in so many different configurations and under such widely different circumstances that no set of tests could be considered complete. I found that I was able to get a reasonable SWR (2:1 or better) under most circumstances, although there were times that I wish I had a bit more ground plane for the antenna.

What Do I Really Think?

I like the antenna. Though not as efficient as a full-size antenna, it more than makes up for that in portability. I've made a number of low power contacts with it. I'll certainly find it useful for those times when I need to take HF measurements in the field. I will also offer it as a "loaner" to my coworkers—not just for "professional" use, but for vacation and fun use from time to time, as well.

It appears to be rugged. It certainly stood up well on the several trips I took it along on, where it got banged around in my suitcase and tossed in the trunks of various rental cars. I like the idea that it enables me to bring along as little antenna as I need if I go backpacking, or to take a bit more antenna when I have the room. Does it work as well as a half-wave dipole up 50 feet in the air? Certainly not. But its performance was just what I expected it would be, and on a par with other mobile/portable antennas of similar size.

Manufacturer: Super Antennas, 1606 Pheasant Way, Placerville, CA 95667; 530-622-6668; **w6mma@jps.net**; **www.superantennas.com**. Manufacturer's suggested prices: MP-1, $150; MP-80 80-meter add-on coil, $25; MP-1 FT817MKT Yaesu FT-817 mounting bracket, $20; MP-1 TRPD tripod, $20; MP-1 MBKT mobile whip and 2-foot base rod section, $15; MP-1 WP4 replacement telescoping whip, $10. QST

NEW BOOKS

RSGB TECHNICAL COMPENDIUM

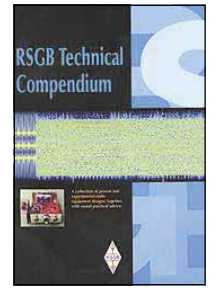
Published by the Radio Society of Great Britain (RSGB, Lambda House, Cranborne Rd, Potters Bar, Herts EN6 3JE, UK. First edition, 2000, 288 pages including index, paperback 11 5/8 × 8 1/8 inches, B&W illustrations. ISBN 1 872309 71 2, $30, available through the ARRL (toll-free 888-277-5289) or on ARRLWeb *(**www.arrl.org/shop/**).*

Reviewed by Paul Danzer, N1II
ARRL Technical Advisor

The RSGB is the British sister-society of the ARRL, and it publishes a monthly magazine, *RadCom*. The *RSGB Technical Compendium* includes all of the technical articles from *RadCom* in the year 1999, plus the contents of several popular columns from that year: *Down To Earth, Eurotek*, *In Practice* and *Technical Topics*. You won't find advertisements or contests—just the solid technical material the RSGB is known for.

The *Technical Topics* column is written by Pat Hawker, G3VA, a well known and often published author for the RSGB. One of his columns included here chides hams for having a not-invented-here problem. This is one of the reasons a book such as this one has a great appeal to hams outside of the UK.

With this as background, just what kind of goodies can be found in the book? A few items will be familiar. There is a very complete explanation of PSK31, by its originator, Peter Martinez. This should not be a surprise, since Peter is G3PLX! There is also a feature article titled *RF Output Power vs. Load Impedance*, as well as a brief reprise of—yes again!—conjugate matching, with the same old cast of characters and the editorial comment that enough is enough!



Several articles are directed toward the 50-MHz-and-up folks—an explanation of several VHF and UHF propagation modes and how to tweak your VHF station for best performance and operation.

One article worth pondering is titled *Designing ATUs Using a Spreadsheet.* Whether or not you are interested in designing an ATU (antenna tuning unit), this write-up is worth looking at just to see how you can use a spreadsheet such as *Microsoft Excel* to do the laborious, repetitive calculation that is often called for when optimizing a design.

Not seen too often on this side of the Atlantic is a description of a 136-kHz loop antenna, with a matching amplifier.

British digital technology is well represented, with several PIC applications, a digital power meter, a digital voice communication system and even a brief explanation of personal computer technology for the uninitiated.

The reprint of the *Down To Earth* column starts with an *Easy Build 80m Transceiver.* A small amount of translation is necessary here, since some of the schematic symbols vary from those we here know and love, and some of the solid-state parts would have to be replaced by more-available US counterparts.

One very, very, very nice little project from this column uses a single op-amp to produce dual power supply voltages—in this case ± 4.5 V from a single 9-V source.

The *QST* Hints and Kinks column is similar to the *In Practice* columns reprinted as part of this compendium. Safety issues, adding in-line fuses and soldering ideas are included. There is also an interesting section comparing receiver sensitivity as measured and classified in the ARRL Lab and by the RSGB. With credit given to the ARRL's Zack Lau, W1VT, a conversion chart is presented.

Invariably there will be one or two items that will bring up one of those feelings of "why didn't I think of that!" As an example, consider the humble 300-Ω-fed folded dipole. We all know you cannot use it on its second harmonic. But build it as a continuous loop around two washline pulleys, and when you want to use the dipole on the second harmonic of this resonant frequency, move the feed point from the center toward one end (that's why it is built on pulleys). Then, simply tune (or move!) for minimum SWR.

All in all, there is a year's worth of ideas and reading in this compendium. If you build—or if you are just curious—this book has quite a bit in it for you. QST

FCC Registration Number Becomes Mandatory in December

Get ready (again) for the FRN! Although the FCC has slipped the deadline before, the Commission said in early September week that, starting December 3, 2001, everyone doing business with the FCC—licensed or not—must obtain and use a 10-digit FCC Registration Number—or FRN. The FCC called the move "a first step" toward streamlining fee collection and tracking. Many amateurs registered with the Universal Licensing System (ULS) were assigned a 10-digit FRN by the Commission Registration System—or CORES—in a one-time cross-registration last year and notified by mail.

Details to implement CORES for the Amateur Service are still being worked out. An FCC Wireless Telecommunications Bureau spokesperson told ARRL that just how CORES and ULS will work together remains up in the air. The WTB says CORES will not replace the ULS database, but a lot of questions remain as to how CORES is to be integrated. As of press time, a final CORES Amateur Radio implementation was "yet to be determined." Under the most likely scenario, however, CORES registration will supplant ULS registration for those who do not already have an FRN.

Those without an FRN will be required to register and provide one before transacting business with the FCC, whether or not a fee is required. An individual does not have to hold an FCC license to obtain an FRN. The requirement to obtain one extends to applicants for an Amateur Radio license as well as to anyone required to pay a fee to the FCC, such as those applying for a vanity call sign. CORES registrants will be required to supply a Taxpayer Identification Number—or TIN—typically a Social Security Number (SSN) for an individual. The FCC says CORES information is not made public.

An FRN will not be needed to file comments in rulemaking proceedings. Filings that do require an FRN but don't include one will be rejected. The FCC has not yet proposed replacing the ULS Licensee Identification Number with an FRN; many amateurs already have both, and both numbers appear in FCC licensee records. The ULS continues to be available to new registrants.

The FCC began implementing CORES last year. The agency announced the adoption of its new CORES/FRN rules on August 31 and detailed the requirements in a Report and Order.

In its *Order*, the FCC sounded almost apologetic for imposing yet another set of numbers on licensees and applicants. "We realize that the manner in which our electronic systems have developed has results in a multiplicity of numbers, passwords and identifiers," the FCC conceded. The FCC said that once various electronic filing systems—such as ULS—incorporate CORES and FRN into their application process, "the need to maintain registration information in multiple systems will be eliminated."

The FCC said CORES makes provision for the registration of foreign nationals unable to obtain an SSN by providing the ability to register without one. The FCC has required that club stations obtain an assigned TIN when registering in the ULS. In an apparent about-face, the FCC's CORES *Order* states that unincorporated radio clubs registering in CORES should use the TIN/SSN of the license trustee. The ARRL has asked the FCC to clarify.

The on-line filing system and further information on CORES is available from the "Commission Registration System" link on the FCC Web page, **www.fcc.gov/**.

ARRL Helps Clear the Air in Line Noise Cases

The ARRL has successfully "run interference" in several recent cases where electric utilities were accused of causing problems for amateurs. Serious progress or outright success has been reported in Michigan, New Mexico and North Carolina, where amateurs had been plagued by line noise.

ARRL RFI Engineer John Phillips, K2QAI, said he learned of power-line noise complaints earlier this year from two Michigan hams, Ryan Fountain, N8RY, and Rich Johnson, W8YV, both of Gwinn. "The noise was going on for almost three years with no resolution," Phillips said.

Acting on behalf of the two ARRL members, Phillips wrote the CEO of Wisconsin Public Services Corporation, the parent company of Upper Peninsula Power Company in Michigan. "Shortly thereafter I received a call from a manager of UPPCO, asking for

information and help and sounding very concerned," Phillips said.

In his reply, Phillips told the utility manager that power-line noise was not hard to track down with the right tools and techniques and mentioned that he planned to attend a Mike Martin, K3RFI, power-line noise workshop that was coming up.

"To my surprise, seated right behind me in the course was Jay Ringler of UPPCO," Phillips said. "Jay enjoyed the course, and he and the company have been working diligently on the noise problems ever since."

Phillips said he's heard from N8RY that, while not all the noise has been cured, it had been reduced considerably and that he was very pleased with the efforts made both by UPPCO and ARRL on his behalf.

Since coming to Headquarters last May, Phillips has worked closely with suspected power-line-interference situations. He says

Rick Lindquist, N1RL ♦ Senior News Editor

even some ex- perts are easily befuddled while trying to pin down interference sources, but that Martin's technique is nothing short of amazing.

"He's almost supernatural in his ability to find line noise," said Phillips, who says line noise usually turns out to be the result of something that's typically fairly easy and inexpensive to fix.

While the FCC has had to get deeply involved in some power line situations—most notably a case involving a Tennessee utility—other cases referred to the ARRL have been resolved without heavy FCC pressure. Mark Mandelkern, K5AM, of Las Cruces, New Mexico, had reported noise apparently coming from lines operated by the El Paso Electric Company.

"We merely wrote a letter to the CEO of El Paso Electric—with a copy to the FCC's Riley Hollingsworth—and it quickly trickled down to a local manager who called me with a real sound of apprehension in his voice," Phillips recalled. Mandelkern wrote Hollingsworth August 14 that the company has been very cooperative and has begun work to completely re-build a troublesome section of line.

In North Carolina, Jim Scholten, AD1V, had been frustrated for several years by noise from Duke Power Company lines. After a letter went out from ARRL to Duke Power—again with a copy to the FCC—Scholten reported that linemen suddenly appeared at the suspect poles, and his noise problems abated. "It was impossible to make the power company do their job without you!" he wrote Phillips.

ARRL

ARRL RFI Engineer John Phillips, K2QAI

Amateurs suffering from interference believed to be emanating from power-generation or transmission facilities may contact John Phillips, K2QAI, **rfi@arrl.org**.

SECTION MANAGERS GET FINE TUNING AT ARRL HQ

Seventeen of the ARRL's newest section managers turned out at League Headquarters over the August 18-19 weekend for an in-service workshop. The session was aimed at helping the new section leaders feel more comfortable in their roles.

"It was a pleasure to meet and welcome this group of Section Managers to Newington," said ARRL Field and Educational Services Manager Rosalie White, K1STO, who led the workshop. "They are enthusiastic, smart, well-spoken representatives of their sections and offer a broad background within Amateur Radio." White says the ARRL is always on the lookout for similar individuals who are willing to assume ARRL field organization leadership positions.

ARRL

ARRL SM Workshop Class of 2001: **(front row) ARRL Field and Educational Services Manager Rosalie White, K1STO; West Texas SM Lee Kitchens, N5YBW; Nevada SM Jan Welsh, NK7N; Eastern New York SM Pete Cecere, N2YJZ; Western New York SM Scott Bauer, W2LC; Louisiana SM Mickey Cox, K5MC; New Mexico SM Joe Knight, W5PDY; South Carolina SM Patricia Hensley, N4ROS; Northern New Jersey SM William Hudzik, W2UDT; (back row) Virginia SM Carl Clements, W4CAC; Eastern Pennsylvania SM Eric Olena, WB3FPL; Maryland-DC SM Tom Abernethy, W3TOM; San Francisco SM Leonard Gwinn, WA6KLK; North Carolina SM John Covington, W4CC; East Bay SM Andy Oppel, N6AJO; North Texas SM Larry Melby, KA5TXL; and Kentucky SM John Meyers, NB4K.**

A workshop for Section Managers elected or appointed to office in the past 12 months typically is an annual affair. This year's bumper crop—which included a couple of SMs who already have been in office for more than a year—resulted from the fact that last year's session couldn't be scheduled because of conflicts.

This group of SMs voted to hold the workshop in Newington so that they could have the opportunity to meet the Headquarters staff and tour the building and Maxim Memorial Station W1AW. Some even got to town early enough to operate from W1AW.

Section Managers are the top ARRL officials in each of the 71 sections they represent. They serve two year terms and may stand for re-election.

Veteran SM Joe Knight, W5PDY, of New Mexico came to share some of his expertise and experience. "Be careful in your appointments, and then be patient," advised Knight, who has been an SM for 24 years.

Among other things, SMs learned techniques to handle section business efficiently, work with volunteers, handle "difficult" situations, and tout the many ARRL membership benefits to the members in their sections. The SMs participated in idea-sharing sessions, met some of the ARRL HQ staff, and familiarized themselves with the League's organizational structure. They also discussed mutual cooperation in emergency situations.

Nevada SM Jan Welsh, NK7N, called the workshop a once-in-a-lifetime experience. "So much camaraderie and goodwill came out of it," she said. "I don't think there was anyone who didn't have something useful to relate to us, and the exchange of ideas awakens you to what you could do easier or differently."

Louisiana SM Mickey Cox, K5MC, said he enjoyed the Section Managers' Workshop more than his first trip to the Dayton Hamvention this past spring—high praise indeed. "I have always wanted to see HQ and W1AW, and I was not disappointed," he said.

For information about becoming an ARRL Section Manager, visit the ARRL Web site, **www.arrl.org/FandES/field/org/smterms.html**.

AO-40 HAS ITS UPS AND DOWNS

The AO-40 satellite experienced some highs and lows this past summer. The satellite's commissioning took a giant leap forward in mid-August as ground controllers successfully tested the spacecraft's momentum wheel attitude control system. AO-40 controllers hope to use the momentum—or "reaction"—wheel attitude control system to aim AO-40's antennas and, eventually, its

JAMSAT

The first photograph was shot August 7 using the SCOPE camera's wider lens.

FCC News

LOWER AMATEUR RADIO VANITY FEE NOW IN EFFECT

The fee for a new or renewed Amateur Radio vanity call sign dropped from $14 to $12 on September 10. The FCC proposed the lower fee last March. The FCC has estimated that 8000 applicants will apply for vanity call signs in the current fiscal year. Earlier this year, the FCC also put paper and electronic vanity call sign applications on an equal footing in terms of processing priority. The FCC used to give priority to electronic applications for vanity call signs.

FCC rules stipulate refunds for applicants who inadvertently overpay a regulatory fee. Applicants who determine that they overpaid a vanity fee may request a refund in writing. Requests seeking a "Vanity Fee Overpayment Refund" go to FCC, 1270 Fairfield Rd, Gettysburg PA 17325-7245. Refund requests should indicate the date of application, the total fee paid, and the total refund owed.

For more information on applying for a vanity call sign, visit the FCC Amateur Radio Web page, **www.fcc.gov/wtb/amateur/VanityCS.html**.

FCC AFFIRMS DENIAL OF CB DX PETITION

The FCC has affirmed its decision of a year ago and denied a *Petition for Reconsideration* of a proposal to amend FCC Part 95 rules to permit DXing on the 11-meter Citizens Band. The petition, filed by *Popular Communications* Contributing Editor Alan Dixon, N3HOE, sought to lift the prohibition on communication or attempts to communicate with CB stations more than 250 km (approximately 155 miles) away and to contact stations in other countries.

Dixon asked the FCC in September 2000 to reconsider its denial on the grounds that the Commission had not addressed emergency communications and the applicability of a limit on the distance of such communications. In declining July 30 to reverse or revise its earlier denial, the FCC maintained that it had turned away Dixon's petition in the first place because it was inconsistent with the fundamental purpose of the CB Radio Service. The FCC said it has already considered the matters raised by Dixon's *Petition for Reconsideration* and did not believe it had to address every type of communication for which the service might be used.

The FCC said individuals finding themselves in an emergency situation would be more likely to have other radio services available to them, such as amateur, marine, land mobile or cellular. "Further, we believe that messages from these stations are more likely to result in the individual quickly obtaining the needed emergency services," the FCC concluded.

The ARRL had commented in opposition to the initial petition but did not comment on Dixon's *Petition for Reconsideration*.

Amateur Enforcement

♦ **California amateur agrees to stay off repeaters until 2004:** A California amateur is to stay off repeaters for the next two and a half years as part of a deal with the FCC. If Technician licensee Lester M. Killingsworth, KE6WSC, of Hollywood, violates the agreement, he could face license revocation proceedings. FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth wrote Killingsworth on June 15, outlining alleged violations monitored May 17 on the W6NUT repeater system in the Los Angeles area. The letter included a transcript of some of Killingsworth's transmissions, which, Hollingsworth said, contained obscene and indecent language. Killingsworth replied to the FCC inquiry by telephone in early July, and his response is "under review," Hollingsworth said. In the meantime, Killingsworth agreed to the suspension of his repeater privileges, and Hollingsworth said the FCC will hold any enforcement action in the matter in abeyance. If there are no violations, the repeater prohibition will expire automatically at midnight January 21, 2004.

♦ **Amateur agrees to two-year suspension:** An Amateur Extra class operator has agreed to a two-year suspension of his amateur privileges. The accord with Robert J. Kazmierski, WE6M, of San Mateo, California, followed allegations of deliberate interference that drew an *Official Notice of Violation* in late June from the FCC's San Francisco office. FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth said the FCC field office referred the case to him for a possible settlement before seeking a fine. He confirmed the suspension agreement with Kazmierski by letter August 3. Kazmierski could have faced a fine of up to $7500. Acting in response to a complaint, FCC agents had tracked 2-meter interference to Kazmierski's residence.

In a letter to the field office on July 2, Kazmierski apologized for the infraction, said it wouldn't happen again, and pledged to stay off the air at least until the end of this year. Notwithstanding his plea, Hollingsworth said, Kazmierski will be off the air until August 3, 2003, provided he abides by his agreement with the FCC.

♦ **FCC levies $10,000 fine for unlicensed hamming:** The FCC has levied a $10,000 fine on an East Palo Alto, California, man for transmitting without a license on amateur frequencies. Earlier this year, the Commission had proposed forfeitures totaling $17,000 in the case of Joshie Yasin Nakamura Sr, who also is known as "Mervyn Ehambrave" and "Marvin Eugene Barnes." The FCC's *Forfeiture Order*, released July 6, offered no explanation for the discrepancy in the figures. The fine stemmed from complaints about Nakamura to the FCC that date back to late January through March of 2000. The Commission says it heard from the amateur community and from members of the ARRL Amateur Auxiliary that an unlicensed station was operating on several amateur frequencies. Nakamura reportedly is being detained by state authorities on unrelated felony charges and did not respond to the earlier FCC notice.—*FCC*

♦ **FCC pulls plug on AH1A call sign:** The FCC has canceled the AH1A call sign made famous during a 1993 DXpedition to Howland Island, and returned its holder's original US call sign. A May 23, 2001, FCC letter to Luigi "Gino" Attaianese, I8ULL, had questioned whether AH1A had been obtained legitimately. The FCC says Attaianese, then KF1P, applied for a new sequential call sign in 1982 and listed "1 Seashore Drive, Canton Island, EQ" as his mailing address, but asked that the license be sent to a mailing address in Massachusetts. The FCC granted AH1A on April 23, 1982. Not long afterward, Canton Island became part of the Republic of Kiribati. The FCC says it subsequently learned from Kiribati authorities that there never have been street addresses on Canton Island. In addition, the FCC said, Attaianese did not request a change to a US mailing address until 1988. "Without a *bona fide* mailing address on Canton Island, it appears you were not eligible to have the call sign AH1A assigned to your station," the FCC wrote Attaianese. When it didn't get a reply or an explanation, the FCC canceled AH1A on July 19 and returned Attaianese's US call sign to KF1P.

The FCC's action prompted an idea from ARRL Rocky Mountain Director Walt Stinson, W0CP, who was among the 1993 AH1A team members. "No DXpedition since AH1A has been permitted to obtain a relevant prefix designator, although many have sought them," he said. At its July meeting, on Stinson's motion, the ARRL Board of Directors, unanimously agreed to have the ARRL formally ask the FCC to modify its 1×1 call sign program to accommodate the issuance of temporary 2×1 call signs from US prefixes designating areas lacking *bona fide* mailing addresses.

solar panels. The testing paves the way for possible deployment of the solar array and better signals on the ground.

"We can say with some caution that we have a working three-axis control system!!!" enthused AMSAT-DL President and AO-40 team member Peter Guelzow, DB2OS. Until now, AO-40's attitude has been under "spin control," and that remains an option. Extensive testing will precede any decision to transfer the spacecraft from spin stabilization to three-axis stabilization, Guelzow said.

On the down side, AMSAT reported that AO-40's 2.4-GHz S1 transmitter suddenly went silent August 13 and appears lost. The 2.4-GHz S2 transponder continues to operate normally. Attempts to restore the S1 transmitter have not proven successful. Ground controller Stacey Mills, W4SM, said telemetry indicated nothing to account for the failure.

The S1 transponder with its higher-gain parabolic antenna had been brought into the rotation to offer improved coverage when the satellite was farther from Earth. The S2 transponder's helical antenna has about 10 dB less gain than the parabolic. Prior to the failure, stations were reporting much stronger downlink signals via the S1 transmitter.

In late August, a brief outage of the S2 transponder gave ground controllers a few moments of consternation. Sighs of relief were heard around the world as the S2 beacon reappeared. Mills suspected—correctly, as it turned out—that a solid-state matrix connection had not properly latched up. Some well-equipped stations were still able to hear the beacon very weakly. When the satellite came into view at Mills' Virginia location, he manually cycled the middle beacon-to-S2 transmitter connection off and on, "and the middle beacon popped back up," he said.

In early August, AO-40 performed what might be its most spectacular stunt to date when the onboard Japanese-made SCOPE camera snapped a photo of Earth. The result was a magnificent color picture of our planet, the illuminated portion appearing as a bluish crescent.

Another highlight was the September 9 activation of the AO-40 K-band transmitter on 24.048 GHz. The K-band transmitter was connected to the passband and beacon inputs that feed the S2 transmitter.

AO-40 ground controllers were continuing to test the RUDAK digital transponder systems as well as efforts to reorient the satellite, reducing the squint angle so its antennas are facing directly at Earth. A so-called "mystery effect" persists, affecting AO-40's orbit near Earth and puzzling the satellite team. Ground controllers had hoped that the effect might disappear after the satellite's orbit was raised at perigee—its closest point to Earth—by nearly 700 km.

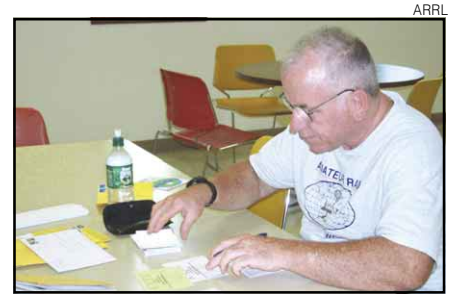
For more information on AO-40, visit the AMSAT-DL Web site, **www.amsat-dl.org/** and the AMSAT-NA Web site, **www.amsat.org/**.

CLUB PROCESSING NA1SS QSLS

The Newington (Connecticut) Amateur Radio League has agreed to handle QSLing duties for NA1SS contacts. The club counts several ARRL staffers among its members.

ARRL staffer Margie Bourgoin, KB1DCO, reports that she'd received more than 550 requests for ISS QSL cards

ARRL



NARL member Richard Lawrence, KB1DMX, tackles a portion of the NA1SS QSL card requests. XYL and ARRL staff member Rose Anne Lawrence, KB1DMW, also is assisting in the NA1SS QSL-handling duties.

FCC Staff Member Steve Linn, N4CAK, SK

The FCC and Amateur Radio communities are mourning the loss of FCC staff member Steve Linn, N4CAK, of Lower Allen Township, Pennsylvania. Linn, 50, and his wife, Lesley Ellen Nearman, 44, died September 21 as a result of an automobile accident in Maryland. The couple's two children survived the wreck.

ARRL President Jim Haynie, W5JBP, said he was deeply saddened by the news. "Steve had not only been a valued employee at the FCC but also a good friend to the Amateur Radio community," he said. "Having just visited with Steve a few days ago in Washington, I will remember his jovial spirit and dedication to the success of ham radio. Our prayers will be with their children, Steve and Lesley's families and all the employees of the FCC who will long feel this great loss."

Linn was among the FCC staff members who turned out September 18 for the ARRL "Amateur Radio Demo and Education Day" at FCC Headquarters in Washington, DC. He and Haynie were scheduled to do a forum presentation together at the Virginia Beach Hamfest.

Maryland State Police say the family was traveling south on Interstate 83 in Maryland, en route to the Virginia Beach Hamfest, when their van was involved in a collision with a tractor-trailer rig. The couple's children, Deena, 9, and Andy, 12, were treated and released at a York, Pennsylvania, hospital.

FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth said Linn was well-liked by the FCC staff members and contractors he worked with at the FCC's Gettysburg office. "He was a very, very nice guy, a good engineer and he had common sense," Hollingsworth said. "He knew the value of Amateur Radio and saw the big picture. Although he worked for the Wireless Bureau, the Enforcement Bureau was increasingly relying upon him for Land Mobile and Amateur licensing and technical matters. We will miss him very much."

An Amateur Radio licensee since 1994 and an ARRL member, Linn was deputy chief of the Licensing and Technical Analysis Branch for private wireless within the Wireless Telecommunications Bureau. His supervisor, Mary Shultz, said called Linn's death "a major shock" to the branch. "He'll be difficult to replace as an employee," Shultz told ARRL, "but impossible to replace as a friend."

ARRL

Steve Linn, N4CAK, at the 2000 Dayton Hamvention.

Linn had worked for the FCC for 25 years, the last six or so years at the Gettysburg office. "He was our expert in the personal radio services," Shultz said. "He was our encyclopedia. He kept up on everything."

Among other Amateur Radio-related topics, Linn frequently served as a source of information and clarification during the sometimes-confounding switchover to the Universal Licensing System and, more recently, to the Commission Registration System, CORES. During the 2000 Dayton Hamvention FCC Forum, Linn spoke in detail about ULS and the Amateur Service. He was a regular presenter at the annual meetings of the National Council of Volunteer Examiner Coordinators in Gettysburg and at area hamfests. In addition to his interest in Amateur Radio. Linn also was an avid photographer.

Services for the couple were held September 24. Memorial contributions are invited to Temple Ohev Sholem, 2345 N Front St, Harrisburg, PA 17110.

ARRL Welcomes KH6HU as "Big Project" Coordinator

ARRL

Gerald W. "Jerry" Hill, KH6HU, of New Haven, Connecticut, has been chosen as coordinator of the ARRL Amateur Radio Education Project—better known as "The Big Project." The educational initiative of ARRL President Jim Haynie, W5JBP, is aimed at providing a turnkey Amateur Radio curriculum, equipment and resources to middle schools.

"We're happy to have Jerry on board, and now we're anxious to get going," Haynie said. Hill started work September 4.

The aim of "The Big Project" is to improve the quality of education by employing educationally valid techniques involving Amateur Radio to teach a variety of subjects—including science, geography, language and speech. In his new position, Hill will work with national educational organizations and ARRL educational advisors to achieve this goal.

Born and raised in the upper Midwest, Hill lived for 25 years in Hawaii and considers it home. Prior to his retirement in April, Hill served as career and technical education regional coordinator for the Department of Education in Kauai. His experience in the education field includes curriculum development, assisting teachers in implementing standards in the classroom, grant writing, and a school-to-work program.

A US Navy veteran, Hill is a member and past president of Kauai Amateur Radio Club and a long-time member of ARRL.

Tax-deductible donations are welcomed to The ARRL Amateur Radio Education Project, c/o Barry Shelley, N1VXY, ARRL, 225 Main St, Newington, CT 06111. For more information, contact Shelley, **bshelley@arrl.org**; 860-594-0212.

as of mid-September. She estimates that at least 85% are for two-way voice contacts. The rest are packet connects and listener reports. Among recipients of the first NA1SS cards to be mailed was Jim Romelfanger, K9ZZ, who worked Susan Helms (KC7NHZ) while he was at the WB9FDZ Field Day site. "It's fun to be part of a true ham radio first!" he said.

US stations working NA1SS or RS0ISS aboard the International Space Station should send QSLs to Margie Bourgoin, KB1DCO, ARRL, 225 Main St, Newington, CT 06111. A self-addressed, stamped envelope is required to get a QSL in return.

ARISS ANTENNAS MOVE CLOSER TO LAUNCH

New Amateur Radio on the International Space Station antennas could be in place by early 2002. In addition, plans now call for splitting the current initial ARISS equipment into separate ham stations aboard the ISS—initially 2 meters in one location and 70 cm in the second.

ARISS Chairman Frank Bauer, KA3HDO, said the new flight antenna systems were shipped in September to Johnson Space Center for a bench review and final safety review. Bauer said prototype units were tested to see if they could withstand the temperature extremes and "thermal shock" of space. Technical testing for SWR and pattern also has been completed.

The new antennas—designed to cover HF, VHF, UHF, and the 1.2 and 2.4 GHz bands—were expected to be transported to the ISS in late November aboard the shuttle *Endeavour* on the STS-108 mission. The new antennas could be installed during a space walk early next year after the Expedition 4 crew is aboard. Bauer said training to install the new antennas was under way.

Once the appropriate gear is in place, ARISS operation could extend from HF through 2.4 GHz. The HF antenna is a 2.5-meter long flexible tape. Bauer thinks it will definitely work on 10 meters and speculated that it might work on 15 or 20 too. The new antennas will be arrayed around the perimeter of the ISS Russian Service Module—or *Zvezda*.

Bauer says a 2-meter station will remain in the Russian Functional Cargo Block—also called the FGB or *Zarya*—and will use the existing Russian antennas now used for ARISS. Once the new antennas have been deployed, a second station will be set up in the Service Module. In the short term, that will be a 70-cm station, but in the long term, the Service Module station could support expanded Amateur Radio capabilities.

The new antenna systems were developed by the US, Italian and Russian ARISS partners. Bauer concedes the hardest part of the process has been getting the new antennas space-ready. "I want to thank all the individuals from around the world who have enabled the ARISS team to get this far," he said. "It has been a challenging effort. Your persistence and can-do spirit enabled the antenna systems to go from just a dream to reality."

Additional information is on the ARISS Web site, **ariss.gsfc.nasa.gov**.

NASA

The new ARISS antennas: The WA1 through WA3 antennas will support VHF and UHF with the flexible tapes. The WA4 antenna includes the 2.5-meter flexible tape for HF. The flat spiral L/S-band microwave antenna is within the Delrin radome cover.

MARITIME NET "DELIVERS" BABY TO SAILOR AT SEA

Thanks to Amateur Radio, a sailor aboard a US Navy destroyer at sea got to hear his newborn son's cries for the first time. On August 12, members of the Maritime Mobile Service Net, with cooperation of the Pacific Seafarers Net, put sailor Mark McDonald in touch with his wife, Wendy, in California, who was about to go into labor. The sailor later was able to chat with his wife and her mom and to listen to his son's crying.

Terry Pipitone, KB1FMM, in Connecticut, said the Net session started out in typical fashion on 14.300 MHz. It soon got interesting after Tom Lange, W4MDL, on McDonald's ship checked in seeking help from anyone who could put the husband and wife in contact. When no West Coast stations were available, Pipitone made some calls to California, where—as it turned out—Wendy McDonald was headed for the hospital.

As the Net's closing time neared, the proceedings shifted to the Pacific Seafarers Net on 14.313 MHz. While KB1FMM remained in contact with the hospital, ARRL member Tom Whelchel, WA6TLL, in California stepped in to provide a phone patch between the hospital and the ship—somewhere in the North Atlantic.

Pipitone says things moved pretty

quickly after that. "At 0810 the baby was born and at 0815 Mark and his new son—Justin Alexander McDonald—were on the phone together," he said. "Mother and son were all doing fine, and the proud father was in tears. The timing and the cooperation could not have been better."

Listening in was Eric Boyle, N0YET, in Kansas, who reports Mark McDonald not only was able to speak with his wife and his mother-in-law but got to hear his baby crying for the first time. "This was neat!" he enthused. "It is times like this that make me extremely proud to be part of the Amateur Radio Community!"

For more information on the Maritime Mobile Service Net, visit the Net's Web site, **www.mmsn.org/**.

In Brief

• **Nominations invited for 2001 ARRL Professional Media Award:** Nominations are open for the annual Professional Media Award, a tribute to the late CBS President Bill Leonard, W2SKE. The award goes each year to a professional journalist whose outstanding coverage in TV, radio, print or multimedia best reflects the enjoyment, importance and public service value of Amateur Radio. The deadline for entries is December 14, 2001. The ARRL Public Relations Committee reviews entries and recommends a winner to the Board of Directors. The winner receives a plaque and a cash award of $500. Leonard was an avid Amateur Radio operator and was most active on the air during the 1960s and 1970s. In 1958, Leonard's contribution to *Sports Illustrated*, "The Battle of the Hams," covered the "sport" of DX contesting. Bill Leonard was inducted into the Broadcasting Hall of Fame in 1996. To obtain a nomination form and more information, contact Media Relations Manager Jennifer Hagy, N1TDY, **jhagy@arrl.org**; 860-594-0328.

• **Former ARRL staff member Ernest W. "Bill" Jennings, K1WJ, SK:** Bill Jennings, K1WJ, of Franklin, Connecticut, died August 26. He was 54 and a former ARRL staff member. An amateur beekeeper, Jennings succumbed after he was attacked by a swarm of his own bees. Authorities say, however, that Jennings died of heart failure, not as a direct result of bee stings, as initially believed. Jennings worked at ARRL Headquarters in the late 1970s and early 1980s. Former colleagues recalled his irrepressible sense of humor and his ability to keep fellow staffers in high spirits and smiling. Jennings was a DXCC Honor Roll and A1 Operator Club member. He also authored the "Basic Operating" chapter that appeared in several editions of *The ARRL Operating Manual*. *QST* Publisher Mark Wilson, K1RO, and ARRL New England Director Tom Frenaye, K1KI, attended a memorial service for Jennings on August 31. Both had worked with Jennings at ARRL Headquarters. Wilson called Jennings "one of the kindest and funniest people I have ever met." Survivors include Jennings' wife, Carol Smith, AJ2I, whom he'd met while both were on the ARRL staff.

• **Former NNY Section Manager George Veraldo, WB2BAU, SK:** George Veraldo, WB2BAU, of Norwood, New York, died August 9. He was 75. Veraldo was the first Northern New York Section Manager and was serving as Affiliated Club Coordinator for the section at his death. "George was always ready to step up to help the section," said current NNY SM Tom Dick, KF2GC. Veraldo is survived by his wife Pat, WB2CRY.—*Tom Dick, KF2GC*

• ***CQ Contest* publishes its final issue:** *CQ Contest* magazine has put out its last issue. Publisher Dick Ross, K2MGA, says the magazine, in publication for almost six years, has been losing money for the past several years, and the decision to cease publication with the October issue was strictly a business decision. The content for the ham radio niche publication will be absorbed into *CQ*. "*CQ*'s dedication to the contest community is in no way diminished," Ross said in "A Message from the Publisher" in *CQ Contest*'s final edition. All *CQ Contest* subscribers were to be converted to *CQ* subscribers or have their *CQ* subscriptions extended on a dollar-for-dollar basis, starting with the November issue of *CQ*. In his "The Band Edge" editorial in the October issue, *CQ Contest* Editor Bob Cox, K3EST, said the magazine's legacy might be carried forward in the form of a Web publication to serve the contesting community.

• **Vote on *QST* Cover Plaque Award:** The winner of the *QST* Cover Plaque Award for September was Frank Gentges, K0BRA, for his article "The AMRAD Active LF Antenna." Congratulations, Frank! The winner of the *QST* Cover Plaque award—given to the author of the best article in each issue—is determined by a vote of ARRL members. Voting takes place each month on the Cover Plaque Poll Web page, **www.arrl.org/members-only/qstvote.html**. As soon as your copy arrives, cast a ballot for your favorite article.

SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Eastern New York, Eastern Pennsylvania, Louisiana, North Carolina, Pacific, San Diego, South Dakota, and Virginia . 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 December 7, 2001. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before January 2, 2002, to full members of record as of December 7, 2001, which is the closing date for nominations. Returns will be counted February 15, 2002. Section Managers elected as a result of the above procedure will take office April 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 April 1, 2002. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the April 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*

NWS/ARRL SKYWARN Recognition Day

The National Weather Service (NWS) and ARRL are sponsoring an event to celebrate SKYWARN volunteers. The event is called the NWS/ARRL SKYWARN Recognition Day, and it will occur on Saturday, December 1, 2001, from 0000 to 2400 UTC.

The National Weather Service (NWS) and the ARRL have co-sponsored a special event for Amateur Radio the past two years. These events celebrated the contributions Amateur Radio operators have made to the NWS during severe weather, mainly through the SKYWARN program, and during the hurricane season. During the events, Amateur Radio operators transmitted from NWS offices and contacted other operators across the country. They provided information about the SKYWARN program and expressed appreciation to all Amateur Radio volunteers. Last year, 80 NWS offices participated in the event. Over 23,000 radio contacts were made from the offices including contacts with operators from 60 countries across the globe.

This announcement will introduce the Recognition Day's activities. Additional information, operating instructions, a list of participating NWS stations, QSL information and more may be found on the Web at **hamradio.noaa.gov/**.

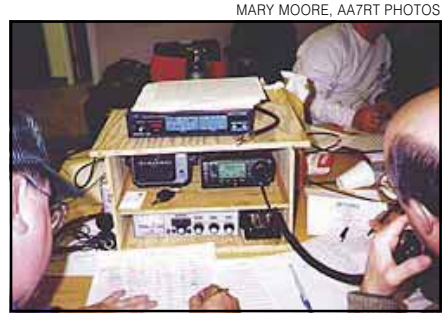
Although the primary reason for this activity is to show appreciation for the SKYWARN volunteers, there are other important reasons. The day will provide an opportunity to educate your National Weather Service staff on the importance of data gathered by a SKYWARN network. Many SKYWARN volunteers have never seen an NWS office, so they will learn what happens to the data they provide. The entire day is geared to strengthen the relationship between Amateur Radio operators, SKYWARN volunteers, and the National Weather Service.

Instructions for Radio Clubs Participating in the 2001 NWS / ARRL SKYWARN Recognition Day

If your club is interested in helping out the NWS during this event, contact your local NWS office and review the application form, operating instructions and example scripts as found at the Web site: **hamradio.noaa.gov/ClubInfo.htm.** Return applications by November 15, 2001 to Kevin Lynott, KC0FEH, National Weather Service, 920 Armory Rd, Goodland, KS 67735 or e-mail it to **kevin.lynott@noaa.gov**.

The Spokane County ARES/RACES station, W7GBU, operated last year at the National Weather Service Office in Spokane, Washington. Antennas were set up in an adjacent grain field (in the shadow of the Doppler radar dome). It was reminiscent of Field Day except, this being December 2000, there was snow on the ground and the temperatures were cold.

MARY MOORE, AA7RT PHOTOS



Joe Qualtieri, KE7PI (left), an Assistant Emergency Coordinator, and Gordon Grove, WA7LNC, Section Emergency Coordinator for Eastern Washington, make contacts on 20 meters from W7GBU.

Although your group will be working the event from a NWS office, it will be the responsibility of your Amateur Radio club to provide equipment and configure your operating area with appropriate antennas. Also, the NWS office will continue to work as normal as the event proceeds, so please remember to be courteous to NWS personnel. If NWS personnel are interested, you are encouraged to allow them to work the radio in accordance with FCC licensing regulations.

Airport Interference: NWS stations operating on airport grounds must ensure that Amateur Radio emissions not interfere with airport communications. If working from airport grounds, the airport manager must be notified by November 22, 2001.

1×1 Call Signs: Many special event stations utilize 1×1 call signs. These special call signs are temporarily allocated by the Federal Communications Commission. If you are interested in obtaining a call sign for the event, please visit *ARRLWeb* at **www.arrl.org/arrlvec/1x1.html**.

NWS Event Station Logs: All National Weather Service stations are required to keep a list of stations contacted. These logs should be in an electronic format, and should be sent to the National Weather Service in Goodland, Kansas, via **scott.mentzer@noaa.gov**.

Operating Event Guidelines for Everyone

Object: For all amateur stations to exchange QSO information with as many National Weather Service special event stations as possible on 80, 40, 20, 15, 10, 6 and 2 meter bands plus the 70 centimeter band. Contacts via repeaters are permitted. Special event stations must work on the grounds of appropriate National Weather Service offices. The special event stations serve to commemorate the contributions to public safety made by Amateur Radio operators during threatening weather.

Date: The event stations will operate the first Saturday in December (December 1, 2001, 0000-2400 UTC).

Exchange: Call sign, signal report, QTH, and a one or two word description of the weather occurring at your site ("sunny," "partly cloudy," "windy," etc).

Modes: NWS stations will work various modes including SSB, FM, AM, RTTY, CW and PSK31. While working digital modes, special event stations will append "NWS" to their call sign (e.g., N0A/NWS). Each NWS station will transmit on different frequencies and modes depending on the individual capabilities at each site.

As always, radio operators must conform to the rules and regulations as stated by the Federal Communications Commission. For example, operators may only utilize frequencies for which they have been licensed. There are no band plans given for the event. However, all contacts will be made utilizing the General or Novice portions of the bands.

Individual Operator Logs and Certificates

The National Weather Service will be

Steve Ewald, WV1X ♦ Public Service Specialist

offering participation certificates and endorsement stickers to Amateur Radio operators who request one along with their log sheet(s) and a self-addressed, stamped envelope. To obtain your certificate, create a handwritten log or print-out from your computer a list of all NWS Special Event Stations that you worked and indicate any endorsement that you may be applying for. Enclose a no. 10 self-addressed, stamped envelope (34 cents) and mail it to the NWS office in Goodland, Kansas: National Weather Service, 920 Armory Rd, Goodland, KS 67735.

The certificates will show the call sign of the operator and a list of sites that the operator contacted. For those radio operators who like to have some incentive, a number of certificate endorsements will be offered. A complete list of the endorsements may be obtained at the Web site. They include: Tornado Endorsement, Hurricane Endorsement, Nor'easter Endorsement and Fire Weather Endorsement.

QSL Cards

Some National Weather Service special event stations will offer their own QSL cards to radio amateurs that make contact with them during SKYWARN Recognition Day. These stations, with QSL address information, will be listed on the Web site at **hamradio.noaa.gov**. Remember, though, that the event's participation certificate can only be requested from the NWS office in Goodland, Kansas.

Have Fun!

This is not a contest, so no scoring will be computed. This is simply a group of stations transmitting from National Weather Service offices during the same time. Similar events occur every year on the Amateur Radio operating calendar. NWS stations may contact other NWS stations during SKYWARN Recognition Day. The National Weather Service may take this opportunity to see if Amateur Radio could be used as back-up communication in an emergency situation.

To see the statistics and find out who operated the last two NWS/ARRL Special Events, link to "History" and "Pictures" from the event's Web site. Questions concerning this event can be directed to Kevin Lynott, KC0FEH, at **kevin.lynott@noaa.gov** or Scott Mentzer, N0QE, at **scott.mentzer@noaa.gov**. Either may be reached at 785-899-2360. The Web site, **hamradio.noaa.gov/**, will be frequently updated to provide the latest information on the event.

SKYWARN Net Delivers

By Chris Kelly, K0PF, Loveland, Colorado

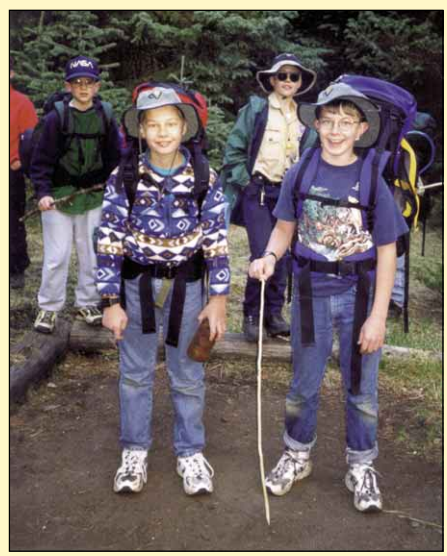
June 20, 2001, was a very active severe-weather night in Colorado. Tornadoes and heavy hail pounded the Denver International Airport in a storm that moved south across the Black Forest region and Elbert County. Near the town of Elbert is a Boy Scout Summer Camp, and that night, in a fairly remote part of that camp, I was directly under that storm with 24 scouts and 8 adult leaders.

We had watched the gathering storms since mid-afternoon. At about sunset, we received word that tornadoes had been spotted about 10 miles north of us. We gathered our scouts, prepared with rain gear and daypacks, under our temporary shelter, and briefed everyone on our plans for seeking protection in a nearby low area in case tornadoes came closer.

You can imagine the scene with very dark skies, rain starting to fall, huddled under a 10 × 20-foot tarp awning with a hissing propane lantern providing minimal comfort in a worrisome time. The younger scouts, eyes wide with concern, were partnered with older scouts and adult leaders as we tried to assess the danger and determine the best response. There was no storm-proof shelter nearby.

Enter ham radio. My son, Joseph Kelly, K0PFT, and I had brought several radios with us to camp, and we quickly got three of them into action. The first was programmed for the Scout Camp VHF frequency to monitor for the storm's progress at various points around the camp. The second was programmed for the National Weather Service NOAA Weather Radio at 162 MHz to hear their announcements. The third radio was programmed for the Pikes Peak repeater on 146.970 on which the Pikes Peak ARES/SKYWARN Severe Weather Group Net (Colorado ARES District 14) was operating, including information directly from the Pueblo weather radar.

Among our adult leaders was a former US Air Force meteorologist who was able to blend these data with local observations to understand our situation. As the storm passed overhead, we had lightning, large hail and heavy rain. While the scene was tense, the good and steady flow of news from the weather net provided important information and frankly, comfort, for that small group out in the woods.



Boy Scouts from Troop 81 on the trail. Left to right: Eric Schweickart (background), Joseph Kelly, K0PFT (left foreground), Greg Washam (background), Phil Kelly (right foreground).

We were not able to check into the net, perhaps, because the repeater was using PL tones we did not know about. Nevertheless, that night the weather net was valuable in helping us understand the weather situation and to let even the youngest scouts know that we were not as isolated as it seemed.

After passage of the cell, radar data indicated that the storm was moving into Calhan. This meant that the cell had passed directly over us since the earlier report of tornadoes was in Kiowa. We were located directly on the line between these two towns.

The hail stopped, and then the rain. We were able to send the scouts off to their tents by about 10:30 PM, still excited, but much less worried than earlier. Several adults remarked that they were amazed at the coverage and capabilities of ham radio. It was clear to them that while we are called "amateurs," the operations of the Pikes Peak ARES/SKYWARN Severe Weather Group Net and the information on that net are professional in caliber.

As the evening calmed, we were able to watch a spectacular lightning display off to the south, which, due to the heavy, low clouds was a totally silent show. It was one of the most unusual and memorable nights of my life.

I want to thank the volunteers who run this net. You may never know how many people are out there listening and using the data provided. Your service is *not* just to the National Weather Service. Amateur Radio, in its finest tradition, is still providing public service through these nets.

AL TOPALIAN, N2CCN

The W2SYR (Syracuse Repeater Association) Mobile Emergency Unit is used by ARES/RACES and was designed for emergency purposes for the communities of central New York. It is also available for public service events. The vehicle was financed by Richard Gillani, AK2K. Donald Perry, KB2RES, James Otis, N2MGU, and Donald Higgins, WE2D, were very involved in the project.

AL TOPALIAN, N2CCN

The communications van has been a hit at several hamfests and has been featured at several club programs this year. The vehicle is equipped with a 45-foot crank-up/fold-over tower.

Field Organization Reports

Public Service Honor Roll
August 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.

719
NM1K
419
K9JPS
348
W7TVA
314
N9VE
280
N8IO
257
N1SN
240
KK5GY
227
K8PJ
223
AC4CS
221
WB5ZED
212
N2LTC
207
KA2ZNZ
198
WA9VND
N5IKN

196
KB2RTZ
195
WA5OUV
193
KB2VRO
188
W6IVV
186
KA4FZI
182
KB2WII
178
AG4DL
175
NB4K
174
K4RBR
173
K0IBS
172
K2UL
171
W4EAT
170
W8YS
WN0Y

168
NN7H
K6YR
K5NHJ
K9FHI
167
WA2MWT
166
N2KPR
165
W0OYH
164
N2OPJ
161
N2RPI
158
WB4BHH
KC8CON
W6DOB
155
W1GMF
154
WB4GM
W6QZ
153
N1LKJ
K5UPN
152
KB5W

150
N9KNJ
148
N7YSS
NR2F
147
K4IWW
KC5OZT
146
KC4ZHF
144
N2CCN
143
NC4ML
KB2KLH
142
WB2UVB
WA5NKC
141
W0LAW
140
KA1GWE
N8BV
K4SCL
AF4NS
K9LGU
139
WA1FNM
N0SU

KE4JHJ
W3YVQ
WA2YL
W2MTA
W3BBQ
N9BDL
W7ZIW
138
WD4MIS
136
WA4GQS
135
WD4JJ
N2AKZ
KB1DSB
WB5NKD
133
W4ZJY
132
KD1LE
KA4UIV
N3YSI
131
N8OD
KC2EOT
130
NZ1D
KK1A
K0PY
WA0TFC

N3WAV
KF6OIF
K2BCL
129
W9CBE
K5IQZ
W4DGH
WI2G
128
KG4FXG
KB5TCH
N3EFW
W7GB
KB5WY
WA4QXT
W3CB
W7GB
NN2H
KF4UBX
127
KI4YV
126
W1QU
AC5Z
N9TVT
KD4GR
125
KB0DTI
AA2SV
WB2LEZ
W9YCV
K4FQU
124
AA3SB
KA4LRM
123
N4TAB
KC7SRL
N3WKE
W7GHT
122
K5DPG
W0WWR
K4YVX
KE4JFS
W1ALE
121
KB0RRU
AF4QZ
WB2QIX
KA4HHE

120
KC4VNO
KB2ETO
K4BEH
K1FP
WB4GGS
K7MQF
119
KC7ZZB
KG4FQG
K9GBR
WB2GTG
WD8DHC
W4WXA
K4WKT
W3IPX
W7QM
118
KM5YL
W4CKS
AC7DD
N7DRP
KA2DBD
W2FR
K4MTX
KC6NBI
KA8WNO
W5AYX
W7LG
N9MN
KF5A
117
N3ZKP
W1PEX
WX4H
116
KC4EZQ
AB2IZ
KA2GJV
W4AUN
115
KC5CKP
AE4MR
114
WD9HII
K7GXZ
KG2D
W2LC
WA4DOX
AG9G
K2DBK
W5MEN
113
N2WDS

W3NNL
K2PB
112
W1JX
WB4BIK
111
AD4XV
N8DD
N3WK
WD0GUF
KF4GQN
KT4PM
N7KOR
WA4EIC
110
W3HK
108
K2DN
KB2KOJ
WA1JVV
KM5VA
106
KA2CQX
KD5NZA
WB7VYH
WA7UVX
KF4WIJ
105
WA8SSI
104
W7VSE
W3OKN
K5VV
N2BVN
KG4CHW
103
KF4KSN
N3SW
102
KA2BCE
101
KA2IWK
AB4XK
100
KE4GYR
AF2K
WA2GUP
99
KA1VED
K5MC
KG4KCC
WA1QAA

WA2YOW
98
KG5GE
WA9JWL
N3RB
KE4WBI
KM4WC
WD4GDB
97
N1IST
96
W1JTH
95
WA4GLS
WA2CUW
W6JPH
94
WB2IJH
KV4AN
KO4OL
WB4PAM
93
K0PIZ
KT4TD
WW8D
WA5I
92
KC2ANN
91
KC8HTP
90
W2CC
W7DPW
89
KU6Z
KD4HGU
K1JPG
88
K2VX
87
W4CC
KE4PAP
KF4OPT
86
K3CSX
KA2ZKM
WB4UHC
K6IUI
85
W4XI
WB4ZNB

K2SO
84
K1SEC
WB9GIU
83
KC8KYP
KC7SGM
N2JRS
KF4INJ
82
W2PII
W4VLL
81
N7CEU
W5XX
80
W5PY
KA2YDW
N4FNT
KJ5YY
79
KC3Y
N2VQA
78
K8QIP
77
NC1X
WD4BUH
W4CAC
76
KG9B
75
KE4DNO
W7EP
74
KD1SM
AA4BN
73
KE3FL
KC6SKK
72
KF4NJP
WA5KQU
71
W0FCL
70
K8LEN
N2HQL
K3TX
WA4CSQ
WA4EYU

The following stations qualified for PSHR during the month indicated, but have not been recognized yet: (July) W1GMF 155, KD1LE 151, WA1FNM 143, N1LKJ 143, NZ1D 124, N1IST 112, K1SEC 97, K8SH 75, NC1X 83, N1LAH 83. (June) N1LKJ 160, KC2DAA 160, K2CSS 156, WB2ZCM 145, N2YJZ 142, KC7ZZB 117, W2JHO 108, W2AKT 1-6, WB2IJH 94.

Section Traffic Manager Reports
August 2001

The following ARRL Section Traffic Managers reported: AL, AK, AR, AZ, CO, CT, EB, EPA, EMA, EWA, GA, IA, ID, IL, KS, KY, LA, MDC, ME, MN, MO, MS, NC, NFL, NH, NLI, NNY, NTX, OH, OK, OR, ORG, SBAR, SC, SD, SDG, SNJ, SFL, STX, TN, VT, WCF, WI, WMA, WNY, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports
August 2001

The following ARRL Section Emergency Coordinators reported: CT, ENY, EWA, IN, KS, KY, LA, MDC, MI, NFL, NLI, OH, SD, SFL, TN, WCF, WMA, WNY, WPA.

Brass Pounders League
August 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*
W1GMF	4	487	1756	23	2447
N2LTC	0	1064	1098	23	2185
NM1K	613	583	851	2	2049
KF5A	3	637	610	1	1263
WB5ZED	20	533	407	33	993
WX4H	0	478	488	10	976
W1PEX	0	64	872	3	939
W6DOB	0	214	531	20	765
K9JPS	1	353	34	331	727
KA1VED	10	296	296	9	611
N8IO	118	246	214	14	592
W7TVA	61	233	135	159	588
K5UPN	14	288	247	1	550
W9YPY	0	243	294	0	537
WB5NKC	34	53	444	0	531
N9VE	0	253	38	239	530
K8GA	—	—	—	—	516

BPL for 100 or more originations plus deliveries: W9RCW 214, K9GU 205, N5IKN 142, KK5GY 132, WA5OUV 111, K8PJ 111.

The following stations qualified for BPL in the months indicated, but were not previously recognized in this column: (July) W1GMF 863, N1LKJ 509, K8GA 123. (June) N1LKJ 562.

My Hamming Adventure in China

By Jack Wagoner, WB8FSV

For five weeks during the summer of 2001 I had the privilege of visiting China and operating ham radio in my spare time. Obtaining my Chinese ham radio license from the Chinese Radio Sports Association (CRSA) was easy. I simply mailed a copy of my US ham ticket, a copy of my passport, 5 US dollars, and a letter requesting permission to operate ham radio in China to the CRSA in Beijing. My Chinese ticket arrived three weeks later.

Bringing ham radio transmitting equipment into China is not permitted, so you must operate from Chinese ham radio club stations or from the homes of individual hams. I spent most of my vacation with my wife's family in Qingdao, China, and I was lucky to have been able to operate from the homes of two Chinese friends, Mr Liu Jinsheng, BA4IT, and Mr Wang Hua Xia, BD4JV. I used the call signs WB8FSV/BA4IT and WB8FSV/BD4JV. All the Qingdao hams I met were very friendly and extremely pleased to meet and host me. Clinging to the shore of the Yellow Sea, Qingdao boasts a mild climate, picturesque mountains, some of the best beaches in China, and European architecture left over from its days as a German colony. It is a very popular vacation destination for Chinese tourists, although few Westerners have discovered it. Qingdao will host the yachting events in the 2008 Beijing Olympics.

Operating from semi-rare China was a treat. Although my call signs were long and a bit confusing, it was fun to generate several small pileups. Even here, near the peak of the current sunspot cycle, I rarely heard very many stations on the air on my preferred bands of 15 and 20 meters. Amazingly most of my CQs went unanswered and only occasionally was I tail-ended. This was due for the most part to the simple wire antennas I used.

WB8FSV

Mr Liu Jinsheng, BA4IT, president of the Qingdao Amateur Radio Club, at his home station.

I found there are two good DX windows or openings from China, from about 1100 to 1700 UTC, and about 2100 to 0400 UTC. 2100 UTC is 5 AM local time in China and I could not ask my radio hosts to get out of bed that early or to go to work late. The 1100 UTC is 7 PM China time and the only practical opportunity I found. In my spare time I was able to operate for a total of 19 hours on 6 separate occasions, usually about 8 PM to 11 PM each local evening. My Chinese ham friends had to go to bed then in order to get up in the morning for work. Nevertheless during that time I made 198 QSOs in 31 different entities. To have operated much more on our family vacation would have been pushing the envelope of domestic tranquility.

The vast majority of my contacts were with my Asian neighbors. Japan dominated with 68 QSOs and Asiatic Russia produced 21. I have yet to work China from my dipole in Ohio, but in China I QSOed 14 Chinese stations. It was simple to log South Korea 9 times and Indonesia 6 times. What fun to easily work many prefixes that I have found difficult from Ohio: VR2, EX8, DU7, T88, HS0 and of course YB, HL and BA. The bands opened to Europe on several occasions allowing me to QSO 23 Europeans. I was pleased to work 31 United States hams but never did hear continental Africa. I did manage to log 3B8FG, but working into Africa is the big DX challenge for most Chinese DXers. Central America and the Caribbean are only slightly less difficult. While I did work one VE7, Mr Wang, BD4JV, tells me he rarely hears Canadian hams.

At my very first operating session from the home of Mr Liu, BA4IT, I worked W6GG for the very first US QSO from Mr Liu's shack. Mr Liu was extremely pleased. Several days later Mr Liu was himself able to work N8DX for his own very first US contact. Coincidentally, the July 2001 *QST* "How's DX" article by Fred Laun, K3ZO, and John Shirley, N8DX, was an accurate account of how to QSL Chinese ham stations. I was able to QSO K3ZO from Mr Wang, BD4JV's station, then handed the mike to Mr Wang for his third QSO with K3ZO. And N8DX turned out to be Mr Liu, BA4IT's first US contact. It's a small world.

Five-Tier Licensing Structure

China has a five-tier ham licensing structure. After passing a written test available by mail, the beginning license class permits operation from club stations only. Approximately 6000 of China's 11,000 licensed hams fit this category and have no call sign of their own. The next class, called Class Four, is for listening only to prepare for a higher class. About 2000 Chinese hams hold Class Four tickets with call signs such as BG5-1-10532. Class Three, the BG prefix, allows 10 watts transmit power on very limited frequencies. You may hear BH prefixes on the air. After passing the Third Class exam, the CRSA grants a BH prefix, which is changed to BG after gaining some experience. Class Two, the BD prefix, allows 100 watts output on most ham frequencies, while Class One, the BA prefix, permits the full 500 watts allowed in China on all standard world ham frequencies. The Class Four-license test is available by mail. Tests to progress to classes beyond Class Four are given once a year in each provincial capital. Each class requires one to three years experience and the collection of 10 QSL cards before you can take the next license exam.

In addition to the written theory test, those wishing to take their Class Three exam have two choices, a CW test or an English proficiency test. The latter only covers IARU phonetics and standard ham abbreviations, such as GB, CUAGN, QSL and QRM. Passing the Second Class exam, besides two years experience and 10 domestic QSLs, requires a CW test of

WB8FSV

The author and BG8EE operate during China Field Day in Qingdao. Three of the 12 and 13-year old club members are visible.

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40 to 50 characters per minute. The Chinese measure code speed in characters per minute, not words per minute. The First Class requires three years experience, passing a 60 to 70 character per minute code test and a written test, and the collection of 10 overseas QSL cards. A Chinese ham radio license must be renewed every 3 years at a cost of about 2 dollars US. The minimum age in China to have a ham station in your home is 18, while there is no minimum age to operate a club station.

Mr Liu Jinsheng, BA4IT, is the president of the Qingdao Ham Radio Club. I was happy to put together a two-hour presentation on ham radio in the United States for the Qingdao club, which my wife helped translate as I went along. It was well received. There are approximately 60 hams in Qingdao, all members of the Qingdao Radio Club. Only 10 of these 60 are active on HF from their own home stations, and only 3 of these, BA4IT, BD4JV and BD4KC, are active DXers. According to the 2001 Chinese Callbook, nearly 3000 of China's 11,000 hams are licensed to operate HF, not including Hong Kong, Macau, Taiwan or club stations.

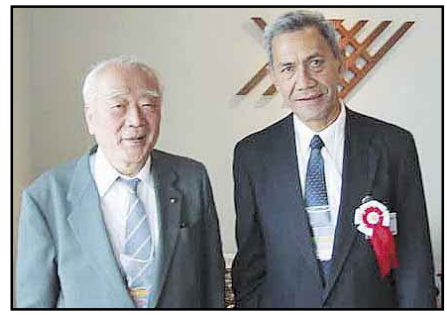
The Qingdao club president, BA4IT, is a member of the most radio-active family in Shandong Province, the location of Qingdao. His wife is a Third Class ham, BG4MC. Mr Liu's brother is BG4LU and has a son who is a Fourth Class ham, BG4-2-8031. Mr Liu also has two sisters, BG4LT and BG4LS. And BG4LT's daughter is BG4MD. BA4IT operates both CW and SSB, and has worked about 15 entities with his Yaesu FT-757 and inverted V antenna.

I was also able to visit the home station of Mr Xu Li Liug, BD4KU. Mr Xu is typical of many Chinese hams on HF in that he only speaks Chinese and is only able to work other Chinese-speaking hams. His logbook contains mostly Chinese entries, with a few Chinese-speaking JAs and HLs. BD4KU uses an ICOM marine radio, an IC-M700, on 40, 20 and 15 meters, with smaller FM radios for 10 meters and VHF. My second Chinese radio host, Mr Wang, BD4JV, is, like me, a DXing nut and enjoys CW. He is on the air almost every night hunting DX with his own FT-757 and inverted V antennas. Mr Wang speaks English well and has worked over 60 DXCC entities.

Although I was in China and missed Field Day this year, the Qingdao Radio Club invited me to participate in China's annual version of FD. It is officially titled the Amateur Radio Emergency Communication Practice Plan, but is popularly called Field Day. It is similar to America's Field Day in that remote operation with independent electric power is encouraged, and similar to our Simulated Emergency Test with periodic reports sent to regional stations and to the national station, BY1PK in Beijing, concerning local staged emergencies. The Qingdao Radio Club set up a portable FD station powered by a car battery in a large public park near the ocean's edge. It was encouraging to see four young club members, ages 12 to 13, each make several contacts from the FD station. Despite my rudimentary Chinese, I was able to make 10 China FD contacts with stations throughout China using 40 and 15-meter SSB. It was fun to operate SSB on what is a CW frequency in the United States, 7060 kHz. The operation was even filmed by Qingdao television for the local TV news.

Since returning from China in August I have learned that China changed their Amateur Radio regulations. Among the changes are: visiting foreign hams can now receive their own Chinese callsigns, Third Class BG hams now have greatly expanded frequency privileges, and the maximum power allowed Chinese hams is now 1000 watts.

Overall I was very pleased with the results of my limited ham radio operation in China. The DX QSOs and the Chinese ham friends I made added immeasurably to the pleasure of my Chinese vacation. Oh yes, and the scenery and historical sites in China were great also…



Tom Christian, VP6TC, President of the newly founded Pitcairn Island Amateur Radio Association, meets Shozo Hara, JA1AN, President of the JARL, at the JAIA luncheon at the Yokohama Ham Fair. Mr Hara will be looking for Tom this month as Tom leads a team to Ducie Island.

These two top-notch DXers have been friends for nearly 40 years and finally met for the first time face to face at the 2001 Friedrichshafen. Both are on the Honor Roll. Bill Hempel (left), VK4LC, has 370+ entities while Ami Shami (right), 4X4DK, has 383+ entities.

VP6—DUCIE ISLAND: NEW DXCC ENTITY?

Don't forget: members of the Pitcairn Island Amateur Radio Association (PIARA) plan to be active as VP6DI on the island of Ducie starting at 0000Z November 16. As of press time we do not know for sure that it will be a new entity, as the vote for IARU membership for PIARA will not be known until close of business at the IARU in Newington, Connecticut on November 15. Results of the vote are expected by 5 PM EST (2200Z).

If PIARA is voted in as a member of the IARU the Pitcairn Islands would qualify as a Political Entity on the DXCC list. The Pitcairn Islands consist of four islands; Pitcairn, Henderson, Oeno and Ducie. The closest island to Ducie is Henderson, which is just slightly over 350 km away. If there is no land (island, above-water reef, atoll, etc) that is 100 meters or more from point to point at high tide between the two, then Ducie will qualify as a Geographical DXCC Entity. As of press time the DXAC was looking into this. From all the maps your editor has seen there does not appear to be any land between the two. More than likely Ducie will be the next new DXCC Entity. Keep an eye on your favorite DX bulletin for the latest word on this one.

The reality is that we will more than likely have a new DXCC Entity starting on November 16, 2001 (GMT). For the record, Captain Edward Edwards did not discover Ducie Island, as previously reported. He did name the island after Lord Ducie. Pedro Fernandez De Quiros, a Portuguese explorer, reported sighting the island (which he named La Encarnacion) sometime between December 1605 and May 1606.

So what do you need to know about this possible new entity for your logging programs?

Prefix:	VP6/D
DXCC Entity:	Ducie Island
IOTA:	OC-182
Latitude:	24° 40′ 00″ South
Longitude:	124° 47′ 00″ West
CQ WAZ:	32
ITU Zone:	63
Continent:	Oceania
Area:	6 sq km (2.5 sq mi)
UTC offset:	–8 hours
Start Date:	Nov 16, 2001*
Bureau:	None

* = pending DXCC approval

A61AJ—QSL MANAGER CHANGE

After several years of being the QSL manager for Ali Al-Futtaim, A61AJ, I am stepping down, due to my workload. Joe Veras, N4QB, is now the new QSL manager and will have all logs for A61AJ. Any cards I receive prior to December 31, 2001 will be forwarded to Joe.

Wrap Up

Thanks for all the DX news, letters, pictures and newsletters. A special thanks goes to JA1BK, VK4LC, WB8FSV and ZL1FMA for helping to make this month's column a success. Until next month, see you in the pileups!
—*Bernie, W3UR*

The BC-474-A

One of the nicest surplus radios to become available after WW-II was the well designed "BC-474—A Radio Receiver and Transmitter," manufactured by RCA. Without any modification, it covers the entire 80-meter band using AM or CW. The transmitter VFO covered from 3500 to 6300 kHz and the receiver tuned from 2300 to 6500 kHz. Of course over the years, with a little adjusting, hams put them on 160 and 40 meters.

The Transmitter

The Army repair manual for this radio says the 3-tube transmitter's range is 15 miles for CW and 8 miles for AM phone. The manual recommended an antenna of 35 feet with a 35-foot counterpoise.

It has all 6V6 type tubes, one for the VFO, one for the power amplifier stage, and one for the AM plate modulator. The controls are standard for a transmitter of that time: VFO Oscillator tuning, PA tuning, and Coarse and Fine antenna controls. To help with the tuning, a PA plate meter and Antenna Current meter are provided. Standard jacks for the key and microphone are built in.

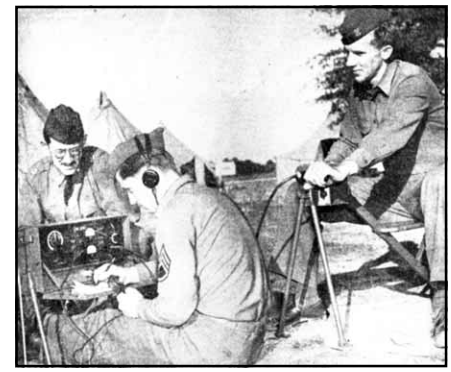
Power for the transmitter was originally provided by a hand-crank generator, GN-44-A, which produced a high voltage of 290 V dc for the plate and 6.6 V dc for the filaments. It has a seat on one leg for the person doing the cranking and two additional legs. This hand-crank generator is extremely hard to find today.

The Receiver

A four tube superheterodyne circuit is used for the reception of CW or AM. The tubes are a low drain type for use with battery power. The controls are minimal but adequate. They are: a Phone-CW switch, Receiver Tuning and Volume controls, and Receive-Transmit and Emission Selector (mode) switches. Two jacks are provided for two sets of earphones.

Power is provided by a battery pack, which fits inside the cabinet, just under the receiver section. Power can also be provided by the hand-crank generator with an additional filter, FL-10, attached. Battery power requirements are 90 volts B and 1.5 volts A for the filaments.

I found an interesting, but unusual, ac power supply located inside the battery section of the cabinet in mine. It is a "Model CV-45 Power Unit." It was obviously designed for the receiver unit, as it matched the receiver plug perfectly. The size and design allows for a great fit within the battery shelf. My guess is—it was used in the repair shop. There were also two adapter plugs to allow a more modern set of loose batteries to be used. I'm wondering if anyone else has these?



A 1942 US Army photo showing the proper use of the BC-474. Note the soldier on the right turning the generator crank, while the operator receives a message. The soldier behind the radio, an officer, is waiting for the message.

The watertight case is painted Army green, inside and out, except for the front panel. The frequencies align with the BC-611 Walkie-talkies, so I'm assuming they were designed to be used together. Today you could have a lot of fun at a public event using BC-611's and the BC-474, instead of 2-meter handie-talkies.

Conclusion

There should be renewed interest in using this radio when we get our new 60-meter band near 5 MHz. It would then cover 80 and 60 meters "without modification," which is important to collectors. It is a nice low power rig that should work very well there.

For use in today's ham shack, a small power supply can be built using junk box parts. The two cables provided with the radio makes it easy to plug in. Any dc voltage from 250 to 325 V will do for the transmitter. A separate power supply for the receiver can also be built or incorporated within the transmitter supply. Coupled to a good ham antenna, this radio will provide many hours of low-power fun.

GETTING READY FOR WINTER

Well it's time to make sure you have your antennas ready for winter. You should also have a good supply of parts ready for those restoration projects you said you would start, once the weather turned colder. I'll see you at the hamfests in a couple of months. —*K2TQN* QST

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Meteor Scatter News

The 2001 Perseids meteor shower seemed to attract somewhat less interest than in former years. "I don't think the shower was very good, about like last year" was the comment from Russ Holshouser, K4QI (FM06), who made eight random QSOs on 2-meter SSB. Al Olcott, K7ICW (DM37), remarked that he had only "fair to mediocre results" logging a dozen 2-meter SSB stations on the morning of August 12 from his summer home in Utah. Al thought the shower peaked between 1430 and 1830, mostly with short bursts, but he observed one long burn of about a minute duration at 1520, long enough to complete four of his contacts.

Brian Allen, N0VSB (DM79), completed a dozen 2-meter SSB contacts through the morning of August 12 from Colorado, and noted that tropo conditions were also good at least as far eastward as Iowa, eastern Kansas and Oklahoma. Herb Krumich, K2LNS (FN21), sensed the shower peaked around 1200 on the 12th. He made six contacts on 144 MHz, including one with VE4AMU (EN19) at around 1900 km. Ray Veldran, K4ZOO (FM08), made nine contacts on 144 MHz and completed with W7XU (EN13) in South Dakota on 222 MHz for a new state—one of the few reports of activity above 144 MHz. Jason Wilburn, KG4BMH (EM76), made five contacts on 144-MHz SSB, including a random hook up with N0VSB (DM79) in Colorado.

The SSB Calling Frequency

Operators from all over the country complained about random meteor-scatter operating practices, especially the concentration of activity around 144.200 MHz. It seemed that the calling frequency was the only place that anyone would call CQ, even when it was obvious that spot was already crowded with stations. As a result, it is likely that fewer contacts were made due to the intense QRM when a chance meteor did briefly open up paths. Even those who complained most admitted they too stuck close by 144.200, claiming they could not make contacts anywhere else. This is nonsense, of course.

Because of the crowding around 144.200 MHz and poor operating practices, many exchanges probably did not meet minimum acceptable standards for a valid contact. A valid contact requires sending and receiving both calls plus, one additional piece of information (like a grid locator) and acknowledgments (simple "rogers" will do) on both ends. Operators who queried on an Internet spotting page, "did we make the contact?" clearly did not. If you made a valid QSO, you would already know for certain by clearly hearing the other station give your call, his call and acknowledgments on the air.

That was very difficult to accomplish amid the chaos on 144.200 MHz, especially as some operators did not clearly identify themselves when coming back to a station. Often enough, it was difficult to tell just who was making a contact with whom! Everyone would do much better by picking a single clear frequency, say spaced at 2.5-kHz intervals, higher and lower than 144.200. If you want to make random contacts, publicize your calling frequency in advance, if you like, or put out a notice on an Internet spotting page. That is a much better use of the Web. If you are hunting for stations, make a list of those you know will be on and then listen for them.

WSJT is the New Craze

Mike King, KM0T (EN13), made 32 QSOs on 144 MHz, 20 of them using *WSJT*, the new high-speed digital meteor-scatter program. Mike made one other contact using high-speed CW, and the rest on SSB. In comparing the three different modes, Mike thought *WSJT* was superior for ease of making meteor scatter contacts. Most of the *WSJT* QSOs took less than 10 minutes, but his longest contacts were actually made on SSB. He attributed this to the relatively lower levels of activity on *WSJT*, rather than any inherent distance advantage to the digital mode.

Clint Walker, W1LP/mm, also had great success with *WSJT* on 2 meters while steaming across the Gulf of Mexico during a non-shower period. On August 29 alone, W1LP/mm completed with K9KNW (EL95) from EJ87, 79, 69 and 51 and worked W4WHN (EL94) from all those grids plus EJ60. Clint thought it was possible to make a *WSJT* contact with anyone within normal meteor-scatter range that gave it a try. *WSJT* cannot extend the normal maximum range of meteor scatter, but it does maximize the efficient use of weak signals and short-duration pings.

So what is *WSJT*, this amazingly effective mode of making meteor-scatter contacts? *WSJT* is a high-speed computer program optimized for making weak-signal meteor-scatter contacts. It generates four tones at 147 characters per second within an SSB passband. Unlike similar programs for generating and recording high-speed CW, decoding is done entirely on screen, so it is not necessary to know Morse code to use *WSJT*. Users say it is similar to RTTY, but much faster and more reliable. It is especially effective with weak signals and pings as short as a few milliseconds. A complete exchange can be received in just a few tenths of a second.

Within a month after Joe Taylor, K1JT, released his new *WSJT* on July 7, more than a thousand operators, worldwide, had already downloaded the necessary files from his Web site at **pulsar.princeton.edu/~joe/K1JT**. *WSJT* is quite easy to operate. Canned messages are stored in memory, requiring only that you click on the appropriate button to send a 30-second burst of information. Any decoded information from a responding station appears in plain text on the screen.

WSJT requires only a *Windows*-based computer and a simple interface with a transceiver. It is easy enough to build your own interface to your rig's audio output and microphone lines. Or, you can buy one of the flexible commercial units advertised in *QST*, such as West Mountain Radio's *RIGblaster,* designed by VHFer K1UHF, or MFJ's *Soundcard Radio Interface*. A single roof-mounted Yagi and 50-W SSB transceiver are sufficient to make 1000 to 2000-km contacts on 144 MHz nearly any morning.

It became popular in Europe almost immediately and activity is spreading rapidly in the US. Activity centers on

This Month

November 11	Good EME conditions
November 10-11	ARRL EME Contest
November 17-18	Leonids meteor shower peaks

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144.140 MHz, but *WSJT* should be ideal for meteor scatter at 222 and 432 MHz as well. Operators have had good success with random meteors, especially in the early morning hours, even when there is no meteor shower. For more discussion, schedules and the latest about *WSJT* operating, check the Ping Jockey Web page at **www.pingjockey.net/cgi-bin/pingtalk**.

North American High-Speed Meteor-Scatter Contest

There are other kinds of meteor-scatter activity in addition to SSB and the new *WSJT* mode. Operators during the week-long North American HSMS Contest, held this past May, also use widely available computer programs to generate and record extremely high-speed Morse code, transmitted as a single SSB tone. The program then slows any received segments containing CW, so that it can be decoded by ear in the usual way. K2TXB came out on top in the fourth annual running of the contest with 14 QSOs, followed by W8WN and W5SNX. Entry logs showed 23 participants. For full results and further details about the North American HSMS Contest, see **www.qsl.net/k0xp/2001HSMS/2001resu.htm**.

ON THE BANDS

Sporadic-E continued well into August, with several 50-MHz transcontinental and transatlantic multihop openings and at least one spectacular 144-MHz event. Some better-than-average tropospheric conditions appeared across the midsection of the country and along the East Coast on several days. There were also a few evenings with weak aurora across the northern tier of states. What must have been auroral-E propagation allowed widely distributed US stations to hear strong 6-meter signals from Iceland, Greenland, the Canadian Arctic and Alaska on several evenings. Dates and times are UTC. Thanks to W1RMA, K1UHF, K2OVS, WA5IYX, WA5KBH, N6ENU, AB7UQ, EA1ABZ, G3FPK, G4ASR, G4UPS and VK3KK for their reports, not otherwise acknowledged in the summary of August activities that follows.

Domestic Sporadic E

Six-meter sporadic-E openings occurred on at least 10 days in August, but more surprising was that double-hop coast-to-coast conditions were evident on at least five of those days, primarily in the early evening. In addition, the MUF shot through 144 MHz on three occasions.

Perhaps the most spectacular of these late-season openings took place on the evening of August 17-18. Dozens of 50-MHz contacts linked the West and East coasts, while stations in the center of the country worked in both directions simultaneously. As single-hop contacts shortened, stations began looking for contacts on 144 MHz.

By 0200, Colorado stations N0VSB (DM79) and W3DHJ (DM68) were making 2-meter contacts into northern Florida, Alabama, Mississippi, Tennessee, Arkansas. Many others joined in over the one-and-a-half hours that 2 meters was open across the center of the country. W7JF (DN55) in Montana made a string of contacts into East Texas; KM0T (EN13) worked New Mexico and Texas from the northwestern corner of Iowa; and others in Indiana, Missouri and Oklahoma joined in the fun.

K7ICW (EM26) reported some 2-meter sporadic E on August 1, between 1500 and 1525, from his home in southern Nevada. He and K5VH (EM00) in southern Texas heard each other, but no contact resulted. Al also mentioned that W6AT in southern California and at least one station in adjacent Arizona also copied K5VH. The third 2-meter sporadic-E opening took place during the evening of August 8-9. Peter Shilton, VE3AX (FN02), worked K0CS (DM79) in Colorado and thought VE3TMG heard N0LL and perhaps others in the center of the country.

Six-Meter DX

US and Canadian stations continued to work Africa and Europe well into mid-August, finishing off what may have been the longest transatlantic sporadic-E season observed since the mid-1980s. It all began on May 25 and ended with two spectacular openings on August 13 and 14. Table 1 summarizes the activities for the month. The table shows the widest extent of each opening, so not all US and Canadian call areas had an opportunity to work all the European and African DXCC entities shown. (The similar table in the October column, by the way, should have read "Transatlantic 50-MHz Activity in July," not June, as printed.)

Among the August openings were some of the best of the summer season. The band was open on August 5-6 for more than 10 hours from all along the East Coast to as far eastward as Germany, Austria and Greece. The band was still open at 0330 (11:30 PM local time), when CT1DYX finally said good morning to W3EP and closed his station. It was 4:30 AM in Portugal. The next morning, US operators from Georgia and Florida west to Texas were able to work Spain and Portugal.

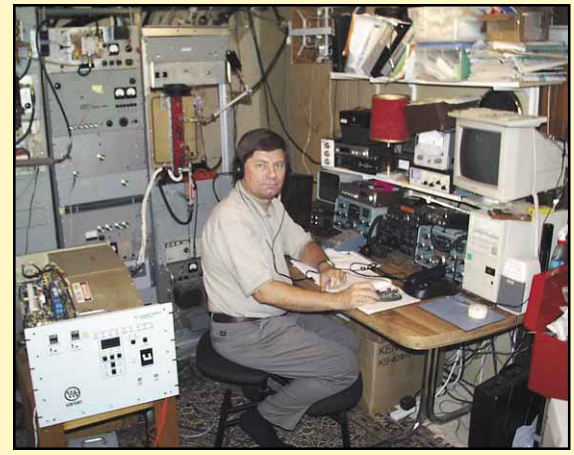
US and Canadians also logged several countries during August that were not reported earlier in the season, including Gibraltar (ZB), Liechtenstein (HB0) and Chad (TT). K1SIX worked TT8JE on the morning of August 7, not only for a new country, but for the first time any US station had worked the central African nation of Chad on 6 meters. K1TOL followed suit a few minutes later. The next afternoon, many operators throughout the Northeast heard the TT8JE beacon, but Eric was not at his station.

Raj Kumar, VU2ZAP, was surprised to hear 4S7EA (Sri Lanka) on August 4, probably via sporadic E. On August 25, Raj copied VR2XMT in the morning and worked HZ1MD and TT8JE in the afternoon. JA1VOK found ZL1WTT that same day across the equator. There were also a few astonishing contacts from Brazil and Argentina to southern Europe late in the month. The so-

VE4MA and W5LUA Complete First-Ever 24-GHz EME Contact

Barry Malowanchuk, VE4MA, and Al Ward, W5LUA, finally completed the first-ever 24-GHz Earth-Moon-Earth (EME) contact on August 18 at 1417, after several years of preparation and tests. Signals were weak and sounded a bit like aurora, but the CW signals were clearly readable out of the noise.

VE4MA used a 2.8-meter offset dish, a 1.6-dB-noise-figure receiver and 70 W from a Varian traveling wave tube (TWT) amplifier in the shack. Feed was accomplished via a waveguide. W5LUA had a 3-meter prime-focus dish, a 1.75-dB-noise-figure receiver and a Thompson TWT that delivered 80 W to the feed horn.



Barry Malowanchuk, VE4MA, at his station in Winnipeg, Manitoba.

WA7CJO and AA6IW are close to finishing their EME-capable 24-GHz stations, and others in Europe, including CT1DMK and G3WDG, have receive capabilities. Nevertheless, it is unlikely that 24-GHz EME will become popular very soon. Water-vapor absorption losses are significant at 24 GHz, and the technical challenges involved in generating sufficient power to overcome atmospheric attenuation will probably limit the number of amateurs willing and able to duplicate this feat, at least in the near future. The best locations for 24-GHz EME might turn out to be high deserts, arctic regions and other areas of the world where atmospheric moisture is generally low.

For more information about meeting the challenges of 24-GHz EME, see Barry Malowanchuk's "24 GHz Moonbounce Experiments at VE4MA" in *The Proceedings of the 35th Conference of the Central States VHF Society*.

lar flux ranged between 150 and 200 during August, high enough for worldwide DX via the F-layer in the winter, but normally rare in August. Nevertheless, these DX contacts late in the month were almost certainly made via F-layer propagation.

Six-Meter DX Prospects for the Winter Season

Cycle 23 peaked sometime in mid-2000 and solar activity has been generally declining since. This does not bode well for worldwide 50-MHz propagation this fall, yet there may be some reason for optimism. The most respected forecasts have been suggesting a double peak for Cycle 23, giving some hope that solar activity this winter may at least match last year's levels. Even so, DX opportunities from the mid-latitudes (including most of the US) were disappointing during the fall and winter of 2000-2001. There is a greater likelihood for north-south propagation across the geomagnetic equator and much longer east-west contacts in near-equatorial regions.

Auroral E

There was also an unusual amount of activity during the early evening hours from the arctic regions on 50 MHz during August, presumably via auroral-E propagation. These events seemed to appear when the K index was between 3 and 5, but they often seemed indistinguishable from ordinary mid-latitude sporadic-E openings, which often took place simultaneously across the US and southern Canada.

Stations widely scattered from the Northeast to the Midwest reported VE8BY/b (FP53) and the Greenland beacons OX3VHF and OX3SIX early on the evenings of August 1, 6, 7, 14 and 22. Six-meter activity is scarce across the Arctic, but VY0AAA (FP53), the call used by VE3FN when visiting Iqaluit on Baffin Bay, and OX3NUK (GP44), the club station at Nuuk, made several dozen contacts on August 6 and 7, at least. Contacts were not limited to the Northeast. W8DQ (EM79) in Ohio worked VY0AAA on August 7 after 0200, and several other W8 and W9 operators were fortunate to hook up with OX3NUK as well.

On the evening of August 14-15, several stations in the Northeast heard quite an array of Arctic beacons between 2300 and 0400, including VO1ZA (GN37), VO1SIX (GN27), VE8BY (FP53), OX3VHF (GP60), OX3SIX (HP15) plus TF3SIX (HP94). There were reports that at least one station in Scotland was also copying the Iceland beacon on the same evening, but no transatlantic contacts resulted.

Propagation shifted much farther west on August 22, primarily between 0130 and 0530. Beginning as early as 0130, stations as widely scattered as KG0VL (EN32) in Iowa, N0JK (EM17) in Kansas and K7RWT (CN85) in Oregon heard VE8BY/b as loud as 59 at two-hop distances up to 3800 km. N7DB (CN85) and others in the Northwest found KL0RG (CO45), NL7ZW (BP71), and KL9A (BP51) after 0330. N0LL (EM09) worked NL7ZW at 0417 and N0JK heard him about the same time, but could not complete a contact.

Tropospheric Ducting

There was some lingering tropospheric enhancement on August 1 across the Mississippi Valley and conditions were at least above average in the center of the country for the August 4-5 UHF contest. W5ZN (EM45) worked northward as far as W7XU/0 and N0QJM (EN13) in South Dakota on 222 through 1296 MHz and added 2304 MHz while running the bands with KM0T (EN13) in Iowa. He also found stations in southern Wisconsin and northern Illinois. The longest distances were in the 1000-km range. Jon Jones, N0JK (EM18), operated on 432 MHz with 5 W and an eight-element quagi from a portable site in southeastern Kansas. He logged W7XU/0 with 59+ signals and worked northeast as far as K9KL (EN64), about 950 km distant. Ed Fitch, W0OHU (EN34) in southern Minnesota, made his longest contacts on 432 MHz with VE4KQ (EN09), at about 700 km.

Some of the longest tropo contacts during the month took place along the East Coast. Conditions were well above average on the evening of August 25 from Nova Scotia to Virginia. The next morning, stations in Massachusetts and Connecticut had little trouble working south into the Carolinas on 144 and 432 MHz at distances up to 1200 km. W4WRL (FM04) in South Carolina logged 2-meter stations as far north as FN43 (New Hampshire) and EM81 (Ohio), for example, at distances up to 850 km. Keith Hornyak, W4QS (EL98) in central Florida, found W3KJ on 432 MHz and K2SMN on 144 MHz, both in New Jersey (FN20). These contacts were in the 1500-km range. K1TEO (FN31) in Connecticut eked out a 144-MHz contact with N0KBH/4 (EL88), for what was probably the longest QSO of the opening, at around 1700 km.

Long-distance tropospheric contacts are rarely reported from the far north, but Hatsuo Yoshida, JA1VOK, mentioned quite an unusual opening from Russian Siberia to central Japan. UA0FL (QN16) on the southern part Sakhalin Island made seven 432-MHz contacts with Japanese operators on August 28. The longest was 1279 km, between UA0FL and JK1KTY (QM05) in the Tokyo area. In terms of latitude, this would be equivalent to a contact between the southern coast of Newfoundland and the Outer Banks of North Carolina.

Table 1
Transatlantic 50 MHz Activity in August

Date	*Time*	*North America—Europe and Africa**
2	1410	VE9AA—I
	1930-2125	VE1, 9; W1-4 (FL)—[CU3], CN, CT, EH
4	2055-2215	VE1, 9—[CT], F, I
5	1650-2330	VE1, 2, 9; W1-4—CT, EH, GW, G, ON, PA, F, HB9, HB0, OE, DL, I, 9A, SV
	2330-0500	VE9, W1-4 (VA), 8 (OH)—CT
6	1025-1050	VE9, W1—CN, [EH], IS0
	1300-1500	W2, 3, 4 (NC, GA, FL), 5 (MS, TX)—CT, EH, 9H
	1720-1730	W4 (FL)—ON
	2100-0000	VE1, 9; W1, 3—[CU], GM, GW, CT, EH9, ZB, EH, F, I
7	1610-1835	W1, 4 (FL)—EH8, TT, EH, I
8	1150-1510	W1, 8 (OH)—EH8, EH, I
	2140-2355	VE1, 3; W1, 2, 3—[CU], EH8, [TT], CT, EH
9	2030-2150	VE1, W1—GW, G, ON, PA, F
10	0000-0030	W1—EH
11	1705-1835	W1—EH, GW, G
12	1640-1645	W1—EH
13	1120-1830	W1, 2—CU, CT, EH, EI, F, GM, GW, G, GU, ON, PA, F, I, 9H, HB9, DL
14	1200-1230	VE1, W1, 4 (FL)—CT, EH, EI, GW, G, GU, ON, F, DL
	2345-0000	W1—CT

*State abbreviations are in parentheses, and country prefixes in brackets indicate heard only.

VHF/UHF/MICROWAVE NEWS

Central States VHF Society Awards

At the 35th annual meeting of the Central States VHF Society, held in Fort Worth, Texas, in late July, Joel Harrison, W5ZN, was named the recipient of the Wilson Award for outstanding service to the Society or to UHF/VHF in general. The Chambers Award was not announced at the meeting.

The Central States VHF Society also sponsors the annual States Above 50-MHz Program to encourage activity on the VHF-through-microwave bands. The basic rules are simple. Tally the number of states worked on each band at 50 MHz and higher. The 2001 leaders were K8TQK (160 states), KM0T (161) and VE3AX (151). Only CSVHF Society members are eligible for the first, second and third-place plaques.

The 2002 award period began July 1 and ends June 30, 2002. Keep track of your states worked on each band, according to the rules and forms that can be found at **www.csvhfs.org/CSTEST1.HTML**, and send in your final tally by July 25, 2002. Plaque winners are announced at the Society's annual meeting.

New Beacons

Bruce Johnson, VE4KQ, has recently installed two beacons in Austin, Manitoba, 130 km west of Winnipeg. VE4HJ operates on 144.281 and 432.300 MHz. Both beacons run 30 W into three-element Yagis pointed southeast. Send reception reports to **bruce.johnson@mts.mb.ca**.

Why QRP?

Lately I've been ruminating about the various QRP gatherings I have attended. Meeting to swap ideas, construction techniques and operating tips allow for a free flowing exchange of information between QRPers. Throw in a building competition or two and you have something to remember for a long time. What a great process to further the goals of QRP. What *really* excites me is seeing young hams and "harmonics" of hams entering building contests and becoming involved in the "nuts and bolts" end of our QRP hobby.

At QRP gatherings one can see the joy and fun hams are having with QRP. I enjoy people discovering what I and many others have known for years: QRP is challenging and *FUN*! What's amazing is the enthusiasm new QRP converts exhibit at these gatherings. It's like they have experienced an epiphany concerning ham radio.

QRPers are a fun loving and inquisitive group. They are fiercely loyal to their craft and are fascinated by the almost magical effects of low power communications. Their thirst for knowledge is unquenchable. This passion is not limited to QRP newbies. The vast majority of us "Old Timers" experience the tingling rush and lingering excitement that comes from busting a massive pileup on a DXpedition with only 5 watts, of outwitting the Wolfpack and working a rare DX station using milliwatts, or building and operating our homemade gear.

LATE NIGHT 2X QRP DX

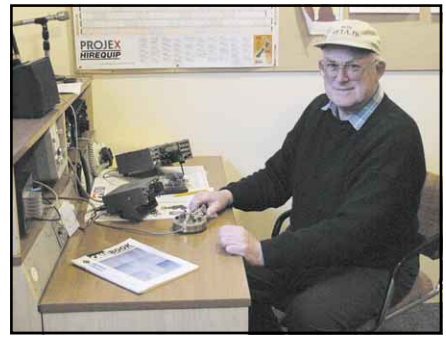
Late at night on April 13, 2001, I fired up my Elecraft K2 and tuned around on 20 meters. Earlier I had made some major changes in the shack configuration in preparation for the upcoming QRP ARCI Spring QSO Party that was to kick off Easter weekend, and wanted to give the station a "shake down" to ensure that things were working properly.

The local time was 2355 EDT (0355Z). As I tuned around I noticed that the band seemed flatter than last night's beer! I quickly looked at the DX cluster and found that the last spot was almost 45 minutes old. The Solar Flux was 149, the A-Index was 29 with the K-Index at 1. I began tuning again, starting from the low end and moving up toward the prime QRP hunting ground of 14.060 MHz. This time I heard a few weak signals spread across the bottom end of the band. 14.060 seemed clear and extremely quiet. After listening briefly on the QRP calling frequency, I started calling "CQ QRP," just for the heck of it. I really didn't expect a reply.

No sooner did I stop calling CQ, than a fairly weak signal came back to me. OK, another QRPer was sitting on the calling frequency waiting for some action. Cool!

After the other station signed his call, I looked at my scratch pad and immediately transmitted "QRZ QRP de K7SZ." I couldn't believe what I'd written down!

Instantly the DX station came back and confirmed his call sign: ZL1AJP/QRP! ***W-O-W!!!*** I had just called "CQ QRP" on what was supposed to be a "dead" band and bagged another QRPer, 12,000 miles away in New Zealand!



Ron, ZL1AJP/QRP—a pleasant catch on a supposedly dead band.

W-O-W!!! What a rush! I immediately checked my beam heading, which was almost 90 degrees off the proper bearing for ZL-land. As I swung the big TH7 around toward 235 degrees, the ZL's signal started to climb. This was amazing!

For the next 15 minutes Ron, ZL1AJP, and I had a great QSO. Both of us were running at the 5 watt level using Elecraft rigs. Ron's station consisted of a K1 and a dipole at 50 feet. Signal reports both ways were RST 529. There was no QSB to contend with, making this one very enjoyable DX QSO.

After swapping signal reports and station information we discussed our mutual admiration for the Elecraft radios we were both using. Upon signing with Ron, I couldn't resist posting a DX spot on the cluster, emphasizing the fact that Ron was QRP and very workable over the 12,000 mile path from the eastern US to New Zealand with only 5 watts. All in all, it was a great night for QRP DX!

CHRISTMAS GIFT IDEAS

Jay Bromley, W5JAY, of the Fort Smith (Arkansas) QRP Group, sent me a couple of nifty little kits that his club sells. Funds collected from the sale of these kits goes to finance ArkieCon, the midwest QRP conference held each spring.

Their first kit is a small, simple Marker Generator Kit that, when completed, will result in a handy frequency standard that emits a stable signal every 5, 10, 20 or 40 kHz up to 30 MHz. This is great for aligning a receiver or spotting your operating frequency.

The other kit the Fort Smith Group sells is their version of the Doug DeMaw, W1FB, Tuna Tin II QRPp crystal controlled transmitter. This 40 meter transmitter puts out about 300 mW and is a gas to use. In addition to building a cute little rig, you'll also own a piece of QRP history. Both of these kits are great for the first time homebrewer.

For further information and pricing, contact Jay Bromley, W5JAY, at **w5jay@alltell.net** or write to him at 9505 Bryn Mawr Cir, Fort Smith, AR 72908.

Don Smith, N8HCS, President of the North Ottawa Amateur Radio Club, contacted me about his club's fundraiser project: the NE8KE TE-NE-KE. Boyd Mason, NE8KE, has given the club the rights to build and sell these keys to raise money for club activities. These small paddle sets are great for portable/mobile work. I have used a TE-NE-KE, in one form or another, for several years. If you need a paddle set for your on-the-go QRP operations, these diminutive keys are a good choice. Contact Don at his home address: Don Smith, 1528 Franklin, Grand Haven, MI 49417, for further info and pricing. By supporting these club fundraising efforts, we collectively support QRP. QST

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ k7sz@arrl.org

I Have Mail

Soon after each installment of Digital Dimension appears in *QST*, I can count on one, two or maybe three letters or e-mails that read something like this, "I tried the URL you listed in this month's Digital Dimension (**www.doubleu.org/index.html**) and all I get back is a message that says the page cannot be found! What gives?"

Bad Earls

Most times the URL that appears here is good, but the URL that appears in the letter or e-mail is bad. The writer mistyped the URL when he or she transferred the printed URL to his or her keyboard. I am able to correct the folks who write to me to complain, but I'm sure that for every letter or e-mail I receive, there are some readers who had a similar problem, but didn't bother complaining.

So, folks, be careful when you type an URL into your Internet browser. If the browser can't find the page, check your typing before you write or give up altogether.

Bad typing may not be the culprit, however. Another reason you may not be able to access a particular Web site may be due to the Internet. A server or a portion of the network may be down temporarily or the network may be so busy that you cannot get through to your intended destination. So, if you are sure you typed the URL correctly and you still cannot access the Web page, try again later and you may be more successful.

By the way, I check all the URLs I write about before I send my copy to ARRL headquarters, and my editor double-checks them. So, unless the Web site disappears or moves, the URLs you see in *QST* are good.

Oz Not

Some of my readers must think I am related to "The Great Oz." They send letters and e-mails asking me all sorts of questions, and I am usually able to respond with some sort of answer. I assure you, however, that I am not the all-knowing Oz or even a distant relative of that wizard. If I don't know the answer off the top of my head or know where I can find it in my library of books, I use an Internet search engine and usually find an answer for my inquisitor. (Google at **www.google.com/** is my favorite search engine these days.)

So, get rid of the middleman (me) and try some search engines. They are easy to use and you will be amazed what they can find for you. For example, say you want to find out more about meteor scatter. Go to Google, enter "meteor scatter" in the search field, and Google displays descriptions of the first 10 Web sites of the approximately 8470 it has found. As it turns out, the first 10 are right on the money and provide useful information about meteor scatter. If you seek more information, there are still 8460 Web sites that might be useful!

High-Speed CW Meteor Scatter Simplified

WSJT, written by Joe Taylor, K1JT, is a high-speed communications program developed for VHF meteor-scatter operation using four-tone 441-baud FSK to communicate by means of a computer sound card.

Traditionally, meteor-scatter aficionados use either SSB, which requires long lasting meteor "burns," or high-speed CW, which is more successful because of the short duration ("pings") of the typical meteor trail.

WSJT is similar to high-speed CW except that it does the decoding for you as opposed to using high-speed CW software or the tape recording equipment to slow down the recorded CW signal for decoding by a human. Instead, *WSJT* records the typical 30-second receive sequence and decodes it automatically during the transmit sequence.

You can go to **pulsar.princeton.edu/~joe/K1JT/** to download a *free* copy of the software. Yes, *WSJT* is available free to anyone for Amateur Radio use.

Mac OS X Version of *MacDopplerPRO*

MacDopplerPRO X is one of the first Amateur Radio programs for Mac OS X. The software tracks up to 32 satellites simultaneously and provides full station automation with automatic switching between VHF and UHF. Multithreading provides concurrent tracking and predictions. Intended to be the ultimate satellite tracking software, it may be interfaced to a number of radios (AOR, ICOM, Kenwood and Yaesu) and antenna rotors (Easycom, Endeavor, KLM/Mirage and Yaesu).

MacDopplerPRO X provides a three-dimensional projection model of earth (using high-resolution maps from The Living Earth, Inc) with realistic solar and lunar lighting modes. It has the ability to spin the camera position to view the earth from above a specific location or above the satellite.

Full predictive dead-spot crossing ensures that a pass is never interrupted by the beam heading passing a dead spot. There is speech advisory of the next satellite acquisition of signal and maximum elevation. QSOs may be logged to a tab-delimited text file, and QRZ Internet and CD-ROM call-sign lookup is supported along with automatic grid-square-locator calculation. Mutual coverage prediction for two locations is another feature of the software.

Go to **www.dogparksoftware.com/MacDopplerPRO.html** and look at the beautiful screens that *MacDopplerPRO X* displays. From that same Web page, you may download a trial version of the software or register the software on line ($65 for AMSAT members, $75 for everyone else). QST

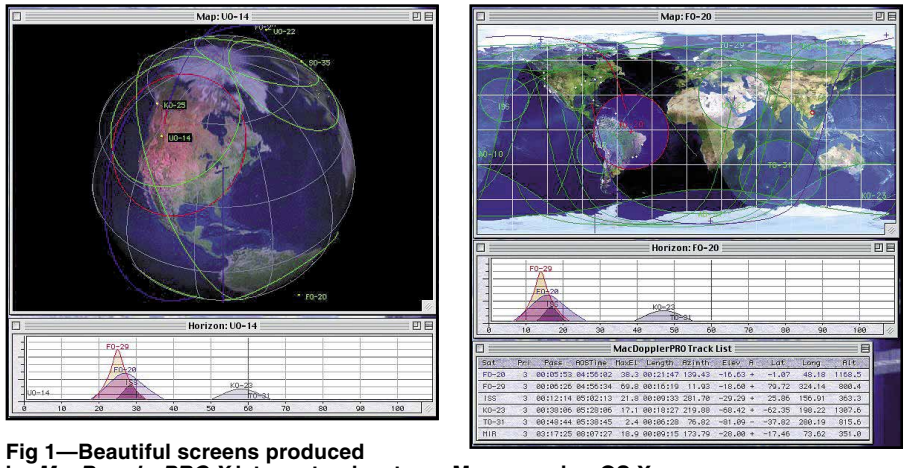


Fig 1—Beautiful screens produced by *MacDopplerPRO X* let you track sats on Macs running OS X.

Stan Horzepa, WA1LOU ♦ One Glen Ave, Wolcott CT 06716-1442 ♦ wa1lou@arrl.net, www.tapr.org/~wa1lou

More of the Good and the Bad

In May 2000, I asked you to tell me about your mobile installations and the problems you did or didn't encounter. The responses were immediate and detailed, and I shared some of those in November 2000. Since then, I've heard from RVers, big rig drivers, SUV owners, even a ham who operates from a 1939 LaSalle! Still others have written, wondering how well a particular auto tolerates/treats our ham radio equipment. No doubt, this is a hot topic. This month, we'll take a look at more of the "Good Cars/Bad Cars" feedback. As always, keep in mind that every installation is different. No endorsement or condemnation of any make or model is being claimed, nor have I verified any specific technical information provided by the respondents.

Paul, K9ARF

I own a 1994 Plymouth Voyager minivan and a 1995 Chrysler Cirrus. Both have the same Electronic Overdrive Automatic Transmission, and both generate a carrier on approximately 147.00 MHz. The signal is radiated from the transmission computer and its associated wiring and is quite strong. I attempted grounding the housing better and shielding the cabling with aluminum foil, to no effect. The mechanics at my dealer looked at me as if I were an alien when I complained of the problem. I wrote to Chrysler back in 1994 when I bought the Voyager, but I'm still waiting for the reply.

Fred Kalt, W2XN

I drive a 2000 Mercury Grand Marquis equipped with a Kenwood TM-261 and a mag-mount antenna on the trunk lid. I have no trouble working local repeaters and the reception is perfectly clear. As with any radio installation in a new car, I was a bit nervous about punching the transmit button. But even with 50 W output, absolutely nothing went wrong.

Steve, KZ1X/4

I have a 1997 Dodge Dakota with the 5.2L V8, 5 speed manual transmission and all options except four wheel drive. I used the factory-supplied high-current dashboard outlet as a power source for my ICOM IC-706 MKII, grounding the rig to the vehicle chassis at the mount. I hear a good bit of ignition noise, but the noise blanker and DSP dispatch the interference with ease.

Phil, K9PJ

I have a 1999 Mercury Mystique with the V6, automatic transmission and all available options. It has been trouble free with my ICOM 2100H 2-meter rig. No noise on receive or transmit, and no interference with the operation of the vehicle.

Kevin Reynolds, N2RLY

I drive a 1993 Ford F350 pickup with the pre-turbo 7.3L diesel engine. Shortly after the 3 year/30,000 mile warranty expired, I began to hear strong RFI on the factory AM/FM radio and on my 2-meter/70-centimeter rig. I traced the source to a thermal disc-controlled electric heater in the fuel filter assembly. The disc was arcing whenever it received power from the key switch and the arc made a fine spark gap transmitter for all around me to receive. Replacing the heater assembly took most of an afternoon, and as I recall around $100 for parts, but the problem hasn't returned.

Mike Langner, K5MGR

Before purchasing a 1996 Saturn 4-door sedan, I insisted on seeing written material from the manufacturer allowing or restricting the installation of transmitter(s) in the vehicle. Although Saturn does recommend running sufficiently large power conductors to and from the transmitter and following good grounding, fusing and bonding practices, they place no restrictions on transmitter power, frequency or location. I've had no RF interference issues to cause concern—the automobile is remarkably quiet, electrically.

Bernard Rate, N7DAL

We have two diesel pickups, a mid-1997 Dodge and a 1998 Dodge. The engines are identical Cummins B5.9L with mechanical direct injection. The '97 has never had a radio noise problem The '98 is a strong noise generator, with the key in the run position, engine off. The trucks are identically equipped with Larsen 5/8-wave antennas and Yaesu FT-2500 radios connected directly to the battery. I cured 90% of the noise on the '98 by installing a grounded shield, fabricated from PC board, around the anti-lock brake controller.

Jeff, W8YI

I drive a 1997 GMC pickup with a 4.3L V6 and automatic transmission. Radio equipment consists of a Ten-Ten Scout for HF and a Kenwood TM-241 2-meter rig. I operate mostly on 40 meter CW and experience only a bit of ignition noise, which the Scout's noise blanker easily handles. Two meter operation is completely trouble-free.

Richard E. Lambert, W5ZHI

I have a 1999 Toyota Camry XLE with the V6 engine. I'm using an ICOM 706MKIIG, an AH-2 antenna tuner and a Yaesu FT-5200, both mounted remotely. Antennas are a Larsen dual band center-mounted on the trunk lid, and a Spider 4-band HF on a homebrew mount at the rear of the car. When I purchased the car, I knew that Toyota had imposed a transmitter power limit of 10 W some years ago, but I suspected that rule probably could be bent. I wrote Toyota America in Torrance, California regarding their policy and recommending its re-evaluation. Soon, I received a response that, "on due consideration of installation criteria," they had decided to raise the limit to the "*FCC 100 W limit on Amateur Transmissions*." I did not argue with them.... I have virtually no radio noise at any speed.

Where are all the Gremlins?

Although this is but a minuscule sampling of the responses I've received, it is quite representative of the experiences most hams are having with mobile installations. Are you surprised at the lack of major interference problems? When I began writing *Your Mobile Companion*, I had heard lots of rumors about strange happenings to vehicles being driven under the influence of ham radio signals. With the exception of one very unhappy BMW owner who destroyed his car's computer while transmitting, *verifiable* horror stories remain just stories. Yes, some autos are such efficient noise generators that operation on some bands is impossible. But, lots of hams are finding a way to go mobile.

Keep 'Em Coming

As long as auto manufacturers continue to add electronic devices to successive models, hams will need to know about coexistence problems with radio gear. Send your information to me, listing auto make, model and accessories. Be sure to include the type of radio and antenna used and some basic installation information. QST

Roger Burch, WF4N ♦ Box 100, Island, KY 42350 ♦ wf4n@arrl.org

SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

NI1G, A. W. Bishop, West Dennis, MA
WB1GMH, John F. Fellows, Middletown Springs, VT
W1JTP, John T. Pratt, Brewster, MA
KC1TI, James D. Mitchell, Marstons Mills, MA
KA1TQE, Ethel M. Backard, Plaistow, NH
*K1WJ, Bill Jennings, North Franklin, CT
K1YQ, David H. Shaw, Sierra Vista, AZ
W1ZBQ, Edward S. Liscombe, Blue Hill, ME
WB2BAU, George A. Veraldo, Norwood, NY
WW2DW, Donald Wormley, Scotch Plains, NJ
WB2GJE, Elwood H. Robinson, West Orange, NJ
K2GZW, William R. Greer, Allenhurst, NJ
W2NV, Joseph F. Mannino, Palisades Park, NJ
W2PPO, John H. Fisher, Clementon, NJ
K2SOT, Raymond K. Pettinger, Whitesboro, NY
N2TZX, Andrew M. Borrok, Jamaica Est, NY
WA2VBD, John E. Lafferty, Point Pleasant, NJ
W2VLZ, Carmen J. Tona, Williamsville, NY
*WA2YFM, Eric H. Lewis, Rochester, NY
KC2ZS, Ansel R. Martin, Lakewood, NY
KB2ZYX, Paul E. Heim, Lynbrook, NY
*K3EEX, Martin L. Bandler, Walkersville, MD
KB3EFW, Bob Floyd, Clarks Summit, PA
KA3NCT, Edythe L. Guerrant, Harrisburg, PA
W3QMY, Richard J. Reynolds, Erie, PA
WA3RQO, Steven Titman, Norristown, PA
WD4AYO, Walter F. Kozak, Wilmington, NC
K4BTT, Lawrence E. Hackney, Shalimar, FL
K4BXJ, James L. McCraw, Memphis, TN
KJ4CF, James H. Brown, Walling, TN
W4CTG, Joseph E. Curlott, Bolivia, NC
*WA4DRU, Allen B. Harbach, Melbourne, FL
K4EJC, Joseph E. Graber, Treasure Island, FL
W4EUY, Solomon A. Azar, Dothan, AL
KE4EVT, Billy C. Jones, Pulaski, TN
AC4GN, William P. Sanders, Lebanon, TN
K4GWE, Garriett W. Edwards, Clay, KY
KA4GXK, Harold E. Eich, Fort Lauderdale, FL
KJ4JI, Horace R. Durham, Minor Hill, TN
KE4JQT, Charles D. Gilmore, Prattville, AL
K4KG, William H. Jay, Douglasville, GA
N4LS, E. Linwood Sikes, Charleston, SC
WB4LVC, Earle A. Newman, Baltimore, MD
WA4MEX, William E. Highers, Somerset, KY
K4MN, Graham T. Harrison, Fayetteville, NC
AC4MY, John T. Murphy, Tampa, FL
WA4NTX, Dario C. La Grave, Mobile, AL
KD4OOC, Frederick P. Engelke, Clearwater, FL
K4QFM, H. Otto Freytag, Riviera Beach, FL
K4SAJ, Ernest F. Feher, Ahoskie, NC
KF4SXH, Joan C. Slayman, Benton, KY
‡ex-W4TB, Nicholas C. Stavrou, Advance, NC
KC4VYL, Bernard S. Anderson, Richmond, VA
AE4X, Robert N. Palmer, Sarasota, FL
KC4ZAW, Evelyn K. Evans, Pelham, AL
K5DOT, Dorothy M. Sorenson, Rio Rancho, NM
‡W5EEF, Bill E. Chilton, Pampa, TX
KA5ENR, Waldo O. Kalich, Houston, TX
W5GKT, Julius J. Saucier, Pineville, LA
KK5GX, Chaillos Cross, Albuquerque, NM
WB5KUM, Blondell S. Garling, New Albany, MS
KI5KZ, Robert D. Sandefur, Choudrant, LA
*WB5OOH, Kenneth D. Warren, Seymour, TX
W5PPQ, Joseph E. Debord, Austin, TX
KK5RA, Hobert C. Lewis, Girard, TX
W5WCP, V. K. Ketola, Dallas, TX
KD6AGA, Mark M. McLean, El Sobrante, CA
W6ARC, J. B. Fadenrecht, Auberry, CA
K6DC, Merle B. Parten, Santa Barbara, CA
W6DMJ, Jerome Waldref, Santa Barbara, CA
KF6DZ, Art Schmitkons, Long Beach, CA
WB6GEG, William F. Wendt, Napa, CA
WA6IDC, David J. Lasley, Berkeley, CA
W6KMI, Julian L. Faas, Fresno, CA
KD6LSQ, Lois J. Bender, Willits, CA
K6MZN, Arthur G. Seymour, Eureka, CA
KK6NQ, Paul T. Kramer, Arroyo Grande, CA
*WA6ODK, Frank G. Bird, Auburn, CA
W6OOR, Carl S. Harvey, Chatsworth, CA
W6TRP, John McFadzean, Bakersfield, CA
W6WHM, Robert B. Richardson, Monterey Park, CA
NR7B, Lester S. Morgan, Everett, WA
AC7BR, Bob E. Stiles, Malone, WA
W7FAB, Clarence McDaniel, Auburn, WA
AI7F, Marc Cimon, Phoenix, AZ
N7GOW, Mitchell T. Robinson, Seattle, WA
KB7HDA, Glenn E. Tucker, Oregon City, OR
WA7IKG, James T. Good, Phoenix, AZ
K7ITW, Ralph Millard, Tacoma, WA
K7JJH, William E. Rowell, Waddell, AZ
W7JWZ, Glen A. R. Klein, Milwaukie, OR
KC7JXT, L. S. Lippincott, Salt Lake City, UT
W7MSR, John F. McAllister, Tacoma, WA
W7OKE, Dell O. McCuaig, Port Angeles, WA
*N7OS, Nate Dixon, Redmond, WA
N7RNG, Melvin H. Carlson, Yakima, WA
W7RQG, Jerry A. Dawson, Vancouver, WA
WL7UX, J. C. Tomlinson, Juneau, AK
W7WFK, John M. Pinto, Kent, WA
AA7XQ, Howard C. Ayer, Brookings, OR
W8AEB, James H. Capps, Gates Mills, OH
KN8B, Thomas M. Stence, Ashland, OH
WD8COW, Eugene M. Cooke, Marietta, OH
*W8CRW, Wayne V. Britton, Vienna, WV
W8DCD, Arne E. Kangas, Trout Creek, MI
K8GQB, Charles W. Homan, Lisbon, OH
WB8IGU, Howard G. Hawkins, Au Gres, MI
*WB8JKW, Louis J. Tocheck, Youngstown, OH
W8LGC, Henry A. Garcia, Wilberforce, OH
WD8LKT, John A. Milhoan, Parkersburg, WV
WD8NVX, Margaret Seibert, Ft Worth, TX
W8ROV, William W. Skinner, Detroit, MI
*W8TJQ, William W. Chapman, East Lansing, MI
W9EHE, Kenneth Stedman, Valparaiso, IN
KA9GZU, Duane Hankinson, Chicago, IL
W9HVR, Leo W. Smith, Pittsfield, IL
N9JUU, Terry R. Ludwig, Oconomowoc, WI
K9LMJ, Rollin J. Robb, Vincennes, IN
W9MCJ, Arthur G. Bauernfeind, South Bend, IN
WA9RZS, Stanley H. Colligan, Wild Rose, WI
WA9WLE, David N. Hanson, Cottonwood, AZ
*WB0BCL, Earl A. Graham, Salina, KS
N0CDD, Robert J. Van Patten, Maplewood, MN
KC0CU, Jackie D. Fulton, Minot, ND
WD0EYP, Louis Hemphill, Columbia, MO
*W0GH, John F. Valker, Minot, ND
WB0ILN, Harold E. White, Kansas City, MO
N0JQJ, George J. Caussyn, Mandan, ND
N0NKZ, Charles W. Porter, Ottumwa, IA
WA0PXF, Joseph L. Fair, Littleton, CO
KU0X, Midred G. Kilpatric, Willow Springs, MO
ZL4LZ, Brian Telford, Invercargill, New Zealand

In the September 2001 Silent Keys column, Charles P. Chilton, W5EEF, of Oklahoma City, OK was listed erroneously. We regret the error.

*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

STRAYS

ARRL CERTIFICATION AND CONTINUING EDUCATION AWARD PRESENTED

◊ On Sunday, September 9, at the Western Pennsylvania Section Convention in Butler, Atlantic Division Director Bernie Fuller, N3EFN, presented Jim Weslager, K3WR, with a special award. About a year ago, the Certification and Continuing Education Program sponsored a contest to find the "perfect" logo for our very first offering—Amateur Radio Emergency Communications Course.

A committee of several ARRL staffers was formed to sort through about 35 logos that were submitted from around the US. Picking the right one was not an easy task—many wonderful logos were reviewed before a decision was made. In the end, the committee chose Jim's logo, which is now used wherever the name of the course is used. The ARRL sincerely thanks Jim and everyone who participated in the ARECC Logo Contest for their great efforts and support.

To learn more about the C-CE Program and Continuing Education Courses, go to the C-CE Home Page on *ARRL Web* (**www.arrl.org/cce/**).

ARRL Atlantic Division Director Bernie Fuller, N3EFN (left), presents Jim Weslager, K3WR, with an award for submitting the winning entry in the logo contest for the Amateur Radio Emergency Communications Course.

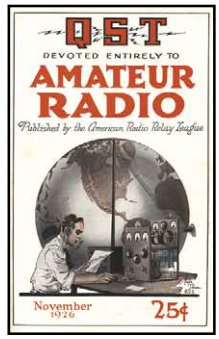
I would like to get in touch with . . .

◊ Other hams who have multiple sclerosis to exchange medical and Amateur Radio information. I'm particularly interested in maintaining my ability to send CW. Karen Stultz, AD4UI, 505 Lincoln Way, Box B, Woodbine, IA 51579.

Previous • Next Strays QST

75, 50 AND 25 YEARS AGO

November 1926



◊ The cover art by Clyde Darr, 8ZZ, shows a ham at his key, with a giant globe behind him—hams are working the world! The editorial discusses "The Five-Point System" suggested by 6PS, where each Official Relay Station (one of the points) would establish schedules with four other ORSs, one in (approximately) each major compass direction (four more points), at the end of his reliable working range, to help relay messages efficiently and reliably.

"General Electric Short-Wave Test Results," by M. L. Prescott, tells the results of GE's 18 months of radio propagation experiments, at frequencies from 192 to 7170 Kc. John Hollywood provides more information on the same subject, in "Horizontal Wave Experiments at 2AER." Elmore Lyford presents "R.F. Amplification—A Re-hash," telling about recent developmental work in R.F. amplifiers for commercial receivers. John Clayton describes "A Shielded Crystal-Controller Unit" that can be used either as a low-power transmitter or as a driver for a high-power amplifier. Oliver Wright, 6GD/6BKA, presents "The Flying Loop," telling about his experiments with a mobile station in a DeHaviland biplane. The airborne transceiver uses a single UX210 in a 40-meter super-regenerator circuit for both sending and receiving.

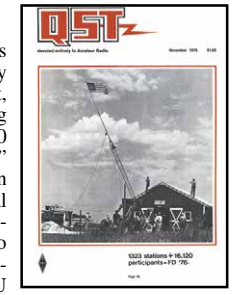
The ad on the inside back cover announces "The *A.R.R.L. Radio Amateur's Handbook*" IS HERE! The *Handbook*, authored by Francis Edward Handy, "… only costs a dollar—postpaid anywhere."

November 1951

◊ The cover cartoon, by "Gil" Gildersleeve, W1CJD, shows a modern ham merrily making contacts while the family watches TV in the next room. The editorial discusses the fine ham tradition of the fall Sweepstakes contest, noting that the first Sweepstakes (January 1930) was a full 14-day contest with *no* time limit—"none of this weekend stuff."

Vern Chambers, W1JEQ, describes "A De Luxe Mobile Transmitter for 14 and 28 Mc.," a 30-W trunk-mounted rig with solenoid switching circuits for quick band-changing. R. M. Smith, W1FTX, and W. E. Bradley, W1FWH, tell about "The Novice Conversion of a 'Command' Transmitter," using the popular military surplus ARC-5 transmitter. John Kaye, W6SRY, and Dorothy Kaye, W6YIR, tell about their i.f. amplifier with skirt selectivity of "One Db. per Cycle!" Ed Tilton, W1HDQ, describes "A V.H.F. Receiver for the Novice or Technician" that can be built for either 144 or 220 Mc. National Emergency Coordinator George Hart, W1NJM, reports on "Water in the Dust Bowl," telling how hams helped with communication during one of the greatest floods in the Midwest's history. Phil Rand, W1DBM, describes "A Civil Defense Control-Station Antenna for 144 Mc.," a four-section stacked coaxial array.

November 1976



◊ The cover photo shows a Field Day club entry raising their antenna mast, with a caption reporting "1323 stations+16,120 partici-pants=FD '76." Now that WARC-79 is on the horizon, the editorial raises the worrisome question, "Will Amateur Radio Exist in 1980?," and reports on ARRL and IARU preparations to defend our frequencies from other radio interests.

"SSTV Image Processing," by George Steber, WB9LVI, discusses using the techniques developed for enhancement of photos taken by deep space probes to improve amateur SSTV pictures. "A Side-Mount Rotator for a Large HF Array," by J. P. Ashcroft, WB5BFZ/WB5DTX, tells "how one Texan 'rides herd' on his 40-meter beam!" Lew McCoy, W1ICP, describes how to build an inexpensive 12-V power supply, in "The Ugly Duckling." A photo Stray shows Cliff Penniston, W9BQQ, with a replica of his first ham station, and quotes his mother's comment of that early era, "I think my boy's losing his mind. He thinks he can pick signals out of the air." Jim Morris, KH6HQG, reports on Dick Hart, K0MQS, and his successful 12-year quest for "Worked All States on 144 MHz." "A Call to Arms," by Dean Laughlin, K7JWZ, tells about Idaho's hams providing emergency communication during the recent heavy flooding in the upper Snake River Valley. 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

COMING CONVENTIONS

October 19-21
Pacific Division, Concord, CA*

November 3-4
Georgia State, Lawrenceville*

***See October *QST* for details.**

INDIANA STATE CONVENTION

November 17-18, Fort Wayne

The Indiana State Convention (29th Annual Fort Wayne Hamfest and Computer Expo), sponsored by the Allen County AR Technical Society, will be held at the Allen County War Memorial Coliseum and Expo Center, 4000 Parnell Ave, at the corner of Indiana 930 (Coliseum Blvd) and Parnell Ave. Doors are open for setup on Friday evening and Saturday morning; public Saturday 9 AM to 4 PM, Sunday 9 AM to 3 PM. Features include over 1000 commercial and flea market tables; new and used radio, computer, and general electronics items; vendors; several international ham equipment manufacturers; forums and meetings; special guest speaker Riley Hollingsworth, FCC Special Counsel for AR Enforcement; VE sessions (Saturday); parking ($2). Talk-in on 146.88. Admission is $5, under 12 free with adult (good both days). Tables: 8-ft $20 for flea market, $40 for premium, $27.50 for electricity (219-483-8163). Send SASE to AC-ARTS/Fort Wayne Hamfest, Box 10342, Fort Wayne, IN 46851; or contact James Boyer, KB9IH, 219-489-6700 or 219-484-1314; **jboyer@aol.com**; **www.acarts.com**.

SOUTHEASTERN DIVISION CONVENTION

December 1-2, Palmetto/Tampa, FL

The Southeastern Division Convention (26th Annual Tampa Bay Hamfest), sponsored by the Florida Gulf Coast AR Council, will be held at the Manatee County Civic Center, 1 Haben Blvd; at US-301/US-41 and Haben Blvd; Exit 43 off I-75, just N of the Manatee River. Doors are open Saturday 8 AM to 5 PM, Sunday 9 AM to 2 PM. Features include manufacturer/dealer show (Bob Laus, K4RJL, 727-539-8627; **k4rjl@arrl.net**); indoor and outdoor flea market (Dan Hawthorne, AI4ET, 727-586-0497; **ai4et@arrl.net**); tailgating ($10 per space; Sam Everts, KE4BXF, **ke4bxf@earthlink.com**); forums and presentations on numerous topics; VE sessions (Saturday 9:30 AM and 3:30 PM, Sunday 9:30 AM); QSL card checking; special guests ARRL President Jim Haynie, W5JBP, and ARRL Lab Supervisor Ed Hare, W1RFI; Wouff Hong ceremony; handicapped accessible. Talk-in on 145.43, 442.95 (100 Hz). Admission is $6 in advance, $7 at the door. Tables are $20 (electricity is available for $32 per outlet). Contact Fred Hendershot, N3BUL, 11316 Leprechaun Dr, Riverview, FL 33569; 813-671-9556; **n3bul@arrl.net**; **www.fgcarc.org**.

Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262. QST

HAMFEST CALENDAR

Attention: The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **November 1** to be listed in the **January** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

Arizona (Mesa)—Dec 1. Ed Cole, KB7RMO, 520-468-9015.

Florida (Okeechobee)—Nov 24. Chuck Phillips, KE4EUW, 863-610-0427.

Florida (Palmetto/Tampa)—Dec 1-2, Southeastern Division Convention. See "Coming Conventions."

Illinois (Chicago)—Nov 11. Melissa Meneely, KB9QWZ, 773-384-7514. (Auction)

Illinois (Wheaton)—Nov 25. Fire and Radio Traders Society of Northern Illinois, 630-826-7981.

†**Indiana (Evansville)—Nov 24**; set up Friday 5-9 PM, Saturday 6-8 AM; public 8 AM to 2 PM. *Sprs:* EARS and The Ham Station. Vanderburgh County 4-H Center, Fairgrounds Auditorium, 202 W Boonville-New Harmony Rd; US Hwy 41 at Boonville-New Harmony Rd, 5 miles S of I-64, 2 miles N of Evansville Airport. Indoor flea market, new and used equipment, free tailgating (weather permitting), commercial dealers, vendors, free parking, refreshments. *TI:* 145.15, 146.925, 443.925, 145.11 (107.2 Hz on all frequencies listed). *Adm:* $5. Tables: advance $8 (flea market), $10 (wall space); after Nov 15 $10 (flea market), $12 (wall space). Neil Rapp, WB9VPG, 2744 Pinehurst Dr, Bloomington, IN 47403; 812-333-4116; **ears@w9ear.org**; **w9ear.org/hamfest.htm**.

Indiana (Fort Wayne)—Nov 17-18, Indiana State Convention. See "Coming Conventions."

†ARRL Hamfest

Indiana (Greenfield)—Dec 9. Brad Hewson, KB9VZL, **kb9vzl@excite.com**.

†**Louisiana (Minden)—Dec 1**; set up Friday 3 PM; public Saturday 8 AM to 2 PM. *Spr:* Minden ARA. Minden Civic Center, 520 Broadway St; from I-20 take Minden-Sibley Exit 47, turn N on US Hwy 371, go 1 1/2 miles to US Hwy 79/80 E, turn right, go 1/4 mile to Civic Center. Christmas Hamfest and Computer Show, flea market, wide variety of equipment, dealers, VE sessions (all elements), refreshments. *TI:* 147.3, 145.43, 147.21. *Adm:* $4, under 12 free. Tables: $5 (flea market), $10 (dealers). Jimmy White, KB5SUE, 1259 Sand Plant Rd, Dubberly, LA 71024; 318-377-2501; **kb5sue@microgear.net**; **www.bayou.com/~k5dlh/fest.html**.

†**Louisiana (Monroe)—Nov 17**, set up Friday 2-5 PM; public Friday 5-7 PM (social cookout on site), Saturday 8 AM to 3 PM. *Spr:* Twin City Hams ARC. Barak Shrine Temple, 6620 Frontage Rd; from I-20 take Exit 120 (Garrett Rd), go S to stop light at service road, turn left (E) on service road, continue approximately 1 1/2 miles, Shrine Temple is on the right. Dealers, VE sessions, trailer/motor home hookups available (reservations, 318-345-2511), card checking for WAS and VUCC, forums (ARRL, LCARC, Technical Project). *TI:* 146.85. *Adm:* $5. Tables: $10 (electricity $10 additional). Scott Dickson, W5WZ, Box 1871, West Monroe, LA 71294; 318-644-2215; **w5wz@arrl.net**; **www.tchams.org/users/hamfest/**.

†**Massachusetts (Newtonville)—Nov 17**; sellers 9:30 AM; public 11 AM to 4 PM. *Spr:* Waltham ARA. Newton Masonic Hall, 460 Newtonville Ave; at the corner of Walnut St and Newtonville Ave, near the Star Market which straddles the Mass Pike. Amateur Radio and Electronics Auction. *TI:* 146.64. *Adm:* $2. Eliot Mayer, W1MJ, 24 Hamilton Rd, Belmont, MA 02478; 617-484-1089; **w1mj@arrl.net**; **www.wara64.org/auction**.

†**Michigan (Harrison Township)—Dec 2**; set up 6 AM; public 8 AM to 2 PM. *Spr:* L'Anse Creuse ARC. L'Anse Creuse High School, Reimold Rd, Harrison Twp (same facility as last year); I-94 to Exit 236 (Metro Beach Pkwy), E to Crocker, left on Crocker to Reimold, right on Reimold to last school. Hamfest/Computer Swap, trunk sales ($5 per space, weather permitting), vendors, new and used equipment, forums, VE sessions (9 AM, walk-ins accepted; Don, WA8IZV, 810-294-1567; **donols@provide.net**), free parking, refreshments. *TI:* 147.08, 146.52. *Adm:* advance $1, door $5. Tables: $12 (8-ft). Gregg Crump, KC8PXJ, 29729 South River Rd, Harrison Twp, MI 48045; 810-463-0729; **grcrump@home.com**; **www.ameritech.net/users/lc_arc/index.html**.

†**Mississippi (Ocean Springs)—Nov 16-17**; set up Friday 1 PM; public Friday 5-9 PM, Saturday 8 AM to 2 PM. *Spr:* West Jackson County ARC. St Martin Community Center, Lemoyne Blvd; from I-10 take Exit 50 S to second stop light, turn W on Lemoyne Blvd, go approximately 1 mile to Community Center on N side of Blvd. Hamfest/Swapfest, forums and meetings, VE sessions (Saturday, 11 AM; bring photo ID, original license and photocopy, $10 fee; walk-ins accepted), self-contained overnight RV parking (no hookups), free paved parking. *TI:* 145.11. *Adm:* $2. Tables: $5 (first-come, first-served). Ernie Orman, W5OXA, 15625 Little Joe Rd, Biloxi, MS 39532; 228-392-2816; **w5oxa@arrl.net**; **www.datasync.com/~w5oxa**.

New Hampshire (Londonderry)—Nov 17. Paul Gifford, K1NL, 603-883-3308.

†**North Carolina (Benson)—Nov 18**, 8 AM to 4 PM. *Spr:* Johnston ARS. American Legion Complex, US Hwy 301 N; 300 yards S of NC 242 and US 301. Indoor flea market, dealers, tailgating, VE sessions, refreshments. *TI:* 147.27. *Adm:* advance $4, door $5. Tables: $10. Bill Lambert, AK4H, 8917 NC 50 N, Benson, NC 27504; 919-894-3352 or 919-894-3100 (7-10 PM); **blambert1@mindspring.com**; **www.jars.net**.

Oklahoma (Enid)—Nov 3. Tom Worth, N5LWT, 580-233-8473; **enidhamfest@yahoo.com**.

†**Washington (Blaine)—Nov 3**, 9 AM to 2 PM. *Spr:* Mount Baker ARC. Forest Grove Bingo Hall, 4230 Lynden-Birch Bay Rd; N on I-5 to Exit 270, W on Lynden-Birch Bay Rd, 2.2 miles to facility. Vendors, seminars, VE sessions, overnight RV parking, refreshments. *TI:* 146.74. *Adm:* $4. Tables: $15; 4 or more $12. Al Norton, K7IEY, 1008 Liberty St, Lynden, WA 98264; 360-354-4622; **k7iey@netscape.net**; **www.qsl.net/k7skw**.

Wisconsin (Appleton/Menasha)—Nov 4. John Ensley, N9RJZ, 920-733-3113. QST

Gail Iannone ♦ Convention Program Manager

Two New Programs for Scholars and Competitors!

The CADXA Scholarship

The award, endowed through the generosity of members of the Central Arizona DX Association, is intended exclusively for educational use, to provide assistance with tuition, books, supplies and/or other fees essential to the advanced education of the recipient.

Applicant requirements:

(1) Available to a licensed radio amateur and resident of Arizona who is a graduating high school senior. Current college student may be considered if graduating high school seniors do not qualify.

(2) Preference will be given to Technician class or higher licensees who hold a CW endorsement.

(3) Preference will be given to applicants with a cumulative GPA that is 80% or better of the maximum grade point average used by the institution they're attending.

(4) Applicant should submit documentation of Amateur Radio activities and achievements (such as DXCC, WAS, local club officers and contest awards) and any honors derived from community service or acceptance in organizations such as the National Honor Society.

Award:

The ARRL Foundation Scholarship Committee shall consider all qualified applicants (see above). Upon the Committee's recommendation, the Board of Directors of the Foundation shall disburse an annual award of $500. In a year when no qualified candidate is identified, no award shall be made. Two awards may be made in the year after a non-award year. Should the founders cease association with this scholarship *or* if there has not been a response from the founders for a period of 180 days or more after the board of the ARRL Foundation seeks approval for adjustments to these Terms of Reference, then the Foundation Board of Directors shall become vested with authority and responsibility for modifying the Terms of Reference (TOR) to meet existing situations and conditions.

WRTC USA Youth Fund

Excitement is building for the World Radiosport Team Championship (see **www.wrtc2002.org/general.htm**) to be held in Finland in July 2002 and young competitors will be first-time participants in this oft-described "Olympics of Ham Radio." Details about the fund and how you can help are below.

Terms of Reference

(1) The name of the fund is the WRTC USA Youth Fund

(2) Reimbursement of travel expenses up to $1000

(3) Eligibility for funds:

(a) Must be a US citizen

(b) Must be age 25 or less at the time of the WRTC event

(c) Must have been selected as a competitor for the WRTC event

(4) If insufficient funds are available, the funds will be evenly proportioned between eligible candidates

(5) If any funds are left over, they will be made available for the next WRTC event

(6) The ARRL Foundation will be the fund administrators.

(7) The Boring ARC will verify eligibility and request fund disbursements.

The CADXA Story

It was in mid 1974 that a small group of hams, most of whom lived in the East Phoenix area, decided to pursue their special interest, DXing, and formed the Central Arizona DX Association. That November we initiated a Constitution and Bylaws, and officially became a radio club on January 1, 1975. There are currently over 110 active members of the CADXA. Nearly all have achieved DXCC, and several are listed on the most recent SSB and CW Honor Roll.

BOB DAVIES, K7BHM

When the Central Arizona DX Association gathered to celebrate 25 years, proud to show their banner were Warren Semon, Jr, N7CW; Lawrence Molitor, W7IUV; Warren Mays, K7SA; James McDonald, N7US; Alan Koblinski, W7XA; Robert Davies, Jr, K7BHM; Donald Birch, K7NN; Edward Stearns, AA7A; Thomas Taylor, W7RV; David Hollander, N7RK; Tony Gonzales, K6AIA; Stephen Protas, K7SP; Mark Manwaring, N7MN; Hardy Landskov, N7RT; Thomas Boza, NE7X, and Wayne Zimmerman, NN6R.

The purpose of the CADXA is to bring together radio amateurs interested in DXing; promote the common interest through mutual assistance, coordination and cooperation for all members to achieve DX; to encourage proper operating techniques and ethics; and to exchange knowledge, methods and other such expedients that would benefit the members in pursuing DX.

Chartered as an ARRL affiliated organization in November 1976, CADXA recently received our 25th year ARRL affiliation certificate. We initiated our self-governed CADXA Scholarship in 1996 and have distributed funds to eight recipients since its inception. The CADXA continues to sponsor or provide "hampower" to the most popular and most needed countries through DXpeditions.

—Bob Davies, K7BHM

Contributor's Corner

We wish to thank the following for their generous contributions to:

The WRTC—USA Youth Fund
Richard V. Tavan, N6XI
Dave Pascoe, KM3T
John M. Crovelli, W2GD
Floyd Smithberg, NQ7X
Tom Frenaye, K1KI; Mark Wilson, K1RO
In fond memory of Bill Jennings, K1WJ

Goldwater Scholarship Fund
William R. Baker

The General Fund
Bristol ARC (Virginia)
In fond memory of Calvin B. Christian, W4WRJ
Joseph E. Rogers, AJ1Y
In fond memory of Paul E. Helm, KB2ZYK are:
Sherry Gaeta, KB2IRQ; Jim Mezey, W2KFV;
Dave Nardo, W2UQ; Gerald Anzano, N1LDW;
Mike Kozma, WY2U; Chester Tuthill, KB2NPM;
Charles Fliederbaum, KB2PAA; Harris Small, W2IJO;
John Regan, KF2RR; Herbert L. Polak, N2XXP, and
Nassau ARC (New York).
Lori Book
In fond memory of Herman Neuliep, N9TUH
Wade Walstrom, W0EJ
In fond memory of Ross Stevens, W0XJ.
John V. Boehme, K4PRK
New England Division Cabinet (via K1KI)
ThinkFast Consulting, Inc
In fond memory of Herman Neuliep, N9TUH
Andrew Family Foundation (Illinois)
Myron T. Kelley, W4VQE
Daniel Ruth, W3ZF, on behalf of the Estate of
H. Winton Hamill, W1RDF
Charles and Susan Froning
In fond memory of Herman Neuliep, N9TUH
Audrey Wagaman
In loving memory of John Wagaman, K3HBN

As received and acknowledged during the months of **July and August**.

Mary E. Lau, N1VH ♦ Secretary, ARRL Foundation Inc.

By Dan Henderson, N1ND
Contest Branch Manager

2001 ARRL International DX Contest Phone Results

There are few things more satisfying for contesters than to see their rate meter (QSOs per hour) in the triple digit range. The beginning contesters will certainly remember first seeing their "Last 10" meter hit 100 or better. More seasoned contesters will certainly recall the first time they had a consecutive string of hourly rates topping the century mark. When you talk to any top contesters, they will be able to recount their best-ever rates—several hundred an hour won't be uncommon for most of them. It takes all kinds—great stations running, casual operators searching and pouncing, and dedicated guys who try their hand at both—to make any contest a success.

The 2001 ARRL International DX Phone contest, held March 3-4, was another successful outing. A total of 2303 competitive and checklogs were received for this year's contest—bringing the total participation for both weekends of the contest to a record 4803 entries—an increase of over 7.6% from the record set in 2000. Isn't it amazing what the right time of the sunspot cycle will do? A total of over one billion points were recorded during the contest, coming from 1,463,765 QSOs and 272,111 multipliers worked. That is almost 8.5 QSOs completed every second of the contest—over 30k an hour. How's that for rate?

While participation was great, it was difficult, but not impossible to find record-breaking scores. Jeff, K1ZM, followed up on his record-shattering effort in the DX CW contest to also bring home a new record in the W/VE Single Operator QRP category. His score of 1,917,510 shows what can be done with QRP, a great op and big antennas. Jeff's average rate for the contest period was 33.5 Qs per hour. Finishing second in the category was Tom, N4KG, with an almost 800K effort from Alabama.

The W/VE Single Operator Assisted category was a spirited contest between seasoned contest veterans Ray, W2RE, and Chas, K3WW. Once the dust had settled, Ray emerged as the victor by a score of 4,509,582 to 4,127,760. Ray's average QSO per hour rate was just over 66. Also breaking 4 megapoints in 2001 in the category were Saul, K2XA, and Lou, KS1L.

The operators at HB9AUS take a pause from their preparations. Their efforts placed fifth in the Multi-Single Category in Europe.

The other W/VE record-setting performance came in the Single Operator Low Power contest, where not one but two stations broke the old barrier. In what was also the closest Single Operator all band finish, Bill, K4XS, edged John, VE3EJ, by a mere 75K to set the new overall category record with a score of 3,186,945. John won the multiplier battle 416-405, but Bill's 2623—2421 edge in the QSO column paved the way to the win, a rate of 54+ per hour of the contest.

After having competed as a multioperator in the past several contests, John, K1AR, using the K1EA station, took top honors in the W/VE Single Operator High Power category with a winning score of 5,750,496. John lost the QSO battle by a slim 9 QSOs to runner-up Bob, KQ2M, but chalked up 25 more multipliers to post a 300K victory. John and Bob both averaged rates of at least 82 Qs per hour for the 48 hours of the contest.

Winning their respective Single Operator Single Band categories were Peter, WW2Y (160), Joe, AA1BU (80), Eric, K9ES (40), Dan W7WA (20), Jeff, W2FU (15), and Bill, W4ZV (10). None were new overall W/VE Category winners, but each withstood good challenges to emerge victorious.

Multioperator categories by their nature lead the way in rates during a

Top Ten

W/VE Single Operator, QRP, Phone

K1ZM	1,917,510
N4KG	789,192
W0AH	517,470
WB3BEL	310,596
KB3TS	295,074
N3AIU	245,310
W6CN	209,139
KK0Q	173,448
WA8ZBT	166,605
N0UR	165,699

W/VE Single Operator Assisted, Phone

W2RE	4,509,582
K3WW	4,127,760
K2XA	4,054,125
KS1L	4,028,988
N3RR	3,794,070
K1KI (KM1P,op)	3,434,400
W1GD	3,259,359
K3PP	2,933,595
N2MM	2,833,164
N4AO	2,702,160

W/VE 160

WW2Y	6,954
W2VO	1,311
N4PN	390

W/VE 80

AA1BU	45,936
W7DD	23,214
K9BGL	16,968
K3SV	10,164
W4WS (N4VHK,op)	2,448
K2CF	2,025
W7UT	1,890
K1JT	816

W/VE 40

K9ES	35,175
K4TX	30,144
W9GXR	18,954
AC1O	15,150
K2LP	13,800
WB2AMU	11,070
WB2DVU	10,800
N9QX	9,324
K8PO	8,901
KB4KA	8,820

W/VE 20

W7WA	577,791
K2LE	317,046
WA2QNW	313,296
VE3XAP (@VE3MIS)	154,470
W8TWA	108,810
W1AW (N1ND,op)	100,362
K9YNF	57,591
WA1MKS	55,920
K9CAN	52,560
W6/NP4IW	40,020

W/VE 15

W2FU	611,712
W7EJ	581,160
W4WA	506,127
KS4XG	461,700
K6HNZ	376,629
WA7AR	308,328
KU8E	306,456
W7EB	292,284
K5GO (KI0MB,op)	265,356
KG0ZI	251,781

W/VE 10

W4ZV	882,960
K5RX	701,184
W5PR	626,226
K9NW	593,280
N7DF	576,720
N4BP	505,116
K4VX	487,896
N4ZZ	473,424
ND8DX	438,486
VA3KA	437,250

DX Single Operator, QRP, Phone

LY5A (LY2PAJ,op)	540,216
F5BEG	302,967
KH6/W8QZA	291,480
LU1VK	235,800
DK3KD	138,321
JR4DAH	84,390
JA2JSF	81,432
EA8/DK7ZH	70,587
YU1KN	68,283
G3FNM	62,832

DX Single Operator Assisted, Phone

S51DX	1,974,708
YL8M (YL2KL,op)	990,726
OD5/OK1MU	645,906
RV0AR	495,963
PJ7B	482,544
DL4FAY	431,319
JA1YNE	429,678
IZ5CML	398,295
DF6QV	231,813
OK1KT	176,085

DX 160

S57M	828
PY3CEJ	360
A61AO (RV6LNA,op)	240

DX 80

CO8ZZ	117,819
YV4FZM	91,107
OT1T (ON4UN, op)	83,952
I4AVG	66,264
VK3DZM	28,500
SP8BRQ	19,992
F5OIH	12,963
JA0QNJ	10,593
IK1HSS	8,694
EU1AZ	7,848

DX 40

YT7A	105,840
SP7VC	87,048
DF3GY	70,950
9A6A	66,654
S52ZW	50,568
UV5I (UR6IM,op)	46,305
OH5W (OH2JTE, op)	41,472
UZ5U	33,696
YV5AMH	8,343
EA3GHQ	6,804

DX 20

3E1AA (HP1XVH,op)	497,118
PY2NY	309,894
9A4X	282,228
RA9OW	281,532
YV5LIX	273,600
IQ3A	271,788
RZ9UA	234,525
YZ9A	211,410
PY7YL	203,661
S51CK	174,420

DX 15

CT1BOP	388,869
IY4W (I4LEC,op)	309,219
PI4DEC (PA3GRH,op)	286,563
YT7KF	264,261
S50R	237,858
OT1H	213,639
S52Z (S53MM,op)	199,656
IK0AZG	185,850
YO4NF	179,301
PY2TO	166,488

DX 10

HC8Z (HC1OT, op)	655,920
CT3BX	573,834
KP4WW	563,823
PY2KC	538,935
CT8T	429,933
ON4UN (ON4MA, op)	416,874
PA7FM	410,580
HR6/N4MO	380,373
ZF2AH	363,060
S50C (S55OO,op)	354,240

contest. Those additional operators and transmitters translate to more QSOs. The W/VE Multioperator Unlimited champions for 2001 were the ops at KC1XX. At an hourly rate of over 175 QSOs per hour they were able to fend off the challenge from W3LPL's 161 per hour rate and claim the category by a score of 16,795,188 to 15,265,385.

The W/VE Multioperator Two Transmitter winners at K4JA finished with an average hourly rate of better than 2 QSOs per minute (124/hour). Their score of 10,067,106 held up against a strong effort by the ops at W2A, who averaged an hourly rate of 111 Qs. Rounding out the W/VE Multioperator efforts was the great Multi-Single effort posted by the crew at K8AZ, whose score of 4,302,252 computed out to just shy of 1 QSO per minute (59/hour), about 1 QSO per hour more than runner-up KY2J.

DX participation in 2001 was good, though not at a record level. Leading the charge in the DX Single Operator QRP category was Jonas, LY2PAJ, operating as LY5A. His score of 540,216 topped the second place effort of Gerard, F5BEG by nearly 238K points. Jonas's average rate of 20 Qs per hour was a good effort. Taking top spot in the DX Single Assisted category was Janez, S51DX with a score of 1,974,708. This easily topped the score of YL8M, with Girts, YL2KL as the operator. Janez's rate of nearly one QSO per minute (54/hour) was one key to his decisive win.

Kurt, VP9/W6PH, led the way in the DX Single Operator Low power category with an average hourly QSO rate of 57+ per minute and a score of 2,109,216. Category runner-up Pedro, HK3JJH, ended up with a rate of better than one per minute for the contest period, but ended up trailing Kurt in the multiplier count by 51. This is a good example that while rate is important, it isn't the only key to winning the contest.

The champion of the DX Single Operator High Power may have operated from the Cayman Islands, but Paul, K9PG, operator of winning station ZF2NT, is a resident of the Chicago area. Paul literally had a "field day" averaging an outstanding 183 Qs per hour for the contest period. Calculate in 431 multipliers and his winning score of 8,981,940 was a runaway category winner. Finishing second in a hard fought battle, was P40W, with John, W2GD, as the operator, who edged out Martti, EA8BH by a scant 85K points.

Congratulations go to the DX Single Operator Single Band champions of 2001: Bojan, S57M (160), Raul, CO8ZZ (80), Atilla, YT7A (40), 3E1AA (Guenter, HP1XVH, op) (20), Rafael, CT1BOP (15), and HC8Z (Pedro, HC1OT, op) (10).

The DX Multioperator categories produced the tightest contests of the year, as well as strong interest among operators. The DX Multioperator Single Transmitter contest came down to the wire, but in the end the ops of 8P9JA (at 8P9Z) used their slightly better QSO rate to offset the superior multiplier total of VP5B to win the category by a mere 41K points—8,389,512 to 8,348,256. 8P9JA's QSO rate was 178.2 per hour while VP5B's rate of 172.5 left them close because they logged 9 more mults.

The DX Multioperator Two Transmit-

Top Ten

W/VE

	Score	160	80	40	20	15	10
Single Operator, Low Power							
K4XS	3,186,945	14/11	65/45	171/58	698/92	536/100	1139/99
VE3EJ	3,111,264	12/10	80/45	119/61	453/93	1021/104	808/103
VO1MP	1,783,992	1/1	160/58	123/56	288/75	405/95	540/107
KS1J	1,580,391	5/5	37/31	81/52	356/73	338/76	794/90
K2PS	1,492,050	1/1	41/31	81/46	293/83	403/86	631/96
K1VR	1,421,508	0/0	75/43	123/58	302/82	263/81	568/92
W2TZ	1,374,252	8/6	49/34	124/51	209/71	244/69	802/88
KC8FS	1,246,710	0/0	18/15	55/40	271/74	303/74	786/87
N5AW	1,219,092	3/3	30/19	66/32	241/77	365/86	557/105
W1CTN	1,154,844	7/5	62/39	88/50	241/72	262/80	496/87
Single Operator, High Power							
K1AR (@K1EA)	5,750,496	17/14	178/60	382/81	921/107	1117/112	1321/113
KQ2M	5,467,770	14/12	157/58	327/73	942/104	1268/108	1237/107
K4ZW	4,419,390	5/5	88/49	117/59	1104/105	1251/97	1028/95
N2NT	4,407,237	20/18	192/59	230/69	746/106	959/105	1096/96
K3ZO	4,346,364	8/8	65/42	259/61	820/101	1143/102	1181/104
W9RE	4,305,375	14/13	84/52	200/60	741/103	1015/111	1171/106
K8DX	4,245,606	15/14	63/43	165/66	676/102	1158/120	1089/102
W3BGN	3,718,272	22/19	113/47	169/57	733/94	753/94	1154/110
VE3OI	3,109,098	14/12	39/31	91/48	473/90	1230/106	866/95
VA3UZ	3,097,710	14/13	71/48	183/72	413/96	968/108	661/110
Multioperator Single Transmitter							
K8AZ	4,302,252	13/11	89/60	172/72	558/112	909/125	1082/128
KY2J	3,883,680	16/14	119/60	180/71	615/95	1040/113	820/111
K2XR	3,664,791	18/16	79/56	142/70	697/108	772/113	853/114
NE3F	3,245,760	13/13	76/51	173/67	531/97	629/106	993/114
AA1ON	2,683,251	10/10	83/50	145/68	533/96	514/103	734/116
Multioperator Two Transmitter							
K4JA	10,067,106	26/22	147/64	374/83	1618/126	1940/135	1866/132
W2A	8,724,672	20/18	229/69	344/82	1218/124	1863/129	1672/122
K2TE	6,602,310	4/9	108/54	286/72	945/119	1496/134	1451/125
NZ1U (@KB1H)	5,372,730	5/4	165/61	201/77	912/112	1002/121	1333/120
K2RD	5,266,512	14/12	92/55	172/67	787/114	1227/127	1212/126
Multioperator Unlimited Transmitter							
KC1XX	16,795,188	51/35	532/84	680/105	2156/152	2576/146	2411/144
W3LPL	15,265,395	54/39	425/80	746/104	1965/146	2383/146	2172/142
K9NS	11,461,671	32/23	183/67	428/93	1384/133	2272/145	2058/140
KR1G	8,438,652	18/17	265/68	430/84	1531/130	1494/130	1395/119
W3PP	8,373,792	27/22	139/62	348/81	1456/124	1675/128	1486/127

DX

Single Operator, Low Power							
VP9/W6PH	2,109,216	0/0	345/46	380/48	849/54	777/58	417/48
HK3JJH	1,773,408	0/0	0/0	93/32	922/58	726/57	1171/56
ZX2B (PY2MNL, op)	1,422,330	0/0	1/1	5/5	543/59	855/58	1201/59
6Y5/WO9Z	1,145,328	0/0	81/28	154/37	522/51	346/48	681/50
IO4I	962,544	0/0	8/5	13/8	622/56	725/57	455/50
AY8A (LU8ADX,op)	917,664	0/0	0/0	1/1	303/43	674/56	958/58
HC2/UA4WAE	726,600	0/0	47/20	128/33	313/51	395/50	328/46
4M5E	686,796	0/0	4/5	21/15	263/43	549/55	494/54
KH6GMP	650,958	0/0	0/0	0/0	398/50	411/51	600/53
YU7KWX	629,586	0/0	28/11	91/20	362/54	366/53	332/40
Single Operator, High Power							
ZF2NT (K9PG,op)	8,981,940	114/46	407/57	510/58	2130/60	2022/60	3597/60
P40W (W2GD,op)	6,909,948	90/33	334/54	640/58	1978/60	1732/60	2335/59
EA8BH	6,824,700	56/21	252/42	481/54	2288/61	1921/61	2585/61
KH7Z (@KH7R) (KH6ND,op)	6,749,190	88/30	319/52	773/57	1522/57	1388/59	3052/60
P40V (AI6V,op)	6,038,760	114/30	467/55	480/54	1296/58	1138/58	2875/61
PJ2K (K6RO,op)	5,546,532	45/19	484/52	670/57	1205/58	1425/58	2293/58
WP2Z (K2QM, op)	5,047,677	78/25	295/50	545/56	1181/56	1509/58	1945/58
V47KP	4,967,073	134/34	353/53	581/56	1134/58	1656/58	1365/58
C6A/N2VV	4,734,630	160/34	397/50	746/57	1052/59	1580/59	1156/51
NH7A	3,585,330	39/14	129/34	508/54	1018/55	1008/56	1708/58
Multioperator Single Transmitter							
8P9JA (@8P9Z)	8,389,512	86/29	501/58	674/59	2126/60	1758/60	3407/61
VP5B	8,348,256	201/49	514/55	831/56	1538/58	1475/59	3723/59
PJ4G	6,464,016	82/29	365/51	563/55	1508/59	1594/59	2794/59
FY5KE	5,986,128	63/24	413/55	662/54	1151/59	1543/59	2584/60
TM5C	5,609,496	41/14	431/48	859/57	1381/58	1356/59	2249/60
Multioperator Two Transmitter							
6Y8A	10,962,966	240/47	534/55	1031/60	2100/60	3082/60	3667/61
XA5T	10,414,080	211/48	958/57	1270/58	1786/58	3058/60	2957/58
IR4T	5,125,788	32/14	136/28	832/58	1648/59	1629/60	1847/60
LU1FC	1,627,296	0/0	0/0	7/5	638/55	882/57	1555/59
PY3MHZ	1,303,560	0/0	8/7	2/3	685/54	864/58	861/58
Multioperator Unlimited Transmitter							
J38X	9,463,401	101/30	412/53	889/58	2473/60	3055/60	2897/60
VP5A	7,101,042	200/41	548/57	745/59	1317/60	1322/60	2871/61
VP2EK	5,394,420	13/8	236/43	322/51	2053/59	2505/58	1386/57
LU4FM	4,515,525	0/0	5/5	472/52	1533/59	1718/59	2677/60
RW2F	4,428,333	11/8	267/29	779/57	1656/60	1424/60	1270/59

ter category was another strongly contested race, with the operators at 6Y8A finally pulling away from the XA5T station by a score of 10,962,966 to 10,414,080. The ops at 6Y8A averaged a staggering 221.9 QSOs per hour. In the DX Multioperator Unlimited division, the ops of J38X kept the rate up to the tune of almost 205 per hour to win the category by a score of 9,463,491 to runner-up VP5A's total of 7,101,042.

From the DX perspective, no overall category records were set, although several new DX Continental records were established. Congratulations go to the stations who set new Category Continental records in 2001: KH7Z (KH6ND, op at KH7R) SOHP Oceania, A61AO (RV6LNA, op) SOSB160 Asia, RA9OW SOSB 20 Asia, CT3BX SOSB 10 Africa, TM5C Multioperator Single Transmitter Europe, 5U5A Multioperator Unlimited Transmitter Africa, and LU4FM Multioperator Unlimited Transmitter South America.

The Affiliated Club Competition always brings out strong participation. The ACC is a combined CW and Phone competition. Almost one quarter of the total logs received in 2001 are from stations participating in this competition.

Leading the way in the Unlimited category was the Yankee Clipper Contest Club. Their 239 member logs accounted for a total of 353,791,857 points.

Affiliated Club Competition

	Score	Entries
Unlimited Category		
Yankee Clipper Contest Club	353,791,857	239
Frankford Radio Club	317,797,848	160
Potomac Valley Radio Club	189,136,371	123
Society of Midwest Contesters	86,526,336	107
Medium Category		
North Coast Contesters	53,081,586	25
Northern California Contest Club	37,542,762	40
Tennessee Contest Group	32,745,465	29
Mad River Radio Club	31,605,963	21
Minnesota Wireless Assn	31,137,942	28
Florida Contest Group	27,908,142	38
Texas DX Society	24,754,500	10
South East Contest Club	24,689,256	18
Southern California Contest Club	23,553,924	32
Central Texas DX and Contest Club	14,650,794	7
Rochester (NY) DX Assn	13,777,950	24
North Texas Contest Club	13,753,014	16
Willamette Valley DX Club	12,289,476	13
Central Arizona DX Assn	9,766,452	13
Western Washington DX Club	8,675,433	19
Order of Boiled Owls of New York	7,331,121	10
Grand Mesa Contesters of Colorado	5,219,697	11
Western New York DX Assn	3,824,700	11
Southeastern DX Club	3,409,134	3
Eastern Iowa DX Assn	2,705,643	8
Carolina DX Assn	2,588,943	9
Oklahoma DX Assn	2,251,491	3
Northern Arizona DX Assn	1,294,398	6
Bergen ARA	1,084,632	15
West Park Radiops	966,945	8
Salt City DX Assn	964,857	4
Northrop Grumman Radio Club	925,542	7
Green River Valley ARS	881,298	6
Lincoln ARC	725,037	3
Kentucky Contest Group	563,325	4
Mississippi Valley DX/Contest Club	467,379	3
South Jersey Radio Assn	377,022	6
Southern California DX Club	355,899	6
Kansas City DX Club	261,213	3
Mother Lode DX/Contest Club	33,543	4
Local Category		
Hudson Valley Contesters & DXers	22,373,070	10
River City Contesters	21,647,955	7
Meriden ARC	2,789,139	5
Utah Contest Club	1,680,453	5
Western Illinois ARC	1,625,370	7
Northern New York Contest Club	1,236,327	8
Dauberville DX Assn	575,817	4
Great Falls Area ARC	432,795	5
Redmond Top Key Contest Club	408,420	5
Sturdy Memorial Hospital ARC	391,572	3
South Towns ARS	335,988	4
Wireless Association of South Hills	183,780	3
Loudoun ARG	157,068	3

W/VE Regional Single Operator Leaders

Tables list call sign, score, and power (A = QRP, B = Low Power, C = High Power).

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

K1ZM	1,917,510	A
KB3TS	295,074	A
N2NJZ	86,991	A
K1KP	35,862	A
WB7OCV	28,560	A
VO1MP	1,783,992	B
KS1J	1,580,391	B
K2PS	1,492,050	B
K1VR	1,421,508	B
W2TZ	1,374,252	B
K1AR (@K1EA)	5,750,496	C
KQ2M	5,467,770	C
N2NT	4,407,237	C
K3ZO	4,346,364	C
W3BGN	3,718,272	C

Southeast Region (Delta, Roanoke and Southeastern Divisions)

N4KG	789,192	A
WB3BEL	310,596	A
WA3NKO	163,680	A
KQ4YY	32,571	A
W5WZ	3,024	A
K4XS	3,186,945	B
KC8FS	1,246,710	B
NF4A	1,027,890	B
K5IID	940,212	B
KU4BP (@N4VHK)	940,155	B
K4ZW	4,419,390	C
K4DLJ	1,980,855	C
WA4TII	1,723,575	C
K4BAI	1,347,954	C
K1TO	1,317,693	C

Central Region (Central and Great Lakes Divisions; Ontario Section)

N8XA	87,768	A
K9DIY	4,896	A
VE3EJ	3,111,264	B
N4TZ	1,084,800	B
N8KM	760,596	B
VE3MQW	559,977	B
N8CN	543,555	B
W9RE	4,305,375	C
K8DX	4,245,606	C
VE3OI	3,109,098	C
VA3UZ	3,097,710	C
K8GL	2,051,163	C

Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)

W0AH	517,470	A
KK0Q	173,448	A
WA8ZBT	166,605	A
N0UR	165,699	A
K0GT	81,618	A
N5AW	1,219,092	B
AC0W	1,132,398	B
N5DO	810,468	B
KW4T	497,502	B
VE5SF	444,150	B
KT0R	985,932	C
N0HJZ	547,080	C
K5RA	544,680	C
KI9A (@K0LIR)	530,208	C
N0UU	442,602	C

West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)

N3AIU	245,310	A
W6CN	209,139	A
W7YAQ	148,680	A
N7UC (W7YA,op)	90,315	A
N7IR	80,586	A
N6NF	761,124	B
WN6K	611,289	B
W3SE	399,066	B
WK6I	328,746	B
KI7Y	279,222	B
N6BV	2,402,955	C
W7GG	1,889,550	C
W6UE (W4EF,op)	1,498,980	C
N6ED	1,475,694	C
K7RI	1,459,050	C

Phone and Combined Sponsored Plaque Winners

Plaque Category	*Winner*	*Plaque Sponsor*
W/VE All Band Phone	K1AR (@K1EA)	Frankford Radio Club
W/VE 1.8 MHz Phone	WW2Y	Butch Greve, W9EWC Memorial
W/VE 3.5 MHz Phone	AA1BU	K1ZM Communications, Inc
W/VE 14 MHz Phone	W7WA	William F. Beyer Jr., N2WB
W/VE Low Power Phone	K4XS	Dauberville DX Association
W/VE Single Operator Assisted Phone	W2RE	Pete Carter, K3VW Memorial
W/VE Multi-Single Transmitter Phone	K8AZ	Steve Adams K4RF
W/VE Multi-Unlimited Phone	KC1XX	Western New York DX Association
World Single Operator Phone	ZF2NT (K9PG, op)	North Jersey DX Association
Asia Single Operator Phone	7J2YAF (JA1KSO, op)	Tim Coad, NU6S
Europe Single Operator Phone	M6T (G4PIQ, op)	Jerry Griffin, K6MD
World 14 MHz Phone	3E1AA (HP1XVH, op)	Central California DX Club
World 21 MHz Phone	CT1BOP	Long Island DX Association
World 28 MHz Phone	CT3BX	North Shenandoah DX Association NS4DX
World QRP Phone	LY5A (LY2PAJ, op)	Southern Arizona DX Association
World Single Operator Assisted Phone	S51DX	Willamette Valley DX Club
World Multi-Single Transmitter Phone	8P9JA (@8P9Z)	Carl Cook, AI6V/P49V
Asia Multi-Single Transmitter Phone	JA1YPA	Yankee Clipper Contest Club
North America Multi-Single Transmitter Phone	VP5B *	Nick Lash, K9KLR
Oceania Multi-Single Transmitter Phone	WH6H	AH9B/V73B
World Multi-Two Transmitters Phone	6Y8A	W6NL and K6BL
Europe Multi-Unlimited Phone	RW2F	Operators at K1TTT
Oceania Multi-Unlimited Phone	NH6YK	David Brandenburg, K5RQ
South America Multi-Two Transmitter Phone	LU1FC	Operators at K1TTT
W/VE Combined Score	KQ2M	National Contest Journal
W/VE Low Power Combined Score	VA3UZ	Rochester DX Association K2FR Memorial Plaque
World Single Op Combined Score	M6T (G4PIQ, op)	Mike Manafo, K3UOC
Japan Low Power All Band Phone	7L4IOU	Western Washington DX Club
Seventh Call Area All Band Phone	W7GG	Willamette Valley DX Club
World Multi-Unlimited Combined	RW2F	W2PV Memorial—Schenectady ARA
World Multi-Unlimited Phone	J38X	Stanley Cohen, W8QDQ
Rocky Mountain Division Single Operator Low Power Phone	W0ETT	Grand Mesa Contesters & DX Society
Central Division Single Operator High Power All Band Phone	W9RE	Society of Midwest Contesters
Central Division Low Power All Band Phone	N4TZ	Mike Tessmer, K9NW

*Asterisk indicates plaque is awarded to runner-up when winner has been awarded a higher level plaque. This does not apply to combined score plaques. Overall continental plaques may be purchased from the ARRL Contest Branch. Contact **contests@arrl.org** for more information.

Placing second was the Frankford Radio Club, with a total score of 317,797,848 points from 160 submissions. The Medium Category saw a strong effort from the North Coast Contesters pay off as their 25-log total of 53,081,586 points took top honors over the 37,542,762 points from the Northern California Contest Club's 40 members. In a close contest of the Local Category, the Hudson Valley Contesters and DXers brought home the cherished club gavel with a score of 22,373,070. Runner-up River City Contesters laid claim to 21,647,955 points. Kudos all around for an exciting Affiliated Club event in 2001.

It isn't too late to purchase one of the inaugural ARRL International DX Contest pins. All you needed to do was work 100 QSOs during the contest. These attractive multi-colored pins are $5 each for US stations and $8 US for DX stations (shipping included). They may be ordered by contacting the ARRL Contest Branch. Don't miss the opportunity to own the very first DX Contest pin offered by the ARRL.

The ARRL International DX Phone contest is always an anticipated event. Contesters see it as a chance to test their skills against the best. Casual operators see it as an opportunity to work some new and interesting stations—and a good way to build up overall or specific band DXCC totals. All would agree that it is a fun challenge. The 2002 Contest is set for March 2-3—the first weekend in March. Predictions are that this could still be a good time in the current sunspot cycle to catch good propagation. Start planning now to share in this great operating event. Who knows, maybe you can watch your QSO rate meter climb to new personal heights in 2002. 73.

SOAPBOX

Conditions were not as good on Sunday but that's the way it goes (AE4EC)… First ever Multi-Two effort with the local guys. We have lots to learn (AE9B)… First test of the station at my new QTH. 10, and 15 were great. Filled in a lot of band countries (K0XM)… Operating QRP on phone is really tough, even with excellent antennas (K1ZM)… DX for the little guy… what could I do with a beam? (K2CS)… KC2HLY - Zach- 9 years old really enjoyed it (K2YEH)… What a fun time working DX and getting a great pin to boot (K3IZ)… Had a 256-hour on Sunday morning - wow! (K5ZD)… The 1.5 hour nap helped me operate 46 out 48 hours. I might be getting the hang of this SOAB stuff (K8DX)…Nice to see 10m hopping (K9GY)… Booming on 10, 15 and 20. Got WAC on two more bands, maybe even cracked DXCC. First time this contest — great weekend. (KA1SZP)… Either the band remained fairly constant or there were some serious systems out there. I heard the same callsigns all day (KA6WBQ)… Great fun, and I did DXCC in a weekend! (KB2EOQ)… Can't ragchewers and contesters all just get along? Here's a thought: If someone is talking on a frequency, don't transmit (KC0BOM)… A comfortable chair, a working rig and a free weekend for the contest — Bliss (KC2FYJ)… My first time to ever crack the 1,000 QSO barrier. Likewise, this was my first time over 1 Million points. Highlight of contest was having SU9ZZ call me on 15m and then thank me for the multiplier (KC8FS)… Having never worked the Int'l DX contest I found it to be a very interesting experience (KD5CKP)… It was fun to get my DXCC in less than 12 hours of operating (KD5GKP)… This was so much fun, my legs hurt from being glued to the radio. Thought 20m was vacant but 10 and 15m were jam packed with activity (KM5TY)… My first contest (KR4LO)… Great contest. Didn't do well into Europe, but surprises everywhere (N0UU)… First contest a General Class operator. It was great (N0YYO)…I found Sunday afternoon why I thought I was experiencing strange propagation. A windstorm had rotated my 15 and 20 meter beams about 90 degrees from the rotator indication, so we had worked all weekend off the side of both beams (N1AU)… Gonna miss 10 meters. The best band for the midsize station like I have (N1DG)… Highlight of the contest was undoubtedly working VK5GN on 160M (N1EU)… Other than the two computer crashes, a melted 15 meter trap on the low tri-bander, and strange short skip propagation on Sunday afternoon... this year's contest was lots of fun. We did beat last year's score by over 1M points. We owe our JA ops a big thanks for that, with over 600 JA Qs. We have our goals already set for next year (N1LN)… I took some time off to help around the house and deal with my neighbors' RFI problems so I only ended up operating for about 32 hours. I am learning (N3HXQ)… I obeyed the Prime Directive in this one — had FUN! I set my personal best score and got some new countries and band-countries even with limited/sporadic operating time (N4JN)… Another great contest—and I broke 1 Meg at age 82 (N4UH)… I noticed more YL's all over the world working the contest (N5RLQ)… Head cold + Phone contest + Sudafed = "out-of-body" experience (N6ER)… QRP is a brutal torture as a single op. This time I tried the SO Assisted category and found it not so intense. There were plenty of targets on the band maps to work. Congratulations and thanks to all of you with the sensitive receivers that could copy me (N6WS)… 10 m was great with new ones like FO5, 3D2 and KH0 giving multipliers. South America was strong with PY0FF 59++ Great contest and can't wait for next year (N9GUN)… Highlight was working 9M0M on Spratley with 7 minutes left (NE0P)… My best personal effort ever. Band conditions were exceptional. Worked everyone I could hear (VE3HG)… Gotta put something together for 160 (VE9WH)… Have been operating contests, QRP, for many decades and this was the first time I ever worked DXCC (103 countries) in a contest weekend. One of the highlights of 45 years in ham radio (W0AH)… Worked Bouvet and Spratly Islands using just a dipole antenna. Great fun (W2KA)… It took me a second to figure how to log "100 milliwatts" which G0LIC gave me as he pegged my meter at S9+ (W4ZV)… Worked 5U5A as my last contact at 2359Z (W7JAM)… Car fire (yes, my car) 10 minutes after drove home to start contest Friday night caused major disturbance equal to the biggest solar flare (W7YAQ)… First contest with a new HF ticket (W7YES)… This is my first submitted log in many years. It won't be the last (WA2YJF)… This is my first time actually turning in a score (WD4DDU)… SSB, a form of torture that can be fun (WO1N)… Neighbors had TVI; headset had RFI; EWA had weak propagation. Other than that, a great weekend (WS7V)… Offered a choice between dental work and phone contesting, I would have to think it over (WT3P)… Not bad, for home location in center of city (9A3MA)… Great DX location! But too far away to do well in this test (9M0M)… Where was South Dakota? (CT2GQN)… Finally completed my WAS although I could just operate a few hours (EA3WL)… Based on the level of participation I think we should be looking to have band allocations extended! (EI4DW)… Great HF conditions and limited time on the bands gave me some good runs; I was very happy with a 257 hour on Saturday and 252 hour on Sunday from a plain old "G." (G4BUO)… I achieved my all-time personal best as a mobile in this contest. Let's hope the conditions are as good next year (G4NXG/M)… We reactivated the IU2M station at our radio club in Milan. It has been a great deal! (IU2M)… 10m was excellent but something was wrong on 15m (JH8KYU)… Aurora wipeout Sunday, Note to self "100 miles South of the Arctic Circle is not a good location for contesting."(KL7RA)… Just as I was getting started, there was a power failure. Luckily I had my batteries charged for just such an emergency. I was also without air conditioning. Anybody who's been in Latin America during the dry season knows what that means. It gets HOT fast! (HR1/N0UEP)… Unbelievably busy band! It was difficult to find the place for CQ, as the whole band was full on Sunday. Hope these conditions would remain next year (OK1DSF)… Nice to meet so many old friends on the bands (SP9NH)… A great band opening on 160. Only got back from Europe at the weekend so was still jet lagged (VK5GN)… Got my first ever 400 hour! What a blast! Thanks a ton to Bruce for letting me come down and play (ZF2NT)… Propagation held up for the whole contest (ZL1ANJ)… I didn't expect to make this many QSOs with my 100 Watts (ZL1TM).

DX Contest Pins still available

Those operators who completed a minimum of 100 contacts during the 2001 contest may still purchase the attractive commemorative pins celebrating the first ARRL International DX Contest of the new millennium. This first-time offer is certain to become a keepsake. They cost $5 per pin for US participants and $8 for DX orders and may be ordered from the Contest Branch at ARRL at 860-594-0295 with a credit card. You may also send a copy of your summary sheet along with your check to DX Contest Pin, ARRL, 225 Main St, Newington, CT 06111.

Scores

Scores are listed by DXCC Entities and ARRL/RAC Sections. Within each Country or Section, single operator scores are listed in descending order, by power categories. Line scores list call sign, score, QSOs, multipliers, power (A = QRP, B = Low Power, C = High Power, D = Multioperator), and band (if single band). Single Assisted entries appear after all Single Operator scores, followed by multioperator scores by category. W/VE entries appear first, followed by DX entries.

Phone
W/VE
Single Operator
1

Connecticut

W1CTN	1,154,844	1156	333	B	
KM5YL	278,208	483	192	B	
W1AZT	114,210	282	135	B	
W1TS	90,480	232	130	B	
W3TB	71,508	202	118	B	
KA1SZP	16,632	84	66	B	
KQ2M	5,467,770	3945	462	C	
K1VDF	1,065,216	1387	256	C	
W1WEF	1,004,484	1222	274	C	
NT1N	335,670	334	335	C	
N1JW	167,238	342	163	C	
KA1VMG	79,704	216	123	C	
W1DAR	68,742	201	114	C	
K1RO	21,528	104	69	C	
W1AW (N1ND,op)	100,362	389	86	C	20
W1AMF	95,319	357	89	B	10

Eastern Massachusetts

K1KP	35,862	139	86	A	
K1VR	1,421,508	1331	356	B	
K1VUT	1,151,334	1242	309	B	
N1SV	1,049,670	1090	321	B	
W1WAI	642,270	790	271	B	
N3KCJ	521,586	743	234	B	
K1HT	436,176	624	233	B	
W1EM	343,200	550	208	B	
W1TE	312,825	485	215	B	
K1YA	204,435	413	165	B	
K1WCC	173,760	362	160	B	
W1MK	130,077	291	149	B	
WA1OFR	92,736	276	112	B	
WB1FLA	86,697	247	117	B	
WA1QGC	70,380	204	115	B	
KY1B	62,790	182	115	B	
W1TW	60,606	182	111	B	
W1EWN	32,964	134	82	B	
K1RB	26,208	104	84	B	
N1VI	24,192	126	64	B	
WA1OLV	13,392	93	48	B	
KQ1F	1,914	29	22	B	
N1DD	1,381,248	1408	327	C	
K5MA	1,110,756	1226	302	C	
W1RY	952,455	965	329	C	
W1KRS	683,046	834	273	C	
W1DO	30,000	100	100	C	
KE1Y	72,192	376	64	C	80
AA1BU	45,936	232	66	C	80
K2LP	13,800	100	46	C	40
WG1Z	33,408	174	64	A	20
W1ZZ	167,400	558	100	B	10
N1DC	67,308	284	79	B	10
N1WRK	11,748	89	44	C	10
W1PLK	4,704	56	28	B	10

Maine

W1BW	517,959	741	233	B	
N1LW	277,848	454	204	B	
WN1OTV	63,609	233	91	B	
W1EL	58,194	183	106	B	
N1CJR	18,900	105	60	B	
KD1OG	12,705	77	55	B	
N1YIS	720	15	16	B	
AB1R	164,340	330	166	C	
N1RY	15,015	77	65	C	
K1SWG	5,616	48	39	C	
AC1O	15,150	101	50	C	40
KA1AIF	15,525	115	45	B	10
K1JB	13,284	108	41	B	10

New Hampshire

WS1A	1,102,824	1156	318	B	
NM1W	489,042	606	269	B	
WE1USA	372,762	1062	117	B	
AE1T	85,800	260	110	B	
KA5WHO	49,608	159	104	B	
AE1D	39,312	156	84	B	
WK1P	17,784	104	57	B	
KC1F	2,758,680	2328	395	C	
W6FC	426,258	597	238	C	
K1BV	75,240	330	76	C	10
KB1PZ	15,651	111	47	C	10

Rhode Island

KS1J	1,580,391	1611	327	B	
K1VSJ	668,283	847	263	B	
N1WGD	7,290	54	45	B	
KB1LN	132,165	267	165	C	
WA1MKS	55,920	233	80	B	20

Vermont

W1ZS	375,396	574	218	B	
AA1SU	202,980	398	170	B	
N1BCL	101,244	286	118	B	
AA1VF	37,350	150	83	B	
K1LI	1,035,810	1354	255	C	
K1CN	219,564	428	171	C	
N1ZUK	121,302	293	138	C	

Western Massachusetts

WT1S	730,881	843	289	B	
N1FUS	219,600	400	183	B	
N1ISB	90,720	252	120	B	
N1MHH	76,608	224	114	B	
N1VOR	36,045	135	89	B	
K1AR (@K1EA)	5,750,496	3936	487	C	
K5ZD	1,841,112	1686	364	C	
W1KT	960,144	964	332	C	
KK1H	113,520	440	86	B	10

2

Eastern New York

K1ZM	1,917,510	1610	397	A	
N2MTG	38,184	148	86	B	
K2DL	2,430	30	27	B	
N1JP	705,384	808	291	C	
KE2DX	688,215	1067	215	C	
W2ENY	475,164	591	268	C	
W2ZU	394,215	641	205	C	
NA2M	321,012	482	222	C	
WF2B	189,297	369	171	C	
N2SQW	26,352	122	72	C	
WX2N	46,125	205	75	B	15
N3EMF	75,582	323	78	C	10

NYC-Long Island

WB2ZTH	621,810	630	329	B	
N2GA	361,200	560	215	B	
KC2FYJ	97,137	251	129	B	
KS2G	66,759	289	77	B	
N2LEB	58,410	177	110	B	
N2GC	115,776	268	144	C	
WB2AMU	11,070	82	45	B	40
K2LE	317,046	997	106	C	20
WA2OVG	7,626	62	41	C	20
K2MFY	249,516	717	116	B	10
WA2YJF	86,430	335	86	B	10
W3EH	22,176	132	56	C	10
KA2ASU	20,700	138	50	B	10
N1GNV	14,100	100	47	B	10
KA6WBQ	10,584	84	42	B	10

Northern New Jersey

K2WA	378,834	613	206	B	
W2PI	127,008	294	144	B	
K2YSY	108,000	250	144	B	
KC2HEU	94,878	251	126	B	
K2YLH	71,604	204	117	B	
KC2HL	66,933	201	111	B	
KX2S	53,808	236	76	B	
KG2MV	49,392	168	98	B	
WA2LXE	28,032	128	73	B	
N2LK	25,875	115	75	B	
WB2IDV	24,624	114	72	B	
WA2QHL	21,114	102	69	B	
W1GI	8,256	64	43	B	
N2OPJ	4,320	45	32	B	
WB2HID	2,835	35	27	B	
KA2NJP	1,440	20	24	B	
N2NT	4,407,237	3243	453	C	
N2LT	2,784,726	2502	371	C	
W2UDT	321,504	544	197	C	
WA2BKN	163,620	303	180	C	
K2ZB	23,616	123	64	C	
K2AMI	15,840	88	60	C	
WA2QNW	313,296	976	107	C	20
KC2Q	14,535	95	51	B	20
WA2ASQ	11,880	90	44	B	20
AE2JL	26,565	161	55	B	15
NA2U	288,684	891	108	B	10
AB2FA	5,289	43	41	C	10

Northern New York

N2NJZ	86,991	271	107	A	
NS2P	495,495	715	231	B	
N2YMY	5,445	55	33	B	
NG2C	81,648	336	81	C	10

Southern New Jersey

K2PS	1,492,050	1450	343	B	
W2RDS	258,390	495	174	B	
KA2YKN	37,224	132	94	B	
W2MAT	32,760	130	84	B	
WA2IAU	23,331	101	77	B	
W5KI	12,213	69	59	B	
KV2M	10,017	63	53	B	
W2ORA	6,804	63	36	B	
N2MR	1,372,806	1439	318	C	
NQ3N	1,230,930	1410	291	C	
K2UT	630,252	732	287	C	
N2VW	380,562	533	238	C	
WB2LNR	74,256	221	112	C	
WW2Y	6,954	61	38	C	160
K1JT	816	17	16	B	80
N3XOF	8,316	63	44	C	40
AD3Y	168	8	7	B	15
K2BQW	101,052	401	84	B	10
W2DBA	18,375	125	49	C	10

Western New York

WB7OCV	28,560	112	85	A	
W2TZ	1,374,252	1436	319	B	
K2CS	529,959	733	241	B	
K1PY	507,693	739	229	B	
N2CK	258,462	519	166	B	
N2LQQ	86,346	246	117	B	
N2OPW	57,879	177	109	B	
KV2X	54,000	180	100	B	
KC2DGC	6,201	53	39	B	
KA2MGE	3,627	39	31	B	
WB2AIV	3,192	38	28	B	
N2MG	1,501,164	1554	322	C	
W2LU	1,178,445	1255	313	C	
K2NV	540,654	718	251	C	
N2WK	392,364	519	252	C	
WR2V	299,052	468	213	C	
W2FUI	127,800	300	142	C	
W2VO	1,311	23	19	C	160
K2CF	2,025	27	25	B	80
WB2DVU	10,800	80	45	B	40
W2FU	611,712	1728	118	C	15
WB2OSM	199,374	707	94	C	10
N2CU	53,037	249	71	B	10
WB2HWI	19,239	121	53	B	10

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Delaware

W3TT	25,134	118	71	A	
NY3C	83,754	423	66	B	

Eastern Pennsylvania

KB3TS	295,074	507	194	A	
N3ZIL	16,524	108	51	A	
W3MF	801,087	1031	259	B	
N3RM	123,939	293	141	B	
N3KAK	106,371	223	159	B	
W3BEN	104,085	257	135	B	
W3MEL	89,304	244	122	B	
KE3TC	59,100	197	100	B	
AA3TT	43,086	167	86	B	
N3WL	41,280	160	86	B	
W3SSS	31,122	133	78	B	
KA3PVA	28,800	120	80	B	
K3NL	25,185	115	73	B	
KB3CRG	22,050	98	75	B	
W3BGN	3,718,272	2944	421	C	
N3KR	461,997	639	241	C	
K3MGT	283,536	528	179	C	
K3VA	246,006	474	173	C	
W8FJ	227,766	374	203	C	
W3BYX	226,980	388	195	C	
K4JLD	218,160	360	202	C	
AD3Z	199,374	329	202	C	
W3KV	101,700	300	113	C	
W3JRY	44,640	155	96	C	
N3TA	7,740	60	43	C	
K3SV	10,164	77	44	C	80
N3CB	1,173	23	17	C	15
K3QD	32,076	162	66	C	10

Maryland-DC

W3MR	1,063,809	1227	289	B	
W3DQ	440,568	633	232	B	
N3UN	137,532	314	146	B	
WN3C	129,687	311	139	B	
K3TW	89,010	215	138	B	
W3FQE	54,978	187	98	B	
N3ZNU	43,332	157	92	B	
W3CP	37,611	199	63	B	
N3SEO	36,105	145	83	B	
N3SZW	22,320	120	62	B	
K3CTR	21,384	108	66	B	
N3SOK	18,600	100	62	B	
W3EE	17,355	89	65	B	
KF3BN	15,930	90	59	B	
N3EYB	3,078	38	27	B	
K3YJP	1,995	35	19	B	
K3ZO	4,346,364	3466	418	C	
K2PLF	1,731,048	1738	332	C	
N3AM	1,372,644	1257	364	C	
N3HXQ	889,746	1037	286	C	
N3WD	503,811	727	231	C	
N3HBX	488,250	1302	125	C	
W3HVQ	421,317	507	277	C	
N3UM	418,215	569	245	C	
N3LH	360,930	530	227	C	
W3AZ	337,635	549	205	C	
W3OU	262,710	417	210	C	
W2BZR	191,226	406	157	C	
K3GV	71,262	214	111	C	
K3VY	4,464	48	31	B	15
N3HS	48,039	239	67	C	10
NS3T	4,305	41	35	B	10

Western Pennsylvania

AA3LX	325,440	452	240	B	
N3UE	81,726	257	106	B	
K3TJM	39,864	151	88	B	
WN3VAW	34,710	130	89	B	
KA3AVB	34,608	112	103	B	
WB3AVD	20,349	119	57	B	
AD8J	19,968	128	52	B	
W3GH	633,846	709	298	C	
WB3EPE	93,840	230	136	C	
N3WMC	52,866	198	89	C	
KM3J	3,255	35	31	C	40
WW3S	280,719	843	111	B	10
WB0IWG	57,297	269	71	A	10

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Alabama

N4KG	789,192	904	291	A	
W4NTI	179,244	383	156	B	
WB4HUX	585	15	13	B	
N4YQ	387,672	557	232	C	
K4NVJ	21,546	126	57	C	15
AG4W	201,900	673	100	C	10

Georgia

K4OGG	339,660	555	204	B	
KT4ZB	246,840	440	187	B	
N4WD	215,124	394	182	B	
K4PHE	136,080	336	135	B	
K6EID	102,240	426	80	B	
KB4BBC	46,128	124	124	B	
WA4TII	1,723,575	1715	335	C	
K4BAI	1,347,954	1658	271	C	
N4NX	417,816	829	168	C	
W4WA	506,127	1493	113	C	15

Kentucky

W4UDX	62,445	181	115	B	
AA2GS	38,907	131	99	B	
KU4ZJ	22,800	95	80	B	
N4HT	1,124,091	1343	279	C	
K4IU	104,250	250	139	C	
W4LC	113,472	394	96	B	15

North Carolina

KU4BP (@N4VHK)	940,155	1165	269	B	
N4YDU	395,352	646	204	B	
W4IDX	304,290	483	210	B	
KR4LO	180,642	391	154	B	
N4QVM	162,792	323	168	B	
NC4ME	142,725	275	173	B	
N3ZKK	96,579	219	147	B	
K4AHC	83,520	232	120	B	
K4QPL	81,252	222	122	B	
KV4CN	80,892	214	126	B	
K4SLC	66,528	198	112	B	
AE4EC	31,200	130	80	B	
K4TP	19,116	108	59	B	
KC4YOT	18,915	97	65	B	
N4UH	1,112,190	1310	283	C	
N4CW	517,311	753	229	C	
W4YDY	223,776	444	168	C	
NC4MI	176,292	354	166	C	
KG4GSY	74,061	211	117	C	
W4WS (N4VHK,op)	2,448	34	24	B	80
K5LZT	756	18	14	B	20
KS4XG	461,700	1425	108	C	15
KZ2I	990	33	10	B	15
W4ZV	882,960	2264	130	C	10
K4QI	17,658	109	54	B	10
KA4KJI	12,792	104	41	C	10

Northern Florida

KQ4YY	32,571	141	77	A	
NF4A	1,027,890	1215	282	B	
NI4ET	82,110	238	115	B	
N4IPH	52,890	205	86	B	
NN4DF	28,782	123	78	B	
N1ZZZ	27,156	124	73	B	
W2SW	18,753	133	47	B	
W4YA	18,618	107	58	B	
AG4DX	12	2	2	B	
K4VUD	769,500	1026	250	C	
N4EK	230,400	512	150	C	
NW5E	191,475	345	185	C	
W7QF	173,484	366	158	C	
AD4E	22,440	110	68	C	
N4PN	390	13	10	C	160
KX2J	34,968	188	62	B	20
KC4LAH	20,352	128	53	C	10

South Carolina

WM3O	57,330	182	105	B	
NO4D	11,130	70	53	B	
K4DLJ	1,980,855	1809	365	C	
W2JJC	1,162,080	1614	240	C	
N8VQG	2,664	37	24	C	20
K4TSU	28,980	140	69	C	10
W4ULY	960	20	16	C	10

Southern Florida

WA3NKO	163,680	341	160	A	
W4SAA	441,969	649	227	B	
WD4JR	293,832	462	212	B	
KK4TA	155,025	325	159	B	
KE4UHO	139,995	305	153	B	
KQ0Q	132,300	300	147	B	
WT5L	103,194	273	126	B	
K4RFK	97,686	243	134	B	
W4MOT	86,670	214	135	B	
W4OV	32,631	149	73	B	
KG4KDF	29,376	136	72	B	
KA1VY	13,197	83	53	B	
NJ2F	512,127	739	231	C	
N8PR	351,882	519	226	C	
AD4LX	64,935	185	117	C	
W4UM	1,080	20	18	C	
K9ES	35,175	175	67	B	40
N4BP	505,116	1559	108	C	10
KE4JZT	68,145	295	77	B	10
KG4MBZ	40,365	195	69	B	10

Tennessee

K4BEV	598,752	756	264	B	
NA4K	589,968	816	241	B	
WD4OHD	94,464	256	123	B	
W4GMM	87,690	370	79	B	
N4JN	64,890	206	105	B	
W4JH	55,212	214	86	B	
WB9BSH	38,130	155	82	B	
N7DLS	36,582	134	91	B	
W4NI	36,450	150	81	B	
KA4OTB	35,856	144	83	B	
W4AUI	29,766	121	82	B	
W4MEA	18,444	106	58	B	
K4LTA	762,816	928	274	C	
AA3VA	175,032	374	156	C	
K4IUD	103,194	234	147	C	
W4OGG	27,489	119	77	C	
AK4ST	9,855	73	45	C	
KB4KA	8,820	70	42	B	40
K4BP	7,128	66	36	C	40
N4ZZ	473,424	1409	112	C	10
WD4K	363,888	1083	112	C	10
WD4PTJ	23,868	153	52	C	10
KF4ZEO	4,032	56	24	B	10
WA4JA	1,767	31	19	C	10

Virginia

WB3BEL	310,596	572	181	A	
K4FPF	422,139	631	223	B	
KU4FP	398,430	570	233	B	
K4UVT	239,382	429	186	B	
KG6AR	106,722	242	147	B	
K3MZ	87,822	238	123	B	
WA4FXX	69,690	202	115	B	
WB4DNL	56,244	172	109	B	
N4ZNH	50,562	159	106	B	
KS4JB	42,336	147	96	B	
K1SO	38,181	143	89	B	
K4EP	33,417	141	79	B	
N4JED	31,755	145	73	B	
N4PD	26,973	111	81	B	
W4PWF	21,000	125	56	B	
N6MW	19,926	82	81	B	
N8GM	10,350	75	46	B	
K4SM	630	15	14	B	
K4ZW	4,419,390	3593	410	C	
N3HF	1,185,912	1086	364	C	
K4YT	1,038,024	1109	312	C	
N4MM	655,110	753	290	C	
W2YE	345,072	553	208	C	
WD4DDU	296,709	497	199	C	
N3JT	239,520	499	160	C	
W4YE	100,548	266	126	C	
W4ZYT	90,750	242	125	C	
W3GHU	84,870	246	115	C	
AA4KD	76,962	202	127	C	
W6IHG	37,338	127	98	C	
K4TX	30,144	157	64	C	40
N4EL	49,059	237	69	C	15
WW5W	43,452	204	71	B	15
W4SD	10,944	96	38	B	10
N3TG	6,825	65	35	B	10
KG4BWS	3	1	1	C	10

West Central Florida

K4XS	3,186,945	2623	405	B	
N4IG	857,490	1010	283	B	
W9NWY	38,760	152	85	B	
W4TIJ	32,319	133	81	B	
K1TO	1,317,693	1469	299	C	
WA2NDP	5,115	55	31	C	20
K9HUY	133,464	536	83	C	10

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Arkansas

K5NLX	16,059	101	53	C	
K5GO (KI0MB,op)	265,356	1092	81	C	15
KB5EKX	26,208	156	56	C	10
W9KTB	5,124	61	28	B	10

Louisiana

W5WZ	3,024	48	21	A	
WA5TRX	24,786	162	51	C	

Mississippi

KD5CKP	39,420	146	90	B	
W5KK	39,330	114	115	B	
KE5K	475,893	627	253	C	
W5OXA	94,041	243	129	C	
N5FG	44,352	192	77	C	15
N3AWS	1,887	37	17	A	10

New Mexico

W5GZ	266,256	516	172	B	
KA5BAT	182,748	388	157	B	
KM5P	67,164	193	116	B	
N6ZZ	80,136	318	84	C	
KD5JAA	35,577	177	67	C	
W5JRP	24,552	132	62	C	20
N7DF	576,720	1602	120	C	10
K5AM	415,053	1293	107	C	10

North Texas

WA8ZBT	166,605	383	145	A	
WK5K	153,450	330	155	B	
WA5VKS	92,115	267	115	B	
N5CHA	30,336	128	79	B	
KM5OL	28,728	133	72	B	
AD5AC	27,540	153	60	B	
W5ETM	25,200	112	75	B	
KC5OZT	5,100	50	34	B	
K5RA	544,680	712	255	C	
W5FO	5,022	54	31	C	
K4GVN	2,880	40	24	C	
K5RX	701,184	1826	128	C	10
KY5N	117,450	435	90	B	10
KV5B	103,752	393	88	B	10

Oklahoma

K0CIE	348,660	596	195	B	
K5PX	61,275	215	95	B	
KD5DLL	39,606	161	82	B	
N5PMP	14,523	103	47	B	
N5RXF	127,413	297	143	C	
W5TM (W5AO,op)	339,660	1110	102	B	10

South Texas

N5AW	1,219,092	1262	322	B	
WA5IYX	282,564	564	167	B	
N5RLQ	107,730	270	133	B	
KK5VN	106,500	284	125	B	
KD5GKP	74,865	217	115	B	
WX5I	37,332	204	61	B	
KN5Z	33,654	142	79	B	
KQ5U	21,948	118	62	B	
AG5T	8,400	56	50	B	
W5EB	6,600	50	44	B	
K5XR (W5ASP, op)	441,630	701	210	C	
KM5TY	196,416	372	176	C	
N5DD	157,458	326	161	C	
W5BBR	84,042	203	138	C	
W5UFA	43,710	155	94	C	
AC5ZS	12,087	79	51	C	
W5PR	626,226	1711	122	C	10
W5KJS	10,332	84	41	C	10
KD5FQF	10,080	80	42	C	10

West Texas

N5DO	810,468	958	282	B
KD5RQ	120,582	319	126	B
KF5YZ	119,646	289	138	B
WB5QLR	43,848	168	87	B
AG4CG	18,522	98	63	B
NZ5M	2,325	31	25	B 15

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East Bay

K6JAT	112,500	300	125	B
KK6WT	61,752	248	83	B
K6BIR	36,072	167	72	B
KF6PKG	30,744	168	61	B
KE6QR	25,740	132	65	B
N6BV	2,402,955	2391	335	C
W6/NP4IW	40,020	230	58	B 20
KF6ULM	6,552	84	26	C 15
KG6HM	2,430	45	18	B 10

Los Angeles

W3SE	399,066	586	227	B
K6ASK	122,364	309	132	B
WO6M	67,872	224	101	B
KB6ATT	52,272	176	99	B
WB6NFO	46,956	182	86	B
W6RCL	41,076	163	84	B
N6UB	20,736	108	64	B
W6AFU	17,856	124	48	B
W6UE (W4EF,op)				
	1,498,980	1505	332	C
N6ED	1,475,694	1542	319	C
K0DI	390,390	715	182	C
N6OPR	205,410	410	167	C
N6TW	181,068	382	158	C
AI6Z	68,040	189	120	C
KF6YAN	36,270	186	65	C
KU6T	3,339	53	21	B 40
W6AFA	197,964	702	94	C 10
W6FFH	43,875	225	65	B 10
NK6A	20,868	148	47	C 10

Orange

N7UC (W7YA,op)				
	90,315	223	135	A
WK6I	328,746	586	187	B
W6SA	153,126	362	141	B
WA6BFW	108,360	301	120	B
KR6ER	4,158	63	22	B
WW6O	441,450	675	218	C

Santa Barbara

NN6DX (W1PR,op)				
	113,400	315	120	B
WA6FGV	84,888	262	108	B
W6FM	388,206	711	182	C
WA5VGI	129,780	309	140	C
W7CB	123,942	454	91	C
KD6PQF	15,129	123	41	C 10

Santa Clara Valley

K6III	7,500	50	50	A
N6NF	761,124	1066	238	B
N6EM	246,450	530	155	B
KA6MAL	31,464	152	69	B
N6IV	24,780	118	70	B
K6UF	15,408	107	48	B
K6GT	345,744	588	196	C
N6DQ	55,581	191	97	C
AJ6V	29,190	139	70	C
K8PO	8,901	69	43	C 40
W6ISQ	3	1	1	C 20
K6HNZ	376,629	1243	101	C 15
K6XX	9,435	185	17	C 15
W9ABZ	186	31	2	B 15
KG6CEH	39,456	274	48	B 10

San Diego

W6CN	209,139	433	161	A
WN6K	611,289	939	217	B
AA6EE	37,440	156	80	B
K7JJ	434,400	724	200	C

San Francisco

K6UM	273,402	498	183	B
K6UUW	40,482	173	78	B
KD6ZZA	21,222	131	54	B
KC6AWX	14,550	97	50	B
KV6RO	11,514	101	38	C
W6ESJ	21,777	119	61	B 15

San Joaquin Valley

KI6PG	4,275	57	25	B
W6TE	262,848	592	148	C
K6XJ	212,355	429	165	C
KA6BIM	282,240	840	112	C 10
NT6K	91,440	381	80	B 10

Sacramento Valley

K6KO	157,752	313	168	B
W6RFF	147,696	362	136	B
N6JM	121,905	315	129	B
KI6T	647,427	853	253	C
W6QEU	261,834	578	151	C
KJ6RA	99,414	263	126	C
K6RN	65,610	270	81	C 15
W6RKC	14,832	103	48	B 15

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Arizona

N3AIU	245,310	481	170	A
N7IR	80,586	242	111	A
NQ7X	73,440	240	102	A
KX7J	34,680	136	85	B
W7DPL	8,778	77	38	B
N7PWZ	2,457	39	21	B
K5RR	1,096,488	1256	291	C
K6TIM	284,928	424	224	C
NF7E	171,120	368	155	C
KN5H	128,316	289	148	C
KC7V	126,000	300	140	C
N7UJJ	62,100	207	100	C
W7ZR	22,302	118	63	C
N7JXS	20,880	116	60	C
W7MD	17,976	107	56	C
W7DD	23,214	146	53	C 80
AA7A	337,464	1032	109	C 10
W7USA	86,700	340	85	B 10
W7YS	21,267	139	51	C 10
W7AYY	16,500	110	50	C 10

Eastern Washington

WS7V	169,260	403	140	B
W7AVA	37,224	141	88	B
KC7WUE	12,423	101	41	B
WA7LT	91,611	351	87	B 15
K7EFB	14,238	113	42	B 10
K7MM	480	20	8	B 10

Idaho

KW7N	122,112	318	128	B
KG7WZ	21,150	150	47	B
KG7H	510,384	784	217	C
KJ7TH	137,280	440	104	C 15
W1HUE	6,972	83	28	A 10

Montana

KE7NO	177,018	362	163	B
KK7QJ	77,100	257	100	B
KG7VQ	18,414	99	62	B
AC7GM	18,207	119	51	B
W7YM	17,820	108	55	B
N7CZ	15,210	78	65	B
K7LRF	5,106	46	37	B
W7WK	262,995	445	197	C
KC7UP	244,398	506	161	C
K7ABV	97,782	379	86	B 15

Nevada

NV7A (K5RC, op)				
	236,070	645	122	C
KC7DB	181,542	383	158	C
K7QE	37,146	151	82	C
W7EB	292,284	1059	92	C 15

Oregon

W7YAQ	148,680	354	140	A
KI7Y	279,222	538	173	B
W7YVK	53,580	190	94	B
W7GG	1,889,550	1950	323	C
K7ZZ	1,077,159	1541	233	C
K0JJ	397,500	625	212	C
KR7X	187,920	540	116	C
W7OZ	93,930	310	101	C
W7BJB	81,840	248	110	C
W7EJ	581,160	1670	116	C 15
WA7AR	308,328	886	116	C 15
KA7FEF	4,176	58	24	B 10

Utah

W7HS	76,125	203	125	B
K1IF	185,298	347	178	C
N7LYV	124,125	331	125	C
W7UT	1,890	30	21	B 80
KO7X	33,984	192	59	C 20

Western Washington

W7/JR1NKN	8,910	110	27	A
KB7N	103,968	304	114	B
W7GTO	30,051	159	63	B
K7SR	25,542	129	66	B
KB7PKC	13,818	98	47	B
W7JAM	8,640	80	36	B
K7RI	1,459,050	1775	274	C
W7QN	224,601	443	169	C
N7WDX	133,857	321	139	C
K7BP (W7HUY,op)				
	65,268	196	111	C
KE7SW	51,660	205	84	C
WI7F	25,986	122	71	C
W7WA	577,791	1493	129	C 20
W7IJ	80,373	367	73	C 10
N7CKP	90	6	5	B 10

Wyoming

WA8WLO	71,910	235	102	B
KD7RX	10,812	68	53	B
N7JT	35,880	130	92	C

8

Michigan

N8CN	543,555	771	235	B
N8WK	448,836	662	226	B
K8GT	419,976	614	228	B
K8CV	175,536	368	159	B
W8OW	133,920	310	144	B
N8BHT	130,680	330	132	B
KE8FO	108,129	271	133	B
WB0WAO	85,020	218	130	B
KC8MPQ	81,585	245	111	B
N8NX	62,685	199	105	B
NO8S	51,000	200	85	B
N8EN	47,571	157	101	B
K8ESQ	29,070	170	57	B
N8DXR	24,708	116	71	B
N8VEN	23,100	110	70	B
K8IKW	19,488	116	56	B
WB8ZXI	18,720	104	60	B
WA8OLD	17,574	101	58	B
W8KZM	11,376	79	48	B
K8GL	2,051,163	1863	367	C
W8MJ	647,241	833	259	C
WB8CHE	13,629	77	59	C
KT8X	11,583	99	39	C
W8TWA	108,810	403	90	C 20
W8UD	155,325	545	95	C 15
N8LIQ	65,052	278	78	C 15
K8IR	24,804	156	53	B 10

Ohio

N8XA	87,768	212	138	A
N8KM	760,596	964	263	B
KI8IZ	279,684	457	204	B
AF8C	201,894	418	161	B
NC8V	172,272	388	148	B
AK8B	126,270	305	138	B
N8SSE	115,668	306	126	B
KC8HWV	97,755	245	133	B
N8BV	95,250	254	125	B
W8KNO	94,800	400	79	B
N8TXI	93,375	249	125	B
K8VUS	68,052	214	106	B
W8VE	66,906	189	118	B
K8LY	64,152	216	99	B
W8IDM	53,550	175	102	B
K8NMG	47,277	153	103	B
N8AA	38,250	150	85	B
KD8VK	11,844	84	47	B
KI8FB	10,731	73	49	B
K8DX	4,245,606	3166	447	C
W8BIN	618,276	769	268	C
W8KEN	469,404	708	221	C
WG8Y	203,400	678	100	C
KU8E	306,456	904	113	C 15
ND8DX	438,486	1366	107	C 10
K8ND	269,040	760	118	B 10
N8MWK	66,564	258	86	A 10
WD6ADM	42,840	204	70	B 10
WB8PLP	42,036	226	62	B 10
K8KSN	16,005	97	55	B 10

West Virginia

KC8FS	1,246,710	1433	290	B
K5IID	940,212	1092	287	B
N0NGT	49,470	170	97	B
KC8OAN	27,132	119	76	B
KK8WV	25,200	112	75	B
KV3R	1,244,622	1334	311	C
K2UOP	762,450	850	299	C
K8KFJ	9,504	72	44	C 10

9

Illinois

K9JE	451,440	684	220	B
W9IL	293,400	489	200	B
W9FGH	234,135	473	165	B
N9REP	228,000	475	160	B
W9ILY	170,520	406	140	B
AA9DM	134,994	302	149	B
K9CS	105,033	223	157	B
W9JJT	77,274	243	106	B
W9HL	67,536	201	112	B
NZ8C	57,528	188	102	B
N9KO	51,840	180	96	B
WB9PPL	51,030	189	90	B
KA9CAR	39,780	170	78	B
W9LYA	36,801	141	87	B
KB9CYL	34,965	185	63	B
N9DT	31,185	165	63	B
W9VQ	28,536	116	82	B
WD9FEN	28,080	130	72	B
NG9R	24,408	113	72	B
KD9AC	18,666	102	61	B
KB9VDV	16,530	95	58	B
KA3HSW	13,452	76	59	B
WA9LAY	1,170	26	15	B
K9ZO (KB9UWU,op)				
	1,555,200	1600	324	C
KX9DX	300,696	536	187	C
W9LYN	114,480	265	144	C
W9OA	99,840	260	128	C
WA9CCQ	65,073	199	109	C
NB9Q	51,603	167	103	C
K9IDQ	35,040	160	73	C
W9GIG	30,240	105	96	C
WA9TPQ	8,004	58	46	C
KK9A	6,600	50	44	C
K9BGL	16,968	101	56	C 80
W9BNR	15,510	110	47	B 20
K9RR	59,130	219	90	C 15
K9UQN	20,829	131	53	C 15
W9OF	84,318	299	94	C 10
N9GUN	67,308	284	79	B 10
KE9EX	363	11	11	B 10

Indiana

K9DIY	4,896	51	32	A
N4TZ	1,084,800	1130	320	B
N9DR	237,276	468	169	B
K9IG	219,261	371	197	B
K9MI	189,540	390	162	B
K9TTT	106,200	236	150	B
N9KT	22,272	116	64	B
KB9TOW	3,672	34	36	B
W9RE	4,305,375	3225	445	C
KC9FC	360,162	642	187	C
WA1MKE	205,254	378	181	C
N9QX	9,324	74	42	C 40
WT9U	41,280	215	64	B 15
K9NW	593,280	1648	120	C 10

Wisconsin

N9UA	351,540	558	210	B
KB9NIV	104,877	271	129	B
KB9RLB	9,324	74	42	B
W9ISC	5,076	47	36	B
W9BCV	275,730	455	202	C
W9JA	233,058	434	179	C
N9OY	71,415	207	115	C
WI9M	57,645	183	105	C
KB9Q	30,861	127	81	C
W9GXR	18,954	117	54	C 40
K9YNF	57,591	243	79	C 20
K9CAN	52,560	240	73	C 20
W9OP	210,540	580	121	C 10
K9RSW	3,969	49	27	C 10
KB9VSG	741	19	13	B 10

0

Colorado

W0AH	517,470	734	235	A
KK0Q	173,448	396	146	A
KI0ND	49,914	177	94	A
W0ETT	359,058	581	206	B
N0ZA	147,294	334	147	B
KT0L	77,436	239	108	B
WB0HZL	46,200	154	100	B
N0KJI	32,232	158	68	B
N0IBT	25,830	123	70	B
K0KPB	23,760	99	80	B
ND7A	10,971	69	53	B
K8PVD	7,950	53	50	B
KF4MDW	4,935	47	35	B
K0GAS	264,408	479	184	C
K0CO	1,800	25	24	C
KG0ZI	251,781	943	89	C 15
KC0GBC	12,804	97	44	B 10

Iowa

K0GT	81,618	223	122	A
WN0G	296,625	565	175	B
N0RKX	208,794	391	178	B
K0VM	190,026	391	162	B
K0CF	144,828	324	149	B
NE0P	83,205	215	129	B
KC0BOM	30,192	136	74	B
K0XD	12,348	98	42	B
W0PPF	57,327	197	97	C
W0EJ	31,104	144	72	C
K0DAS	95,697	343	93	C 10

Kansas

N0YYO	372,075	605	205	B
K0BJ	180,180	385	156	B
WA0YXK	156,870	315	166	B
KB0MZG	150,930	390	129	B
KB0WPY	125,670	295	142	B
KA0EIC	50,400	168	100	B
KC0DEB	34,584	131	88	B
W0WPL	12,825	75	57	B
KC0GPW	10,296	66	52	B
KC0IDI	363	11	11	B
N0UU	442,602	734	201	C
KK0SS	391,194	1266	103	C 10
KG0UA	38,316	206	62	C 10
K0LLS	648	18	12	B 10

Minnesota

AC0W	1,132,398	1187	318	B
KW4T	497,502	666	249	B
KA0ZPP	73,800	246	100	B
WA0MHJ	66,444	196	113	B
N0BHC	38,220	140	91	B
KC0H	27,000	120	75	B
K0MPH	21,528	104	69	B
WA2MNO	16,704	96	58	B
K0DMR	8,178	58	47	B
N0BM	6,000	50	40	B
KT0R	985,932	1074	306	C
N0HJZ	547,080	776	235	C
WA2HFI	70,059	193	121	C
W0OR	28,917	119	81	C

Missouri

K2HT	118,455	265	149	B
KN0E	35,862	139	86	B
KI0ET	28,188	116	81	B
W0YZZ	26,733	133	67	B
KI0MB	4,329	37	39	B
KI9A (@K0LIR)				
	530,208	789	224	C
K0DAT	106,272	246	144	C
W0PKO	34,974	134	87	C
K0JPL	4,032	42	32	C
WA0OTV	810	18	15	C 15
K4VX (N9JF,op)				
	487,896	1402	116	C 10
K1XT	161,028	497	108	B 10

North Dakota

K0UD	205,884	399	172	B
N0ND	148,044	338	146	B
KB0IXX	70,452	206	114	B
W0CAQ	14,706	114	43	B

Nebraska

K0IL	241,500	460	175	B
N0NF	110,880	280	132	B
N0WY	55,521	199	93	B
N0LZ	30,750	125	82	B
KT0K	159,192	603	88	B 10
WN0L	35,979	179	67	B 10

South Dakota

WB0ULX	102,816	238	144	B
KD0EE	216,657	399	181	C
WD0BMS	102,900	245	140	C
WD0BMR	67,104	233	96	C

Maritime

VE1JS	471,495	731	215	B
VE9WH	142,128	329	144	B
VE1OP	1,484,592	1576	314	C
VE9MY	121,506	263	154	C

Newfoundland-Labrador

VO1MP	1,783,992	1517	392	B
VO1BC	487,575	825	197	B
VO1WET	1,688,544	2132	264	C

Quebec

VE2AWR	447,120	648	230	B
VA2IC	52,920	180	98	B
VE2OWL	11,040	80	46	B
VE2AYU	926,640	1170	264	C
VA2AN	28,032	146	64	C 15
VE2TKH	64,818	277	78	C 10
VE2LHP	32,745	185	59	C 10

Ontario

VE3EJ	3,111,264	2493	416	B
VE3MQW	559,977	781	239	B
VE3GD	130,872	328	133	B
VE3YQY	48,480	202	80	B
VE3AGC	34,443	129	89	B
VE3RGG	3,255	35	31	B
VE3OI	3,109,098	2713	382	C
VA3UZ	3,097,710	2310	447	C
VE3XAP (@VE3MIS)				
	154,470	542	95	C 20
VA3KA	437,250	1325	110	C 10
VE3XN	178,911	579	103	C 10
VE3UZ (@VA3RU)				
	71,811	303	79	B 10
VE3STT	17,628	113	52	C 10
VA3SPN	270	10	9	B 10

Manitoba

VE4RA	154,809	309	167	B
VE4RP	53,760	140	128	B
VE4JOP	22,464	156	48	C
VE4HAZ	17,136	112	51	B 10

Saskatchewan

VE5SF	444,150	658	225	B

Alberta

VE6TN	251,316	468	179	B
VE6BF	68,139	201	113	B
VE6JO	675	15	15	B
VA6RA	9,588	94	34	B 15

British Columbia

VE7XF	76,800	160	160	B
VE7QO	48,357	199	81	B
VE7XB	255,024	528	161	C
VE7XO	151,125	403	125	C
VE7AVV	42,303	239	59	B 10
VE7VF	32,916	211	52	B 10
VE7NS	31,650	211	50	B 10
VE7NNN	11,622	149	26	B 10

Yukon

VY1MB	2,415	35	23	B 10

Single Operator Assisted

1

KS1L	4,028,988	3116	431	C
K1KI (KM1P,op)				
	3,434,400	2700	424	C
AA1QD	2,591,106	2261	382	C
KI1G	2,511,453	2027	413	C
K1AM	2,361,960	1944	405	C
WC1M	2,241,462	1882	397	C
N1DG	2,123,406	1587	446	C
K1JN	1,716,708	1498	382	C
N8RA	1,660,329	1623	341	C
NR1DX	1,581,780	1286	410	C
K1UQ	1,416,255	1315	359	C
K1RX	1,275,960	1240	343	C
KK1DX	1,257,456	1072	391	C
W1LLU	1,243,164	1226	338	C
K1NU	1,229,868	1076	381	C
K1OA	1,191,285	1151	345	B
K1GU	1,057,032	1108	318	C
KE1IH	1,036,164	1093	316	C
K1JE	965,196	993	324	C
AA1V	908,622	858	353	C
K1VV	897,624	959	312	C
W1QK	866,736	926	312	C
NQ1K	803,682	738	363	C
WO1N	759,186	827	306	B
N1API	734,052	913	268	C
KX1X	661,713	893	247	B
K1RV	603,174	703	286	B
K1BD	574,434	658	291	C
K1ST	549,504	636	288	C
W1SRG (AG1C, op)				
	543,078	678	267	B
KE1KD	469,050	530	295	C
K1HI	445,440	640	232	C
W1BIH	338,652	409	276	C
W1HR	337,920	440	256	C
W1AZ	337,095	495	227	B
WA1ZYX	280,350	445	210	B
W1RM	224,442	337	222	C
K1TS	185,220	420	147	B
WV1M	128,313	269	159	C
K1AJ	121,605	335	121	C
K1TH	107,199	277	129	C
W1WFZ	65,472	176	124	C
N1CPC	54,249	169	107	C
K1TW	50,925	175	97	B
K1SF	48,852	177	92	C
K1NYK	41,448	157	88	B
NF1A	25,200	105	80	C
N1NQD	16,206	73	74	C
W3SM	9,576	84	38	B
K1KU	3,534	38	31	C

2

W2RE	4,509,582	3178	473	C
K2XA	4,054,125	2845	475	C
W1GD	3,259,359	2367	459	C
N2MM	2,833,164	2127	444	C
N2ED	2,635,671	2029	433	C
W2GDJ	2,113,230	1735	406	C
N1RK	1,492,860	1390	358	C
W2YC	1,433,586	1177	406	C
W2WB	1,400,454	1286	363	C
W2TV	1,373,535	1165	393	C
WE2F	1,196,046	1242	321	B
KQ2O	1,123,362	1278	293	C
N1EU	1,114,155	945	393	C
WA2VYA	1,064,826	1134	313	C
K2XF	816,960	920	296	C
K2BX	814,680	876	310	C
N2UM	675,792	741	304	C
K2WB	644,412	647	332	C
KF2O	619,920	492	420	C
W2KA	601,710	647	310	C
WT4Q	510,000	680	250	C
N2FF	503,595	589	285	C
W2GO	503,496	666	252	C
W2YR	469,044	606	258	C
W6XR	432,468	492	293	C
WA3RHW	354,252	557	212	B
KD2P	308,550	425	242	C
K2EP	283,575	475	199	C
WK2H	278,595	453	205	C
K2QMF	162,288	294	184	C
KB2EOQ	160,440	280	191	B
WE2L	158,817	317	167	C
N2OO	152,847	333	153	C
N2CY	125,433	231	181	C

N2SCJ 84,645 209 135 C
W2EZ 58,500 195 100 C
K2OWE 52,155 183 95 C
K2WJ 3,744 48 26 C

3

K3WW 4,127,760 2730 504 C
N3RR 3,794,070 2581 490 C
K3PP 2,933,595 2085 469 C
AA3B 2,681,910 2079 430 C
W3FV 2,375,076 1894 418 C
N3RS 2,062,368 1736 396 C
N3ED 1,753,920 1392 420 C
N3ZA 1,604,400 1337 400 C
WT3W 1,361,970 1227 370 C
N3MV 1,321,008 1168 377 C
K3NZ 1,309,350 1075 406 C
K3ND 1,191,486 1138 349 C
W3EKT 974,088 978 332 C
K3IXD 935,064 936 333 C
W3AP 926,601 1033 299 C
K3JG 923,037 983 313 C
W3UJ 831,198 986 281 B
K3CP 815,877 807 337 C
WT3P 814,086 923 294 C
WB3CIW 476,982 657 242 C
NN3Q 472,626 682 231 C
NA1DX 431,664 529 272 B
W3UL 395,928 564 234 C
W3IZ 382,704 536 238 C
W3ZJ 351,600 586 200 C
K3GEG 350,220 449 260 B
K3BSA 297,510 470 211 C
WA3KPP 272,700 450 202 B
W3OV 214,110 366 195 C
N3RD 105,096 232 151 C
WB4ZHO 101,952 192 177 B
NZ3O 93,294 219 142 C
KB3MM 63,336 182 116 B
4U1WB (AJ3M,op)
48,960 192 85 C
WR3L 34,992 108 108 B
N4XR 31,827 103 103 C

4

N4AO 2,702,160 2085 432 C
K3KO 420,657 499 281 C
KD4SN 249,984 384 217 B
W3IO 241,920 384 210 C
KO4MR 87,840 240 122 C
K8YC 63,750 170 125 B
N8CH 33,660 132 85 B
K3IZ 20,202 91 74 B
KD4RH 16,848 104 54 C
W4ATL 3,300 44 25 B

5

N5JR 925,629 1147 269 C
K5LP 400,113 511 261 C
N5MT 148,848 443 112 C
W5AJ 137,598 323 142 B
N5ZC 120,006 226 177 C
K5NA 53,775 239 75 C
KM5WR 51,840 192 90 C
KE5OG 2,028 26 26 C

6

N6WS 707,265 845 279 A
W6TK 273,834 922 99 C
N6ER 218,136 488 149 C
N6HC 188,454 641 98 C
N6FM 141,036 292 161 C
K6ACZ 115,926 278 139 B
K6EP 111,384 273 136 C
NF6R 50,730 178 95 C

7

W7OM 855,792 1132 252 C
W7CT 326,802 502 217 C
WA7UTM 272,745 435 209 C
K7BG 104,850 233 150 C
KT7G 24,750 125 66 B
W7YES 10,557 69 51 C

8

N8TR 2,594,592 1848 468 C
N8BJQ 2,122,824 1892 374 C
K8DJC 626,175 605 345 C
ND8L 219,372 362 202 B
N4ZR 184,548 364 169 C
WA8WV 61,491 199 103 C
W8IMF 5,250 50 35 C

9

N2BJ 1,575,735 1505 349 C
W9XT 1,421,784 1302 364 C
WE9A 314,601 497 211 C
KB9CRY 275,808 416 221 C
NV8V 229,632 416 184 C
KB9KEG 137,250 305 150 B
N9LCR 100,062 327 102 C
N9LF 87,318 231 126 B
N9BOR 14,820 76 65 B
KG9N 12,936 98 44 B
K9GY 12,276 93 44 B
K9WX 6,000 50 40 B
N9XX 5,658 46 41 B

0

K0DU 1,558,332 1692 307 B
N0AT 599,571 651 307 C
K0OB 258,408 444 194 C
K0XM 71,967 161 149 B
K0BX 28,350 135 70 C
VA3NA 409,932 579 236 B
VE3HG 393,990 571 230 B
VA3NR 90,744 199 152 B

Multioperator Single Transmitter

1

AA1ON (+W1RH, AA1IZ, KC1YR)
2,683,251 2019 443 C
KK1L (+K1RD, K1LI)
1,986,225 1865 355 C
N1MM (+N1IXF)
1,267,938 1218 347 C
NC1I (+WA1LPJ, N1DPM)
1,142,430 1130 337 C
N1AU (+WC1D)
948,387 991 319 C
W1DAD (+K1MOM)
402,600 550 244 B
N1SOH (+W1FM)
383,994 547 234 C
W1AF (K3UOC, N1QZY,ops)
364,179 521 233 C
KT1O (+N1AO, K1JB)
319,731 541 197 B
N1WW (AE1B, K1KMD,ops)
163,800 364 150 B
W1SMH 143,220 341 140 B

2

KY2J (+NA2N, WA2JQK)
3,883,680 2790 464 C
K2XR (+N2IW, WB2WIK, N2YFH, K2OWR)
3,664,791 2561 477 C
K2DM (+K3ZM)
2,563,176 2044 418 C
W2XT (+W2EN, W2RD)
2,450,466 1973 414 C
W2MU (KD2NE, KE2SD, N2MCI, N2SA, W2XL, WA2MMX, WB2AQU,ops)
1,807,377 1573 383 C
AB2DE (+ops)
1,362,126 1198 379 C
WB2KHO (+KB2NOW)
590,100 700 281 B
K2YEH (+KC2HLY, W2JEF, N2VR, K2CDJ)
531,531 649 273 B
AA2UP (+N2XBD)
331,452 594 186 C
WB2ELW (K2CF, KC2DGC, K2KRB, K2OO, KA2MGE, N2OY, KC2GJX, ops)
161,322 322 167 C
KF2EW (+ops)
31,356 134 78 B
WB2JSM 3,813 41 31 B

3

NE3F (+KS3F, NT3V)
3,245,760 2415 448 C
WT3Q (+K3OX)
2,397,516 1804 443 C
K3OO (+K3OOO)
1,583,604 1364 387 C
N3BNA (+N2WKS)
1,512,798 1267 398 C
W3LJ (+K3NCO, W3IDT, K8DH)
643,500 750 286 C
WY3T (+N3JRX, W3BDR)
301,938 553 182 C
K3IVO (+ops)
216,240 424 170 C

4

KT4Q (+KG4GKJ)
1,070,190 1265 282 C
K4TCG (@NY4T) (NY4T, W4IV, N4SSD, KE4KMG, N4LKE, W1ADE, KR4FO, KF4AIG,ops)
647,961 797 271 B
K4RF (+K4SZ)
180,438 493 122 C

5

N1LN (+W5MF, K7LEX, WA5OJE, N5TU)
2,660,232 2228 398 C
KE5GL (+KA5OSM, K4OCE)
104,064 271 128 C
W5YM (K5KVN, KC8ATF, + ops)
20,034 106 63 B

6

W6YX (N6DE, W6LD, N7MH, WJ6O, AD6FX, ops)
1,985,988 1844 359 C
W6MLP 16,779 119 47 B
W6TDM 5,355 51 35 B

7

WX7P 318,912 604 176 C

8

K8AZ (+K8BL, K8LN, K8MR, K8NZ, W8KIC, WB8K, WT8C)
4,302,252 2823 508 C
N4SEA (+ops)
366,639 553 221 C

9

WN9O (+W9IU)
2,511,519 1907 439 C
KD9ST (+KA9SQS, KA9SQR, KB9EXE)
2,003,856 1744 383 C
K9CU (KX9X, NO9Z, K9BF, AA9YF, W9SZ, K9XE, W9ADS, K9QZI, KB9PMT,ops)
1,195,908 1238 322 C
K9QT (+K9NR)
902,850 926 325 C
K9WM (NN9K, K9WA,ops)
62,451 257 81 B

0

KR0B (+N0BKL, KJ0B, KS0T, KB0KQA, N0RA, K0KP)
1,802,196 1517 396 C
K0UK (+K0CL, W0DET)
1,363,425 1225 371 B
W0NO (+AB0S)
1,291,938 1321 326 C
N0GVK (+KE0**BZ**)
454,965 619 245 C
W0GOM (+K0BX, N0AJ)
174,840 376 155 C
W0BR (+N0SZE, KC0EVN)
161,298 309 174 B
K0JA (+K0JE)
54,516 154 118 C
VE3RM (+VE3WIB)
2,451,456 2128 384 C
VE5FX (+ops)
373,023 651 191 C

Multioperator Two Transmitters

K4JA (+K9JY, KG9X, WE9V, W4JVN)
10,067,106 5971 562 C
W2A (W2XX, N2TX, KE2TR, AA2MF, ops)
8,724,672 5346 544 C
K2TE (+W1GO, KB1SO, N1SNB, KW1DX) 6,602,310 4290 513 C
NZ1U (@KB1H) (+KB1H, NB1U, N1XS, AA1CE, KB1DFB, W1TJL, K1EBY, KE1LI) 5,372,730 3618 495 C
K2RD (+W1CU, WA1FCN)
5,266,512 3504 501 C
N5TW (+NA4M, WM5R, K5EWS, KI5DR, W5RQ, K5PI, WQ5G, W5TD)
5,122,482 3761 454 C
W6AX (@W6GO) (N6IG, K3EST, K6AW,ops)
5,092,164 3674 462 C
W6EEN (+K6XC, W6ORD, DL3OI, KR6X, N6RT)
4,679,832 3436 454 C
N0NI (+W0OV, W0ETC, W0FLS, N0AC, N0HR)
4,118,208 2848 482 C
AA5NT (+ops)
3,542,556 2759 428 C
AE9B (+NW0L, K0OU)
3,483,564 2569 452 C
W3GNQ 3,168,444 2306 458 C
W8ZA 3,085,731 2343 439 C
K0IR (+K0SV, W0MRD, W80TRA)
3,067,080 2440 419 C
W4CAT (K1KY, NQ4U, KG4ENY, KC4QFR, W1ADE, KQ6ID, W9WI, K4OOO, W4UR, KE4OAR)
2,060,949 1903 361 C
K6NO (K6RC,K6SG)
1,972,782 1842 357 C
K6IDX (+K0BEE, W6OAT, W1SRD, KH8A, W6CWO)
1,861,269 1637 379 C
N1RR (+WM1K, W1KM, N2PGD, N1LH)
1,794,447 1621 369 C
K4WPM (+K4QFF, KS4CG, K4WZ, WA4ZJJ, AD4QB, KB4TXS, AK5E)
746,460 858 290 B
N3BB 690,921 997 231 C
W9YB (KB9VOR, N9WEW, KB9WSY, WB9OFG, KB9SZW, KB9YHT, XE1XOE, ops)
154,413 301 171 B
VE6ZA (+VE6NWG, VE6NWR, VE6RSS)
89,925 275 109 C

Multioperator Unlimited Transmitters

KC1XX (+AD1C, K1GQ, K1XM, W1FV, W1JCC, N2AA, W2RQ, KM3T)
16,795,188 8406 666 C
W3LPL (+K1HTV, K1RZ, W2GG, ND3A, WX3B, AI3M, K3MM, KE3Q, NK3R, K3RA, K3RV, W3UR)
15,265,395 7745 657 C
K9NS (AA9D, KB3AFT, K9DX, K9GS, K9HMB, K9NO, K9PW, K9PPY, K9RO, K9RS, KS9W, N9NCX)
11,461,671 6357 601 C
KR1G (+K1EPJ, KF1V, WA1S, K1RX)
8,438,652 5133 548 C
W3PP (+N3KW, NW3Y, K3FT, N3HUV, N3PT, W3OR, W2GJ, WB4FDT, KW3Z)
8,373,792 5131 544 C
K3ANS (+K2NJ, W2NO, W2CG, K3MD, N3AD, W3ZL, K3YD, WF3H, N3IYX, N3PUR, KF4ERW)
7,693,776 4646 552 C
N2RM (+AA2D, N2NC, NA2AA, NM3K, W2GMA, WM2H)
7,548,156 4668 539 C
W4MYA (+KF4QQY, N4DEN, N4EHJ, NK4H, W4DAA, W4HJ, WA4QDM, WK4Y, logger)
7,533,870 4694 535 C
K1TTT (+K1MK, W1TO, NJ1F, K1EP, N1SR, K2KQ)
7,125,132 4382 542 C
K3NM (+W3CF, LU9AY, AA2WN, K3MQH)
6,042,036 4004 503 C
K3CT (@K3II) (+K3II, K3TEJ, K5KG)
5,474,208 3592 508 C
W0AIH (+WR0DK, AE9D, N9TGR, N9TK, NE9U, KB9TTO, K9TP, AA0ZZ, K80VRV, K0TG, KB9S)
4,109,664 2848 481 C
KV1W (+N6RFM, W1RZF, W1NR, K1MBO, W1BK)
4,084,182 2966 459 C
AA1K (+KB3FEE, AB1P)
3,879,480 2939 440 C
K3DI (+W3OQ)
1,193,424 1081 368 C
VE7SCC (+ops)
932,715 987 315 C
K0RAY (+N0PKX)
582,000 776 250 C
KB5TX (KC5OEG, AB5UE, KM5SY, KK5RZ, W5XW, KC5HRN, N5DXV, W5AYB, KC5HVY)
168,480 351 160 B
W6EBW (K6LW, W6JHB, W6DAY, KF6ZOD, KG6ECF, KE6ZYT, KE6OFL, W6TEC, KG6AVD)
140,598 321 146 B
WA6BMH (KA6WZR,KW6PE,KO6GWZ, W6GRY, KE6DKU, KE6BBP, N6OPB, KO6WZ,ops)
900 25 12 B

DX

Single Operator

Africa

Madagascar

5R8FU 54,600 200 91 C

Madeira Islands

CT3KU 10,146 89 38 B
CT9L (DJ6QT,op)
1,869,678 2586 241 C
CT9KY 9,300 100 31 B 20
CT3BX 573,834 3242 59 C 10

Canary Islands

EA8/DK7ZH 70,587 253 93 A
EA8BH 6,824,700 7583 300 C
EC8AUZ 78,312 502 52 C
EA8LS 43,632 303 48 C 20

Egypt

SU9ZZ 515,238 1087 158 B

Mali

TZ6DX 786,132 1506 174 C

South Africa

ZS1NF 62,244 247 84 B

Asia

Vietnam

3W2LWS (WA1LWS, op)
11,712 122 32 B

Georgia

4L1DA 8,400 112 25 A 10

Israel

4Z5FL/M 33,366 166 67 B
4Z5JQ 15,759 103 51 B
4X1VF 27,825 265 35 B 10

Kuwait

9K9X 47,124 238 66 C
9K9Z 46,731 421 37 B 10

United Arab Emirates

A61AO (RV6LNA,op)
240 10 8 C160

Taiwan

BV7FF 1,476 41 12 C 10

Kyrgyzstan

EX2T 80,910 290 93 C
EX2X 13,824 128 36 C 20
EX8MDA 21,168 168 42 C 15
EX7ML 4,824 67 24 C 15
EX8MIO 1,260 28 15 B 10

South Korea

HL5UOG 34,371 171 67 B
HL2AMO 14,076 102 46 B
DS5ACV 9,594 82 39 B

Thailand

E21EIC 9,933 77 43 B
HS6NDK 162 9 6 B 15

Japan

JR4DAH 84,390 290 97 A
JA2JSF 81,432 261 104 A
JA2MWV 32,760 182 60 A
JA4AKN 11,781 119 33 A
JA9SCB 1,575 35 15 A
7L4IOU 337,884 761 148 B
JJ1VRO 223,929 537 139 B
JS1OYN 100,161 359 93 B
JA1OZK 89,628 308 97 B
JH4UTP 86,445 339 85 B
JR4PMX 76,356 303 84 B
JA1XRH 59,508 228 87 B
JE7DOT 51,030 210 81 B
JA2BQX 44,550 198 75 B
JH2QZA 44,550 225 66 B
JA1SWB 40,656 242 56 B
JA3YPL (JJ3TBB, op)
28,188 174 54 B
JH6OPP 27,633 151 61 B
JA5JCC 27,081 153 59 B
JA2GHP 26,730 165 54 B
JL2HUJ 26,196 148 59 B
JA1ALX/9 25,665 145 59 B
JA1IZ 25,254 138 61 B
JG0OXL 25,032 149 56 B
JR1MRG 22,578 142 53 B
JH6FTJ 19,737 129 51 B
JR1SGU 19,602 121 54 B
JK1WXM 16,272 113 48 B
JA1KK 14,544 101 48 B
JA1XUY 12,474 99 42 B
JH1RMH 11,016 102 36 B
JA0IOF 8,613 99 29 B
JJ1NZA 8,010 89 30 B
JF2SKV 7,854 77 34 B
JA0BJY 7,035 67 35 B
JA1VBP 6,603 71 31 B
JE1SLP 6,222 61 34 B
JH1PXY 5,832 72 27 B
JM1NHZ 5,376 64 28 B
JA2PFZ 5,133 59 29 B
JL3RDC 4,680 65 24 B
JA1XPU 4,464 62 24 B
JG2REJ 3,102 47 22 B
JQ1AHZ/2 2,109 37 19 B
JH1TUX 1,632 34 16 B
JR1GGB 1,530 34 15 B
7N4JZK 1,470 98 5 B
JH0IXE 648 18 12 B
JM3HYL 144 12 4 B
7N4HMB 126 7 6 B
JA9EJG 105 7 5 B
7J2YAF (JA1KSO,op)
2,224,368 3252 228 C
JH5FXP 1,896,024 2678 236 C
JH7DNO 1,780,704 2592 229 C
JA8RWU 1,565,520 2372 220 C
JA1ELY 1,481,205 2101 235 C
JH4UYB 1,285,725 1975 217 C
JH1EAQ 1,235,817 1881 219 C
JI2KVW 865,728 1503 192 C
JA2BNN 559,674 1054 177 C
JG1ZUY (JM1LPN, op)
512,550 1005 170 C
JQ1BVI 409,488 898 152 C
JA2AXB 235,170 585 134 C
JF2FIU 215,460 665 108 C
JA1PCY 195,570 530 123 C
JA3AOP 59,769 229 87 C
JJ1RDX 41,538 322 43 C
JA3ARM 28,665 147 65 C
7J1ABD 27,258 154 59 C
JL3JTD 25,308 114 74 C
JN3SAC 24,249 137 59 C
JA8TEZ 12,915 105 41 C
JA5IP 11,193 91 41 C
JH2BTM 10,260 90 38 C
JA6QDU 7,296 64 38 C
JR1LEV 6,696 62 36 C
JI7VUR 3,045 29 35 C
JG2CNZ 2,772 42 22 C
JA2QVP 90 6 5 C
JG3WCZ 60 5 4 C
JA0QNJ 10,593 107 33 C 80
JE1SPY 216 12 6 B 80
JH1APZ 360 15 8 B 40
JF2BDK 16,884 134 42 C 20
JE2HVC 6,030 67 30 C 20
JE1GZB 2,220 37 20 B 20
JH0EPI 2,145 55 13 B 20
JH7IMX 1,440 32 15 B 20
JA1STY 72 6 4 B 20
JA7BJS 152,544 908 56 C 15
JL3VUL 116,280 680 57 B 15
JH9URT 47,232 328 48 B 15
JR9NVB 47,187 321 49 B 15
JH8DHV 11,730 115 34 B 15
JA1PUK 10,488 92 38 B 15
7K2GMJ 9,672 104 31 B 15
JI8GZS 3,672 51 24 B 15
JK1BII 2,280 40 19 B 15
JA1EM 2,040 40 17 B 15
JG0EXP 1,404 26 18 B 15
JA7ADV 1,248 32 13 B 15
JF2FKJ 972 27 12 B 15
JE0VFV 441 21 7 B 15
JN3MUC 135 9 5 B 15
JA7CPW 75 5 5 B 15
JK8HDS 75 5 5 B 15
JK8FRL 18 3 2 B 15
JH1AEP 149,604 959 52 C 10
JA0QWO 79,950 533 50 C 10
JA7NVF 70,848 492 48 B 10
JH7NPF 51,348 389 44 B 10
JQ1UXN 50,160 380 44 B 10
JF3BFS 47,388 359 44 B 10
JE2HCJ 41,400 300 46 B 10
JG2TKH 32,508 252 43 B 10
JH1UUT 32,175 275 39 B 10
JA5FDJ 29,106 231 42 C 10
JA1BUI 28,509 221 43 B 10
8J1BAL 25,080 220 38 B 10
JI1HFJ 17,760 160 37 B 10
JJ6DGP 13,959 141 33 B 10
7N2UQC 12,183 131 31 B 10
JA1BBA 11,988 108 37 B 10
JA1HP 11,880 110 36 C 10
JH1OAI 11,040 115 32 C 10
JA3LFK 10,530 135 26 A 10
JH0NVX 10,506 103 34 B 10
JG1TVK 8,775 117 25 B 10
JM1GHT 7,533 93 27 B 10
JA3PYC 6,885 85 27 B 10
JA5ATN 6,804 84 27 B 10
JA6BGA 6,750 90 25 C 10
JA6EFT 6,375 85 25 B 10
JA8IJI 4,092 62 22 B 10
JG1GGF 3,933 57 23 B 10
JN1BMX 3,762 57 22 C 10
JK7QYZ 3,591 63 19 B 10
JG4OOU 768 32 8 B 10
JA1AAT 630 21 10 B 10
JA1EEG 336 16 7 B 10
JG1GCO 240 10 8 C 10

Ogasawara

JD1BIA 49,419 289 57 B

Jordan

JY9NX 71,145 279 85 C

Turkey

TA3BN 13,800 92 50 B
TA3J 2,856 56 17 B 40
TA3YJ 1,836 34 18 B 10

Asiatic Russia

RK9CZO (RX9CAZ, op)
109,134 387 94 B

RZ9OU	76,860	305	84	B
UA0QO	14,256	99	48	B
RX9CEL	6,930	66	35	B
UA0SE	3,519	51	23	B
RA0FN	123,795	393	105	C
UA9JDP	87,945	451	65	C
RX9SX	46,575	207	75	C
UA9OS	44,880	220	68	C
RV9SV	40,158	194	69	C
RV9BB	32,850	150	73	C
RW9QA	22,620	130	58	C
UA0JDD	7,884	73	36	C
RA9OW	281,532	1618	58	C 20
RZ9UA	234,525	1325	59	C 20
UA9MA	136,116	796	57	C 20
UA9FM	63,342	391	54	C 20
UA0SJ	25,584	208	41	B 20
RZ9IB	7,980	76	35	B 20
UA9BS	7,623	77	33	B 20
RX9UKF	4,368	56	26	B 20
UA9MAZ	3,969	49	27	B 20
RA9FDR	2,829	41	23	B 20
UA0FDX	130,152	748	58	C 15
UA0APP	1,395	31	15	B 15
RS0F	72,864	506	48	C 10

Kazakhstan

UN7FJ (@UN7FZ)				
	12,384	86	48	B
UP4L	335,625	895	125	C
UP5P (UN5PR, op)				
	181,956	514	118	C
UN7D	34,128	237	48	B 20
UN7JJ	109,272	628	58	C 15
UN9FD	1,080	30	12	B 15

Hong Kong

VR2BG	93,150	621	50	C 10

India

VU3DJQ	4,914	63	26	B 20

Europe
Croatia

9A4SS	113,100	377	100	B
9A5AZZ	1,665	37	15	B 80
9A6A	66,654	483	46	C 40
9A3ZA	360	15	8	A 40
9A4X	282,228	1622	58	C 20
9A7DM	108,216	668	54	C 20
9A2VR	164,673	963	57	C 15
9A3MA	155,781	911	57	C 15
9A2U (9A2R, op)				
	35,955	255	47	B 15
9A5Z	8,544	89	32	B 15
9A5Y (9A3NM, op)				
	251,460	1397	60	C 10
9A2RD	225,852	1298	58	B 10
9A9R	185,490	1145	54	C 10
9A5V	143,832	922	52	B 10
9A6ACY	35,217	273	43	B 10
9A2GA	9,540	106	30	C 10

Malta

9H1DE	101,994	382	89	B

Portugal

CT1EAT	463,935	985	157	B
CT1DYV	210,795	611	115	B
CT1EWX	180,000	600	100	B
CT1BNW	42,636	187	76	B
CT2GBK	3,000	50	20	B 40
CT1AOZ	169,008	1006	56	C 20
CT1BOP	388,869	2197	59	C 15
CT8T	429,933	2429	59	C 10
CT2GQN	99,144	612	54	B 10
CT2FUR	34,425	255	45	B 10

Fed. Rep. of Germany

DK3KD	138,321	423	109	A
DL1ARD	6,600	55	40	A
DL2JRM	2,808	36	26	A
DL7PP	553,164	1487	124	B
DK0DO	322,368	736	146	B
DJ1AA (AB0DL,op)				
	158,130	502	105	B
DL7APK	102,114	366	93	B
DL4RCK	85,065	265	107	B
DL4WA	68,376	259	88	B
DK4IO	45,333	219	69	B
DL2VB	24,750	150	55	B
DJ1VQ	13,365	99	45	B
DL9LR	12,177	99	41	B
DL8DXL	8,769	79	37	B
DL7VRG	4,950	50	33	B
DL8SDI	4,440	74	20	B
DJ6XB	3,510	45	26	B
DL3KDC	1,680	28	20	B
DL2DX	714,525	1361	175	C
DL3GA	486,873	1151	141	C
DL1PT	117,600	350	112	C
DK7FP	107,100	357	100	C
DH1TW	85,932	341	84	C
DL6DVU	33,276	188	59	C
DL3NM	6,426	51	42	C
DL3WB	2,640	40	22	C
DF3GY	70,950	473	50	C 40
DF7YU	73,008	468	52	B 20
DL5ME	67,473	441	51	C 15
DA1LDN	45,747	299	51	B 15
DL7XR	24,120	201	40	B 15
DL6RAI	284,439	1607	59	C 10
DF3KV	280,269	1639	57	C 10
DF9ZP	258,660	1437	60	B 10
DH0GDS	18,720	160	39	C 10
DL9ZWG	9,207	93	33	C 10
DJ2YE	7,800	104	25	C 10
DJ0BX	6,885	85	27	B 10
DL2ZAV	5,655	65	29	B 10
DL0XX	3	1	1	C 10

Spain

EA3MR	599,214	1297	154	B
EA1WS	559,008	1294	144	B
EA1OT	200,655	637	105	B
EA5QB	83,160	280	99	B
EA3NA	76,734	261	98	B
EA1WX	75,951	291	87	B
EA4AAK	73,038	259	94	B
ED5ASF	37,884	164	77	B
EA4EJR	33,288	146	76	B
EA1APS	24,003	127	63	B
EA3GIP	18,816	98	64	B
EA7FIQ	18,792	108	58	B
EA4EMC	18,408	104	59	B
EA2AVM	15.105	95	53	B
EA5TN	13,671	93	49	B
EA1HF	10,137	109	31	B
EA1DGE	8,100	75	36	B
EC2BAH	5,307	61	29	B
EA5DFV	1,650,537	2583	213	C
EA3BOX	1,255,956	2158	194	C
EA3WL	488,796	1058	154	C
EA3BIM	311,649	793	131	C
EA5BY	220,941	501	147	C
EA4BQ (OH0XX, op)				
	213,066	534	133	C
EA5FID	210,255	535	131	C
EA1FFC	130,326	406	107	C
EA3AAW	27,018	158	57	C
EA3GIS	15,288	91	56	C
EA3AQQ	15,015	91	55	C
EA1BID	2,337	41	19	C
EA3GHQ	6,804	81	28	C 40
EA1AAW	28,167	229	41	B 20
EA1DDO	107,730	630	57	C 15
EA3KT	31,458	214	49	B 15
EA3AR	199,584	1188	56	C 10
EA7FTR	173,376	1032	56	B 10
EA5DFX	59,925	425	47	B 10
EA3DUZ	34,086	247	46	C 10
EA5AAJ	14,157	121	39	B 10
EA7GSU	5,460	70	26	B 10
EC7AMD	3,375	45	25	B 10
EC5CZB	3,240	45	24	B 10

Balearic Islands

EA6XD	15,309	81	63	B
EA6TC	76,800	512	50	C 10

Ireland

EI8GP	269,100	780	115	B
EI2CH	100,170	371	90	B
EI4DW	1,171,566	2013	194	C

Moldova

ER6A (ER1LW, op)				
	470,400	1120	140	B
ER1BF	1,326	26	17	B
ER0ND (UT7ND, op)				
	176,112	1223	48	C 10

Estonia

ES6KW	2,997	37	27	B
ES4RD	64,938	274	79	C
ES6PZ	15,972	121	44	C
ES6MT	9,216	96	32	B 15
ES5CX	1,998	37	18	B 15
ES6CO	12,702	146	29	C 10
ES1AC	216	9	8	B 10

Belarus

EW6AL	21,900	146	50	B
EU2DX	13,875	125	37	B
EU1AZ	7,848	109	24	C 80
EW1WB	6,177	71	29	B 15
EU1SA	36,822	323	38	C 10

France

F5BEG	302,967	687	147	A
F5POJ	62,100	225	92	B
F5TYY	54,492	239	76	B
F5MAA	42,432	208	68	B
F5TVG	35,964	148	81	B
F5FYO	19,140	110	58	B
F5JBF	12,282	89	46	B
F6CWA	412,086	794	173	C
F6HMQ	212,940	1183	60	C
F6KAR (F5IQA, op)				
	131,010	397	110	C
F6FTB	92,928	352	88	C
F5AMH	88,440	335	88	C
F5OIH	12,963	149	29	C 80
F6DRP	67,485	409	55	B 15
F5MOO	250,020	1389	60	C 10
F5NZO	110,850	739	50	B 10
F5JY	35,640	264	45	B 10

England

G3FNM	62,832	272	77	A
G4NXG/M	137,808	396	116	B
G3NDC	56,196	223	84	B
G4REH	52,488	216	81	B
G3RSD	34,293	161	71	B
G6QQ	10,962	87	42	B
G0/N9LYE	4,200	50	28	B
G3YTU	1,914	29	22	B
M6T (G4PIQ,op)				
	3,261,087	4041	269	C
G4BUO	1,067,475	1655	215	C
G3TMA	393,579	1017	129	C
G4IUF	245,016	664	123	C
G3MXJ	114,180	346	110	C
G4OJH	255,474	1494	57	C 10
M0SDX	246,384	1416	58	C 10
G0VSN	65,283	463	47	C 10
G0NWY	42,504	322	44	B 10
M4T (G0VQR, op)				
	10,752	112	32	B 10

Northern Ireland

GI0KVQ	360,315	765	157	B

Scotland

GM4ELV	3,312	46	24	A
MM0LEO	63,936	296	72	B
GM4UYZ	45,990	210	73	B
GM4YXI	1,696,785	2759	205	C
GM7V (GM3WOJ,op)				
	990,720	1536	215	C
GM3BCL	250,200	695	120	C

Guernsey

MU0FAL	83,325	275	101	B

Wales

MW5EPA	161,928	519	104	B
GW0AJI	78,174	303	86	B
GW3WWN	34,452	198	58	B
GW3NJW	12,705	121	35	B 15
GW4BLE	328,140	1823	60	C 10

Hungary

HA8EN	72,165	283	85	B
HA8IB	15,390	90	57	B
HA8JV	1,497,231	2411	207	C
HA8AR	18,093	163	37	B 20
HA7RC	14,580	135	36	B 20
HG5C	283,680	1576	60	C 10
HA6NF	193,050	1170	55	C 10
HG1W	190,836	1178	54	C 10
HG8Z	117,936	756	52	C 10
HA5PT	46,200	385	40	B 10
HA0GK	5,922	94	21	A 10

Switzerland

HB9FBM	41,496	182	76	C
HB9CQS	4,950	66	25	C 20
HB9ACA	41,076	326	42	B 10
HB9DCM	30,645	227	45	B 10

Italy

IK5RUN	54,372	197	92	A
IK3ITB	18,720	160	39	A
IO4I	962,544	1823	176	B
IR9A	549,630	1182	155	B
IV3WQF	425,448	933	152	B
IZ7DZO	279,822	626	149	B
IZ6CST	111,858	362	103	B
IK2WZQ	110,220	334	110	B
IZ2ABN	108,237	331	109	B
IK2THN	105,210	334	105	B
IK7RVY	62,370	297	70	B
IZ2ACG	60,993	251	81	B
IT9AJP	58,734	251	78	B
IT9VCE	56,133	243	77	B
IK0NGI	55,932	236	79	B
IK4AUY	44,571	179	83	B
IZ0CRN	44,550	198	75	B
I3LTT	29,463	161	61	B
IK2WYI	27,492	158	58	B
I1NVU	26,928	176	51	B
IK5YJK	26,598	143	62	B
IK3SCB	25,281	159	53	B
IZ4DYP	24,339	133	61	B
IV3KSE	21,594	122	59	B
IK6ZDE	19,557	123	53	B
IZ1ANZ	17,160	110	52	B
IK2VUC	14,040	90	52	B
IZ6BTN	13,200	100	44	B
I0KHP	6,039	61	33	B
IK4CBM	5,400	60	30	B
IK2THP	918	17	18	B
IZ4COW	1,166,976	2026	192	C
IQ7R	376,710	866	145	C
IZ3BUR	170,658	499	114	C
II1H	97,848	453	72	C
IK6UBY	74,382	253	98	C
IK3SSJ	43,650	194	75	C
IK0JMS	1,980	33	20	C
IZ0BPI	510	17	10	C
I4AVG	66,264	502	44	C 80
IK1HSS	8,694	126	23	C 80
IR4R	71,685	531	45	C 40
IQ3A	271,788	1562	58	C 20
IT9ICS	107,604	732	49	B 20
IK8UND	10,323	111	31	C 20
IY4W (I4LEC,op)				
	309,219	1747	59	C 15
IK0AZG	185,850	1050	59	C 15
IK3STG	88,614	547	54	B 15
IZ5ASZ	26,187	203	43	B 15
IZ7CDB	23,865	185	43	B 15
I00A	15,228	141	36	B 15
IK2GSN	270,864	1584	57	C 10
IO3P	225,852	1298	58	C 10
IK2DUU	200,541	1133	59	C 10
IQ2C	195,111	1141	57	C 10
IK1RLI	172,590	1046	55	C 10
I0SNY	164,010	994	55	C 10
IQ3X	147,552	928	53	C 10
IK2UCK	146,328	938	52	C 10
II9F	143,832	922	52	C 10
IK2PTR	134,472	862	52	C 10
IK7BRX	84,900	566	50	C 10
IO2L	55,842	454	41	C 10
II9R	44,247	343	43	B 10
IT9JOF	39,882	289	46	C 10
IK4QJM	27,120	226	40	B 10
IQ8S	14,097	127	37	B 10
IU2R	12,285	117	35	A 10
IK2AIT	6,264	72	29	B 10
I00A	5,772	74	26	B 10
IK2UTP	4,602	59	26	B 10

Sardinia

IS0IGV	92,070	330	93	B

Norway

LA3BO	72,600	275	88	B
LA9DFA	427,335	919	155	C
LA6EIA	6,210	115	18	C
LA5KO	147,795	835	59	C 15
LA4GIA	11,760	112	35	C 15
LA1NG	38,880	270	48	C 10
LA2HFA	17,115	163	35	B 10

Luxembourg

LX1JH	307,467	807	127	B
LX1NO	1,352,400	2300	196	C
LX1RQ	164,943	447	123	C

Lithuania

LY5A (LY2PAJ,op)				
	540,216	984	183	A
LY2DM	78,684	316	83	B
LY3CY	25,080	152	55	B
LY1DS	18,180	101	60	B
LY7Z (LY2TA,op)				
	1,426,095	2211	215	C
LY3BH	444,264	856	173	C
LY5W (LY1DR,op)				
	443,424	992	149	C
LY9A (LY3BA, op)				
	162,279	949	57	C 20
LY2BM	147,900	850	58	C 20
LY2MM	9,216	128	24	B 10
LY2LA	5,568	64	29	B 10

Bulgaria

LZ1HB	260,271	717	121	B
LZ9R	24,960	160	52	B
LZ5Z	1,574,865	2215	237	C
LZ1NG	115,197	817	47	C
LZ2RF	243	9	9	B 40
LZ2UZ	1,836	36	17	B 20
LZ2PP	51,045	415	41	C 10
LZ2GS	6,720	80	28	B 10

Austria

OE75CWL	375,552	978	128	C
OE8SKQ	246,738	1394	59	C
OE5OHO	20,007	171	39	B 10

Finland

OH2LYP	83,334	323	86	B
OH2KU	3,696	56	22	B
OH2U (OH2LUR, op)				
	1,531,668	2342	218	C
OH8L (OH8LQ,op)				
	1,022,652	1671	204	C
OH1MM	170,922	467	122	C
OH5NHI	23,184	138	56	C
OH6YF	14,124	107	44	C
OH5NE	12,540	110	38	C
OH5W (OH2JTE, op)				
	41,472	288	48	C 40
OH5ZZ	83,961	491	57	C 20
OH6NIO	156,774	901	58	C 15
OH4YT	3,672	51	24	B 15
OH9MM	63,720	472	45	C 10
OH1F	5,727	83	23	C 10
OH2GBI (NG8T,op)				
	2,496	52	16	B 10

Czech Republic

OK2PLK	1,425	25	19	A
OK2MBP	115,818	398	97	B
OK1BA	110,544	376	98	B
OK1SI	48,399	221	73	B
OK1DOL	46,170	190	81	B
OK1DVK	24,024	104	77	B
OK1DKO	16,983	111	51	B
OK2BHE	8,040	67	40	B
OK1HGM	1,080	24	15	B
OK1RF	3,018,036	3782	266	C
OK2FD	834,210	1426	195	C
OK2GG	12,927	139	31	C
OK1DSX	924	22	14	C
OK2EQ	561	17	11	C 80
OK2HZ	1,470	35	14	B 40
OK1FC	35,178	286	41	C 20
OK1FCJ	125,664	748	56	C 15
OK2ZV	59,823	391	51	B 15
OK2WTM	39,345	305	43	B 15
OK2ZJ	10,848	113	32	B 15
OK1VBA	1,479	29	17	B 15
OK2NN	33,120	230	48	C 15
OK2RZ	332,406	1878	59	C 10
OK1DUO	185,877	1087	57	C 10
OK1DSF	84,600	600	47	C 10
OK1ARI	79,212	574	46	B 10
OK2INW	70,182	557	42	B 10
OK2ABU	29,748	268	37	C 10
OK1QM	19,422	166	39	B 10
OK1WMV	6,468	77	28	B 10
OK1AIJ	5,550	74	25	A 10
OK2PGJ	2,772	42	22	C 10

Slovakia

OM4DN	90,816	352	86	B
OM7AG	73,332	291	84	B
OM3YK	68,121	261	87	B
OM5DX	234,348	1324	59	C 20
OM7CA	4,095	65	21	B 20
OM8DD	45,750	305	50	B 15
OM3EI	342,855	2005	57	C 10
OM6T (OM5AW,op)				
	71,208	516	46	B 10
OM7AR	17,928	166	36	B 10
OM7YC	16,137	163	33	B 10

Belgium

ON4CAS	173,580	526	110	B
ON5JD	31,920	152	70	B
ON4CHK	8,208	72	38	B
ON4KVA	576	16	12	B
OT1L	1,064,664	2232	159	C
OT1T (ON4UN, op)				
	83,952	583	48	C 80
ON4ON	24,168	212	38	B 20
OT1H	213,639	1207	59	B 15
ON4UN (ON4MA, op)				
	416,874	2278	61	C 10
ON4XG	27,588	209	44	B 10
ON7SS	11,235	107	35	B 10

Denmark

OZ1ACB	85,170	334	85	B
OZ5WQ	13,905	103	45	B
OZ7AEI	12,384	96	43	B
OZ1HXQ	834,108	1562	178	C
OZ9Y	733,212	1674	146	C

Netherlands

PA3AAV	159,408	432	123	B
PA0ULA	42,267	193	73	B
PA3GZC	33,276	188	59	B
PA3HGF	1,140	20	19	B
PA0FEI	882	21	14	B
PA0IJM	203,520	530	128	C
PI4DEC (PA3GRH,op)				
	286,563	1619	59	C 15
PA3CAL	12,342	121	34	B 15
PA7FM	410,580	2281	60	C 10
PI4TUE	271,788	1562	58	C 10
PA5AT	54,648	414	44	B 10
PA0MIR	27,798	226	41	B 10
PA0KHS	20,757	187	37	B 10

Slovenia

S51W	437,184	1056	138	B
S57J	198,600	662	100	B
S56A	136,422	429	106	B
S57AW	12,300	100	41	B
S50S	2,923,176	3929	248	C
S51TA	2,119,260	3380	209	C
S52GP	137,424	409	112	C
S57M	828	23	12	C160
S52ZW	50,568	392	43	C 40
S51CK	174,420	1020	57	C 20
S53Z	66,612	427	52	C 20
S50R	237,858	1367	58	C 15
S52Z (S53MM,op)				
	199,656	1128	59	C 15
S57NMQ	128,184	763	56	B 15
S57MSU	24,444	194	42	B 15
S50C (S55OO,op)				
	354,240	1968	60	C 10
S50K	311,634	1791	58	C 10
S59G	168,135	1019	55	B 10

Sweden

SM6B (SM6AGR, op)				
	226,872	548	138	B
SM7BJW	109,200	400	91	B
7S3A (SM3CER, op)				
	27,720	165	56	B
SM2LIY	23,430	142	55	B
SM3EAE	3,906	42	31	B
SM4RRD	3,510	45	26	B
SM6WQB	411,600	980	140	C
8S4Z (SM4SET, op)				
	37,488	176	71	C
SM7EHU	5,610	85	22	C 80
SM3D	8,544	89	32	B 15
8S7A (SM7CRW, op)				
	111,024	771	48	C 10
SM0W	24,282	213	38	B 10
7S2E (SM2DMU, op)				
	20,889	211	33	B 10
SM6FJY	13,068	121	36	B 10
SM4AIO	3,813	41	31	B 10
SM7FTG	2,838	43	22	B 10
7S0W	240	10	8	C 10

Poland

SP6IEQ	90,954	326	93	B
SP9HQC	68,370	265	86	B
SQ8FEW	64,965	305	71	B
SP7A (SP7FQI,op)				
	41,106	221	62	B
SQ4CUX	37,632	196	64	B
SP1DMD	34,710	178	65	B
SP9W	22,263	181	41	B
SP2GMA	11,352	88	43	B
SP6GNJ	10,944	76	48	B
SP3VAU	10,902	79	46	B
SP3XR	9,471	77	41	B
SP9TPZ	3,036	44	23	B
SP7LHX	2,886	37	26	B
SP9XWD	702	18	13	B
SP6DVP	216	9	8	B
SP9QMP	726,180	1330	182	C
SP9LJD	592,512	1543	128	C
SP2FAX	154,224	918	56	C
SP9NH	72,828	289	84	C
SP4Z	62,040	220	94	C
SP7FBQ	23,595	143	55	C
SP6HTQ	13,524	98	46	C
SP8BRQ	19,992	238	28	C 80
SP7GAQ	4,788	84	19	C 80
SP3NUN	18	3	2	B 80
SP7VC	87,048	558	52	C 40
SP3KRE	33,615	249	45	B 20
SP6AYP	12,672	128	33	C 20
SP3GHK	10,296	104	33	B 20
SP4SHD	2,700	50	18	B 20
SN2X (SP2DWG,op)				
	73,224	452	54	B 15
SP6JFI	34,827	247	47	B 15
SP6TRO	30,888	234	44	B 15
SP2AYC	6,216	74	28	B 15
SP3BVI	5,694	73	26	B 15
SP8OOB	2,832	59	16	B 15
SP6YYP	2,700	45	20	A 15
SP6EWB/9	378	14	9	B 15
SP7GIQ	253,848	1511	56	C 10
SP6IXF	201,042	1241	54	C 10
SP3GTS	39,312	312	42	B 10
SQ9HYM	33,540	260	43	B 10
SP4AAZ	16,188	142	38	B 10
SP3LWP	10,800	90	40	B 10
SP4DEU	10,266	118	29	B 10
SP6LUV	5,850	78	25	C 10
SP6OJG	4,125	55	25	B 10
SP7KQW	2,967	43	23	B 10
SP8LBK	1,092	28	13	B 10

Greece

SV2AEL	46,992	356	44	B 10

Kaliningrad

RA2FW	63,840	266	80	B

European Russia

RZ4FA	219,966	601	122	B

RX3RC 187,620 530 118 B
RU6LA 160,776 462 116 B
UA4FER 148,143 437 113 B
UA3AGW 58,740 220 89 B
RA3DNC 46,647 213 73 B
RV3QX 31,785 163 65 B
RV3YR 22,344 133 56 B
RZ6ARM 6,438 58 37 B
RX3AEX 4,830 46 35 B
RX3DTN 3,483 43 27 B
RW4AA 594,072 1338 148 C
RK4FF 468,342 1062 147 C
UA4HTT 433,260 996 145 C
UA3AB 421,452 1018 138 C
UA4LCH 394,650 877 150 C
UA3BL 261,960 590 148 C
RD4M (UA4LU,op) 223,200 600 124 C
RM3C (RA3CW,op) 211,338 597 118 C
RU6MM 45,135 255 59 C
RN3RQ 37,332 183 68 C
RV1CC 24,765 127 65 C
RZ1AK 14,535 95 51 C
RZ1AZ 14,469 91 53 C
UA1ACC 2,835 35 27 C
UA4CIF 1,080 24 15 C
RW3DU 432 16 9 B 40
RA1ACJ 124,659 729 57 C 20
RZ1ZR 76,950 475 54 C 20
RX3VM 37,026 242 51 C 20
RV4SBO 1,566 29 18 B 20
RN1AO 462 14 11 B 20
UA3DPX 102,795 623 55 C 15
RA1AW 15,552 144 36 C 15
RK6AXS 80,928 562 48 C 10
RA3WA 25,308 222 38 B 10
UA3LHL 4,320 72 20 B 10
RX3ABI 264 11 8 B 10
UA3LBE 144 8 6 B 10

Ukraine

UX4UA 16,500 110 50 A
UT4UO 369,438 919 134 B
UT1UA 28,086 151 62 B
UT4MW 25,137 147 57 B
UY5TE 22,344 152 49 B
UT3QT 17,415 135 43 B
UY5ZZ 148,143 437 113 C
UR2E (UR5EAW, op) 29,400 200 49 C
UR4EI 15,300 102 50 C
UX0LL 1,530 34 15 C
UV5I (UR6IM,op) 46,305 315 49 C 40
UZ5U 33,696 312 36 B 40
UT7L 104,496 622 56 C 20
UU2JZ 48,216 328 49 C 20
UZ4E 10,767 97 37 C 20
UT7MD 6,156 76 27 C 20
UT5UGR 111,132 686 54 C 15
UT7E 97,461 663 49 C 10
US4IXQ 84,741 601 47 C 10
UZ7U (UT3UA, op) 64,548 489 44 C 10
UU0A 33,411 301 37 C 10
UR7M 33,288 292 38 C 10
UR6MX 21,690 241 30 C 10
UX1IL 10,044 124 27 C 10
UT0D (UT7DX, op) 8,928 124 24 C 10
UT5UD 8,526 98 29 C 10
US5MKO 5,451 79 23 B 10
UT8IM 2,679 47 19 B 10

Latvia

YL2GN 53,550 255 70 B
YL0A (YL2KA, op) 10,140 130 26 B
YL7A 298,944 692 144 C
YL2LY 117,564 388 101 C
YL2KO 51,183 363 47 C 15
YL1ZJ 12,882 113 38 B 15
YL2SM 109,158 791 46 C 10
YL3BZ 4,740 79 20 B 10

Romania

YO4AAC 504 14 12 A
YO5KTK 192,786 506 127 B
YO5OEF 87,120 330 88 B
YO3APJ 9,120 80 38 B
YO6OEK 504 14 12 B
YO6PED 105 7 5 B
YO4CIS 247,680 640 129 C
YO9HP 1,092 28 13 C 20
YO4NF 179,301 1013 59 C 15
YO3KPA 159,384 916 58 B 15
YO9FJW 86,664 628 46 B 10
YO5BIM 16,830 187 30 C 10
YO8DHD 13,050 150 29 B 10
YO8MI 7,956 102 26 C 10
YO6BMC 4,560 76 20 B 10
YO9GZU 1,200 25 16 A 10

Yugoslavia

YU1KN 68,283 281 81 A
YU7KWX 629,586 1179 178 B
YU7QL 137,370 482 95 B
4N0S (YU1ASB,op) 20,349 119 57 B
YU7RN 12,672 96 44 B
YU7BJ 244,662 674 121 C
YT7A 105,840 630 56 C 40
YZ9A 211,410 1215 58 C 20
YT7KF 264,261 1493 59 C 15
YU7CF 87,528 521 56 C 15
YT7TY 4,680 60 26 A 15
YU7GMN (4N7DW, op) 239,112 1476 54 C 10
YZ1U 101,706 737 46 C 10
YU7BCP 81,498 578 47 C 10
YU7HI 65,964 478 46 B 10
YZ1V 56,889 441 43 B 10
4N1N (4N1LB,op) 48,312 366 44 B 10
YU7SF 12,600 140 30 B 10
4N1JA 3,339 53 21 A 10

Macedonia

Z31JA 466,896 1096 142 C
Z31GX 162,792 1064 51 C 10

North America

Jamaica

6Y5/WO9Z 1,145,328 1784 214 B
6Y4Y 175,617 741 79 B

Barbados

8P6FH 95,034 337 94 B
8P6EX 885,972 1717 172 C

Bahamas

C6A/N2VV 4,734,630 5091 310 C

Cuba

CO8ZZ 117,819 741 53 B 80

Dominican Republic

HI8ROX 105,504 628 56 B 15

Panama

3E1AA (HP1XVH,op) 497,118 2857 58 C 20

Honduras

HR1/N0UEP 2,916 36 27 B
HR6/N4MO 380,373 2149 59 B 10

Alaska

KL7/NO7F 431,319 893 161 B
WL7CSJ 66,825 297 75 B
KL7RA 2,568,483 3411 251 C

Virgin Islands

NP2DJ 16,830 102 55 B
WP2Z (K2QM, op) 5,047,677 5553 303 C
KP2E (N4FD,op) 278,421 1573 59 B 10

Puerto Rico

KP4KOE 44,541 303 49 B
WP4LNY 35,370 262 45 B
KP4WW 563,823 3081 61 C 10

St. Kitts & Nevis

V47KP 4,967,073 5223 317 C

Bermuda

VP9/W6PH 2,109,216 2768 254 B

Mexico

XE2AUB 562,767 1721 109 B
XE1ZOI 23,940 114 70 B
6D2X 58,245 353 55 C 20

Cayman Islands

ZF2NT (K9PG,op) 8,981,940 8780 341 C
ZF2AH 363,060 2017 60 C 10

Oceania

Philippines

DU1UGZ 54,060 265 68 B
DU1BP 9,570 110 29 B
DU1SAN 5,112 71 24 B
DU1DX 255 17 5 B 15

Hawaii

KH6/W8QZA 291,480 694 140 A
KH6GMP 650,958 1409 154 B
KH7Z (@KH7R) (KH6ND,op) 6,749,190 7142 315 C
NH7A 3,585,330 4410 271 C
WH6FQ 7,200 60 40 C
AH6IM 215,208 1281 56 B 10

East Kiribati

T32RD (OK1RI, op) 2,091,000 2788 250 C

Marshall Islands

V73UX 371,637 1041 119 B

Australia

VK5GN 441,816 898 164 C
VK3DZM 28,500 190 50 C 80
VK3GK 64,116 411 52 B 15
VK4CEJ 315,237 1781 59 C 10
VK2ARJ 278,421 1573 59 C 10
VK4EJ 264,780 1471 60 B 10
VK2KPP 233,856 1344 58 C 10

Indonesia

YC0IEM 5,025 67 25 B
YB0LBK 110,160 408 90 C
YB0ECT 13,431 121 37 B 20

New Zealand

ZL2AL 136,116 398 114 B
ZL1ANJ 2,113,284 2887 244 C
ZL3GA 11,385 115 33 B 15
ZL1TM 84,975 515 55 B 10
ZL2AWH 37,008 257 48 B 10

South America

Chile

CE8EIO 1,841,616 3024 203 C
CE4U 1,682,640 2952 190 C
CE4MWK 11,322 111 34 B 20
CE4P (CE4PBB,op) 214,194 1231 58 C 10

Bolivia

CP1FF 55,173 347 53 B 10

Uruguay

CX9AU 414,915 995 139 B
CX8BAE 157,296 904 58 B 10
CX7CAJ 122,976 732 56 B 10

Ecuador

HC2/UA4WAE 726,600 1211 200 B

Galapagos Islands

HC8Z (HC1OT,op) 655,920 3644 60 C 10

Colombia

HK3JJH 1,773,408 2912 208 B
HK3AXY 360,180 870 138 C
HK6PIJ 239,946 1379 58 B 10

Argentina

LU1VK 235,800 786 100 A
AY8A (LU8ADX,op) 917,664 1936 158 B
LR0N 533,970 1047 170 B
LU5EVK 168,150 590 95 B
LU5FII 159,885 935 57 B
LU1BR 1,324,743 2219 199 C
LU1DZ 325,620 810 134 C
LU9APM 30,774 223 46 B 15
LU3DR 16,800 140 40 A 15
LU1FZR 320,193 1809 59 B 10
LW7DX 275,235 1555 59 C 10
LU1VEW 201,609 1179 57 B 10
LU4DX 149,625 875 57 B 10
LU7DW 145,812 838 58 B 10
LW1EGD 134,919 789 57 C 10
LW2DX 117,264 698 56 B 10
LW7EGO 85,698 529 54 B 10
LT5H 49,113 321 51 B 10
LU5JKG 14,391 123 39 B 10

Peru

OA4DKC 194,925 565 115 B

Aruba

P40W (W2GD,op) 6,909,948 7109 324 C
P40V (AI6V,op) 6,038,760 6370 316 C
P43E 321,480 1786 60 C 10

Netherland Antilles

PJ2K (K6RO,op) 5,546,532 6122 302 C

Brazil

ZX2B (PY2MNL, op) 1,422,330 2605 182 B
PY2YU 582,660 1245 156 B
PY4OY 181,656 1044 58 B
PP7ZZ 164,424 527 104 B
PY7IQ 72,912 248 98 B
PU2UDT 68,904 396 58 B
PP2RON 36,432 264 46 B
PY2KQ 54,360 302 60 C
PS8ET 12,543 113 37 C
PS8NF 11,130 106 35 C
PY5HSD 6,432 67 32 C
PY3CEJ 360 12 10 C160
PY3DX 2,601 51 17 C 80
PY2NY 309,894 1781 58 C 20
PY7YL 203,661 1191 57 B 20
PY2TO 166,488 991 56 B 15
PY2LED 125,328 746 56 B 15
PT2AW 70,200 468 50 B 15
PY1NX 70,074 458 51 B 15
PY2APQ 55,539 363 51 B 15
PY3FBI 49,980 340 49 B 15
PY2OZF 37,224 282 44 B 15
PY2AER 35,814 254 47 B 15
PY4NF 240 10 8 B 15
PY2KC 538,935 2945 61 C 10
PY1KS 183,903 1039 59 B 10
PY4DBU 180,009 1017 59 C 10
PY5EG 96,957 567 57 C 10
PU2MXU 40,896 284 48 B 10
PU2VYT 36,531 297 41 B 10
PR8RZJ 27,270 202 45 C 10
PY1SX 10,146 89 38 B 10

Falkland Islands

VP8DCD 26,565 161 55 B

Venezuela

4M5E 686,796 1331 172 B
4M3B 557,760 1162 160 B
YV4FZM 91,107 573 53 C 80
YV5AMH 8,343 103 27 B 40
YV5LIX 273,600 1520 60 B 20

Single Operator Assisted

Asia

OD5/OK1MU 645,906 1297 166 C
RV0AR 495,963 1053 157 C
JA1YNE 429,678 981 146 C
JA9XBW 5,490 61 30 B

Europe

S51DX 1,974,708 2887 228 C
YL8M (YL2KL,op) 990,726 1766 187 C
DL4FAY 431,319 893 161 C
IZ5CML 398,295 795 167 C
DF6QV 231,813 599 129 C
OK1KT 176,085 455 129 C
DK3GI 146,673 379 129 B
GW0GEI 112,671 351 107 C
OH9W 81,270 301 90 C
SQ7BCG 66,666 271 82 B
S53M (S53ZO,op) 60,507 249 81 B
EW2AA 52,059 259 67 C
DK2ZO 5,022 54 31 B

North America

PJ7B 482,544 1117 144 C

Oceania

VK2UZ 65,985 415 53 B
VK6NU 18,900 105 60 B

Multioperator Single Transmitter

Asia

JA1YPA 60,060 286 70 C
RZ0IWR (UA0IAS,UA0-138-236,ops) 40,095 297 45 B 15

Europe

TM5C (F6ARC, F5MUX, F6CTT, ops) 5,609,496 6317 296 C
OM7M (OK2BFN, OM3PA, OM3PC, OM5RM, OM5RW, OM5ZW, ops) 2,558,949 3319 257 C
OE2S (OE2GEN, OE2LCM, OE2MON, OE2VEL, ops) 2,236,323 3119 239 C
HB9FAP 2,084,172 3074 226 C
HB9AUS 2,036,064 2672 254 C
OL5Q (OK1FFU, OK1FLC, OK1VSL, OK1INC, ops) 1,805,040 2760 218 C
SP8YMM (SP8ARY, SP8GQU, SP8LBK, SP8GWI, SQ8BGJ, ops) 1,646,325 2439 225 C
GJ2A (AB2E, GJ0NYG, ops) 1,468,236 2497 196 C
IU2M (I2WIJ, IK2SAI, IK2SFZ, IK2RPJ, IK2ZEY, IK2GWH, ops) 1,298,991 2267 191 C
DL0DX (DK2OY, DL5JS, DL5KUT, DL6EZ, ops) 1,187,280 1940 204 C
DK0NB (+DL7NFK, DL9NDS) 1,108,431 2019 183 C
IO4T (IK4RQJ, IK4VET, IK4XCL, IK4ZHH, IZ4DIJ, ops) 1,058,904 1848 191 C
IR3B (IV3IPS, IV3EPO, IV3BBR, IV3TYS, ops) 995,220 1710 194 C
EI9E (+EI9HQ, EI7FJ, EI6GF) 801,216 1391 192 C
OZ5ESB (OZ1CWP, OZ1INN, ops) 769,902 1594 161 C
EA4TX (+N6HB) 575,289 1341 143 C
YL7C (YL2MD, YL2GQT, ops) 443,682 942 157 C
SV1DPI (+SV1CIB) 440,580 1049 140 B
RU3FM 337,365 765 147 C
HB9OK (HB9DHG, HB9DOS, HB9FAQ, HB9DQG, HB9FBT, HB9FBS, HB9ODM, HB9OAU, HB9DLV) 295,740 795 124 C
EA2CCG (+EA2ATU, EA2MQ, EC2AHS) 250,920 680 123 B
ON4NOB (+ON4AMX, ON4CJI, ON1DRZ, ON4CHT) 198,360 1140 58 C
F6KFI 174,600 485 120 B
RK6AYN (RN6BP, RW6ACM, UA6AH, ops) 148,086 433 114 C
SP9KRT (SP9ZW,SP9ADU,SP9EMI, SP9-1753,ops 89,280 310 96 B
TF3IRA (TF3AO, TF3HP, TF3KET, TF3RJT, ops) 62,001 249 83 C
9A1CMS (9A5TR, 9A5ATW, ops) 60,984 242 84 B
UR4PWC (+US-P-362,US-P-296 US-P-363,US-P-291) 52,974 218 81 B
IR2G (IK2RXX,IZ2BHQ,IK2VTX, IZ2DOB,ops) 33,972 149 76 B
UX8IXX (+US8IDV, US-I-620, US-I-621) 32,391 177 61 B
OL5KRT (OK2BUZ, OK2CVA, ops) 32,214 182 59 C
SP9KJU (SP9MDY,SQ9HYD,ops) 25,134 142 59 B
EN5J (UU2JQ, UU0JX, ops) 22,785 217 35 C

North America

8P9JA (@8P9Z) (K4MA, AA4NC, ops) 8,389,512 8552 327 C
VP5B (K4ISV, K4CN, ops) 8,348,256 8282 336 C
TI4G (TI2WGO, TI2CDA, ops) 3,092,184 3846 268 C
V31DX (+KI6IM) 1,385,556 1957 236 C

Oceania

WH6H (+AD6E) 3,681,720 4383 280 B
4F4IX 63,618 461 46 B

South America

PJ4G (K2NG, K2TW, NO2R, ops) 6,464,016 6906 312 C
FY5KE 5,986,128 6416 311 C
LU5FB (LU6FQD,LU1FKR,LU1FGE, LU3FZW,LU3FQG,LU1FD, ops) 1,837,746 3174 193 C
LU1NF 1,784,349 3147 189 C
LU4D 1,669,260 2588 215 B
LU7FJ (LU5FF, LU4FXI, LU7FNI, ops) 954,528 1952 163 B
LU2FA (+LU2FP) 643,110 1261 170 C
PY2GEC (PY2TO, PY2GA, PR8RZJ, ops) 330,624 896 123 B
PY2ZR (+PU2NYV) 267,462 702 127 B
PR7AA 254,205 807 105 B
PY2ABU 180,540 590 102 B

Multioperator Two Transmitters

Asia

9M0M (AF7Y, AF7O, KM5EP, WB9Z, NA7DB, N7MB, XE1L, ops) 1,011,936 2032 166 C
JH8KYU (+JF1SQC, JK1PKS) 590,760 1094 180 B

Europe

IR4T (I4UFH, IK4MHB, IK4UPB, IK2SGC, IK2QEI, ops) 5,125,788 6124 279 C
EA4URE (EA1EY, EA1JE, EA4BT, EA4AXE, EC4ABH, ops) 1,142,280 1670 228 C
EJ3RCW 477,687 989 161 B
UU5A (UU1JA, UU3JD, ops) 11,067 119 31 C

North America

6Y8A (WA6O, WT6G, W6NS, N6XG, K0COP, K2KW, ops) 10,962,966 10654 343 C
XA5T (W5PF, W5IDX, NX5M, N5XJ, W5SB, W5MJ, W5BAK, K5NZ, ops) 10,414,080 10240 339 C
T48RAC (CO8KL, CO8DD, CO8TW, CO8NPB, CO8WN, CO8SJ,CM8ABG, VE3ESE, ops) 355,212 1196 99 B

South America

LU1FC 1,627,296 3082 176 C
PY3MHZ (PY3ABT, PY3AFS, PY3BZA, PY3CQ, PY3DZZ, PY3FOX, PY3KK, PY3KN, PY3MM) 1,303,560 2414 180 C

Multioperator Unlimited Transmitters

Africa

5U5A (I2UIY, I2YSB, IK2DIA, ops) 2,080,848 3941 176 C
VQ9IO 407,550 950 143 C

Asia

JA3YBK 3,008,160 4178 240 C
JA7YAA (JE7HLZ, JH0NZN, JH0ORW, JG7PSJ, 7M1JAS, JO7DJT, ops) 2,413,500 3218 250 C
RK9JWJ (UA9JLZ, UA9JMA, ops) 48,555 249 65 B

Europe

RW2F (LY4AA, UA2FB, UA2FF, UA2FZ, RA2FA, RN2FA, RV2FW, ops) 4,428,333 5407 273 C
9A7A 3,985,020 5070 262 C
RU1A (RN1AM, RW1AC, RA3AUU, UA1ARX, RX1AA, UA1AKC, ops) 3,772,800 4800 262 C
LY2ZO 1,558,410 2534 205 C
SK3W (OH1JT, SM3EVR, SM3SGP, SM5IMO, ops) 196,140 467 140 C
S52LW 184,680 513 120 B

North America

J38X (K1XX, W1MD, ops) 9,463,401 9827 321 C
VP5A (WE3C, KQ3V, ops) 7,101,042 7003 338 C
VP2EK (AC8G, N8JE, N6JRL, WD8MQJ, W8ILC, ops) 5,394,420 6515 276 C

Oceania

NH6YK (+AH7MI, AH6P, N4SIX, NH7YL, WH7K, KH7V, AH7E, W7IUS, WH6FQ, KH7PK, WH7O) 604,890 1430 141 B

South America

LU4FM 4,515,525 6405 235 C

Checklogs: 4M3B, AH6OZ, DF3OL, DJ0AJ, DL1JMS, DL5NA, EA3BJM, EA5BHK, EA5BHX, EA6BM, EA6SX, EA7RU, F5BBD, F5SSI, G2QT, HA4YO, IK0ZSK, IK7WPD, IK3XTY, IV3BKH, IZ5BRO, K2AW, K3SWZ, K4CDX, K4RZ, K6JAT, K7ZO, KB1FTC, KE1F, KO3Q, KR3O, LA2JR, LA4OGA, LA8OM, LZ2FM, LZ3HI, N3AIU, N3SEO, N5IAC, NY6DX, N0UR, OA4AHW, OE5BVM, OK2BJT, OK2BJT, OK2BOV, OK2PCN, OK2BWB, OK2PCN, OK2ZW, ON7RN, PA7DVD, PT2ND, PT7BZ, PY2QD, RA1QDP, RA3MB, RA3MS, RK6AW, RU1AB, RV3LO, RW3DY, RW9AB, SK7HW, SM3MHD, SP1BLE, SP1BLE, SP2WGZ, SP3BLT, SP3BLT, SP3CUG, SP4CUX, SP7BCG, SP9GNM, SP9KGU, SQ9BDV, SQ9BDV, UN8LA, UR4RWO, UR5FCM, UT5UBJ, UU0JC, V44NK, VE3DRZ, VE4MG, W5WMU, W7RNF, W7ZR, WB0GGM, YO3FWC

General Rules for All ARRL Contests

1. Precedence of Rules:

1.1. Rules for individual contests or events, including Field Day, take precedence over all General Rules.

1.2. General Rules for HF and VHF contests take precedence over General Rules for all contests.

2. Conditions of Entry: Entrants agree to be bound by:

2.1. The provisions and intent of ARRL contest rules;

2.2. The regulations of the national licensing authority;

2.3. The decisions of the ARRL Awards Committee.

3. General Rules:

3.1. All operators must observe the limitations of their operator licenses and station licenses at all times.

3.2. All call signs and exchange information must be sent, received, acknowledged and logged correctly by each station for a complete QSO.

3.3. An operator may not use more than one call sign from any given location during the contest period.

3.4. The same station may be worked only once per band for contest credit.

3.5. A transmitter used to contact one or more stations may not be subsequently used under any other call during the contest period, except for family stations where more than one call has been issued, and then only if the second call sign is used by a different operator. (The intent of this rule is to accommodate family members who must share a rig, and to prohibit manufactured or artificial contacts.)

3.6. For the purposes of ARRL contests, maritime mobile is defined as shipboard operation on the high seas, outside of the territorial waters of the country (defined for these purposes only as 12 miles).

3.7. All transmitters and receivers must be located within a 500-meter diameter circle, excluding antennas.

3.7.1. This prohibits the use of remote receiving installations.

3.7.2. Exceptions:

3.7.2.1. Stations remotely controlled by radio link may use necessary equipment at the control point. This does not include using the control point as another receiving location.

3.7.2.2. Multioperator and Single Operator Assisted stations may use spotting nets.

3.8. Cross-band contacts are not permitted.

3.9. Contacts made through repeaters, digipeaters, or gateways are not permitted.

3.9.1. This applies to all forms of active relays or repeaters.

3.9.2. Satellite contacts, where allowed, are not subject to this rule.

3.10. The use of non-Amateur Radio means of communication (for example, Internet or telephone) to solicit a contact (or contacts) during the contest period is not permitted.

3.11. Entrants who qualify for unsponsored plaques may purchase them from the ARRL Contest Branch.

3.12. General contest queries should be directed to the Contest Branch Manager via e-mail at **contests@arrl.org** or by telephone at 860-594-0232.

3.13. All logs (electronic or paper) submitted to the ARRL for any contest must be in chronological order, in a single log (file). Separate band-by-band files or logs are subject to being classified as checklogs and ineligible for competition.

3.14. In contests where spotting nets are permissible, spotting your own station or requesting another station to spot you is not permitted.

4. ARRL Standard File Format for Electronic Submission of Entries.

4.1 The official ARRL File Format for electronic submissions is the Cabrillo format.

4.1.1. The Cabrillo log file must include both an accurately completed header (containing the summary information) and the QSO log data.

4.2. All electronic files must be standard ASCII text.

4.2.1. Output files from word processors (such as Word documents), database programs (such as Excel spread sheets) or logging program .bin files that are not ASCII text files are not acceptable for submissions.

4.3. Cabrillo format specifications are available:

4.3.1. On the ARRL Contest homepage at: **http://www.arrl.org/contests**.

4.3.2. On the Internet at **http://www.kkn.net/~trey/cabrillo/**.

4.3.3. By sending an SASE with 2 units of postage and $1 to Cabrillo File Specs, Contest Branch, ARRL, 225 Main St, Newington, CT 06111.

4.4. Electronic log files may be submitted either via the Internet as an e-mail or on diskette.

4.4.1. Files sent via e-mail must be sent as attachments, not as the text of the e-mail, and sent to the appropriate e-mail address from the following list:

4.4.1.1. **10GHZ@arrl.org**
10Meter@arrl.org
160Meter@arrl.org
AugustUHF@arrl.org
DXCW@arrl.org
DXPhone@arrl.org
EMEContest@arrl.org
FieldDay@arrl.org
IARUHF@iaru.org
JanuaryVHF@arrl.org
JuneVHF@arrl.org
RTTYRU@arrl.org
SeptemberVHF@arrl.org
SSCW@arrl.org
SSPhone@arrl.org
StraightKey@arrl.org

4.4.2. E-mail log submissions must include the entry's call sign, contest name and year in the Subject line.

4.4.3. Electronic files must be named with the call sign used during the contest and the file extension .log or .txt. Files that are sent using a filename other than the call sign used may be classified checklogs.

4.4.4. Submit only the Cabrillo log file. Do not submit any other files. Cabrillo files should be sent only as unzipped attachments to the e-mail. Do not zip files.

4.5. Electronic logs are assumed to be signed when submitted.

4.6. Any log that is computer generated must be submitted as an electronic file in Cabrillo file format. Failure to submit the required electronic file can result in the entry being designated a checklog, and thereby ineligible for competition. A paper printout of an electronic log file is not an acceptable substitute.

4.7. Only one entry may be included in each submission (e-mail or diskette). CW and Phone weekends of the November Sweepstakes and International DX Contest are considered separate contests and must be submitted separately.

4.8. All diskettes submitted become property of the ARRL and are not returnable.

4.9. Multioperator Two Transmitter category entries must indicate which transmitter makes each QSO in the Cabrillo log file.

4.10. The log checking software will calculate off times in those contests that include them. Do not list them in the main body of the Cabrillo log file itself or in the Soapbox comments.

4.11. Any electronic file that does not include complete entry information (category, power, etc) will have the missing data recorded at a default value or may be designated as a checklog.

4.12. Diskettes sent via postal service should be mailed to: ARRL, 225 Main St, Newington, CT 06111 with the contest name clearly marked on the envelope/mailer. It is recommended that the sender obtain a receipt showing the date the entry was mailed in case a problem arises.

5. Paper Logs:

5.1. Entrants must use official Contest Forms or acceptable facsimile.

5.2. The most current forms should be used, as scoring rules, ARRL sections, etc, do change periodically.

5.3. Handwritten logs, showing required QSO information, are accepted for all ARRL contests.

5.4. Handwritten logs that have been transcribed into a word processor, database, or logging program after the contest are considered electronic logs. The electronic log file in Cabrillo file format for these logs must be submitted.

5.5. Paper entries with more than 500 QSOs must include band by band dupe sheets.

5.5.1 A dupe sheet is an alphanumerically sorted list of all contacts made during the contest, sorted by band and mode as

appropriate. A list of duplicate contacts does not meet this requirement.

5.6. Paper entries should be submitted to: ARRL, 225 Main St, Newington, CT 06111 with the contest name clearly marked on the envelope. It is recommended that the sender obtain a receipt showing the date the entry was mailed in case a problem arises.

5.7. Only one contest entry may be included in each envelope mailed to ARRL.

6. Reporting:

6.1. Entries must be sent to the ARRL within 30 days after the end of the contest. For electronic submissions, this is determined by the date the e-mail is sent. For regular mail, this is determined from the postmark.

6.2. Logs not submitted or postmarked by the contest deadline may be classified as checklogs.

6.3. Entries received at the ARRL more than 30 days after the contest submission deadline may not be included in *QST* listings.

6.4. Only one entry per e-mail/envelope is allowed.

6.5. All entries—whether electronic or paper—must include complete summary information including: contest, call sign used, entrant's name, address, club affiliation (if applicable), call signs of all operators, category, ARRL section, and claimed score.

7. Disqualification and Penalties:

7.1. If the claimed score of a participant is reduced by 2% or more, the entry may be disqualified. Score reduction does not include correction of arithmetic errors.

7.2. Score reduction may be made for taking credit for unconfirmed QSOs or multipliers, duplicate contacts or other scoring discrepancies.

7.2.1. Duplicate QSOs in electronic log file are considered zero point QSOs and are not penalized.

7.3. If a paper entry with more than two-percent duplicate contacts left in the log is detected, it will be automatically disqualified.

7.4. If an entry in which more than 2% "rubber clocking" (altering the actual time to increase the operating time so that it is greater than the allowable limit) is detected, it will be automatically disqualified.

7.5. Participants that are disqualified will be barred from submitting an entry in the next annual running of that specific contest; for example, disqualification from the 2001 Phone SS prohibits submission of an entry for the 2002 Phone SS, but 2002 CW SS participation is allowable.

7.6. Call signs of all disqualified participants will be listed in the *QST* contest report.

7.7. Any participant on the borderline of disqualification, but not actually disqualified may receive a warning letter.

7.8. In a paper log, for each duplicate contact that is claimed for credit, each miscopied call sign or each busted exchange that is removed from the log by HQ, three additional contacts will be deleted as a penalty. In electronic logs, for each duplicate contact that is claimed for credit, each miscopied call sign or each busted exchange that is removed from the log by HQ, one additional contact will be deleted as a penalty. The penalty will not be considered part of the 2% disqualification criteria.

7.9. In all cases, the decisions of the ARRL Awards Committee are final.

8. Club Competition:

8.1. Six ARRL-sponsored contests include an ARRL affiliated club competition:

8.1.1. January VHF Sweepstakes

8.1.2. (February and March) International DX Contest

8.1.3. September VHF QSO Party

8.1.4. November Sweepstakes

8.1.5. (December) 160-Meter Contest

8.1.6. (December) 10-Meter Contest

8.2. Only clubs actively affiliated with the ARRL may participate in the club competition. This means the club:

8.2.1. Is affiliated with the ARRL, and

8.2.2. Has filed an annual report with the Field Services Department of ARRL HQ within the last two years.

8.3. For a club to be listed, the following conditions must be met:

8.3.1. Entries from three different members of the club must be submitted.

8.3.2. The entry must clearly indicate the club name in the Cabrillo file header.

8.3.3. The club secretary must send a list of all club members eligible to compete for the club (not a club roster) and which level (unlimited, medium, local) they wish to enter for each competition within 30 days after the contest.

8.3.4 A member's score must be shown in the contest results to be counted for a club. Only that score shown in the results (or in subsequent corrections) will count for the club competition.

8.4. There are three categories of club competition:

8.4.1. **Unlimited**

8.4.1.1. Club submits 51 or more entries.

8.4.1.2. One station can submit two entries—one on CW and one on phone in the November Sweepstakes and the DX Contest.

8.4.1.3. All stations and all operators must reside within 175 miles (282 km) of the club's center.

8.4.1.4. All members must attend at least 2 club meetings per year to be eligible to submit an entry. (However, if the person has not been a member for a year's time, they must have attended one meeting as a member prior to the contest.)

8.4.1.5. Those club members who are disabled to the extent that they are unable to travel are exempt from the two meetings per year rule. However, they must be regularly active in club affairs.

8.4.1.6. To be considered bona fide, a member must be active in club affairs.

8.4.1.7. Members living outside 175 miles and members that operate stations outside 175 miles may not compete in the club competition. (See rule 8.6.)

8.4.2. **Medium**

8.4.2.1. Club submits 50 or fewer entries and does not qualify under the local club criteria.

8.4.2.2. One station can submit two entries—one on CW and one on phone in the November Sweepstakes and the DX Contest.

8.4.2.3. The same mileage and attendance requirements apply as the unlimited class club.

8.4.2.4. Members living outside 175 miles and members that operate stations outside 175 miles may not compete in the club competition. (See rule 8.6.)

8.4.3. **Local**

8.4.3.1. Club submits 10 or fewer entries.

8.4.3.2. One station can submit two entries—one on CW and one on phone in the November Sweepstakes and the DX Contest.

8.4.3.3. All members must reside and operate within 35 miles of the club's center.

8.4.3.4. There is no attendance requirement.

8.5. Single Operator and Multioperator station scores may be counted:

8.5.1. At a guest-operated single-operator station, both the guest operator and the station licensee must be members of the same club in order to count the score for that club.

8.5.2. At multioperator stations, at least 66% of the operators must be members of the same club for the score to count for that club.

8.5.3. A multioperator entry may (optional) utilize non-member operators licensed one year or less without including such operators in the above 66% calculation. (The intent here is to encourage clubs to recruit contesters from newer amateurs without adversely affecting the club aggregate score.)

8.6. For the ARRL International DX Contest, DXpedition (operating outside the United States and Canada) scores for either single operator or multioperator stations may be counted for Medium or Unlimited Clubs even though the operation is outside the club's area, provided all other requirements are met.

8.6.1. For single guest operators at a DX station, only the operator must be a club member and meet all other criteria.

8.6.2. For multioperator stations, the score counts for only one club and at least 66% of the operators must be members of that club and meet all other criteria.

8.7. In conjunction with the two meetings per year rule, the club must hold at least four in-person meetings per year.

8.8. A club's entry classification may be changed if, in the opinion of the ARRL Awards Committee, the club has manipulated its number of entries to allow the club to enter a lower classification. (For example, if a club with 100 members submits only the 10 highest scores, even if more than 10 of its members wish to compete.)

8.9. It is not within the intent of these rules that a club should vote out a member or that a member resign and then be voted back into the club later so the member-attendance rule can be met.

8.10. The highest scoring active affiliated club entry in each category (unlimited, medium, local) will be awarded a gavel. QST

General Rules for ARRL Contests on Bands below 30 MHz (HF)

1. General Rules:

1.1. See General Rules for All ARRL Contests.

1.2. Cross-mode contacts are not permitted.

2. Entry Categories: The following categories are defined for ARRL contests on bands below 30 MHz. See the rules for each contest to determine which categories apply, and whether additional categories exist for that contest.

2.1. Single Operator: One person performs all transmitting, receiving, spotting, and logging functions as well as equipment and antenna adjustments.

2.1.1. Use of spotting assistance or nets (operating arrangements involving other individuals, DX-alerting nets, packet, Internet, etc) is not permitted.

2.1.2 Single-Operator stations are allowed only one transmitted signal at any given time.

2.1.3. Single Operators may be divided into subcategories based on power output:

2.1.3.1. QRP: 5-W PEP output or less.

2.1.3.2. Low Power: 150-W PEP output or less.

2.1.3.3. High Power: More than 150-W PEP output.

2.2. Single Operator Assisted: One person performs all transmitting, receiving, and logging functions as well as equipment and antenna adjustments.

2.2.1. Use of spotting assistance or nets (operating arrangements involving other individuals, DX-alerting nets, packet, etc) not physically located at the station is permitted.

2.2.2. Single Operator Assisted stations are allowed only one transmitted signal at any given time, not including transmissions on a spotting net.

2.3. Multioperator: More than one person performs transmitting, receiving and logging functions, etc. Multioperator stations are divided into subcategories:

2.3.1. Multioperator, Single Transmitter: Stations are allowed only one transmitted signal at any given time.

2.3.1.1. In those contests that do not have Single Operator Assisted class, this category includes those single operators that use any form of spotting assistance such as from nets or packet.

2.3.1.2. Includes those that receive assistance with logging or relief operators, etc.

2.3.1.3. Limited to 6 band changes (maximum) in any clock hour.

2.3.1.3.1. The clock hour is from zero through 59 minutes.

2.3.1.3.2. Band changes are defined so that, for example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes.

2.3.1.4. Violation of the 6-band change rule or improper logging will result in an entry reclassification to the Multioperator Multitransmitter class.

2.3.2. Multioperator, Two Transmitter:

2.3.2.1. A maximum of two transmitted signals at any given time, on different bands.

2.3.2.2. Each transmitter is limited to 6 band changes (maximum) in any clock hour.

2.3.2.2.1. The clock hour is from zero through 59 minutes.

2.3.2.2.2. Band changes are defined so that, for example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes.

2.3.2.2.3. Violation of the 6-band change rule or improper logging will result in an entry reclassification to the Multioperator Multitransmitter class.

2.3.2.3. Both transmitters may work any and all stations; the second transmitter is not limited to working new multipliers only. However, a station may only be worked once per band regardless of which transmitter is used.

2.3.2.4. Each of the two transmitters must keep a separate, chronological log for the entire contest period.

2.3.2.5. The Cabrillo log must indicate which transmitter made each QSO in this category.

2.3.3. Multioperator Multitransmitter:

2.3.3.1. A maximum of one transmitted signal per band at any given time.

2.3.3.2. Multioperator Multitransmitter stations must keep a separate, chronological log for each band for the entire contest period. QST

General Rules for ARRL Contests on Bands above 50 MHz

1. General Rules:

1.1. See General Rules for All ARRL Contests.

1.2. Individuals and stations are limited to one entry per contest.

1.3. A transmitter, receiver, or antenna used to contact one or more stations may not subsequently be used under any other call during the contest period, except as provided for in General Rules for All ARRL Contests number 3.5.

1.4. 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).

1.5. Crossband QSOs do not count.

1.6. Aeronautical mobile contacts do not count.

1.7. Retransmitting either or both stations, or use of repeater frequencies, is not permitted.

1.7.1. This prohibits use of all repeater frequencies.

1.7.2. Contest entrants may not transmit on repeaters or repeater frequencies for the purpose of soliciting contacts.

1.8. Use of the national simplex frequency, 146.52 MHz, or immediately adjacent guard frequencies, is prohibited.

1.8.1. Contest entrants may not transmit on 146.52 for the purpose of making or soliciting QSOs.

1.8.2. The intent of this rule is to protect the national simplex frequency from contest monopolization.

1.8.3. There are no restrictions on the use of 223.50 MHz.

1.9. Only recognized FM simplex frequencies may be used, such as 144.90 to 145.00; 146.49, .55 and .58, and 147.42, .45, .48, .51, .54 and .57 MHz on the 2-meter band.

1.9.1. Local-option simplex channels and frequencies adjacent to the above that do not violate the intent of the above rules, or the spirit and intent of the band plans as recommended in the ARRL Repeater Directory, may be used for contest purposes.

1.10. While no minimum distance is specified for contacts, equipment should be capable of communications at a range of at least 1 km.

1.11. A station located precisely on a dividing line between grid squares must select only one as the location for exchange purposes. A different grid-square multiplier cannot be given without moving the complete station (including antennas) at least 100 meters.

1.12. Above 300 GHz, contacts are permitted for contest credit

only between licensed amateurs using coherent radiation on transmission (for example, laser) and employing at least one stage of electronic detection on receive.

1.13. Marine Mobile (and Maritime) entries will be listed separately as "Marine Mobile" in the listings and compete separately for awards.

1.14. Participants are reminded that the segment 50.100-50.125 MHz should be used for intercontinental QSOs only, using 50.125 MHz as a calling frequency, then QSY after contact is established.

2. Entry Categories: The following categories are defined for ARRL contests on bands above 50 MHz. See the rules for each contest to determine which categories apply, and whether additional categories exist for that contest.

2.1. Single Operator: One person performs all transmitting, receiving, spotting, and logging functions as well as equipment and antenna adjustments.

2.1.1. Single Operator Low Power:

2.1.1.1 Power limits on any band may not exceed the following:

2.1.1.1.1. 50 MHz and 144 MHz—200 W PEP.

2.1.1.1.2. 222 MHz and 432 MHz—100 W PEP.

2.1.1.1.3. 902 MHz and above—10 W PEP.

2.1.2 Single Operator High Power: Power limits on any band exceeds the limits for the Single Operator Low power.

2.1.3. Use of spotting assistance or nets (operating arrangements involving other individuals, DX-alerting nets, packet, etc) is not permitted.

2.1.4. Single Operator stations are allowed only one transmitted signal at any given time.

2.1.5. Both categories of Single Operator stations compete for all-band and single-band awards.

2.1.6. Overall and single-band winners are recognized both in *QST* score listings and in awards offered.

2.2. Single Operator Portable:

2.2.1. Ten (10) W PEP output or less.

2.2.2. Portable power source.

2.2.3. Portable equipment and antennas.

2.2.4. Single Operator Portable stations must operate from a location other than a permanent station location.

2.2.5. Single Operator Portable stations may not change locations during the contest period outside of the original 500-meter diameter permitted circle.

2.3. Rover: One or two operators of a single station that moves among two or more grid squares during the course of a contest.

2.3.1. A rover vehicle may transport only one station using a single call sign.

2.3.2. A rover may not operate with more than one call sign.

2.3.3. Rover vehicles must transport all the equipment, power supplies, and antennas used at each operating site.

2.3.4. Rovers sign "rover" on phone and /R on CW after their call sign.

2.3.5. All Rovers are encouraged to adopt operating practices that allow as many stations as possible to contact them.

2.3.6. Rover operators may submit separate logs for single operator (fixed station) in addition to their rover entries. Rovers submitting a score for inclusion in a club competition must also include a secondary summary sheet indicating the portion of the score which counts for the club score if any of the QSOs submitted take place outside of their club's territory.

2.4 Multioperator: More than one person performs transmitting, receiving and logging functions, etc. Stations must locate all equipment (including antennas) within a circle whose diameter does not exceed 300 meters (1,000 feet). Multioperator stations may be divided into subcategories:

2.4.1. Multioperator (Unlimited): Stations submit logs with more than four bands used.

2.4.2. Limited Multioperator: Stations submit logs with a maximum of four bands used. (Logs from additional bands used, if any, should be included as checklogs.) QST

2001 ARRL 10-Meter Contest Rules

1. Object: For Amateurs worldwide to exchange QSO information with as many stations as possible on the 10-meter band.

2. Date and Contest Period: Second full weekend of December. Starts 0000 UTC Saturday; ends 2400 UTC Sunday (**December 15-16, 2001**).

2.1. All stations operate no more than 36 hours out of the 48-hour period.

2.2. Listening time counts as operating time.

3. Entry Categories:

3.1. Single Operator: (9 categories)

3.1.1. QRP.

3.1.1.1. Mixed Mode (Phone and CW).

3.1.1.2. Phone only.

3.1.1.3. CW only.

3.1.2. Low Power.

3.1.2.1. Mixed Mode (Phone and CW).

3.1.2.2. Phone only.

3.1.2.3. CW only.

3.1.3. High Power.

3.1.3.1. Mixed Mode (Phone and CW).

3.1.3.2. Phone only.

3.1.3.3. CW only.

Multioperator, Single Transmitter, mixed mode (only).

Includes single operators using packet or spotting assistance.

4. Contest Exchange:

W/VE stations (including Hawaii and Alaska) send signal report and state or province (District of Columbia stations send signal report and DC).

Novice and Technician Plus stations sign /N or /T on CW. If used, you must indicate /N or /T on your summary sheet.

DX stations (including KH2, KP4, etc) transmit signal report and sequential serial number starting with 001.

Maritime mobile stations send signal report and ITU Region (1, 2 or 3).

5. Scoring:

5.1. QSO points:

5.1.1. Count two points for each complete two-way phone QSO.

5.1.2. Count four points for each two-way CW QSO.

Count eight points for CW QSOs with US Novice or Technician Plus stations signing /N or /T (28.1 to 28.3 MHz only).

5.2. Multipliers: (per mode, phone and CW).

5.2.1. The 50 US states (plus District of Columbia).

5.2.2. Canada [NB (VE1, 9), NS (VE1), QC (VE2), ON (VE3), MB (VE4), SK (VE5), AB (VE6), BC (VE7), NT (VE8), NF, (VO1), LB (VO2)], YT (VY1), PE (VY2) NU (VY0).

5.2.3. DXCC entities (except the mainland US, Canada, Alaska and Hawaii).

5.2.4. ITU regions (maritime mobiles only).

Final Score: Multiply QSO points by total multipliers (the sum of states/VE provinces/DXCC entities/ITU regions per mode). Example: KA1RWY works 2245 stations including 1305 phone QSOs, 930 non-Novice CW QSOs, 10 Novice CW QSOs, for a total of 6410 QSO points. She works 49 states, 10 Canadian call areas, 23 DXCC entities and a maritime mobile station in Region 2 on phone and 30 states, 8 Canadian call areas, and 19 DXCC entities on CW for a total multiplier of 140. Final score = 6410 (QSO points) × 140 (multiplier) = 897,400 points.

6. Miscellaneous:

6.1 Single operator mixed-mode and multioperator stations may work stations once on CW and once on SSB.

6.2 Your call sign must indicate your DXCC entity if competing as DX. (N6TR in Oregon does not send N6TR/7, but K6GSS in Puerto Rico must send K6GSS/KP4).

6.3. All entrants may transmit only one signal on the air at any given time.

All CW contacts must take place below 28.3 MHz.

7. Awards: Certificates will be awarded to:

7.1 The highest-scoring single-operator station (in each category) from each ARRL/RAC Section and DXCC entity.

7.2 The top scoring Novice/Technician Plus station (in each category) in each ARRL Section.

7.3. Top multioperator entries in each ARRL Division, Canada and each continent.

7.4. Additional certificates will be awarded as participation warrants.

8. Miscellaneous:

8.1 All electronic logs (computer generated) must submit an ASCII text file of the log information in Cabrillo file format. Paper print outs of the electronic file are not acceptable substitutes.

8.2 Handwritten paper logs are acceptable submissions**.**

8.3 All entries must be e-mailed or postmarked by January 16, 2002.

8.4 E-mail entries only to: **10meter@arrl.org**. Submissions require Cabrillo log file with all required information (including exchange sent, category entered, power, and ARRL/RAC section—see General Rules for specific file format).

8.5 Electronic files not in Cabrillo file format may be designated as checklogs.

8.6 Paper entries should be mailed to 10 Meter Contest, ARRL, 225 Main St, Newington, CT 06111.

8.7 Paper entries must be submitted on current ARRL entry forms or an acceptable facsimile.

8.7.1. Forms are available for downloading at the Contest Branch Home Page at **www.arrl.org/contests/forms/**

8.7.2. Forms are available for an SASE sent to the Contest Branch.

8.8 See "General Rules for All ARRL Contests" and "General Rules for ARRL Contests on bands below 30 MHz (HF)" in this issue.

8.9 General queries should be directed to the Contest Branch at **contests@arrl.org** or by calling 860-594-0232. QST

2001 ARRL 160-Meter Contest Rules

1. Object: For Amateurs worldwide to exchange information with W/VE amateurs on the 160-meter band CW only. DX-to-DX QSOs do not count for contest credit.

2. Date and Contest Period: First full weekend of December. Starts 2200 UTC Friday, ends 1600 UTC Sunday (**December 7-9, 2001**). This is a 42-hour period with no time limitation.

3. Entry Categories:

3.1. Single Operator:

3.1.1. QRP.

3.1.2. Low Power.

3.1.3. High Power.

3.2. Multioperator, Single Transmitter (only).

3.2.1. This includes single operators using packet or spotting assistance.

4. Contest Exchange:

4.1. W/VE: Signal report and ARRL/RAC Section.

4.2. DX: Signal report. Country name is obvious from the call sign. Send ITU Region if maritime or aeronautical mobile.

5. Scoring:

5.1. QSO Points:

5.1.1. Two points for QSOs with amateurs in an ARRL/RAC Section.

5.1.2. W/VE stations count five points for DX QSOs.

5.2. Multipliers: ARRL/RAC Sections (maximum of 80) and DXCC entities (W/VE participants only).

5.2.1. Northwest Territory multiplier includes the Yukon (VY1) and Nunavut (VY0).

5.3. Final Score: Multiply QSO points by multiplier. Example: NU0X works 357 stations, including 13 DX stations, and has a multiplier of 67. His score would be 753 QSO points [(344 × 2) + (13 × 5)] multiplied by 67 for 50,451 points.

6. Miscellaneous:

6.1. Participants are reminded that the segment 1.830 to 1.835 should be used for intercontinental QSOs only, in conformance with the ARRL band plan.

7. Awards: Certificates will be awarded to the top-scoring QRP, low-power and high-power single-operator stations in each ARRL/RAC Section and DXCC entity, and to the top-scoring multioperator stations in each ARRL Division and continent.

8. Miscellaneous:

8.1 All logs that are generated using a computer must submit an ASCII text file of the log information in the Cabrillo file format. A paper printout in lieu of the electronic log file are not acceptable substitutes. Hand-written paper logs are still acceptable.

8.2 All entries for this contest must be e-mailed or postmarked by January 8, 2002.

8.3 Email entries only to **160meter@arrl.org**. Electronic submissions require a Cabrillo format summary file (combined summary and log). (See "General Rules" for specific file format.)

8.4 Electronic files not in Cabrillo format may be designated as checklogs not eligible for awards.

8.5 Handwritten paper entries should be mailed to 160 Meter Contest, ARRL, 225 Main St, Newington, CT 06111.

8.6 Paper entries must be submitted on current ARRL entry forms or on an acceptable facsimile.

8.6.1. Forms are available for downloading at the Contest Branch Home Page at **www.arrl.org/contests/forms/**.

8.6.2. Forms are available for an SASE sent to the Contest Branch.

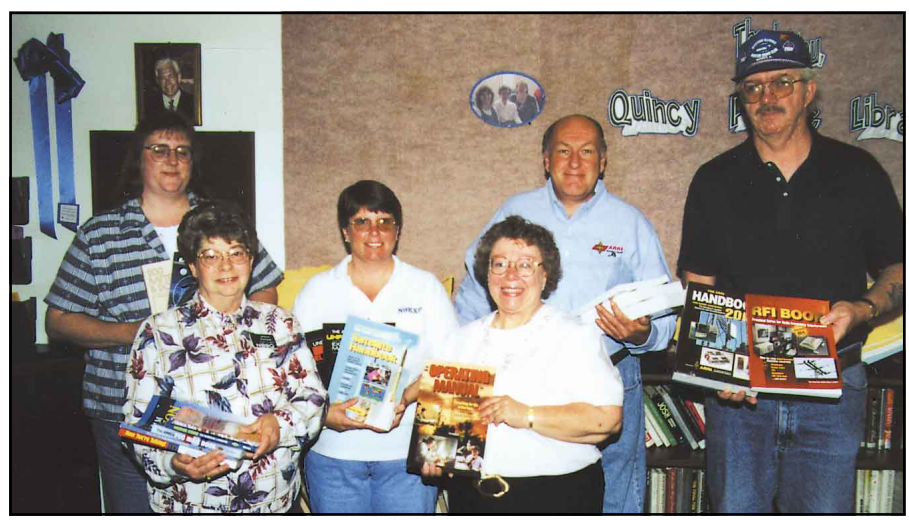
8.7 See "General Rules for All ARRL Contests" and "General Rules for ARRL Contests on bands below 30 MHz (HF)," in this issue.

8.8 General queries should be directed to the Contest Branch at **contests@arrl.org** or by calling 860-594-0232. QST

STRAYS

The Western Illinois ARC and the Western Catholic Union recently presented the Quincy (IL) Public Library with the ARRL Library Book Set. Left to right: Kimberly Drake, of the QPL; Arlyce Nowack, NB9Q; Lou Ann Crockett, N9KXP; Susan Beach, of the QPL; Bob Mitchell, KB9ZEH, and Darrell Taylor, N9DT. For information on how your club can sponsor an ARRL Library Book Set, contact ARRL Publication Sales, pubsales@arrl.org.

Previous • **Next Strays**



CONTEST CORRAL

Feedback

Every effort is made to accurately report each participant's entry information for ARRL Contests. However, there are cases where *QST* reports information as submitted but the participant subsequently discovers that they have made an error in their Cabrillo file. When this is reported to the Contest Branch, we attempt to verify the corrected information and that the problem was inadvertent. In fairness to all competitors, when the correction can be verified we will report changes affecting Top Ten entries and certificate winners. *This underscores the need for participants to verify their entry information is correct before submitting their contest entry.*

In the **2001 ARRL International DX** CW contest, **IY4W (K2MRZ, op)** submitted as Single Operator All Band but was in fact Single Operator Single Band 10 Meters. This places the entry in 8th place for DX entries in the category. **N9UA** indicated his ARRL Section as CT but actually operated from the WI section. This places him first in his category in that section. **C6AGS (KI6T, op)** was miscoded. His score was 987,471 with 1503 QSOs and 219 multipliers, operating single op, low power, from the Bahamas.

In the **2000 ARRL Ten-Meter Contest**, the **L50DK** log had problems with recorded times that resulted in excessive QSOs being removed for exceeding allowable operating time. After correcting this error, their final score in the Multi-operator category shows a score of 1,688,904 on 2033 QSOs and 252 multipliers. **N3HBX** incorrectly submitted his entry marked CW only when it was a Phone only log.

In the **2001 ARRL RTTY Roundup**, **KF2XF** was incorrectly reported in the NNJ section. He should be listed in the NLI section. **WA3IIA** was listed in the WPA section but actually operated in the EPA section.

W1AW Qualifying Runs are 9 AM EST Thursday, November 1, and 7 PM EST Friday, November 16. The K6YR West Coast Qualifying Run will be at 9 PM PST November 7. Check the W1AW schedule for details.

3-5

ARRL November Sweepstakes, CW. See October *QST*, p 114.

Eighth Annual North American Collegiate ARC Championship, CW, 2100Z Nov 3 to 0300Z Nov 5 (phone is 2100Z Nov 17 to 0300Z Nov 19). Both sections run concurrently with the ARRL November Sweepstakes contest. Participation limited to clubs at institutions of higher learning beyond the high school level. Colleges may enter Sweepstakes in any of the valid Sweepstakes entry categories and abide by all of the ARRL Sweepstakes rules. In an effort to encourage club station improvements all contacts must be made from the established club radio station located on a college campus, if one exists. (No "portable" operation from a nearby contest "super station.") A club may operate from a member's station provided that a club station does not exist on campus. Official results will be based on those published in *QST* so all contestants must submit a valid log to the ARRL. The combined champion is based on a points system whereby each CW and phone score is divided by the highest scoring collegiate score for that mode and multiplied by 1000. The overall combined score is the sum of the CW and phone points. Separate champions will be determined for CW, phone and combined scores. Contestants must also submit a score summary (the contest summary sheet, not a complete log) to: Collegiate Championship, c/o Ken Harker, WM5R, 927 East 46th St, Apt 102, Austin, TX 78751; **wm5r@arrl.net**. Provisional scores and winners will be available on the Collegiate Championship home page at **www.collegiatechampionship.org/**.

IPA Contest, Phone and CW, sponsored by The International Police Association Radio Club, CW Nov 3, 0600Z-1000Z and 1400Z-1800Z; Phone Nov 4 0600Z-1000Z and 1400Z-1800Z; 80 40 20 15 10 meters. Single op, Multi-single, Multi-multi and SWL. Exchange RST and serial number. IPARC members give their membership number. Count 1 point per QSO; 5 points for every QSO with an IPARC member. Multipliers are DXCC countries and US states per band. Final score is QSO points × total multipliers per band. Add band totals together to get final score. Send logs by Dec 31, to: Uwe Greggersen, DL8KCG, Hurststr. 9, D-51645 Gummersbach, Germany. **dl8kcg@darc.de**; **www.iparc.com/Contests/contests.html**.

10-11

Worked All Europe Contest, RTTY, from 0000Z Nov 10 to 2400Z Nov 11. 80 40 20 15 10 meters. Single-op all band, Multi-op, Single transmitter and SWL. DX cluster assistance allowed for all classes. Single ops must take 12 hours of "off" time (consisting of periods lasting no more than three hours) during the contest. Exchange RST and QSO serial number. Work stations once per band. Count 1 point for each QSO and 1 point for each QTC. A QTC is a report of confirmed QSOs that took place earlier in the contest that is sent back to a station. A QTC contains the time, call sign and QSO number of the station being reported (e.g., 1307/DL1AA/346). 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 to complete this quota. Count 1 point for each QTC reported to any station not on your own continent. Each station may both send and receive QTCs, but the sum of QTCs exchanged between two stations (sent plus received) must not exceed 10. A uniform list of QTCs sent must be kept. QTC 3/7 indicates that this is the 3rd series and 7 QTCs are now being sent. Record all received QTCs on a separate sheet with a clear indication of the sender. multipliers are DXCC/WAE countries per band. Each multiplier counts as follows: 80 meters ×4; 40 meters ×3; 20 15 10 meters ×2. Score is total number of QSOs + QTCs × total number of multipliers. Awards. Send logs by December 15, to WAEDC Contest Committee, Durerring 7, PO Box 1126, D-74370, Sersheim, Germany, or e-mail **waedc@darc.de**; **www.darc.de/referate/dx/fedcw.htm**.

Japan International DX Contest, phone. sponsored by *Five Nine* magazine, from 2300Z Nov 9 until 2300Z Nov 11. Work JAs only. 80 40 20 15 10 meters. Operate no more than 30 hours (JAs operate full 48). Single operator multi/single band, high (>100 W) or low (<100 W) power, multi-single, or maritime mobile. Single ops allowed only one transmitted signal at a time; multiops are allowed an additional signal only to work new multipliers; otherwise they must remain on a band for 10 minutes. Exchange RS(T) and CQ Zone; JA stations exchange prefecture number (1-50). Score 4 pts/QSO on 160; 2 pts/QSO on 80 and 10; and 1 pt/QSO on 40, 20 and 15. Multipliers are JA prefectures worked per band (max 50). Final score is QSO points × multipliers. Electronic entries accepted. Awards. Send logs postmarked by Dec 31 to JIDX Contest, c/o Five-Nine Magazine, PO Box 59, Kamata, Tokyo, 144 Japan, or email them to **jidx-log@ne.nal.go.jp**; **jzap.com/je1cka/jidx/**.

OK/OM DX Contest, 0000Z Nov 10 to 2400Z Nov 11, CW and SSB, 160 80 40 20 15 10 meters. Single ops, SSB, CW or mixed mode; Multiops, mixed mode, QRP. Exchange RST plus serial number. OK/OM stations will include their three-letter district code no. Count 1 pt/QSO with OK/OM. Final score equals total QSO points times the total number of OK/OM/OL prefixes worked per band and mode. Entries must be received by Dec 15. Mail to OK1FUA, Martin Huml, Radioamater, Vlastina 23, 161 01 Praha 6, Czech Republic. **okomdx@radioamater.cz**; **crk.mlp.cz/ENG/DXCONTE.HTM**.

17-19

ARRL November Sweepstakes, Phone. See October *QST*, page 114.

North American Collegiate ARC Championship, phone. See Nov 3-5 listing.

LZ DX Contest, CW only. Sponsored by the Bulgarian Federation of Radio Amateurs, 1200Z Nov 17 to 2100Z Nov 18, 80 40 20 15 10 meters. Categories A—single op multi band, B—Single op single band, C—Multi op, D—SWL. All categories must stay on a band 10 mins before changing to another band. Exchange RST and ITU zone. Count 6 points for QSO with an LZ station, 3 points for QSO outside your continent, 1 point for QSO inside your continent. Multiplier is ITU zones per band. Final score is QSO points × total ITU zones. Awards. Send log within 30 days to: BFRA, PO Box 830, 1000 Sofia, Bulgaria; email **lz1bj@yahoo.com**; **www.qsl.net/lz1fw/contest/**.

27-28

CQ WW DX Contest, CW. See October *QST*, p 113. QST

STRAYS

MILITARY COMMUNICATIONS EQUIPMENT SOUGHT

◊ The Pueblo Weisbrod Aircraft Museum is expanding into its new, 30,000 sq ft hangar and is seeking donations of present day or former military communications equipment from WW1, WW2, Korean War, Cold War, Vietnam and Desert Shield/Desert Storm to be put on display. This Museum is the largest vintage military aircraft museum in the State of Colorado, based on the number of WW2 and post-WW2 aircraft on display.

Contact the Museum at 719-948-9219, fax 719-948-2437, e-mail **pwam@iex.net** or write to 81001 Magnuson Ave, Pueblo, CO 81001. —*William G. Pearce, USN (Ret), W0MWO*

Previous Strays

George Fremin III, K5TR ♦ 624 Lost Oak Trail, Johnson City, TX 78636 ♦ k5tr@arrl.org

SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall K. Carlson, WB0JJX— This is one of the most difficult columns I have had to write as an SM, so close on the heels of the NY/Washington terrorist attacks. No one knows what will befall this nation by the time you read this. Everything else seems trivial in comparison. We commend the bravery of all the emergency workers as they strive to save what lives they can and to provide closure to the family's whose loved ones have perished, their efforts have been nothing less than heroic. We extend our compassion to those who have suffered such a terrible loss and as always offer our support to our government and community in what every way we can. 73 with the hope of a better tomorrow – 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, Pietro DeVolpi, K3PD, Paul Craig, N3YSI, Dave Heller, K3TX, George Law, N3KYZ, Harry Thomas, W3KOD. I would like to welcome Pete, K3PD, onto the E. Pa. Staff. I am quite pleased that Pete has accepted the position of Assistant Section Manager. I first met Pete at the Harrisburg Hamfest on July 4th. In the following weeks, Pete was a big factor in finding two individuals who could fill two important vacancies in the District. Quite a few folks have already met Pete, working at his usual spot at the QSL Bureau table at several Hamfests. The addition of Pete to the E. Pa. staff is a huge asset. One of the vacancies, which Pete helped to fill, is the position of DEC. I am extremely proud to welcome back to the E. Pa. staff Steve Gobat, KA3PDQ. Steve had been EC for Dauphin County. However, a few months ago Steve had resigned after becoming frustrated over a problem at the EC position. I am very happy to have Steve back and he will do an excellent job. A new comer to the E. Pa. Staff is James D. Acri, N3JRO. Jim has accepted the position of EC for Dauphin County. I am happy to welcome Jim onto our staff. Pete and Steve were quickly put into action when a request for assistance came in from the MDC Section. The EC from Frederick County MD was seeking assistance from a few Hams in Adams County for a Public Service Event that would encompass some of the Adams County area. Unfortunately Adams County presently does not have an EC nor have they had one for some time. The silver lining to all of this may be that someone from Adams County steps forward to assist in the program. The Hanover Area Hamming Association is also assisting in trying to rouse someone in the Adams County area. My heartiest thanks to Charles Strong, W3CQB, for his efforts in helping to look for some volunteers in Adams County and also for sending an online copy of his club's newsletter. Congratulations to the officers recently elected at the Carbon Amateur Radio Club; President Anthony E. Good, K3NG; Vice President Robert A. Roomberg KB3BYT; Secretary Larry G. Lilly Sr, N3CR; Treasurer John J. Schreibmaier, W3MF. Tfc: W3IPX 214, N3YSI 210, K2BCL 192, N3EFW 162, W3HK 121, N3SW 53, W3NNL 48, K3TX 32, W3JKX 31, W3TWV 19, AD3X 11, KA3LVP 10, KB3CEZ 10, KB3CVO 8, KB3DDL 7, KB3BBR 5, W3ZQN 4, N3IRN 4, N3AS 4, W3ROQ 3, W3BNR 3, N3AO 2, KB3CKD 1, N3HR 1; Net Reports: EPA 137, EPAEPTN 104, PTTN 46, SEPPTN 26, PFN 22, D3ARES 8, LCARES 7, MARCTN 5, MCOES 1, and D4ARES 0.

MARYLAND/DC: SM, Tom Abernethy, W3TOM, 301-292-6263-w3tom@arrl.org.— MDC Section Webpage: http://www.qsl.net/w3tom/. On 14 August, we conducted an HF net for the purpose of passing traffic, and training operators in formal traffic handling and net operations. Net was convened at 1930L on 3921 kHz. The following stations checked into the net: N3WKE/NCS, W3YVQ, BACO; W3YRS/BACI; WA1QAA, HOWA; N3FFB, HARF; and W3YD, PRGE; W3CQH, MONT; N3ZOC, ANAR; N3SEO, ANAR; KA3GRW, CHAS; W3TOM, CHAS. Net was secured at 2030L. Sincere thanks to those who participated. CALV EC N3QHC reports 16 members, an increase of 1 during August; The new CALV ARES Net is progressing nicely. Check ins include KR3A, N3IDX, N3QHC, N3YO, WA1QAA, KF4GFB, W3IRE, N3AE, N1WR, N3YR, N3ZIZ, N3MZV, and K3MVZ. Four net sessions were conducted during August on 146.985; Dennis also reports holding a debriefing on 26 August after the RACES CALVEX Dress Rehearsal held on 23 August; work on a CALV Emergency Plan is progressing. WASH EC KD3JK reports nine sessions of the WASH ARES/RACES Net which meets on Tuesdays on 146.94 and the Four States Net which meets Thursdays on 147.090; One training session was held targeted at new members and focussed on training in NTS and SITREP message forms and voicing of messages. FRED EC N8AAY reports 21 members, an increase of 11; four sessions of the FRED ARES Net which meets on 147.06. ANAR EC N3QXW reports 44 members, an increase of 4; On 26 August the following ANAR ARES members provided communications support for the Annapolis 10 mile run: N3WOF, KB3CJT, N3HKJ, W3RUM, N3IJK, N3SEO and K3BMV. PRGE EC WI3N reports 45 members, an increase of two. 73, Tom. With the Nets: NET/NET MGR/QND/QTC/QNI: MSN/KC3Y/31/48/291, MEPN/N3WKE/32/60/369, MDD/WJ3K/62/178/518, MDD Top Brass AA3SB/182 K3JL/138 W3YVQ/136, BTN/AA3LN/31/48/357. Tfc: W3YVQ 116, AA3SB 93, W3CB 71, N3WK 46, KC3Y 45, N3WKE 45, N3DE 41, K3CSX 30, N3KGM 26, N3ZKP 13, WA1QAA 12, WA3GYW 2, KE3FL 2. PSHR: W3YVQ 139, W3CB 128, AA3SB 124, N3WKE 123, N3ZKP 117, N3WK 111, WA1QAA 99, K3CSX 86, KC3Y 79, KE3FL 73.

NORTHERN NEW YORK: SM, Thomas A. Dick, KF2GC, http://www.northnet.org/nnyham, e-mail: kf2gc@arrl.org —ASMs: KD2AJ, WZ2T, WB2KLD, N2ZMS, WA2RLW. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: WN2F. STM: N2ZGN. TC: N2JKG. WN2F, KB2LML, KB2RKW, KD2AJ, WA2RP, WB2YDT, N4TW, N2BO, N2NAN, AB2HQ, WB2KLD, N2ZGN, and many more for helping to organize for this & you have been instrumental in pulling off this years SET here in NNY. We were able to get Essex Co. Franklin Co. St. Lawrence Co. Clinton Co. Schoharie Co. Fulton Co. Jefferson Co. and Lewis Co. all involved with our Simulated Emergency Test. We made this a meaning full event and I know the training and skills that were passed on will undoubtedly be of value in the months and years to come. I want to thank everyone for their help this year and all the EOCs & Amateurs throughout the section for their participation. Great job everyone! Our first NNYARA Hamfest 2001 was October 13th in Lake Placid, NY and I want to thank all our NNYARA clubs and members for their support and help making this a valued event for amateurs also, our Guest Speakers and Presenters. We look forward to making next year's Hamfest 2002 another meaningful one. Thanks again! Web site: www.geocities.com/nnyara, 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. Time has passed since so many lives were lost in New York, DC, Pa but continue to pray the families and friends. We must remember those who put their lives on the line and pray for all who lost their lives. NEEDED Docents (tour guides) for positions on the New Jersey Battleship (museum).Experience history up close. Be important to the public and meet people from all walks of life. Training and items such as uniforms will be provided along with certain privileges. If this intrigues you, call Scott at 856-966-5000. email: scottkodger@aol.com.Traffic for Aug. QNI rpts NJM 118, NJN(E) 198, NJN(L) 185, NJPN 186, NJSN 193, SJTN 60, SJVN 259, JSARS 168, JSARS 245 (July) SAR: WA2YL 173, K2UL 84, AA2SV 64, KB2RTZ 40, WA2CUW 38, W2AZ 37, K2UL-4 32, WB2UVB 29, N2VQA 20, WJ2F 8, KA2CQX 5, KB2VYZ 2, KB2VSR KB2YBM KC2ETU 1. PSHR KB2RTZ 196, K2UL 172, WB2UVB 142, WA2YL 139, AA2SV 125, KA2CQX 106, WA2CUW 95, N2VQA 79, N2HQL 70, KA2YKN 43, KB2YJD 21, W2MC 16.

WESTERN NEW YORK: SM, Scott Bauer, W2LC— The Empire State Games (ESG) is the largest public service event in New York where Amateur Radio is used for communications. Congratulations and thank you to the ESG coordinators: Vivian Douglas, WA2PUU, the ESG state communications coordinator; host city chairpersons: Carol Mayers, KB2RMZ, Bud Hesler KZ2K, and Pete Chapman, NA2A; repeater trustees Albert Long, W2JIT, 145.45 and Sheldon Hepler, KA2NIL, 145.17; Jack Roshia, KA2ZNZ, net manager of the Oneida County Traffic and Emergency Net (OCTEN), which covered the message traffic. Congratulations to the Liverpool ARC for the fine Amateur Radio exhibit at the New York State Fair here in Syracuse, on the tracks in the caboose. Dick, AC1M, and Marty, W2SWN, coordinated the special event station. Congratulations to the South Towns Amateur Radio Society for the Amateur Radio exhibit at the Erie County Fair, with Gary, KB2YJ, and Keith, KC2DGC, doing the coordination. The Binghamton ARA and WB2GHH (Pres) organized a Fox Hunt for the Twin Orchards Baptist Church in Vestal (W3JU youth group leader), with AA2EQ, AA2MU, KB2YEN, KC2FLU, KC2FWT, and W2TRT participating. Sounds like a lot of fun! Silent Key: Daniel Hunter, KE2LD, of the Lancaster ARC. August Net Summaries:

Net	NM	Sess	QNI	QSP
BRVSN	N2OYQ	31	159	9
ESS	WI2G	31	363	64
NYPON	N2YJZ	31	366	79
NYS/L	W2YGW	31	310	197
NYSCN	W2MTA	4	20	1
OARC	N2KPR	5	43	6
OCTEN/L	KA2ZNZ	31	692	255
STAR	N2NCB	29	213	2
WDN/E	N2JRS	31	491	71
WDN/M	KA2IWK	8	105	5

Net	NM	Sess	QNI	QSP
CNYTN	WA2PUU	31	378	75
NYPHONE	N2LTC	31	219	303
NYS/E	WB2QIX	31	308	154
NYS/M	KA2GJV	31	172	51
NYSPTEN	WB3CUF	31	371	41
OCTEN/E	KA2ZNZ	31	1410	261
OMEN	N2UC	1	11	1
TIGARDS	W2MTA	4	27	4
WDN/L	W2GUT	31	509	8

Traffic (August 2001), * indicates PSHR, #indicates BPL: N2LTC#* 2186, KA2ZNZ* 447, W2MTA* 342, WB2IJH* 312, NN2H* 255, KA2GJV* 221, KB2KOJ* 182, WI2G* 159, W2FR* 113, N2KPR* 97, KC2EOT* 95, W2LC* 95, WB2QIX* 88, KG2D* 80, W2PII* 75, KA2DBD* 59, W2GUT* 52, KA2IWK* 51, N2CCN* 47, N2JRS* 37, KB2SGT* 27, AF2K* 25, N2WDS* 22, KA2BCE* 20, KB2ETO* 14, K2DN* 13, WA2GUP* 14, KB2WII* 7, KG2HA* 1. Digital; Stn Rx/Tx: KA2GJV 8/0, N2LTC 862/757.

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. I want to congratulate and welcome the Tri-County CW Club as they become our newest ARRL affiliated club in the section. The club meets in North Huntingdon, Pa. As I write this article we just finished the Western Pa. Section Convention at the Butler Hamfest. I enjoyed seeing everyone at the event. On Saturday November 17 the simulated emergency test, SET, will take place in our section. This is a combined exercise to demonstrate the emergency communications activities of the amateur radio operators. The drill is conducted in the various counties and coordinated through the Western Pa. Phone and traffic system on 3983 kHz. I encourage everyone to participate in this worthwhile exercise. Check with your local emergency coordinator for the local repeater that will be used in your county. I am always looking for individuals that are willing to volunteer for the many positions available in the section. Please contact me if you would like additional information regarding these various appointments. I am starting my calendar for club visits for the upcoming year. If you would like to have me attend one of your club functions to speak on the activities of the ARRL and the section contact me directly. Contact information is on page 12 of *QST*. This month's featured web site belongs to the Mercer County Amateur Radio Club. The url for their Web site is http://www.arlnetwork.com/mcarc. Hope everyone has a Happy Thanksgiving! 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. Sadly, someone very close to me, KA9WCR, became a Silent Key on July 20. She entered the hobby late in life, but was fascinated by the magic of Amateur Radio at an early age. Over the years, she instilled that interest in me, and was always a source of encouragement. It is because of her that I joined this great hobby. My mother was 75. York Radio Club reports that WK9J has assumed the presidency of YRC following the resignation of KE9VC due to illness. The Lamoine Emergency ARC (Macomb) has changed its club call to W9SSP in memory of a long-time member. The Schaumburg ARC is proposing an amendment to its by-laws to allow for absentee voting. The Fox River Radio League was asked once again to provide communications for the Walter Payton Run in June. Over 1500 runners and 32 amateurs participated in the event. Hamfesters RC has a new home on the internet at www.hamfesters.org. The St. Clair ARC newsletter reports that 12 members assisted the Shriner's Circus Parade in June. The Tri-Town RAC marked the 70th anniversary of its club with a special event station on August 17. STARS is now producing an electronic version on their newsletter for distribution via e-mail. The STARS group celebrated their 25th anniversary at a picnic in July. Six members of the North Shore RC provided assistance on the 10k race in Deerfield. July traffic: WD9F 41, WA9RUM 7. Ninth region C4 report for July, traffic 192, sessions 62, time 385 min, average 3.09, rate .498, rep 95%. ILN K9CNP NS9F KF9ME. W9VEY Memorial Net report de K9AXS 7 with 245 check-ins. August traffic: WD9F 60, N9GZ 8, WA9RUM 6, WA9APQ 2. Ninth region C4 report for Aug traffic 227 sessions 62 time 395 min average 3.66 rate .574 percent rep 97% ILN K9CNP NS9F KF9ME. W9VEY Memorial Net report de K9AXS 6 with 195 check-ins.

INDIANA: SM, Peggy Coulter, W9JUJ—SEC: K9ZBM. ASEC: WA9ZCE. STM: WA9JWL. OOC: AA9WD. SGL: K9JZZ. PIC: KB9LEI. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys: 8/19, Bruce Woodward, W9ZY, Indy; 8/24, Lowell Goodson, W9RBV, Evansville; 8/29, Melvin C. Cox, K9MEL, Farmersburg. Bruce, as I have known him for so many years as W9UMH will be greatly missed. He was net manager of ITN for many years, was Section Manager for several years. He was very active in several radio clubs in Indianapolis. On Aug. 18th Central IN SKYWARN was activated for severe weather. John Curran MIC for the Indy NWS office commended amateurs for their speed and accuracy during the weather event. John reported that of the 45 reports the NWS received, 21 reports were via Amateur Radio. Of these 21 reports, 20 were "in real time". Where is all the news? Not much was sent to me. I just can't realize that summer is over and soon cold wx. Hope to see you at the IN State Convention at Fort Wayne.Have a Happy Thanksgiving. NM's ITN/WA9JWL, QIN/K9PUI/KJ9J, ICN/K8LEN, VHF/WA9JWL.

Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	1330/2130/2300	2192	217	1530	86
QIN	3656	1430/0000	161	52	716	54
ICN	3705	2315	17	9	132	15
Hoosier VHF nets(6 nets)			368	24	540	26

D9RN Total QTC 356 in 62 sessions IN QNI W9UEM, NT9G, K9GBR, N9KNJ, WB9QPA, WA9JWL, and KB9NPU. 9RN Total QTC 227 in 62 sessions IN QNI KO9D, K9PUI, WB9UYU, N9HZ, KJ9J, WB9OFG, and W9FC. Tfc: W9FC 318, N9KNJ 124, WA9JWL 124, K9PUI 79, KO9D 76, KB9NPU 68, K9GBR 52, WB9QPA 39, W9JUJ 36, WD9HII 34, KA9EIV 24, WB9OFG 20, W9UEM 19, W9EHY 9, K9RPZ 8, K9ZBM 8, K9DIY 7, AB9AA 7, K8LEN 7, WB9NCE 5, N9HZ 4, AB9A 3, K9CUN 3, N9AJM 2.

WISCONSIN: SM: Don Michalski, W9IXG—SEC: WB9RQR. STM: K9LGU. ACC: K9FHI. SGL: AD9X. OOC: W9DGI. PIC: open. TC: K9GDF. ASM: K9UTQ. W9RCW, W9CBE. BM: WB9NRK. With deep sorrow, I report that Terry Ludwig, N9JUU, is a Silent Key. He was secretary of the Watertown ARC. N9RON, Harold Krueger, 80, passed away. Harold was a member of the RRRC. The USS Wisconsin ARC, has Honorary Membership upon Jim Romelfanger, K9ZZ. Congratulations!! ECARC is in the process of rebuilding the 147.240 repeater system with commercial grade equipment. When completed they will have up to eight remote receive sites in the area. The goal is to have one watt handheld coverage any place in Eau Claire County. Bruce Micales, WA2DEU, has been appointed by Stan Kaplan, WB9RQR, SEC, as the Liaison Emergency Coordinator, LEC, for the Red Cross. Also,

Continued on page 112.

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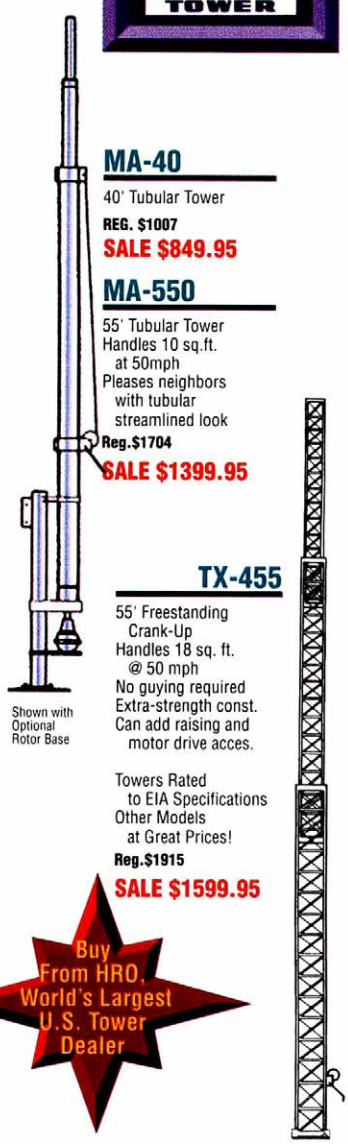

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Tom Kucharski, KA9EWJ, as LEC for the National Weather Service. The LEC positions are of the level as DECs. RRRC reports that 11 out of 12 students passed their Technician license, thanks in part, to Pat Volkmann, WB9JIC. Many of these students were youngsters!! RMRA 444.30 repeater is interfaced to the Internet Radio Linking Project (IRLP). We believe this is the first such connection in Wisconsin. This allows anyone within range of the repeater to conduct a QSO as far away as Australia with only a hand-held and for potential ARES use. Our appreciation to K9PT, KC9NW, KB9RFB, and K9DB for providing this link! 73, Don, W9IXG. Tfc: K9JPS 727, W9YPY 537, N9VE 530, K9GU 452, W9RCW 451, N9TVT 419, W9CBE 167, N9BDL 112, K9LGU 98, WA7UVX 91, K9FHI 87, W9IHW 69, N9KHD 66, AG9G 63, KE9VU 55, W9UW 48, KB9ROB 39, KG9B 37, AA9BB 31, K9HDF 30, W9BHL 29, W9YCV 25, WB9ICH 24, N9JIY 17.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, KMØD—The Minnesota ARES Simulated Emergency Test was held Saturday Oct 6th. Hamfest Minnesota is Saturday Oct 27 at RiverCentre in St.Paul. A reminder for those who have Internet access, you can receive the MN Section eSignals electronic newsletter by going to the membership data page and checking the box pertaining to receiving such emails. So far we have about 950 people on the mailing list. The electronic newsletter contains material which far exceeds the space available to fit in this news column. Material from the newsletter is often found in club newsletters for those who don't receive it otherwise.

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MSPN/E	3860	5:30 P	693/108/31	KBØOHI
MSPN/N	3860	12 P	433/74/31	WAØTFC
MSSN	3710	6 P	N/A	vacant
MSN/1	3605	6:30 P	217/59/31	KØWPK
MSN/2	3605	9:50 P	131/30/30	KØPIZ
PAW	3925	9A-5P	2026/83/77	KAØIZA

Tfc: KBØOHI, WAØTFC, WØLAW, WØGRW, KØWPK, KBØAII, WØHPD, KCØHAW, KØPIZ, KØPSH, KAØIZA, KN9U, KBØAIJ, W3FAF, WDØGUF, WAØYSL, KØIKO.

NORTH DAKOTA: SM, Kent Olson, KAØLDG —First of all, let's have a moment of silence for our fellow Americans who fell prey to this vicious, inhumane act of violence. Our sorrow and horror at this unbelievable act are impossible to communicate. At a time like this, it is difficult to do anything but stay glued to our televisions as the magnitude of the events unfolds. The ham radio community was able to summon their strength of will and start to assist in any way they were able. If you take a look at the ARRL Web site, you can read about some of the great acts of generosity and, in some cases, heroism on the part of the hams. This is the time to re-examine why we became involved in ham radio in the first place. There are many reasons: friendships, communicating with far-flung lands, and community service. On occasions like this, let's try to remember how we can all be of service to our fellow human beings. Take the time to see what you can do in your community to prepare for, God forbid, any possible contingencies. Section Web site at: http://home.earthlink.net/~qtipf16/. August Tfc: HF NM KE0XT reports Goose River Net, 4/40/0; WX Net 27/695/4; Data Net 30/570/11.

SOUTH DAKOTA: SM, R.L. Cory, WØYMB—On Saturday, Sept 1, 18 members of the Hot Springs ARC and the Black Hills ARC (two of them had only recently received their licenses) provided communications for the 4th Annual Southern Hills Triathlon sponsored by the Hot Springs Jaycees. A letter to the Lake Area Radio Klub at Watertown from ARRL Headquarters recognized the 50 year affiliation and congratulated them for reaching the milestone. Their club also reports that their SKYWARN activities were the most in June than any one can remember. 19 hams were involved in their activities also the committee is working on having next year's Little House on the Prairie special event station coordinate with a contest schedule to obtain more operators and have a smooth operation. They are also working on a triathlon around Lake Poinsett. The South Dakota Novice Net last month had the most check ins in 3 years. Let's make it bigger yet. It meets at 7 PM CST on Sunday on 3700. Total traffic reported for August was 337.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH—Hope you participated in the AR QSO Party last month. Details of success will be announced very soon. My thanks to Don, W5RL, ASM for his work and leadership, & to each one of you who participated. Attended hamfests at Queen Wilhelmina and NLR (CAREN club) (Sept) & appreciate them, as well as other clubs who offered all of us hamfests throughout the year. Jonesboro also had hamfest in Oct. – will do better next year getting information out well in advance of the hamfest so you can make plans. They include (as of now) Harrison, Fort Smith, Russellville, Jonesboro, Little Rock & North Little Rock, and perhaps Siloam Springs too. A new challenge is being offered to have more ARRL members. You can receive special recognition and a nice award by helping recruit new and existing members to renew their membership. Details will be shared on upcoming emails & HF nets, as well as in letters available upon request. We have a very active section and many of you are responsible for our success. Please continue in your efforts & let's keep up the good work. You're very much appreciated! Traffic for August includes 132 pieces of traffic exchanges and over 3000 checking in regularly. Thanks especially to K5BOC, KC5TMU, W9YCE, AB5AU K7ZQR, WA5KQU, W0YCE, KO5E, K5KAC & W5RXU for their efforts in getting many of the messages passed.

LOUISIANA: SM, Mickey Cox, K5MC - ACC: KM5YL. OOC: WB5CXJ. PIC: K5IQ. SEC: AC5TM. SGL: KD5KNZ. LCW NM: W4DLZ. LTN NM: WB5ZED. Very sorry to report that Alvin, N5VIL, is a Silent Key. David W5OER has been appointed DEC for the Capital District. All ARES members in the Capital District need to support David as he takes on his new duties. I had the privilege of visiting ARRL HQ and W1AW to attend the recent SM Workshop in Newington. It was my first visit to HQ and I was most impressed. If you've never seen HQ, I hope that you will have the opportunity to do so in the future. In addition to seeing W1AW and many historical items on

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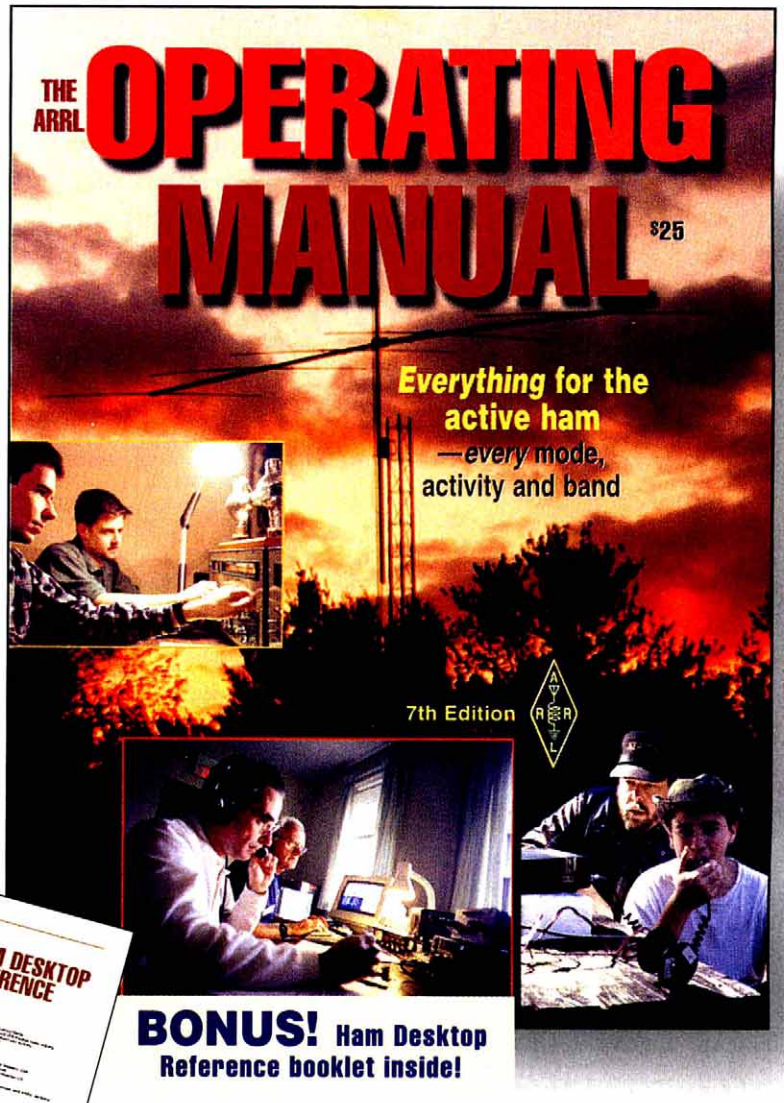

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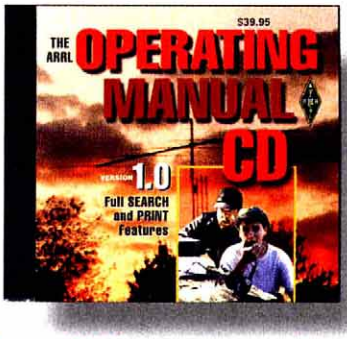

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display, you will see such sites as the ARRL Lab and the Outgoing QSL Bureau. I also want to thank the great staff we have working for us at HQ for the excellent hospitality that was shown to us during the workshop. Hurricane season is upon us. ARES members and other public service oriented amateurs need to remain prepared by participating as much as possible in such activities as local drills, routine traffic handling, and so forth. Contest season is also upon us. For those of us who enjoy contesting and chasing DX on HF, this is the time of year we most look forward to. Although the peak of the current sunspot cycle has apparently passed, from October through next March we should have some excellent propagation on 160 through 10 meters. Tfc: K5IQZ 170, K5MC 113, KM5YL 29, KG5GE 28, K5DPG 21, W5PY 16. PSHR: K5IQZ 129, K5DPG 122, KM5YL 118, K5MC 99, KG5GE 98, W5PY 80. Net Reports: sessions/QNI/QTC. LTN: 31/416/106. LCW: 31/195/64.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Section Web Page: www.arrlmiss.org. Web Master: K5IBM at k5ibm@arrl.net. ASM: N5EZX, W5EPW. ACC: N5JGK. SGL: AB5WF. STM: KJ5YY. TC: N5XXX. Congratulations to KC5YCH and KB5ZEA for completing the Level 2 ARRL Emergency Communications Course. MDXA activated W5B from the Biloxi Lighthouse during International Lighthouse Weekend. QSL Manager W5OXA reports participants were KD5CQT, W5UE, N5ID, WA5DM, N5FG, K5NY, W5PF, K5JB, W5RUK, KK5EW, W5DJW, WB4YBY, and W5ACS. Congratulations to K5YG (Single Op W/VE - High Power) and W5VZF (Multi-Op W/VE - Low Power) for making the Top Ten in their respective categories in the 2001 ARRL RTTY Roundup. Also congratulations to KE5K for making the DXCC Honor Roll. The Mississippi Baptist Hams Net meets on 7260 each Sunday and has changed times from 1:30 PM to 2:00 PM. Check out WB5ZED's traffic count below! Welcome aboard to AB5RS as Assistant EC for Jackson County. Regret to report the passing of Blondell Garling, WB5KUM, of New Albany and xyl of W5UBG. Blondell had just earned her General before she passed. OO Report: K5XQ. PIO Report: W5KWB. DEC/EC Reports: NN5AF, KD5CQX, KD5CKP, KD5FUO, N5NQ, WB5OCD, AB5WF, KB5ZEA, N5ZNT. Net Reports: sessions/QNI/QTC. MSPN 31/3239/45, MTN 31/102/57, MSN 31/1417/13, PBRA 31/699/19, Jackson Co ARES/RACES 31/430/9, MAEN 5/75/0, Attala Co ARES 5/63/2, JARCEN 4/68/0, NW MS ARES 4/32/0, LARC 4/70/0, MBHN 4/16/0, MLEN 4/79/0, Lo Co Net 4/38/0, Jones Co ARES 4/70/0, MCARA 4/52/0, Central Miss Linking Net 1/30/0. PSHR: WB5ZED 221, KB5W 152, K5VV 104, KD5CKP 115, W5XX 81, KJ5YY 80. Traffic: WB5ZED 993 (BPL), KB5W 355, K5VV 50, W5LEW 29, KJ5YY 16, KD5CKP 8, W5XX 5.

TENNESSEE: SM, O.D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU. TC: KB4LJV. DARC leadership and other members are very storm conscious so the W4BS repeater system is dedicated to storm reporting usage. Storm weather spotters and SKYWARN classes have been sponsored. The ARES/RACES groups are prepared to handle emergency communications when the need arises. The rest of the TN section is proud of this group because we get it next and the extra time difference it makes it much safer for the rest of us. ORARC's "Reflector" reported that according to K4TKQ, there may be new interest in reviving the 2-meter hospital net. At one time, the net served 21 hospitals in central East TN. UCARS members have been very busy assisting with communications during recent floods in upper East TN. DRN-5 rpt 62 sess, 765 msg, TN rep 71 % by KE4GYR & W4OGG. Net/Sess/QTC/QNI: TMPN 31/31/2623; TEMPN 23/51/810; TEPN 27/95/2481. Tfc: WA4HKU 59, N4PU 36, KE4GYR 34, WB4DYJ 14, K4QQ 11, WA4GZZ 3, WA4GLS 2.

GREAT LAKES DIVISION

KENTUCKY: SM, John D. Meyers, NB4K—ASMs Bill Uschan, K4MIS, Jim Hicks, WB4CTX, Bob Drake, N4VGI, Bill Call, KJ4W, Fred Jones, WA4SWF, Patrick Spencer, KD4PWL. STM: Bill Slayman, KE4JFS. TC: Joe Pollock, K4ULW. SEC: Ron Dodson, KA4MAP. PIC: Steve McCallum, W2ZBY. OOC: Bill Hilyerd, K4LRX. SGL: Bill Burger, WB4KY. ACC: Marie East, KE4MZP, and Silent Key Administrator Tom Lykins, K4LID. November and time to prepare for the winter not only for our home and automobiles but make sure that we check out our ham equipment. On September 8th at the Greater Louisville Hamfest held at the Bullitt County Fairgrounds awards were presented to Jan Huddleson, KF4GQN, Section Traffic Handler of the year, Glenn Foley, KO4OL, and James Smith, WB4ZDU, runner ups Section Traffic Handler of the Year. Kentucky Section Amateur Radio Emergency Services Operator of the Year award for 2001 was presented to Fred Jones, WA4SWF, of District 9 Lawrence County Louisa, Kentucky. Silent Key's this month find us losing three of our brethren that were reported: K4GWE, WA4MEX and KF4SXH. If you know of a Silent Key that is not listed please send that info to k4lid@arrl.net. I'm looking forward to the meeting on Oct 2nd with the Murray State University ARC and any other clubs in W. Ky. that can make to that meeting. Tfc: KF4UBX 308, KF4GQN 35, KO4OL 28, NB4K 23, KE4JFS 22, WD8JAW 18, K4TXJ 3. PSHR: NB4K 175, KF4UBX 128, KE4JFS 122, KF4GQN 111, KO4OL 94.

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net). ASM: John Freeman, N8ZE (n8ze@arrl.net). ASM: Lyle Willette AB8CB (ab8cb@arrl.net). SEC: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). STM: James Wades, WB8SIW (wb8siw@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (kb8rji@arrl.net) SGL: Ed Hude, WA8QJE (edhude@juno.com). TC: Dave Smith, W8YZ (w8yz@arrl.net). Youth Activities: Steve Lendzion, KC8MCQ (kc8mcq@arrl.net). BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net). Now that we have SET behind us, I would like to thank all that took the time out of their busy lives to participate and hope that it was an enjoyable, educational experience. Despite what some may feel, CW is not dead. For those of you that enjoy this mode of communication, I am pleased to report that QMN, The Michigan Net, is now offering a slow-speed training net effective October 16. This net will be held annually from October 1 through May 1 each year on Tuesday and Thursday @ 7:30 PM Eastern Time on 3663 kHz. Radiotelegraph speeds will run from approximately 10 to

13 wpm. Individuals wishing to participate in this net may wish to procure a copy of the "Michigan Net Public Service Communications Handbook" in advance of the training net. This book may be requested through the QMN General Manager at: wb8siw@arrl.net. I would like to thank the members of QMN for inviting me to attend their picnic and annual meeting. Congratulations to the newly elected officers: General Manager, Jim Wades WB8SIW; Early Net Manager, Anne Travis K8AE; Late Net Manager, Stan Niedermeier, W8YIQ and Treasurer, John Kroll K8LJG. I would like to report that Darin Figurskey, WCM NWS White Lake has been transferred to the NWS Office in Buffalo. Thanks to Darin for his work with our SKYWARN, Rain Gauge Network and Four Seasons Spotter Programs. 73, Dick W8FQT Traffic reports for July 2001: K8GA 516, K8LJG 285, N8FPN 214, KB8ZYY 185, W8RTN 163, K8KV 143, AA8PI 138, N8EIZ 112, WX8Y 78, AA8SN 52, W8RNQ 48, WI8K 41, K8UPE 36, W8RF 28, KA8DDQ 23, W8YIQ 17, WA8DHB 15, K8YB 14, N8JAT 14, K8AMR 12, K8ZJU 11, KI8GR 9, K3UWO 8, W8MRA 8, KA8LAR 7, WB8WJV 7, K8AI 6, N8EXV 4, KB8GOY 4, W8NGO 3. Deadline 5th of the month. Please support the following SECTION NETS:

Net	QNI	QTC	Sess	NM	Freq	Time	Day
QMN	576	323	61	WB8SIW	3.663	6:30&10 PM	Daily
MACS	238	62	31	W8RNQ	3.953	11 PM	Daily (1 PM Sun.)
MITN	640	233	31	N8FPN	3.952	7 PM	Daily
UPN	1021	44	36	AA8SN	3.921	5 PM	Daily (Noon Sun.)
GLETN	631	106	31	WB8ICN	3.932	8:30 PM	Daily
SEMTN	250	76	31	WI8K	145.330	10:15 PM	Daily
WSSBN	768	44	31	K8CPW	3.935	7 PM	Daily
MI-ARPSC	60	2	4	W8FQT	3.932	5 PM	Sunday (Alt. 7.232)
VHF	437	23	20	KB8ZYY	Var.	Var.	

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12 and check out the Section Page at www.maser.org)— ASM-NE: Bob Winston, W2THU, Cleveland; ASM-NW: Ron Griffin, N8AEH, Findlay; ASM-Central: Mary Carpenter, N8OAM, Westerville; ASM-SW: John Haungs, W8STX, Cincinnati; ASM-SE: Connie Hamilton, N8IO, Marietta. SEC: Larry Rain, WD8IHP, Mansfield. STM: Jack Wagoner, WB8FSV, Hilliard. ACC: Brenda Krukowski, KB8IUP, Toledo; TC: Tom Holmes, N8ZM, Tipp City. PIC: Scott Yonally, N8SY, Mansfield. OOC: Richard Kuns, KC8TW, Fairfield. SGL: Jeff Ferriell, K8ZDA, Columbus. FOR NOVEMBER. The Ohio Section Conference at Columbus in September had three major stories to report. News Number ONE, Ron Griffin, N8AEH, Findlay, who for 16 years and counting edited the Ohio Section Journal, is the eighth winner of the Allan Severson, AB8P, Memorial Award as the Ohio Section Ham of the Year. He has been the only editor *The Journal*, published quarterly since 1986, has ever had and he's a good one. Besides its regularity, The OSJ is well known for its outstanding content and design. It is the only such section journal published in the US among all 71 ARRL sections. The reason is Ron's ever attention to detail plus his constant devotion to excellence and the high degree of confidence he engenders among the OSJ contributors. News Number TWO, ASM Robert Winston, W2THU, Cleveland, was appointed Ohio Section chairman of the Ohio 2003 Bicentennial. He will be announcing our plans soon for that yearlong celebration. News Number THREE, PIC Scott Yonally, N8SY, announced that PARC NEWSLETTER of Portage County ARC (Tom Parkinson, KB8UUZ, editor) won the 10th annual Ohio Ham Radio Newsletter contest. Second place for the second straight year was "The ZARC CARRIER" of Zanesville ARC (Danny Grandstaff, KB8RIM, editor) and third place was won by DELARA NEWS, of Delaware ARA (Ken Bird, W8SMK, editor). Honorable mentions were "RAGCHEWER" of Lancaster and Fairfield County ARC, "VOICE COIL" of Mahoning CountyARA and "Q-FIVER" of OHKYIN ARS of Cincinnati. Special thanks to PIC Yonally for another outstanding job in completing the 10th annual newsletter contest. There were 33 entries this year. OHIO SECTION CONGRATS TO, (A) Massillon ARC for 517 hours of service from 34 members during the 7 day I-77 Safety Break. Another successful event of ham radio on public display, and (B) Barry Franz, KC8KKC, Cincinnati, for his editorial in "The Spark" newsletter of the Cincinnati FM Club about myths surrounding ham radio...OHIO HAMFESTS FOR NOVEMBER; (10) Grant ARC at Georgetown and (10) Cleveland Area at Garfield Heights...de K8QOE. Now for traffic reports for August.

Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	151	35	220	31	1845	3.577	WD8KFN
BN (L)	185	72	284	31	2200	3.577	NY8V
OSN	86	31	443	30	1810	3.708	WB8KQJ
OSSBN	1781	682	2784	93	1030, 1615, 1845	3.9725	N8IO

Tfc: N8IO 592, K8PJ 273, WB8KVM 244, WD8KFN 212, W8PBX 204, N8IXF 178, KD8HB 132, WA8SSI 127, N8BV 126, W8STX 122, WA8EYQ 114, N8DD 98, W8RG 86, KC8FCC 84, N8OD 82, KC8HJL 81, N8TNV 79, NS8C 59, AB8KB 53, KC8PDY 44, N8IBR 42, K3RC 41, KC8XL 40, KD9K 35, KA8VWE 34, KC8HTP 33, KI8IM 29, NY8V 29, N7CEU 28, KB8SBK 27, N8CW 26, WD8KBW 26, W8SIQ 26, W8VQV 24, KC8HPR 22, KC8KYP 22, K8QIP 19, N8WLE 16, K8YWX 15, KI8O 14, W8BO 13, W8RPS 13, N8RRB 11, KB8SIA 11, WB8IOW 6, N8RAK 6, KB8ESY 3, K8WC 4. (July) KB8ESY 2.

HUDSON DIVISION

EASTERN NEW YORK: SM, Pete Cecere, N2YJZ— STM: Jim Peterson, K2CSS. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. I am forgoing the traffic listings for this issue to write some very important words that need to be said about the disaster that happened in September. Never have I been so saddened and yet so proud at the same time. To all of the amateur radio volunteers that responded to the call, you have my deepest admiration and appreciation. With no hesitation, men and woman responded to the call-up and reported to where they were needed the most. They relied on their training and abilities to get the job done. They responded in the true spirit of patriotism for their country. If the only reward

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SC-41 Soft case; PB-32..... **4.99**
SC-43 Soft case; TH-79/PB-33/34..... **4.99**

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that I receive as Manager of this Section is knowing and associating with these people, it is enough. I am indeed proud. God Bless you and thank you, 73 de Pete, N2YJZ

NEW YORK CITY / LONG ISLAND: SM, George Tranos, N2GA. ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SEC: KA2D. ACC: N2MUN. PIC: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. SGL: N2GA. Amateur Radio volunteers responded to the World Trade Center disaster in September. New Yorkers and all Americans came together during the aftermath of this horrendous event. Hams volunteered their time and equipment for multiple days. Calls came in from throughout the US offering assistance. I'd like to thank each of you who helped in any way. I'd especially like to thank those who went into Manhattan to help provide with communications at Red Cross shelters, on emergency response vehicles and to provide backup at the Office of Emergency Management. Special thanks go to those who spent hours traveling to and from the disaster site and often staying for 12-hour rotating shifts. Also, thanks to all of those who manned the formal ARES and traffic nets. Tom Carrubba, SEC; Charles Hargove, N2NOV, DEC for NY City; John Kiernan, KE2UN, EC for Manhattan; Bill Scheibel N2NFI, DEC for Suffolk and all of the ARES leadership did a great job with communication, recruitment and coordination. The entire section has been shocked by this event and my sympathies are extended to all those affected by this disaster. I am proud of all our volunteers who have put aside their personal lives to assist others in this time of great need. HRU 2002: Ham Radio University 2002 is Sunday, January 20, 2002. Mark your calendars now! Contact Phil N2MUN for more information and the date of the next HRU planning meeting at n2mun@arrl.net or 631-226-0698. November events: NY City Marathon - Sunday, November 4. Contact Steve W2ML at w2ml@arrl.org. NLI CW Traffic Net meets Monday thru Friday at 7:30 PM Local Time on 3630 kHz. 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 Website (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! 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. Tfc: WB2GTG 360, WA2YOW 160, N2AKZ 154, KB2KLH 126, AB2IZ 82, N2WGF 56, KA2YDW 29, KA2UEC 7, WA2VZK 3, KE2SX 3, N2TEE 3, KA2D 2.

NORTHERN NEW JERSEY: SM, Bill Hudzik, W2UDT—ASM: K2WJ. STM: WB2FTX. ACC: N3RB. SEC: K2SO. OOC: K2ZD. SGL: K1XV. Thanks to W2XX and Webmaster N2WZB the NNJ Web site is up and running. Please let N2WZB know of any club activities to put on our Web page. Congrats to the GSARA for receiving their ARRL 50 year affiliation. I ask all NNJ members to set up their ARRL Web page profile to receive SM bulletins that I plan to start soon. This is a way to pass info to all NNJ ARRL members. Just follow the prompts on the ARRL page. SEC K2SO has started a NNJ ARES net on the WS2Q repeater Morris OEM (146.895) the 2nd Monday of the month at 8 PM. Please give Steve your support. Although in South Jersey, the Battleship New Jersey ARA is looking for volunteers. Please contact N2XYZ if you can help to put our ship back in shape. Thanks to those NNJ clubs for putting me on their mailing list. I would like to hear from more. Along with 20 other new SMs, I attended a workshop at ARRL. The weekend was great! It was a pleasure to meet the other new SMs and learn much from the ARRL staff. But I missed our NJ QSO Party! Please support our section nets. Contact STM WB2FTX if you would like to help out. We are also looking for more NNJ hams to volunteer for various appointments visit our Web page to see what is open.

Net	*NM*	*Sess*	*QNI*	*QTC*	*QSP*
NJM	WA2OPY	31	118	42	38
NJPN	W2CC	35	186	26	26
NJSN	K2PB	31	193	23	21
NJN/E	AG2R	31	198	84	70
NJN/L	AG2R	31	185	71	69
CJTN	KB2VRO	31	206	51	39
NJVN/E	N2RPI	31	482	53	359
NJVN/L	N2OPJ	31	475	63	61

Tfc: N2OPJ 70, WA2MWT 57, KB2VRO 51, N2RPI 43, K2DBK 31, K2VX 27, K2PB 22, W2MTO 19, KC2ANN 17, W2CC 15, N2BVN 13, N2GJ 9, K2SO 6, N3RB 3.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, NØJL—ASM: NØLDD—SEC: NAØR. ACC: NØIJP @ KEØBX. BM: KØIIR @ WØCXX. SGL: KØKD. STM: KBØRUU. Welcome to the new League members in Iowa: KCØLGT, NØJJR, WAØGUM, KCØLGH, N7THH, NØPYJ, KCØLGI, KCØLGA, KCØLGC, KCØLGD, KCØLGB, KCØLGF, KCØLDR, KCØLGK, N1DWS, KBØZMT, KCØLGE, KCØLGG, KCØLHG, ABØRU and NØBFJ. Whew! Glad to have you aboard. GCARC es MARC are doing fox hunts. TSARC is still makin' money. How did those license classes go, CVARC? Did you get a chance to work Nowhere? Check with the Fort Madison group. I hear they are often 'Nowhere.' I understand that some hams can play the harmonica! That right, NYØO? Hey! It's time for JOTA. As I write this, the coverage continues of the loss of the buildings at the World Trade Center. At a moment like this Americans stand by to serve. We, as hams, step forward early and stay late to serve our country. As I type, there is an emergency net in Virginia on 80 meters. It is always hard to serve in time of disaster... much more so when innocents die so someone can make a point. But we will continue... and we will serve... because we are members of the amateur radio service. 73 and carry on. NØJL. Newsletters were received from GRARC, CVARC, TSARC, FMARC, DRAC. Traffic: KBØRUU 325, WØSS 165, WBØB 26, NØJL 25. Tfc: KBØRUU 325, WØSS 165, WBØB 26, NØJL 25.

KANSAS: SM, Orlan Cook, WØOYH— ASM/ACC/OCC: Robert Summers, KØBXF. SEC: Joseph Plankinton, WDØDMV. STM: Ron Cowan, KBØDTI. PIC: Scott Slocum, KCØDYA. TC: Rick Carver, WAØKS. The ARRL Ks Convention was a great success with 441 registered attendees. Bruce, KØBJ, our vice

YAESU

FT-1000D Transceiver

tx: 160–10m **rx**: 100kHz-30MHz • 200w • 100 mem. • Dual receive • Antenna tuner • Dual bandpass filter • Temp. compensated crystal oscillator • 2.4kHz & 2kHz SSB filters, 500Hz CW crystal filter 6"h x 16"w x 15"d, 58 lbs.....**Special © $3999.99**

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Amateur coverage: 160–15 & 6m • 1000w • 220V AC 500w power out on 6m • Built-in high-speed ant. tnr • 2 RF inputs • 4 RF outputs • Auto band switching w/FT-1000D, FT-1000MP, FT-920 & FT-900 • Separate amp & PS units • 16¼" x 5⅜" x 16¼" • (amp) 33 lbs; (pwr sply) 26 lbs..... **$3999.99**

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160-6m mobile, 2m, 430-450MHz rx: 100kHz-30MHz, 30-970MHz (cell blkd) • 100/50/20w • DSP • SSB/CW/AM/FM/AFSK/Packet • Built in CTCSS/DCS • 300 mem. • IF Shift • IF noise blanker • VOX • Dual VFOs • Electronic mem. keyer • Speech processor • Crystal filter, oscillator, and speaker.....**Special © $879.99**

FT-100D/ATAS FT-100D & ATAS-100 mobile ant. combo .....**Special © $1199.98**

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VR-120 100k-1300MHz rcvr.....© **129.99**
VR-500 100kHz-1300MHz AM/FM/SSB handheld receiver**Special © 199.99**
VX-150 5w 2m FM HT.....**Special 159.99**
VX-1R 500mw 2m/440 ....**Special © 129.99**
VX-5R 5w 6m/2m/440 HT**Special © 279.99**
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VXR-5000V/TA 2m w/PS.....**C/O 1299.99**
VXR-5000U/TC 440 rptr w/PS.**C/O 1299.99**
VXD-40UB 440 Duplexer..... **199.99**

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director is our 2001 Ks Amateur of the year. Director Wade, W0EJ, presented the Johnson Co and Jayhawk ARC their 50th year certificates of affiliation with ARRL and the Trojan ARC, their 25th. There were 66 emergency hams in attendance at my Section Meeting. DEC Bob, WG0Q, and EC Carl, N0ORS, shared their own experiences working the Hosington tornado disaster. This was Bob's third tornado. Everyone got a lot from these two guys from the problems they had to solve. Dan, K3UFG, of the ARRL Certification and Continuing Education program brought us up to speed on the certification. Every one, please study the SET material I sent U & get ready. July Kansas Nets: sessions/QNI/QTC,KSBN 31/1036/82 KPN 22/270/18 KMWN 31/653/453 KWN 31/841/507 CSTN 26/1899/ 90, QKS 61/255/87 QKS-SS summer bk SEC 69/781/15 QNS KB0AMY, KC0AUH, N0BTH, KC0CFL, KC0CIG, WD0DDG, WD0DVM, AA0IQ, N0LJK, W0PBV, KB0WEQ, Joseph WD0DVM, SEC. TEN 62/191/??? QNS 99% W0FE KB0DTI AA0FO K0PY W0WWR NB0Z WB0ZNY W0SS/Mgr. TRN ???/456/475 with KB0AMY W0FE N0KJ AA0OM W0WWR. Ks tfc W0WWR 363, K0PY 65, W0OYH 55, KB0ODT 40, N0RZ 20, K0RY NB0Z 10, KC0JCQ, KC0GL, N0ZIZ, W0FCL 11. OBS WA0DTH 18.

MISSOURI: SM, Dale Bagley, K0KY—ASM: John Seals, WR0R. ASM: Bill Coby, KB0MWG. ASM: Larry Ballew, AB0HP. ACC: Keith Haye, WE0G. BM: Brian Smith, KI0MB. OOC: Mike Musick, N0QBF. STM: Charles Boyd, KE0K. SEC: Patrick Boyle, K0JPB. Nearly 100 MO Section Amateurs have signed up so far to be included in the Missouri Legislative e-mail alert system. When legislation that will impact on Amateur is introduced or are being considered, those on the list will be sent an e-mail. The Central Missouri Radio Association Hamfest / ARRL MO State Convention was very successful. Thanks to the efforts of CMRA members and Chairman Dale Huffington, AE0S. The highlight of the Convention was the presentation of Dan Miller, K3UGH, Education and Certification specialist for the ARRL. Wade Walstrom, W0EJ, Midwest Division Director updated a large crowd of Amateurs at the ARRL Forum concerning the efforts of the ARRL and presented Thaddeus Huff, KC0AQG, with the 2000 Hiram Percy Maxim Memorial Award plaque and $1000 check. Aaron Drake, KB0VKZ, of Springfield Missouri received the Quarter Century Wireless $1000 Scholarship. His father is Fred Drake, KI0ET, a very active member of the Southwest MO ARC in Springfield, MO. I had the pleasure of presenting the ARRL Affiliated Club Charter to Michael Blake, N0NQW, the president of the 145.49 repeater group. It is great to work with such a fine group of amateurs and honor their accomplishments. The OBP #1 ARC was presented their 75th Anniversary Certificate by Wade Walstrom at the St. Charles ARC Hamfest. Jim Glasscock, W0FF, and Kenneth Scott, W9VHL, represented the OBP#1 ARC in the presentation. This year's St. Charles Hamfest was one of the best attended in several years. Several MO Section Amateur Radio Clubs have not turned in updates of information concerning the clubs. When no updates occur in two years, the club is moved to the inactive status. To reactivate the club, go to the Club Big List and search for your club, update and submit the information and that should take care of the matter. The MS 150 Bike Tour of St. Louis and Mid-MO relied on the efforts of a large number of Amateur Radio Operators. This year Mike Musick, N0QBF, coordinated the Troy, MO loop and Ben Hoffman, N0OFD, coordinated the Columbia, MO loop. Events like this demonstrate community service and reveal the value of Amateur Radio to the public. NET Sess/QNI/QTC/NM: WAARCI 4/94/0/KB0VZP. JACKSON CO. ARES 4/36/0/K0UAA. MTN 31/402/45/K0DAT. Rollabillboard 31/ 460/12 NA0V. MON 56/152/30 K9ZTV. AUDRAIN CO. ARES/5/63/3 WB0SEN. Tfc: KE0K 13.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. WA0ZCN has been appointed Net Manager of the Nebraska Cornhusker Net. Nineteen amateurs provided communications for the Arrows to Aerospace parade in Bellevue on August 18. The AKSARBEN ARC's flea market was held at the Sarpy County fairgrounds on September 8. Estimated attendance was between 300 – 350. The KA0BOJ (145.310) repeater has moved to the Channel 12 ((KUON) tower at Mead. It has excellent coverage. It shares feed line and antennas with the Civil Air Patrol. The K0USA (146.940) has moved from 72nd & Crown Point to the WOWT studios in downtown Omaha. WOWT is committed to continue its relationship with the AKSARBEN ARC. Negotiations are in the final stages for a location of the clubs' 220 repeater and WB0CMC's 220, 440 and ATV repeaters as well. Hams from the Lincoln area once again provided communications for this years' State Fair in Lincoln. Net Reports: MIDNE ARES: QNI 338, QTC 5 & 31 sess. NMPN: QNI 1462, QTC 17 & 31 sess. Lincoln/Logan ARES: QNI 16, QTC 2 & 3 sess. NE Storm Net: QNI 784, QTC 19 & 31 sess. NCHN: QNI 236, QTC 3 & 31 sess. NE 40 Meter Net: QNI 368, QTC 4 & 31 sess. MARES: QNI 145, QTC 2 & 5 sessions. West NE Net: QNI 1437, QTC 104 and 27 sess. W0IRZ Memorial Net: QNI 52, QTC 2, & 3 sess. SCNE/NCKS ARES: QNI 40, QTC 11 & 3 sess. Tfc: K0PTK 92, KE0XQ 20, WY0F 6, W0WHY 4, W0UJI 2, KA0DOC 2, WB0ART 2, WY0F 2, W0EXK 2, KA0O 2, K0RRL 2, WA0ZCN 2, WA0ZCM 2, WD0BFO 2. PSHR: KB0YTO 16, KC0HOX 22, KA0DBK 109.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—ASMs: KZ1Z, NK1J, N1API, K1STM. BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: WA1D. STM: K1HEJ. SGL: K1AH. TC: W1FAI. The Southern Berkshire ARC provided a very fine PR presence at The Goshen Fair this year. Several club members participated and quite a few contacts were made. Lots of young visitors got the chance to send their names in CW! Thanks for your time and real commitment to this annual activity. One reason why you haven't heard me on the air lately is because my tower and generator took a lightning hit during a severe storm on August 20. The W1HAD packet nodes survived ok but I lost my 75 meter dipole, had damage to the 440 receive circuit in the radio and some minor damage to the rotor controller. Special thanks to Mark, WA1ZEK, who climbed the tower and to Mike, KM1R, and Jon, N1BDF, who assisted on the ground. That, plus serious illness in the immediate family, have kept me otherwise occupied. Looking forward to being back and active shortly. A huge thank you to the Meriden ARC for once again sponsoring the Nutmeg Hamfest.

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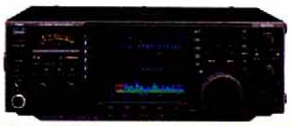

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As those of you who have worked on such events know, this represents a whole lot of work, especially for a single club. Bill, W1KKF, has served as chair for several years now. Why not take the time to thank MARC for their fb effort that benefits us all! See you next month. Net Sess/QNI/QTC/NM: NVTN 28/121/19/KB1CTC; WESCON 23/69/44/KA1GWE; ECTN 30/130/61/WA4QXT. CPN 31/183/42/N1DIO. CN 25/78/22/N1AEH. Tfc: NM1K 2049, KA1VED 611, KA1GWE 69, KB1CTC 52, WA4QXT 49.

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. As I write these words, our nation is reeling from devestating attacks perpetrated by terrorists. In EMA, ARES and RACES have been activated. The MA Emergency Management Agency in Framingham is operational. As we search for answers and attempt to comprehend this hideous act of war, I want to thank the many EMA Amateurs who are standing by, ready and willing to render their assistance if needed. Other news: the joint ARES/RACES/SKYWARN working group is drafting an exercise script calling for a major hurricane to hit our area. W1GMF has a node and digipeater on the air in Abington. Don't forget that fox hunters are active in the Bridgewater area Saturdays from 1000 until 1200. Check on the 147.18 machine for details. Billerica ARS is encouraging its members to build kits to show at future meetings. This SM had the honor of speaking at a recent meeting of the Mystic Valley ARS. Fall River area hams heard a presentation by American Red Cross on disaster training. EMA ARRL Web site of the month: the Boston ARC at http://www.barc.org. Framingham ARA has opened its club station nearly every weekend for visitors. Good news from N1WNT: Genesis ARS has been reactivated. And speaking of reactivation, letters will be sent to all clubs in EMA regarding the Council of Eastern Massachusetts Amateur Radio Clubs, according to ACC N1DHW. Boston ARC conducted a successful communications operation at the recent WGBH Ice Cream Festival. This SM was again honored to attend and instruct at the Handiham Courage North Camp in Minnesota. The Falmouth ARA sponsored a table and display at the recent Otis Air Show. The club talked with over 300 visitors. The City of Marlborough issued a proclamation thanking the Algonquin ARC and other groups for providing assistance during a terrible fire to a residential apartment complex. 73 de K9HI. Tfc: W1GMF 863, N1LKJ 509, NG1A 412, KD1LE 100, NZ1D 91, WA1LPM 76, WA1FNM 68, K1SEC 57, K8SH 44, N1IST 40, N1LAH 33, N1TPU 24, K1BZD 23, NC1X 18, KB1EB 18, WA1VRB 10, N1AJJ 6, N1TDF 4.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: N1JBD. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: N1RY. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: KA1TKS, K1NIT. Web Site: N1WFO. In light of the terrorist attack on Sept. 11, we should all take a long, hard look at how we as individuals and as Hams will be able to respond to the next event. Be assured this was not the last attempt on our country and way of life. Hams in the Lewiston Auburn area are no longer being interfered with by a local taxi cab company on the 146.880 frequency, due to the great job by the Yankee ARC. Interference Committee, headed by N1RY. He and his team did an outstanding job to clean up this problem in a very short time. Congratulations to W1KX on his election to the office of President of the Maine Chapter 134 of QCWA, and to W1ZE as Vice-President. Tfc: W1KX 155, W1QU 51, W1JX 48, KA2ZKM 25, W1JTH 24, KA1RFD 21.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org)—NH Web site (www.nhradio.org). New Hampshire Amateur Radio operators join the rest of the United States and other good and decent people around the world in its sadness at the horrific events that took place in New York, Washington and Pennsylvania on September 11th. New Hampshire Amateurs wish to pay homage to the police, fire, emergency personnel who work so hard in unbelievable conditions. We also wish to thank those Amateur Radio operators in those communities who participate in rescue and support operations. Finally, New Hampshire Amateurs honor the memory of all those who were lost, some of them having to be Amateurs for sure. 73, Al. Net NM/sess/QNI/QTC: GSFM N1RCQ/31/196/26; GSPN WB1GXM/20/111/59/99; VTNH WA1JVV/31/134/88. (Jul) GSPN WB1GXM/20/68/30/99. Tfc: W1PEX 939, N1NH 113, WA1JVV 62, W1ALE 41, N1CPX 31, WB1GXM 16, K1TSV 3.

RHODE ISLAND: SM, Armand Lambert, K1FLD—This is the month we give thanks for our blessings. As I write this in the week of the tragic happenings of New York and Washington, I wish to offer my condolences to those directly affected. Also a big thanks to all the volunteers especially the HAMS who have given communications support. It is times like these that makes Amateur Radio and our involvement in community service so important. In addition I would like to thank Bob, W1YRC, ASM of RI, for taking over SM duties while I was on a convalescing tour of our great country. //Now RI hams have a DXCC card checker. Jim Spears N1NK has volunteered to serve our HAMS. He can be reached at n1nk@arrl.net or 401-624-6031.// Ken KB1AWV reports the PVARC special event held at the USS Saratoga was very successful this year. Perhaps you worked WA1USA (great call sign). Also the PVARC club has been working on foxhunting equipment for more club fun activities.// Doug N2RDF reports the ARSNE W1AQ club is celebrating 75 years of activity serving the RI community.//Thanks for the cards and flowers. It was nice to reflect on them while recovering from surgery. 73 till next time, Armand, K1FLD.

VERMONT: SM, Bob DeVarney, WE1U— I am writing this edition of Section News shortly after the heinous attack on America. This vicious attack will not serve to cripple us as a nation; it will only serve to galvanize us and weld us together into a nation resolved to right this wrong. If you cannot help directly as an ARES operator or in some other way, I strongly encourage you to consider helping in an indirect manner by giving the gift of life: donating blood. In this difficult time, it's very easy to get caught up in the desire for revenge against an ethnic group or groups perceived as our "enemy." We need, however, to channel our energies in a more constructive manner, by helping the victims and families and friends of the victims in any way we can. Together, we stand proud as a

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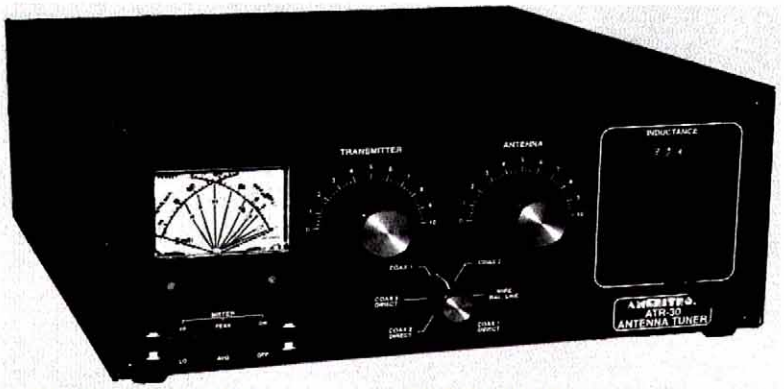

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6:1 vernier re-duction drives makes capacitor tuning smooth and easy.

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

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with Eimac® 3CX1200A7 tube

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Get ham radio's *toughest* tube with AL-1200. The Eimac® 3CX1200A7 has a 50 Watt control grid dissipation and the lowest history of field replacement of any modern transmitting tube that we use. 90 Watts in gives you full power out. All HF bands, all modes. 76 pounds, 18½Dx17Wx10H in.

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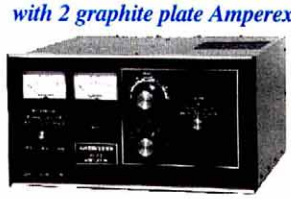
with 2 graphite plate Amperex® 3-500ZG tubes



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Most linears using 3-500s can't give you 1500 Watts because their lightweight power supplies *can't* use these tubes to their full potential. AL-82 is ham radio's *only* super 3-500 amp! 100 Watts in gives you full power out. All HF bands, all modes. Hefty 76 pounds, 18½Dx17Wx10H inches.

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with 2 Eimac® 3CX800A7 tubes

AL-800H, $2495 suggested retail. Two Eimac® 3CX800A7 tubes produces 1500 *plus* Watts SSB PEP with 55 Watts drive. 52 lbs., 8½Hx16½Dx14¼W in. **AL-800, $1695** suggested retail, single 3CX800A7, 1250 Watts out with 70 Watts drive.

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WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, *w1ud@arrl.org*. – ASM: N1MAP. ASM (digital) KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1W. On September 11, we lost the twin-tower buildings of the World Trade Center in New York City. A section of the Pentagon in Washington was also destroyed by terrorists. Again, Amateur Radio came to the forefront. Under the able guidance of Chat, WA1FIA, and Gerry, AA2T, Leominster CD was in contact with the traffic net handling emergency traffic from the disaster area in New York. Thanks for the fine work! With the fall, you may find many DXpeditions to far corners of the world. Make a concerted effort to work them. It may be your last chance. The sunspot cycle is on the downward swing. Clubs in the area had their first meeting and are in the process of planning the itinerary for the upcoming year. Our emergency section, under the able supervision of Dennis, K1VSG, is in great shape. I encourage all to join the WMA Emergency Net on Sunday at 8:30 AM on 3937 kHz. If you are unable to operate on the HF bands, then join your VHF emergency net on your local repeater. If you are interested in handling traffic on CW, send me an e-mail. There are a number of slots open on the First Region Net. 73. Tfc: N1WAS 131, KD1SM 15, N1RLX 4, W1ZPB 107, W1UD 257, K1TMA 178.

NORTHWESTERN DIVISION

ALASKA: SM, Kent Petty, KL5T – Anchorage amateurs support EOC and shelter activation following terrorist attack in New York and at the Pentagon. International flights diverted to Anchorage overwhelmed local hotels, forcing activation of shelters. Hams staffed EOC and shelter, running morale traffic to Japan, China, and Korea. Anchorage and Fairbanks hamfests a great success. Kudos to all whom assisted in organizing the events, and many thanks to the Vendors and Gordon West who made the trip up from the lower 48. HAARP RFI Resolution Committee Meeting garners positive results. HAARP folks willing to host amateur equipment (VHF repeater and more), and expressed serious desire for amateur involvement in future tests. ALL HAMS – Please report communication drills and exercises, emergency communication activations, and public service activities via our online interactive FSD-157 (Public Service Activity Report) form at: http://www.qsl.net/aresalaska/fsd157/public_service.html.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—In August ARES units in Chelan/Douglas and Spokane were activated due to fires. The Chelan/Douglas ARES/RACES responded to a call-out by the Red Cross for a large fire in the Chelan/Douglas area. DEC Paul, KC7JNJ, headed up operations along with EC Sal, KA7ZDL. The Spokane ARES/RACES sent several hams, plus one from Grant Co. and 2 from Okanogan Co. The Panorama ARC had a booth at the NE WA fair in Colville and about 60 written radiogram messages were sent from the station with the assistance of Frank, AA7XL. Guy, N7YRT, has been giving the Colville hams some training in message handling. STM Don, W7GB, and Don, K7BFL, and XYL Elvera helped with the event. In Memoriam: Les Morgan, NR7B, from Spokane became a Silent Key. Les had been an active ham and will be missed. Net Activity: WSN: QNI 772, tfc 191; Noontime Net: QNI 9217, tfc 343; WARTS: QNI 3556, tfc 89. Tfc: W7GB 137, K7BFL 93. KA7EKL 44, K7GXZ 25, KK7T 17. PSHR: W7GB 128, K7GXZ 114.

IDAHO: SM, M.P. Elliott, K7BOI — OOC: W7ZU. SEC: AA7VR. STM: W7GHT. Hopefully, you had a chance to work the October SET exercise. Club activities are in full swing again. Get out and get involved with your local club. If you are unaware of a club in your area, check the Web site or drop me a line. Many Idaho clubs have special holiday activities and it is not too early to get involved. The Boise Red Cross-sponsored licensing classes again this Fall - 10 new ham graduates! Rich Dees, W7BOI, and Ken Kaae, KE7YD, volunteering their time to teach the course and oversee the exams. How about ham classes in your area? Could you get a session stated in your town? 73 - Mike, K7BOI. Tfc: W7GHT-292, KB7GZU-79, WB7VYH-49, W6ZOH-18. PSHR: W7GHT-123, WB7VYH-106. Nets: FARM-31/2574/ 49/W7WJH; NWTN 31/1293/75/KC7RNT; IDCD-23/ 465/11/WB7VYH; IMN-31/381/180/ W6ZOH.

MONTANA: SM, Darrell Thomas, N7KOR—August was a very quiet month as far as Amateur activity was concerned. Many clubs in the Section do not meet during the summer months so no activity reports were received. Apparently the record high temperatures and dry conditions put a lot of things on hold. Net check-ins however did maintain about normal levels. Net/QNI/QTC/NM MSN 118/0 W7OW, MTN 1574/48 N7AIK, IMN 381/180 W6ZOH.

OREGON: SM, Bill Sawders, K7ZM—ASM: KK7CW. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. STC: N7LA. ACC: K7SQ. Congratulations to the High Desert Amateur Radio Group on becoming Oregon's newest ARRL Affiliated Club. Soon to become a newly Affiliated Club is the Providence Portland Medical Center Disaster Communications Team. To become affiliated, at least 51% of your club members must be full or associate members of the League. At least 51% of your clubs' "voting" members must be licensed Amateur Radio Operators. For complete information on how your club can obtain ARRL club affiliation (and reap the many benefits) contact your ARRL Oregon Accredited Club Coordinator (ACC), Joe Berry, K7SQ, at 541-385-3152. New Officers have been elected at the Portland Amateur Radio Club. President is Edward Burress, KC7GFX. Vice-President is Patrick Kennedy, KD7HDP, and Pat Roberson, WA7PAT, is the newly elected Secretary/ Treasurer. Again this year, PARC is coordinating Amateur Radio communications at the Portland marathon, and is seeking station operators. Interested people should contact Pete, W7PR, at 503-771-8545, or Patrick, KD7HDP, via e-mail at KD7HDP@ARRL.net. Many clubs elect new officers in the month of November, and I'd like to list them here. So, keep in touch! NTS traffic totals for August: W7IZ 153. N7YSS 106, W7VSE 80, AC7DD 64, KC7SRL 61. KC7ZZB 38, K7NLM 37, KK1A 8.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ— It was 6 AM in Seattle September 11 and I was a day late in submitting my SM report for *QST* magazine. I would do it now. I booted up the computer, but first a cup of coffee and a glance at headline news. There would be no SM report that day. The

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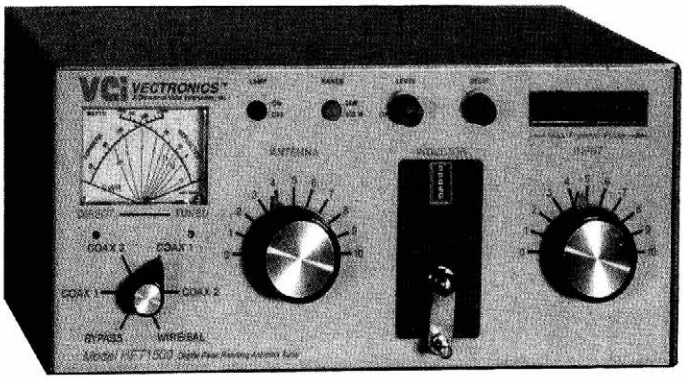

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Two heavy duty 4.5 kV transmitting variable pacitors and a massive high current roller ductor gives you arc-free operation up to 2 kW EP SSB.

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A sturdy hand cranked roller inductor lets you quickly fly from band to band. A precision 5-digit gear driven turns counter lets you accurately return to your previous settings.

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

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

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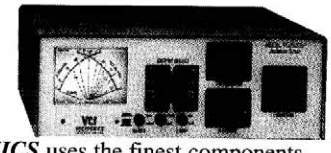
VC-300DLP
$159.95



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300 Watt Mobile Tuner

VC-300M
$109.95

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

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

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

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

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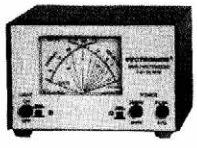

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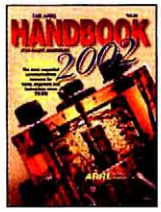
TS-2000
TH-79AAKSS



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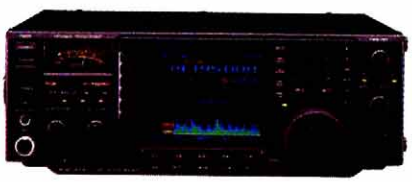

second telephone line rang. It was an ARES member notifying me that the Washington State Emergency Net was activated and that the Washington Amateur Traffic System frequency was being monitored by many. A second call followed from an amateur notifying me of his work number in case he was needed. Listening on the 2-meter ARES frequencies found an eerie silence, only an occasional identification, a traffic report, a question. Amateurs of Western Washington had survived the Mount Saint Helen's eruption, the WTO riots of 1999 and the earthquake of last February 28. The empathy for what was happening on the East Coast and the World Trace Center was apparent. As we observed the collapse of the 350 transmission tower and its associated television stations, we knew it was the umbilical cord to those once employed, most possibly licensed amateurs. We on the West Coast were prepared but for what we did not know. A check of e-mails found over 50 in the mailbox and a new one arriving every few minutes. While monitoring television, HF, VHF and Internet I found an interesting marriage of communication technologies. Soon it will be time to rethink how we operate and handle traffic. Arriving mail soon began dumping old mail from the mailbox and with it traffic reports from STM Pati, W7ZIW, and RN7 advocate George, K7BDU. And there went the Clark County and SEC report. Snail mail arrived with all OOs reporting for a monitoring time of over 215 hours serving the amateur community. Next, mail announcing that the Washington State Disaster Services Committee recently awarded a Certificate in Recognition of Exceptional Service to Harold Todd, W7ZXM for his leadership and dedication in successful efforts to improve disaster communications for Red Cross Chapters across the State. Hal served as Chair of the Communications Subcommittee from 1995 through 2001, and continues to support the committee.

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. LARK congratulated W6STV on his election as N. Cal. MARS Director. EBARC and ROVARC mourn the loss of KD6AGA. EBARC bids goodbye to KE6MSF and KE6SZG who are moving away and welcomes new member W6EWB. ROVARC has a sign, thanks to W6NGE. SARS provided communications for the Liberty Bike run. I enjoyed meeting with HRC and ACARC. An ORCA sponsored Technician License class netted 8 new licensees. ACSCT provided communications for the Alameda Run for the Parks and welcomes KF6TJR as Training Officer. Funny story from MDARC's KM6QX who had trouble getting a smog check done until they figured out the DMV had the license plate on file as " KM6 QX" (spaces before the K and Q). August tfc: W6DOB/765, WB6UZX/33, KE6QR/3. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7PM; NCN2-SLOW SESSION/3705/9PM; NCN-VHF/145.21/7:30PM; RN6/3655/7:45 PM & 9:30PM; PAN/3651/7052/8:30PM. Your check-ins are always welcome.

NEVADA: SM, Jan Welsh, NK7N—ASM: Dick, W6OLD. Glad you're up and running again! The news from New York and Washington has been a wake up call, and I encourage those without an emergency communication training background to take a look at the course now available. Many RACES/ARES nets activated throughout NV. I attended the SM workshop at ARRL HQ in August and hope to use what I learned there during my SM tenure. One bit of info, many newly licensed amateurs never make it on the air. Where did they go? They weren't made aware of club meetings, repeater info, how to program a radio, set up an antenna, and all those things our 'ELMER' used to help us with when we were first licensed. Please make sure those that attend your VE sessions are given this information in a handout or welcome letter. A designated 'elmer' of the month from your club would help. Jim, NW7O, busy on WAS- VUCC-DXCC, e-mail is nw7o@anv.net. I'm looking forward to visiting the Elko area the weekend of 6th of Oct to meet with members of both RARA and Elko ARC. MS bike to Laughlin & Lund to Hiko road race coming up. In NV? Send me an e-mail about your latest project to nk7n@arrl.org. 73 to all, Jan, NK7N. Tfc: W7VPK 37, W7TC 20, N7CPP 10, NV7YL 8, K7NHP 5, W7YDX 3.

PACIFIC: SM, Ron Phillips, AH6HN—The final plans for the Hawaii State Amateur Convention is well underway. Hopefully all the pieces are falling into place, so we don't expect any surprises. Many thanks to all those clubs and individuals who continue to devote their time and effort. Members of the HI QRP Club were active in the International Lighthouse/Lightship Weekend (ILLW), 17-18-19 August. Location was the Laupahoehoe Point Light, HAW-014 on the Big Island. Participating were KH7SO, H6BMM, KH6KT, AH6HB, NH6DR, KH6AFQ, NH6XB, AH7A, AH6NK and KH6B. Good work guys. The Hawaii DX Association is pleased to announce that their member, Dan Spears, KH6UW, will lead a group of four operators including AL7KC, W7TSQ and K7ZZ on a trip to Johnston Island (OC-023) from September 11-18th. The group will be active on 160- 6 meters including the WARC bands using CW and SSB, using the call sign K3J. Two 24-hour stations will be used, with a third activated as needed. European contacts will be emphasized when band openings permit. In response to many requests, a six-meter station (with beacon) has been added to the group's capabilities. A Web site, which will contain log checking, may be found at: http://www.qsl.net/k3j/. Many people have contributed to the success of the trip, but special thanks goes to Force 12 for antenna support. HDXA will handle all QSL's via AH6HN. Be sure to check the Web site for additional QSL info. Here are our stats for the Emergency Amateur Radio Club Net (Diamond Head Rpt 146.88 and 444.5) for July 2001: Number of check-ins: 129: Total net time: 224 minutes. Keep up the good work, Dale. 73 and Aloha, Ron, AH6HN.

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ—Great to hear all of the activity from the Section during the California QSO party. As noted in a previous column, it is contest season. If you've never tried one before you are missing a lot of fun. Contesting does not have to involve a huge station. A VHF contest can be worked from a hilltop using a FM mobile transceiver. HF contests have so many categories even a

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Automatic Speed Tracking

MFJ *AutoTrak*™ automatically locks on, tracks and displays CW speed up to 99 Words-Per-Minute.

Simply place your MFJ-461 close to your receiver speaker until the lock LED flashes in time with the CW.

Four Display Modes

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"peanut whistle" station can earn a piece of wallpaper. Congratulations and Thank YOU!! to all of you in the Section who provided EMCOMM support during the fire season just concluded. Your efforts gain the official support our hobby needs to retain its privileges. Interested in becoming an Official Observer or Official Emergency Station? These are just a couple of the field appointments available. We particularly need volunteers in the northern portion of the Section. Contact me at K6BZ@arrl.org if interested. As we approach Thanksgiving it seems an appropriate time, given the purpose of the holiday (which is not just to watch football) to say "thank you" to those who have assisted you in your ham radio endeavors. Without the Elmers (male & female) many of us would have floundered rather than triumphed in this avocation of ours. Have a safe and happy Thanksgiving. 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV.SEC: KE6EAQ. I want to thank everyone for voting for me as Section Manager. I, and my staff, feel privileged to serve you and we will continue to do our utmost to serve you in the next two years. Thanks again. Several Sonoma and Mendocino County ARES members were placed on standby for mutual aid to the Poe fire in Butte County in early September. The order was later rescinded by the northern Sacramento Valley ASM, but thanks were given that we were ready to help. Humboldt and Del Norte Counties have been busy with public service events as well as most of the rest of the counties in the section. This is good training and very important public contacts are made through this service. SCRA had a great showing at the Pacific Coast Air Museum show and most probably recruited some new folks into our hobby. WARS had two interesting speakers, one who was a police officer in Kosovo who told of his yearlong duties and experiences there. The other spoke on designing fractional antennas. REDXA is gearing up for the winter contest season. South area news next month. NOW is the time to check the house, antennas, and the rigs for the winter season. See all of you soon at your local club meeting. Support and attend your local club.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN – ASM: Mike Siegel, KI6PR. ASM: John Lee, K6YK. SEC: Kent LeBarts, K6IN. OOC: Victor Magana. N6VM. ACC: Charles McConnell, W6DPD. STM: Fred Silveira, K6RAU. I am writing this *QST* Section News column on the day after the tragic and cowardly attack on the United States of America by terrorists. I ask you to join me in prayer for the victims of these attacks and their families. During a time such as this we amateur radio operators assist with health and welfare traffic to loved ones and assist City, County, State and Federal Agencies in relief efforts. Please, become a member of your local ARES (Amateur Radio Emergency Service) group in your City or County. The more prepared for emergencies we are the better we are able to serve our communities. For more information on ARES contact Kent LeBarts, K6IN (SEC) at k6in@arrl.net. Please make a difference by using Amateur Radio to serve your community. My personal thanks to the members of ARES in SJV Section who stand at the ready to provide essential communications to our communities.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W—SEC: KQ6FM. PIC: K6ALZ. BM: WB6MRQ. TC: WA6PWW. OOC: KB6FPW. SCV Homepage is http://www.pdarrl.org/scvsec. Info on license exam sessions is also available on the SCV homepage. We have a new cabinet member. Alan Zeichick, K6ALZ, is our new Public Information Coordinator (PIC). Alan is a publisher and editor by profession and brings urgently needed expertise to the SCV Field Service organization. Welcome aboard, Alan! In less pleasant news, several cities and counties activated their EOCs as a precautionary measure on September 11. Quite a few ARES/RACES members took time to support them by serving at their EOC or by being on active standby. I don't have a complete list at this time. The EOC activations I am aware of at this time include Monterey and Santa Clara counties and the cities of Cupertino and Milpitas. Undoubtedly there were others. Many thanks to you all. Though we often have difficulty supporting drills during business hours, we have demonstrated our willingness and capability to support the served agencies when it really counts. Santa Cruz County ARC meetings are at 7:30 PM on the 3rd Friday of each month at Dominican Hospital, 1515 Soquel Drive, Santa Cruz. Visit their Web site at www.k6bj.org for more info The Palo Alto Amateur Radio Association meets on the first Friday at 7:30 p.m. in the Menlo Park Recreation Center, 700 Alma Street, Menlo Park. West Valley ARA meets on the 3rd Wednesday of each month at 7:30 PM in the Mary Campbell room (Q-84) at the Campbell Community Center. Check out their Web page at www.wvara.org. The South County ARES has a new URL for their web page, http://www.K6MPN.org. They have a wonderful ARES/RACES group in San Mateo County and also one of the better newsletters. They meet third Thursdays in the San Carlos City Hall. room 207 at 7:30 PM. 73 de Glenn, WB6W.

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC—SEC: KE4JHJ. STM: NØSU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl.org. The tragedies in New York and Washington in early September are reminders to us that we are facing disaster scenarios that we never imaged in the past. Most of our deployments have been in the aftermath of natural disasters or accidents. We now must consider how we might be needed when the incident is deliberately caused by people willing to die to carry out their attack. Emergency management has been pondering these scenarios for quite some time. We must do the same. Digital communications has been another topic of interest to disaster communicators. For years we have been debating what combination of digital modes are most useful for the way we serve. Wake County ARES is now sponsoring the "NC ARES Digital Mailing List," an online forum for discussing digital modes and how they can be used in our deployments in the field. This is open to all and is not limited to ARES or Wake County. For more information, visit our Web site, or send an e-mail to majordomo@rtpnet.org with the words "intro ncares-digital" (no quotes) in the body of the message (the subject line is ignored). I would like thank Errol Casey, KD4IHW, for his years of service as our Webmaster and as a Public Information Officer. Errol is stepping down for now, and will be greatly missed. Hope to see you at the Benson

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Selecting the ON digital mode, all connections are made between your rig and computer for instant digital operation.

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Audio Isolation Transformers

Audio isolation transformers and relay eliminate ground loops, audio hum, noise and distortion.

RFI-Proof

Extensive RF suppression and line isolation eliminates RF feedback problems.

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You can override any digital mode and transmit microphone audio at any time by pressing mic PTT -- great for SSTV and Contest Voice Keyer operation.

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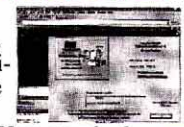

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Hamfest on November 18th. August Traffic: W4EAT 628 (BPL), AB4E 261, NC4ML 227, KB5WY 163, K4IWW 150, KI4YV 142, KE4JHJ 119, W4IRE 103, W3HL 50, AD4XV 43, KE4AHC 33, N4TAB 33, W4CC 24, K4WKT 19, WA4SRD 15, KB8VCZ 13, KR4OE 13, N0SU 11, NT4K 9, AE4HJ 6, KE4YMA 4, N4NTO 2.

SOUTH CAROLINA: SM, Patricia M. Hensley, N4ROS—Attendees at our recent hamfests represented numerous clubs and repeater groups at our initial Presidents' Council meeting. We are a small state when compared to others, but we have a relatively large amateur radio community which enables establishment of an effective and efficient state-wide communication network. These clubs and groups are comprised of members who provide local support for SC ARRL. Therefore, the Council will be invaluable for planning activities for their general membership, as well as for recommendation and selection of individual members who want to serve, work and cooperate as officials for the success of ARRL. I look forward to meeting with additional groups at the Myrtle Beach and Union hamfests. I will also continue to feature a club during my weekly SM Reports on the SC SSB Net which will foster a greater inclusive participation within the SC amateur radio community. Tfc: KA4UIV 111, KA4LRM 96, AF4QZ 50, KG4FQG 22, WD4BUH 18, K4JIF 16, KF4HAV 15, WB4PCS 11. PSHR: KA4UIV 132, KA4LRM 124, AF4QZ 121, KG4FQG 119, WD4BUH 77.

VIRGINIA: SM, Carl Clements, W4CAC—SEC: N4NW. STM: N1SN. PIC: W4PW. ACC: W4IM. OOC: W4NEZ. TC: W4RAH. Web page: www.arrlva.org. I have written this article for several months now, and one of the biggest things I have had to keep in mind, is that the articles will appear two months after I write them. This fact is obvious this month, for as I write this I watch in horror the terrorist attack on America on the television. All of the victims and their families are in our thoughts and prayers. I hope that by the time this article is published, our nation is on the road to recovery from this barbaric action. Thanks to all ARRL ARES personnel who responded after the disaster. EOCs were manned and/or prepared for operation in Northern Va, Tidewater, and on the Peninsula. Loudoun County was activated to assist the Red Cross. These reports from the section are still coming in. On a more positive note, I would like to welcome Rod Hignite, W4RAH, as the section's Technical Coordinator. We are still looking for volunteers for all aspects of our programs. We especially need to fill some OO positions in the southwestern part of the state. If you would like to volunteer for some function of the ARRL in Virginia, please get in touch with the coordinator for that program (they are all listed on the Web page with their email addresses) or drop me a note. Thanks again to all that are helping out in whatever capacity with the ARRL programs in the state. The ARRL members are the ARRL! Tfc: W3BBQ 334, N1SN 203, WA4DOX 190, K4YVX 188, K0IBS 114, K4MTX 83, WD4MIS 83, WB4ZNB 64, KE4PAP 54, W4VLL 46, KV4AN 41, AA4AT 28, KU4MF 27, WB4UHC 23, W4CAC 19, W4YE 12, N3FDR 12, W4JLS 9, W4MWC 8, KB4CAU 6, K4JM 3, N4FNT 2, WB2KQG 2.

WEST VIRGINIA: SM O.N. (Olie Rinehart), WD8V— As you all know, Hal Turley, KC8FS won the election and is, as of Oct.1, your SM. I wish to express my sincere thanks for being allowed to represent the WV section over the past 7+ years and will do everything I can to help Hal in his endeavors as the new SM. 73..... SM Hal Turley, KC8FS— On behalf of all amateurs in WV, I thank Olie for his dedicated service and congratulate him as our new Roanoke Div. Ass't. Dir.; GL Olie! I'm honored to be the new WV SM; TU for the support! I look forward to serving WV & ARRL with many challenges and opportunities. Immediate priorities: Section appointments, Web site and newsletter. Congrats to TARA Prez Garry, W8OI, also appointed Ass't. Div. Dir. Garry advises that TARA renewed its SSC status. Bill, K8WOS earned initial DXCC at HTN hamfest—FB Bill! JaxMill-WV ARRL Convention gets mixed reviews and call for task force review & recommendations. Convention awards: WV Amateur of Year-Jim, N8TMW; FD 2000— Stonewall Jackson ARA, K8DF; WVQSOP winners- Clark, W8TN; Ed, N8OYY/m. KARC rcvs. 50-yr. ARRL Affiliation Award. Congrats to all honored! Tom, N8NMA is new WV Net Mgr. replacing Cal, W8WWF, Tnx Tom for accepting this important role & tnx Cal for your service! 73 de Hal. Tfc: KA8WNO 167, W8YS 123, KC8CON 67, W8WWF 56, WW8D 46, WD8DHC 21, N8NMA 10, N8BP 7. PSHR: W8YS 170, KC8CON 158, WD8DHC 119, KA8WNO 118, WW8D 93, N8NMA 59.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Jeff Ryan, N0WPA— ASM: Tim Armagost, WB0TUB. 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. ARES District 11 with help from D-10 and D-23 fielded 27 operators in support of the first ever Boulder 5430 Triathlon. This is an Iron-Man event where participants swim 2.4 miles, bicycle 112 miles and then run a marathon distance. ARES people supported the bicycle portion with communications for 11 aid stations, 2 ambulance positions, 2 bicycle coordinator positions and 1 overall race coordinator. Kudos to all participants. As public service season winds down our thoughts turn to the annual Simulated Emergency Test (S.E.T.) which can be anytime in October or early November and Jamboree on the Air (JOTA) on October 20th. Ham Radio's two "best faces" are public service and working with young people. Here's a perfect opportunity to get involved. Please contact your local ARES Emergency Coordinator (e-mail me if you don't know how and I'll put you in touch) and/or club to find out how they are participating in these two annual events. Listen to your local nets for these terms (S.E.T. and JOTA) and ask to help. A recent program presented by Mike, W5VSI, to the Pikes Peak Radio Amateur Assn. reminded me of the science, education and FUN involved with the Edge of Space Sciences (EOSS) group. If you want to do something really fun and unique within our hobby, go to their next launch. See the Web page at *www.eoss.org* for details. Thanks to Pat, W0IPL, for his input— and if you have items for this column, e-mail to me at *n0wpa@arrl.net*. 73, de N0WPA. NTS Tfc: AD0A 180, K0TER 74, KI0RP 55, W0ZZS 17. CAWN: K4ARM 959, W0WPD 909, WB0VET 451, W0LVI 384, AB0PG 379, N0NMP 332, K0HBZ 318, N0FCR 225, AA0ZR 217, WD0CKP 185, W0NCD 167.

MFJ *Speech Intelligibility* Enhancer™
gave me back my Ham Radio hobby

MFJ-616 **$169.95**

"As I got older, my high frequency hearing loss was destroying my ham radio for me . . ."

-- Martin F. Jue, K5FLU
President and Founder
MFJ Enterprises, Inc.

I know I'm not the only ham who can't understand all the speech in a QSO caused by high frequency hearing loss. I developed a solution that I want to share with my fellow hams.

I almost gave up my ham radio hobby

I have been a passionate ham radio operator for over 40 years ever since I was a teenager. I loved every minute of it. Still do, but I almost had to give it up.

As I grew older (I'm 56 now) I found myself asking "*What did you say?*" so often it got downright embarrassing. I can hear pretty good most of the time. I just can't always understand what people are saying and my left ear is weaker than my right ear.

It got to where I was having trouble carrying on QSOs. I could hear, but I just couldn't quite make out all the words.

My hearing problem almost put a stop to my lifelong hobby.

There was no way I was going to give up ham radio . . .

Research showed me what to do

I searched the literature and spoke to hearing and speech experts.

According to their research on the intelligibility of speech in hearing English words:

1. The frequencies important for speech intelligibility are the consonant sounds from 500 to 4000 Hz. They contribute 83% of word intelligibility.

Frequencies from 500 to 1000 Hz contributes 35% of word intelligibility and 35% of sound energy.

Frequencies from 1000 to 4000 Hz contributes *48% of intelligibility* but has *only 4% of sound energy!*

2. In contrast, frequencies from 125 to 500 Hz contributes 55% of sound energy but only 4% to word intelligibility.

***In** other words, nearly half the speech intelligibility is contained in 1000 to 4000 Hz frequency range with only 4% of the speech sound energy.*

On the other hand, the low frequencies 125 to 500 Hz have most of the speech energy but contribute very little to intelligibility.

How I improved my ability to hear and understand QSOs

The research showed me what to do.

First, drastically increase the speech energy above 500 Hz where 83% of intelligibility is concentrated.

Second, drastically reduce the speech energy below 500 Hz that contributes only 4% of intelligibility.

Amateur radio communications limit audio to about 300 to 2700 Hz.

I split the audio band into four overlapping octave ranges centered at 300, 600, 1200, 2400 Hz.

I could boost or cut each range by nearly 20 db to give me full control. This let me maximize speech intelligibility for most kinds of frequency loss.

My left ear is weaker than my right ear so I split the output audio into left and right channels with separate 2½ watt amplifiers. A balance control lets me equalize the perceived loudness to each ear. *Now both ears help in improving speech intelligibility!*

I couldn't believe my ears!

I built one and hooked it to my rig.

I boosted the high frequencies, cut the low frequencies, set the volume and adjusted the balanced control so I could hear each side equally loud.

I couldn't believe my ears! Speech that I could hear but barely understand before was now highly understandable. I got my ham radio back!

With this concept, you'll *understand* QSOs better and enjoy ragchewing and contesting more, even if you don't have high frequency hearing loss.

It helped me so much I wanted to share this with my fellow hams

I developed this into an accessory that any ham can use.

I made it immune to RFI, added a front panel phone jack, on/off speaker switch, two selectable transceiver inputs, a bypass switch for in/out comparison and built it into 10Wx2½Hx6D inch aluminum enclosure. Needs 12 VDC.

Other Uses

Replace your rig's audio section for superb audio. Eliminate hum, buzzes, poor frequency response, low audio power.

Works with SSB, FM, AM, CW -- any voice mode. Use any rig -- ham, marine, aircraft, CB. Use for PA systems, internet phone, radio talk shows.

MFJ-616 Accessories

MFJ-392, $19.95. Matching high performance communication headphones.

MFJ-281, $12.95. Mylar cone speaker emphasizes 600-4000 Hz for crystal clear speech fidelity. Requires two.

MFJ-1316, $19.95. For 110 VAC operation. Provides 12 VDC/1.5 Amps.

MFJ-72, $58.80. *All-in-one MFJ-616 Accessory Pack.* Includes MFJ-392 headphones, two MFJ-281 speakers and MFJ-1316 power supply. ***Save $7!***

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NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5BIS & N5ART. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. Roadrunner Net handled 89 msgs with 1,283 checkins. Breakfast Club handled 285 msgs with 1066 checkins. Yucca Net handled 33 msgs with 634 checkins. Caravan Club Net handled 9 msgs with 58 checkins. SCAT Net handled 12 msgs with 663 checkins. Four Corners Net handled 24 msgs with 346 checkins. GARS Net handled 9 msgs with 30 checkins. Rusty's Net handled 82 msgs with 858 checkins. Valencia County Net handled 15 msgs with 61 checkins. Deming ARC Net handled 15 msgs with 78 checkins. The Socorro Hamfest is Oct. 27 at the National Guard Armory. ARRL President, Jim Haynie,W5JBP, Walt Stinson, W0CP, RM Div.Dir., Rev Morton, WS7W, RM Div Vice Dir. & Brennan Price, N4QX, of ARRL HQ Staff, helped make our ARRL NM State Convention a great success! We believe it is the best ARRL Conventions ever held in NM. We thank all who made it so outstanding! Ed Ricco, N5LI, was presented with the "NM Ham Of The Year Award." Ed is active in ARES, SAR, Public Service, Volunteer Legal Services, and many other activities. Congrats to Ed! The Alamogordo Hamfest was also certainly a nice one and our thanks to the AARC and their staff! It was requested, at the Alamogordo Hamfest, that future issues of the Section News not contain Section Net Reports, but rather more news from Newsletters around the State. Net Reports are not leaving much space for Section News! Net Reports would still be compiled and reported as usual. 73, W5PDY.

UTAH: SM, Mel Parkes, AC7CP— As we approach the end of the year, I would like to express my appreciation to all the amateurs in the state of Utah who have worked as club officers for the many clubs throughout Utah. Without your help and effort many of our clubs would not be functioning and successful. Please give some thought to helping out with your local club, especially if you have never served as an officer or committee member. By now many of you who have volunteered to work with the Winter Olympic activities should be well in to training and preparations, your efforts will certainly contribute to the success of the Winter Olympics here in Utah. I would like ask each of you who are ARRL members to encourage those amateurs who haven't joined, to become members of ARRL and enjoy the benefits of membership and also support the efforts of ARRL to improve our hobby. 73 de Mel - AC7CP.

WYOMING: SM, Bob Williams, N7LKH—The Casper Amateur Radio Club participated in The Platte Bridge Station Stage Race, Sept. 1,2,3, 2001 providing emergency communications primarily medical, although some also provided race support including hauling wheels for the racers, and lead vehicles for the groups. Monday Sept. 3rd provided a few crashes which resulted in some road rash and 2 broken collar bones, the group was called into action to assure that an ambulance was dispatched, otherwise everything went well. Approximately 180 racers participated. The following radios operators worked the race: W7ASO, N7RPS, KD7NUC, W7TOY, W7BLM, KC7ZRU, AB7BJ, K7YE, KC7MJI, and KD7OAV. A good time was had by all. We had a great time at the Yellow Pines Hamfest (aka High Plains Roundup), up in the mountains near Laramie. The annual chili cook-off was as much fun as usual, even though it was held in the snow!! The pancake breakfast, sponsored by W7CW and WU7Y, was a BIG hit. Thanks to W7CW for a great Web site to pass the word. VE testing resulted in one new Tech and one upgrade to Extra. Tfc: NN7H 198. PSHR: NN7H 168.

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 Montgomery ARC will have its Hamfest on Saturday November 10, 2001, at the Montgomery Coliseum. Doors will open to the public at 9:00 AM. Talk-in is available from W4AP on the 146.84(-) repeater. CAVEC Amateur Radio License exams start at 8:00 AM. For more information, please contact Dennis Rumbley, KS4UO (chairman) by phone at (334) 409-9971, or by e-mail at ks4uo@arrl.net or check the club's Web site at www.w4ap.org. Don't forget November Sweepstakes is this month. The CW Sweepstakes is in the first full weekend of November (November 3-5, 2001), and the Phone Sweepstakes is on the third full weekend in November (November 17-19, 2001). You can find more information about this the contest and others at http://www.arrl.org/contests. Before I end this report, since Thanksgiving is at the end of the month, I would like to thank everybody for promoting Amateur Radio and helping me with my section duties. I would like to thank my Section Staff: W4NTI, AC4CS, WB4GM, KU4PY, KV4CX, W4OZK, KA4MGE, KA4ZXL, and W4XI. Let's not forget the real important people: all the active hams in the Alabama Section! God bless & 73, Bill Cleveland, KR4TZ.

GEORGIA: SM: Sandy Donahue, W4RU—ASM/South Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. Asst SM/IT: Mike Boatright, KO4WX, SEC: Lowry Rouse, KM4Z. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JNL. ACC: Susan Swiderski, AF4FO. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. website www.qsl.net/arrl-ga, www.w4ru.com. Officers of the Atlanta RC for next 12 months: Pres K4PE. V Pres KF4MHW, Sec KF4MDV, Tres K4TZM, Hamfest chair, KA4VQH. Perhaps the states biggest and best hamfest is almost here. The Alford RC hamfest at the Gwinnett Cty Fairgrounds is Nov 3-4. It's a section convention and ARRL HQ staffer N4QX will be here to check DX cards and conduct a forum. The Gremillion ARC in Newnan completed their annual Powers Crossing festival activities to rousing success. Their officers for the next year are Pres. KB4TXS, V Pres KD4SHK, Sec. KA4JNB, Tres. K4WPM, Activities N4ODI. Athens ARC is in middle of the annual UGA football communications support. Lucky dogs get to watch the DAWGS for nothing. Gwinnett ARC, under leadership of AF4FO, will have an auction Oct 20 at Briscoe Field, the Gwinnett County airport. That same day is the Rome hamfest and a Ga SSB Assn/Cracker net picnic in Ellijay. What's a SM to do? I can't be a 3 places at the same time. 73, Sandy. Tfc August: WB4GGS 244, W4WXA 197, AF4NS 180, KG4FXG 76, K4BEH 67, K1FP 63 K4WKT 50, WB4BIK 32, KA4HHE 18,K4ZC 15.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—

MFJ TUNERS

MFJ-989C *Legal Limit* Antenna Tuner

MFJ uses super heavy duty components to make the world's finest legal limit tuner

MFJ uses super heavy duty components -- roller inductor, variable capacitors, antenna switch and balun -- to build the world's most popular high power antenna tuner.

The rugged world famous MFJ-989C handles 3 KW PEP SSB amplifier input power (1500 Watts PEP SSB output power). Covers 1.8 to 30 MHz, including MARS and WARC bands.

MFJ's *AirCore*™ roller inductor, new *gear-driven* turns counter and weighted spinner knob gives you exact inductance control for absolute minimum SWR.

You can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax, random wire or balanced lines.

MFJ-989C **$359.95** Needle SWR/Wattmeter, massive transmitting variable capacitors, ceramic antenna switch, built-in dummy load, *TrueCurrent*™ Balun, *scratch-proof* Lexan front panel -- all in a sleek compact cabinet (10¾Wx4½Hx15D in).

You get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-

MFJ AirCore™ Roller Inductor gives high-Q, low loss, high efficiency and high power handling.

MFJ's exclusive *Self-Resonance Killer*™ keeps damaging self-resonances away from your operating frequency.

Large, self-cleaning wiping contact gives good low-resistance connection. Solid 1/4 inch brass shaft, self-align bearings give smooth non-binding rotation.

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MFJ will repair or replace your MFJ-989C (at our option) *no matter what* for one year.

More hams use MFJ tuners than all other tuners in the world!

MFJ-986 Two knob *Differential-T*™

MFJ-986 **$329.95**

Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10¾Wx4½Hx15 in.

MFJ-962D *compact* Tuner for Amps

MFJ-962D **$269.95**

A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10¼x4½x10⅞ in.

MFJ-969 300W *Roller Inductor* Tuner

MFJ-969 **$199.95**

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

MFJ-949E *deluxe* 300 Watt Tuner

MFJ-949E **$149.95**

More *hams use MFJ-949s than any other antenna tuner in the world!* Handles 300 Watts. Full 1.8 to 30 MHz coverage, 48 position *Precision48*™ inductor, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E *super value* Tuner

MFJ-941E **$129.95**

The *most for your money!* Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10½Wx2½Hx7D in.

MFJ-945E HF+6 Meter *mobile* Tuner

MFJ-945E **$119.95**

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $4.95,** mobile mount.

MFJ-971 *portable/QRP* Tuner

MFJ-971 **$99.95**

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6½x2½ inches.

MFJ-901B *smallest* Versa Tuner

MFJ-901B **$79.95**

MFJ's smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-16010 *random* wire Tuner

MFJ-16010 **$49.95**

Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 *6 Meter* Tuners

MFJ-906 **$79.95**

MFJ-906 has lighted Cross-Needle SWR/wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $49.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 *VHF/UHF* Tuners

MFJ-921 or MFJ-924 **$69.95**

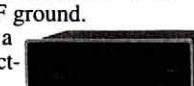
MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

MFJ-922 144/440 MHz Tuner

MFJ-922 **$79.95**

Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-931 *artificial* RF Ground



MFJ-931 **$89.95**

Creates artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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ACC: WA4B. BM: N4GMU. OOC: KD4NLV. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. SKYWARN operator struck by lightning. Danny Townsend, KB5ZEA, was struck by lightning on May 27, while engaged in SKYWARN reporting. As he keyed his mike to respond to KD5JGW weather report, lightning hit the tower, destroying the station equipment and knocking him to the floor. He was taken to the hospital and found to be OK. Miller, K4RYX of Jax reports ARES will be quite busy during October. October 17 will be MCI and much of the detailed information from the scene will be relayed to the local hospitals through the network of amateur radio. A ham operator stands alongside the Transportation Officer at the scene and dispatches the same information FireCom dispatches, only ARES goes immediately from the scene to the hospital via ham radio. Beginning Oct 31 through Nov 4 will be Sea and Sky spectacular 2001, at Jax Landing, Mayport and Jax Bch will be alive with Military activity including Air, Sea, and Land demonstrations. ARES will provide a layer of emer communications in support of this enormous operation which tens of thousands are expected to attend. These exercises are great training for all operators. Good luck, and wish you much success. Local wireless communications tower bill exempts hams in Jacksonville. A bill in the city code exempts Amateur Radio structures from restrictions on height, landscaping and appearance. It relates to "providing uniform standards for the safe provision of both radio and television broadcast signals and telecommunications services, including two-radio paging, PCS, cellular and related wireless services". A Wireless Communications Tower id defined as any structure designed or constructed for purpose of supporting one or more communications, and does not include either broadcast towers and amateur radio towers licensed by FCC de 73 Rudy. Tfc: WX4H 976, NR2F 162, KE4DNO 157, AG4DL 145, AF4PU 77, KF4WIJ 69, WD4GDB 69, N9MN 59, W5MEN 46, K1JPG 44, K4JTD 35, KC4EZQ 32, KM4WC 28, KC4FL 26, WA1VOP 22, W4KIX 19, AB4PG 15, KJ4HS 14, W4CFH 12, K4DMH 11, W8IM 10, WX4J 10, WB9GIU 6, WD4ILS 5, WB2IMO 3, W4ZET 2.

PUERTO RICO: SM, Víctor Madera, KP4PQ — El próximo taller de "OO" del programa "Amateur Auxiliary" se celebrará próximamente en Ponce. Esta vez lo auspicia la FRA, por lo que le damos las gracias a su presidente KP4EMC y su grupo de trabajo. Posiblemente cerraremos este ciclo de talleres con uno en el área este. Se anunciará la fecha. La próxima actividad de la Sección de PR será la reactivación del programa ARES. El PRDX Club sigue celebrando sus reuniones mensuales ofreciendo interesantes programas en cada una de ellas. Si le interesa el DX, no se las pierda. Felicitamos a WP4MJP de Sabana Grande y a WP3HM de Humacao por su gran labor preparando nuevos radioaficionados. Las sesiones de exámenes acreditadas por el ARRL/VEC continúan alrededor de la isla gracias a la cooperación de la Universidad Interamericana de PR. La Federación de Radioaficionados celebra su Asamblea Anual en Ponce para elegir su nueva Junta de Directores. Nuestro más sincero pésame a todos aquellos radioaficionados que de alguna forma sufrieron perdidas debido al desgraciado incidente en New York, Washington o Pennsylvania. Nuestras felicitaciones a aquellos que dedicaron parte de su tiempo en mantener una red abierta para mensajes de "bienestar". Interesados en los programas para "OOs", Comunicaciones de Emergencia y ARES, 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, K9SHT, AA4BN, KD4GR. Web Page: http://www.sflarrl.org. Thanks to the Brevard, Dade, Ft. Myers, Indian River, Orlando, Vero Beach, Wellington Clubs, and EC's for newsletters and activity info. Congratulations to W4STB and W2JAJ who had writings published in ARRL's "Ham Radio… Planning for the Future" July edition. AROUND THE SECTION: Brevard's Melbourne hamfest was a great success. We held a section-level appointee/Club President breakfast/workshop. KD4GR demonstrated a portable repeater, programmable with a standard split on 7 frequencies to go with the CAT team. The Indian River's DCAT was on display. Miami's DCAT has 9 ops ready to go and 15 on standby. W4STB led a group discussion of the proposed state antenna ordinance with instruction on lobbying and good PR. Broward plans a joint exercise and JOTA activity. Dade's KU4GY, ham coordinator at the Hurricane Center, reported 7 new radio ops to help cover the Caribbean. W4WYR reported on winners of the Dade ARC Scholarship: KE4UFT will pursue a BS in computer engineering at UCF, and AF4HEE will seek a Math and Meteorology degree at U of Mia. KG4MNZ has the approval of his middle school to start an amateur radio club for the students. We wish you great success, Ivan! Indian River ARES begins launch support 30 minutes prior to every shuttle or rocket launch. Listen on 147.135 MHz. Martin SKYWARN was activated during tropical storm Barry. One Red Cross shelter opened as 14.64 inches of rain fell in one day. Okeechobee appreciates the move to their new communication facility by the EM office. Osceola ARES weekly net moved to 2030 hours local. Palm Beach ARES helped at the Wellington Regional Hospital when communications went down. Seven people were involved for 6.5 hours. The EOC repeaters are being changed to W4PBC. August Traffic: WA9VND 419, KA4FZI 213, KD4GR 137, KC4ZHF 108, KD4HGU 77, K4VMC 64, KG4MLD 62, K4FQU 55, KG4MLC 53, KE4UOF 50, WB4PAM 33, KT4XK 33, KE4WBI 32, WA4EIC 28, AA4BN 27, WA4CSQ 21, KG4CHW 19, KF4OMB 16, AF4NR 11, W4WYR 8, K4OVC 8. SFL Bulletin Report August by KC4ZHF: recd 51, sent 92, total 143, 5 stations. 73, Phyllisan West, KA4FZI, Section Manager, Southern Florida

VIRGIN ISLANDS: SM, John Ellis, NP2B, St. Croix—ASM: 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. The St. John ARC provided communications for the St. John Triathalon on Monday, Sept. 3, 2001. Jim, KP2L, provided start information and progress of the Maho Bay swim while Bill, NP2JC, and Lee, WP2AID, provided warnings to bikers at the beginning of steep sharp turns on the north coast road. David, KP2CN, and Tom, KP2VI, provided progress reports from two of the sharp turns between Cruz Bay, and Coral Bay.

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Doug, KP2CS, manned the temporary cross-band repeater to connect Maho Bay on the north coast to the ARC's 2-meter repeater on 146.63 MHz. Paul, NP2JF, and Pam, KG4CKQ, coordinated both runner and biker traffic incoming towards the Coral Bay finish line while Mike, KP2CQ, and XYL Chris, AC6BH, provided reports from the finish line and along the runners route. George, KP2G, acted as control for the event. Making plans to meet the folks on the QCWA cruise (well over 100 so far) on St. Thomas on Nov. 1. Local repeaters St. John 146.63, St. Thomas 146.81 and St. Croix 147.25. V.I. section Web site www.viaccess.net/~jellis. Lets hope we keep dodging the storms! 73, 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. OOC: W4ABC. SGL: KC4N. ACC: AC4MK. PIC: WX1JAD. As I write this amateurs in NY and across the country are assisting with communications after the attack of 9/11/2001. I am proud of how quickly WCF was able to activate our local ARES and section nets. It is a great privilege to be part of the amateur radio community. Remember if section ARES or SKYWARN need to activate we will operate on K4WCF/r 145.43, 146.76 & 442.95 (PL Tone 100Hz). HF operations will be on 7281 kHz (day) and 3911 kHz (night). ARRL affiliation certificates were presented to the Sheriff's Tactical Amateur Radio Club and the Baycare Emergency Amateur Radio Society. Jim Haynie, W5JBP, President ARRL and Ed Hare, W1RFI, will be attending the SE Division Convention/Tampa Bay Hamfest on Dec. 1 & 2. Silent Keys: John "Bud" Murphy, AC4MY, Al Monroe, KD4KQL. SEC KD4E reports a decrease of 13 ARES members for a new total of 413. In August there were 47 Nets. 6 public service events, 20 drills and 5 emergencies for a total of 31 ops. The total man hours reported for August is 973 hours. August net report is available on the section's web page. August PSHR: K4RBR 174, K4SCL 140, WB2LEZ 125, W4AUN 116, AE4MR 115, KT4PM 111, KF4KSN 103, AB4XK 101, KT4TD 93, KF4OPT 87. SAR: K4SCL 256, AB4XK 148, KF4OPT 36, KT4PM 31, KT4TD 26, K4RBR 26, W4AUN 24, AE4MR 12, KF4KSN 10, WB2LEZ 7. 73, Dave AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—Allan Cameron, N7UJJ, has been given the "ARRL 2000 Educator of the Year" award. He has been a great teacher and Amateur Radio instructor at Carl Hayden High School for many years and this award is long overdue. Congratulations, Allan, for a job well done. Fried Heyn, WA6WZO, our present SW Division Director is stepping down after over 18 years of service as our SW Director. SW Vice Director Art Goddard, W6XD, has been selected to replace Fried as the new ARRL Southwest Division Director. Have you used our new satellite, AO40? It is now up and running and many contacts have been made through this new object. I do not have the equipment for this type of activity, but many people here in Arizona are having fun working through the satellite. The ATV group has placed a repeater on Mount Lemon. The frequency of operation is input 434.00 MHz, output 1253.250 MHz. The state emergency net is every Sunday morning at 0800 local time on 3990 kHz. Every evening at 0200Z (1900 hours local) is the state traffic net on 3992 kHz. Check with your local club to find out the time and frequency of the many local nets, both HF and VHF. The Tour de Phoenix bike ride, The Tour De Tucson bike ride, Climb A Mountain walk for Cancer, Etc. Are you a participant in these events? Do you use your radio skills to give back to your community? If not, and you are interested in becoming a community volunteer, contact me by telephone or e-mail and I will provide you with a person to contact so you can also be a good community leader. We have two (2) people here in Arizona that are authorized to perform DX card checking; Ned Stearns, AA7A (Phoenix Area) and Bill Schuchman, W7YS, (Flagstaff/Kingman area). If you need this service, let me know and I will help you in this process. Good DXing. Don't forget to checkout the state Web site at *www.qsl.net/arrlaz/.* This site has all the latest state information and links to the many clubs here in Arizona and throughout the country. The Old Pueblo Radio Club will have its hamfest at the PIMA County Fair ground on 20 October 2001, then we have the Fall hamfest at Mesa Community College on 01 December 2001, sponsored by the Superstition ARC. I will not be at the OPRC event due to vacation but will be at the Fall hamfest in Mesa, so if you have a complaint, new idea, or just want to say hello, please stop by the ARRL booth (normally my truck). 73, Clifford Hauser, KD6XH. ATEN 901 QNI, 37 QTC, 31 Sess. Tfc: W7EP 68.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF – Well, propagation was quite good the past few weeks. A contact, on 15 meters with Joe, 7Z1AC, gave us a feeling for the temperature in Saudi, Arabia. Joe, a Texan, thought that he knew about hot weather, but he now has a new appreciation for the hot summer sun. He was waiting for the temperature to drop below 120 F so that he could climb his 85 ft. tower. He also said that he knew it was really hot where he was located because he could wear a coat when inside a building and remove the coat when he went outside. Our outstanding OOC, Joe, W6UPN, is an engineer who is an expert on computer controlled traffic signal systems. He was asked the question about how do you determine the correct adjustment for timing the signals. Joe said that it was very simple but time consuming. You observe the time that the traffic was stopped in each direction and adjust the computer so that the delay was equal in each direction. This is much like that of most Judges' or umpires' decisions. Adjust the call, so that both sides are equally unhappy. Or if you are an optimist, when both sides are equally happy. Joe, W6UPN, is the unanimous winner of the coveted plaque for service as "The outstanding Volunteer of the Year" in the Southwestern Division. -An excellent article in the "Northridge Chamber", newspaper by Dr. Leo Rain, MD is about "What is bluffing and is it ethical?" Leo says that it is part of the game in poker and employed with care in many business negotiations and advertising. – Some people have a way with numbers, some have a way with words. IRLP, is the new buzzword from Canada. Internet Radio Linking Project, IRLP, remember that buzz word, and check it out. A VE7 station told me to look it up on the Internet, so I did. Then specify "IRLP". It looks great for restricted antenna locations.

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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 . . .

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MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

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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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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.

Built-in 0-25 VDC voltmeter. Six feet super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs. Heavy duty aluminum construction. 12½x2¾x2½ in.

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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Now with only a handy-talkie, you can talk around the World. At present you must enter a special, local repeater on two meters with a hand held. This will connect you to the Internet to be relayed to one several hundred selected locations around the world. Check it out you might really like it. The Los Angeles node is listed as: KE6PCV, #365. ke6pcv@calnet.org. 73, de W6BF, Phineas.

ORANGE: SM, Joe Brown, W6UBQ, 909 687 8394. ASM: Riv. Co. Brett, N6NLN 760 346 9291. ASM: Org. Co. Art, W6XD 714-56-396. ASM: SB Co. Jeff, W6JJR, 909 886 3453. The biggest news in the Orange Section was the SW DIV Convention that came to town. What a wonderful time we had. I am still on high. The 2001convention was absolutely the best ever. Don Williams, KD6UVT, Chairman, Inland Empire Council of Amateur Radio Organizations, the Convention Staff, speakers and vendors you had all ingredients in place to make this a fun activity. CONGRATULATIONS. This year, Robert Stoffel, KD6DAQ was honored with the Medal of Merit for his outstanding work in implementing the 800 MHz County Wide Coordinated Comm System in Orange County. This honor is awarded to the men and women of Sheriff's Dept. who have demonstrated heroism, bravery and exemplary skills. Congratulations Robert. I would like to mention Fred Roberts, W6TKV. Editor. After reading 20 some ARC Newsletters. The Circle City Communicator's layout and content are one of the best. The Amateur Radio Booth at the Orange County Fair which ran from July 13th to July 29th was the winner of three ribbons in the nonprofit group category. Staffing 2nd, Interactive Response, 4th and Best of Show 2nd. If you did not help to staff the booth at the fair, you missed a good time. The Fullerton ARC now has a TALK & TECH on the Repeater, Tuesday 8:PM on 147.975 MHz (minus, no PL). Got a problem? check-in. STM traffic report. QTC: KC6SKK 128, K6IUI 94, W6JPH 85, W6QZ 38. PSHR: W6QZ 154, W6JPH 95, K6IUI 86, KC6SKK 73. SCN/V NET MGR W6JPH reports 23 sessions, QNI 142, QTC 69, avg net time 17 mins. 73, Joe Brown, W6UBQ.

SAN DIEGO: SM: Tuck Miller NZ6T 619-434-4211— I am sitting here in deep thought or meditation, trying to comprehend the great tragedy that we have experienced. As I write this, it is only a few days since the attack on the twin towers of the World Trade Center, and of course the nation is in deep mourning. It is times like this, that our people, no matter what ethnic group you belong to, come together as one people, as one country. United for all. I refer to a quote that appeared in the San Diego Union Tribune a few days ago, which basically said an attack on one, is an attack on all. We as a nation, have to stand up to these terrorists. They cannot, and they will not win. What can we do as Amateur Radio operators? First off, you can become actively involved in ARES or RACES. If you have never been a part of these organizations, I encourage you to do so immediately. Obtain the necessary training that will be needed in the event that something happens in our area. I am sure if something happens, we will have many folks coming out of the woodwork trying to lend a hand, but to be quite honest with you, it is better when we have trained communicators, persons who might be familiar with hospital assignments, and persons who have a general knowledge of net procedures. I would encourage people to listen in on the traffic net, on 146.730, a Palomar Club machine, on Tuesday, Thursday, and Saturday nites. This would be a good place to learn how to deliver 3rd party messages, as well as originating, and sending messages as well. Our annual Ham Radio Roundup is scheduled for Oct 20 at the Kearny Mesa Rec Center, Mesa College Drive at Armstrong St (10 AM to 3 PM with potluck at noon.) We are getting close to the holiday season, and as such, please take time to think about the many blessings that we Americans enjoy. Please keep in your thoughts and prayers the victims of these senseless acts of terrorism. May God bless America. Tfc: KD6YJB 58, KC6NXZ 59, K6DAY 23, N6TEP 39. 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). REMINDER: WRITE your Congressional Representatives to urge co-sponsorship of the Amateur Radio Spectrum Protection Act (HR 817 & S 549). The Council of Clubs is reactivated under the leadership of ACC, KE6DKU and ASM, W6YN. Clubs Officers: GET INVOLVED! 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/.SCN slow speed NTS Net, M-F, at 1915 local on 3598 kHz & SCN/SB at 2100 local on 147.000+(131.8), 224.90-(131.8) & 449.300-(131.8). Thats 30.

WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL—I am sitting here trying to write column while watching the events unfold in both New York and Washington D.C. And I share the outrage and anger that something like this as happen in our country. I would encourage everyone to monitor events as they happen so that they can help out the Hams that are involved in the disaster if by nothing else than being aware of any ARES/RACES nets and standing down from those frequencies if you cannot directly help out. On a more positive note I would like to congratulate the following clubs for being affiliated with the League for 25 years: Texas Assn. Of Contest Operators, Southwest Dallas County ARC and Denton County ARC. I hope to see a lot of you at the North Texas Section Convention at the Tri-County ARC Hamfest Nov 10th. 73 de KA5TXL August SAR: K5UPN 550, KC5OZT 267, W5AYX 182, K5NHJ 138, KB5TCH 80, AC5Z 34, and WA5I 27. BPL K5UPN.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC:

MFJ *tunable* Super DSP filter

Only MFJ gives you tunable and programmable "brick wall" DSP Filters

MFJ's *tunable* super DSP filter automatically eliminates heterodynes, reduces noise and interference *simultaneously* on SSB, AM,CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX, weak signal VHF, EME, satellite.

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MFJ's *automatic notch* filter searches for and eliminates *multiple* heterodynes.

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The *automatic* notch and *adaptive* noise reduction can be used with *all* relevant tunable pre-set filters.

***Automatic gain control* (AGC) keeps audio level constant during signal fade.**

U.S. Patent D374,010

MFJ-784B **$249.95**

Tunable bandpass filters

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Adaptive Noise Reduction

Noise reduction works in all filter modes and on all random noise -- white noise, static, impulse, ignition noise, power line noise, hiss.

The LMS algorithm gives you up to 20 dB of noise reduction. Noise reduction is adjustable to prevent signal distortion.

15 *pre-set* filters -- factory set or you custom program

You can select from 15 *pre-set* filters. Use for SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any mode.

If you don't like our pre-set filters, you can program your own -- an MFJ exclusive! Save center frequency/bandwidth, lowpass/highpass cutoffs, auto/manual notch, noise reduction -- all filter settings -- in 10 programmable filters.

Plus more . . .

A push-button bypasses your filter -- lets you hear the *entire* unfiltered signal.

2½ Watt amplifier, volume control, input level control, speaker jack, PTT sense line, line level output. 9½x2½x6 inches.

Plugs between your transceiver or receiver and external speaker or headphones. use 12 VDC or 110 VAC with MFJ-1315, $14.95. Cable Pack, MFJ-5184, $7.95, includes receiver cable, DC cable, 2 open-end TNC cables.

New Features

MFJ's exclusive *tunable Spotting Tone*™ -- accurately tunes even the narrowest CW filter.

MFJ's exclusive *Adaptive Tuning*™ -- tuning rate automatically becomes finer as you narrow bandwidth -- makes narrow filters easy-to-use.

MFJ's exclusive *FilterTalk*™ -- sends precise filter settings in Morse code.

Has automatic notch with variable aggressiveness, new quieter 2½ Watt audio amplifier, new speaker switch keeps phones always active.

Manual and automatic notch can be used together. Noise reduction, automatic notch and custom filter you saved in memory is selected.

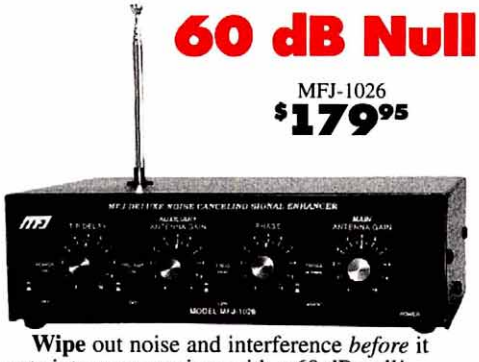
You get an accurate easy-to-use input level indicator, improved manual notch in the CW mode, adjustable line level output, more Mark-Space frequencies and baud rates for data filters and automatic bypass during transmit for monitoring CW sidetone, voice or data by sensing the PTT line.

Firmware Upgrade

For MFJ-784, order **MFJ-55, $29.95**. Gives you most features of the MFJ-784B.

60 dB Null *wipes out* noise and interference

MFJ-1026 **$179.95**



Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise -- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker because interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequences from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network*. You can combine two antennas to give you various directional patterns. You can null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312B, $14.95. 6½x1½x6¼ inches.

MFJ-1025, $159.95. Like MFJ-1026 less built-in active antenna, use external antenna.

Add DSP to any Multimode

MFJ-781 **$129.95** **Add** "brick wall" DSP filtering to any TNC or multi-mode data controller. Copy signals buried in noise and QRM. Under severe QRM, DSP greatly improves copy of Packet, AMTOR, PACTOR, GTOR, Clover, RTTY, SSTV, WeFAX, FAX, CW -- nearly any digital mode. Automatic gain control, On/Off Bypass switch. Plugs between transceiver and multi-mode. Uses 10-16 VDC or 110 VAC with MFJ-1312B, $14.95. 4½x2½x5 inches.

DSP for your MFJ-1278/B

Plug a MFJ-780 "brick wall" DSP filter into your MFJ-1278/B multi-mode and you won't believe your eyes when you see solid copy from signals completely buried in QRM! MFJ-1278/B automatically selects the correct DSP filter for Packet, AMTOR, Pactor, RTTY, ASCII, FAX, Color SSTV, Navtex or CW. Plug in a MFJ-780 and copy signals that other multi-modes can't. *Some soldering needed.*

MFJ-780 **$99.95**

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International 9086, the best solid 9913-type		56¢/51¢

RG-8X Premium, 95%, black 14¢
RG-213 95%, Mil-Type Excellent 35¢

R1 Rotator	8 cond. (2 x #18, 6 x #22)	SALE 26¢/20¢
R2 Rotator	8 cond. (2 x #16, 6 x #18)	SALE 47¢/35¢
#14	Hard-drawn, 7x22, all copper, bare	8¢
#14 FlexWeave™	168-strand, bare copper	14¢
#12 FlexWeave™	259-strand, bare copper	19¢
HD Ladder Line	450 ohms, stranded #16 cond.	22¢/17¢
Super Ladder Line,	stranded #14 cond. Sale	30¢/26¢
1/2" Tinned Copper Braid ground strap, any length		65¢
LadderLock™	Center insulator for ladder-line	$11.95
Copper Ground Strap, 6" all copper		$1.49

Custom Coax Jumpers - made to order.

Pulleys - for antenna support rope. Highest quality, sailboat-type. Small & lightweight. #224 for 3/16" rope @ $11.95 and #082 for 5/16" rope @ $14.95

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Built-in ground strap
Breaks up ground loops
Ends RF feedback problems

For really tough RFI problems, the T-4G is the ultimate fix by shunting stray RF on your coax directly to ground. Stray RF and feed line radiation doesn't have a chance. It solved all my RF feedback problems in my second floor shack. (W4THU) Don't be misled by $100 imitations. Our Line Isolators are still unequaled.

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Mil Spec, Dacron® Antenna Support Line, single braid, sun resistant, 3/16" 700# test 100' hank $8

Kevlar - Dacron® Jacket for sun protection, 500# test, for guying verticals, booms, etc, .075" dia. 200' spool $15.95

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For 16 years, The RADIO WORKS has brought you the best made, best performing wire antennas. No warmed over handbook designs - just performance engineered antenna systems.

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CAROLINA WINDOM 40,	66' long, 40 - 10 m.	It helped set two 40 meter records.	$90
CAROLINA WINDOM 40 Plus		18' vertical radiator increase 40-15 performance	$105
CAROLINA WINDOM 160 Special,	160 - 10m, 132' long.	All bands 160 - 10	$125
G5RV Plus,	80 - 10 m, 102'	High Power Current Balun, heavy-duty Ladder-line	$59.95

Jim's New Book - "Frequently Asked Questions about Antenna Systems and Baluns."
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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Models for every application

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B4-1KXV	4:1	1 KW	Current-type VHF	10 - 2 m	$33.95
B4-1.5K	4:1	1.5 KW	Voltage-type	80 -10 m	$32.95
B4-2K	4:1	2 KW	Voltage-type	80 -10 m	$39.95
B4-2KX	4:1	2 KW+	Current-type	160 -10 m	$49.95
NEW! B1-5K+		5 KW	Current-type	160 - 6 m	$35.95

Here's the new Super Line Isolator Lineup

T-4	Ultra Line Isolator, 160 - 10m	$34.95
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For your Desktop
• Will tune your antenna in 3 to 5 seconds
• 5 to 100 watts • Full HF Band • Digital Control
• Can be controlled from your ICOM or Alinco
You'll wonder how you got along without it!

AT-11MP $239

Z-11 QRP $179
(Shown with a Yaesu FT-817)

For the serious QRPer
• This Tuner will go anywhere with you! • .1 to 60 Watts • Easy to read LED status • Fits under your radio • Miserly 6mA draw • Rugged, yet light weight • Latching relays remember last tuned position, even when power is off!

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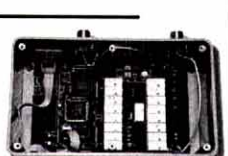
Your antenna will love you for it!



RT-11 $209

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The last thing you want to fall apart is your rotator that's mounted on the top of your tower. You won't make any compromises when you buy and install high quality Hy-Gain rotators.

And we're the only manufacturer to offer a full line of rotators that are completely MADE IN THE USA.

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.

AR-40, $269.95. *Lightweight antenna rotator.* Handles smaller ham antennas and large TV/FM antennas up to 3.0 square feet windload area when mounted in-tower, or 1.5 square feet when mast mounted using the supplied lower support bracket. Dual 12 ball bearing race, disc brake system. Silent, automatic control box -- just dial and touch for desired direction. Accepts mast sizes up to $2^{1}/_{8}$ diameter. Includes light duty mast support. Rotator size is $17^{3}/_{8}$Hx8D inches.

Call your dealer for your best price!

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$529.95
Suggested Retail

T-2X

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AR-40

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Rotator Specifications	T2X	HAM-IV	CD-45II	AR-40
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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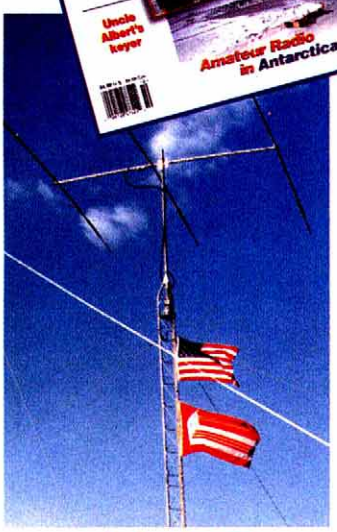

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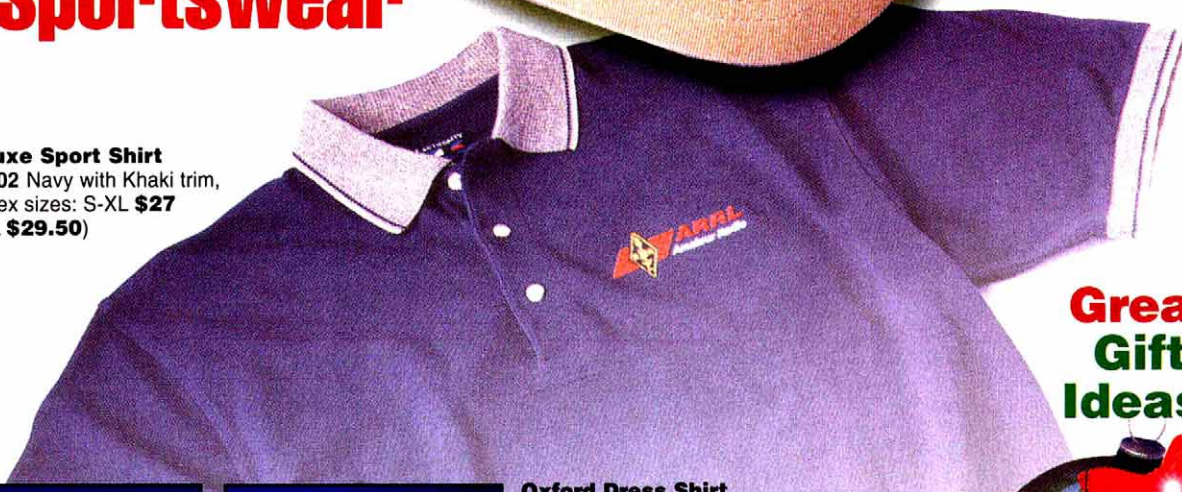

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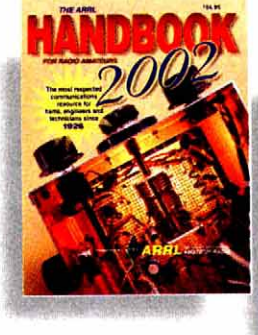

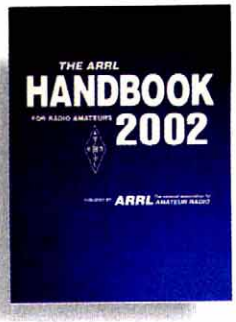

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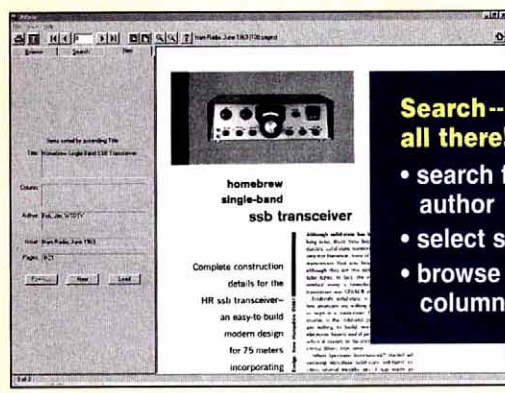

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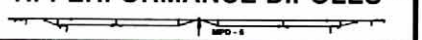

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WB9VMY. SGL: W5NZS. STM: K5KXL I recently had the honor and privilege to speak to a group of men at a charitable luncheon for Mikey Reiser, KD5LPE, a 13 year old blind ham who recently upgraded to General. Congratulations, Mikey, you are an inspiration to us all! We lost another friend this month. Tony Holzman, WB5PNH, passed away after a long battle with cancer. Our thoughts and prayers go out to his wife Kay, KB5VJR, and family. WSJT is alive and growing in OK. Several stations in EM25, 26 and 04 are active on this new digital mode used for VHF meteor scatter. For more information check out http://pulsar.princeton.edu /~joe/K1JT/. To all those in New York, Pennsylvania, and Washington, DC. You were there to support us in our time of need. We would like you to know that you have our support as you continue to recover from the devastating events in your own communities. We, unfortunately, know what you are going through. It will take time to heal, but we must continue to endure. Our prayers and thanks go out to all involved with the rescue and recovery effort. God Bless America! To subscribe to the Oklahoma section email list, send an email to majordomo@qth.net with SUBSCRIBE ARRL-OK in the BODY of your message. New location for the section web coming soon. 73, Charlie. Tfc: KF5A 1263, WB5NKC 531, WB5NKD 449, N5IKN 475, KK5GY 431, WA5OUV 315, WA5IMO 156, K5KXL 135, KI5LQ 115, KE5JE 78, KM5VA 68, W5VBD 29.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, K5SBU, W5JAM. STM: W5GKH. SEC: W5ZX, ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. PIC: KD5HOP. To clear up one thing that came to my attention is that KD5HOP, Robert Nations is the new PIC. He needs some PIOs to assist him in getting stories for the news media and *QST*. We should have pictures of the flooding in the last 3 weeks, with hams on duty at shelters. You that man shelters might be able to take a camera with you and have someone take a picture of you while operating. We need a PIO in each club, however you must be an ARRL member to be a PIO. I'm sure that any help that anyone will give in taking pictures and getting them to a PIO would be of help. I want to thank those who assisted in the floods in South Texas over the past 3 weeks. We had shelters in Stockdale, Yorktown, Victoria, Houston, Eagle Pass, Corpus Christi, and Alice area. Houston area sure didn't need this after having the big flood such a short time ago. In the Corpus area the hams were riding with the Red Cross ERVs to provide communications back to their office, reported by W5JYJ, DEC in the area. I received 10.88 inches with damage caused by tree limbs falling. In the wake of all this the terrorist attack took place and hams again were called into service for some of the EOCs Police Departments in the larger cities here in South Texas just in case something else should take place. In the middle of this the Red Cross in San Antonio ask for operators for 2 shelters in Eagle Pass. All that I could do was give them a phone number of N5YUO in Eagle Pass. We just couldn't spare any operators while manning EOCs and other locations. We have The Capital of Texas, DPS Hq, and several major military facilities, so we stand ready if needed. This has been one of the worst times in America history. May God Bless all of us in America and bring us together as one. Take care of your family and give them love. Tfc: KA5KLU 407, W5TUK 176, W5GKH 160, N5SIG 158, W5ZX 101, N5OUJ 70, KØYNW 66, W5KLV 51, N5NAV 49, KD5GM 37.

WEST TEXAS: SM, Lee Kitchens, N5YBW—ASM, ACC, BM, OOC, PIC, SEC, SGL, STM, AND TC assignments in the process of reconfirmation and will be announced later. As a new SM, there is much to be learned and much to do. The training session for new SMs at ARRL was great. Hope to have a meeting with all appointees at the Odessa hamfest Nov. 2-4. Join us if you can. Would like to hear from each club in the section and to schedule visits during the year. Will also be contacting all appointees to renew, where possible, their continued participation. There are 28 clubs in the section, but only 14 are active. In this new time of threats to the nation, all clubs need to be active in ARES/RACES training and experience. Lubbock ARES/RACES hams responded 9-11 to call out by County Judge, Tom Head, a ham in the making, after the attacks in NYC. Lubbock clubs working on acquiring their own facility. Great report from WS5R, Ben, on Amarillo area activities including training, SKYWARN call outs, work with new NWS tower, and public service during MS walk. Thanks to Larry, WB8LBZ, ASM from El Paso area. He reports ham activity every day of the week either in eyeball meetings or on the air. Net reports from WB5ZEP, Leon, are most appreciated. There are some great Web sites in the section. http://k5wph.org, http://www.qsl.net/w5es, http://www.aasg.com/wtra/menu.htm, http://www.zianet.com/aarc, http://wx.findu.com/k5wph, http://www.k5lib.org. Please communicate freely with me at N5YBW@arrl.org.

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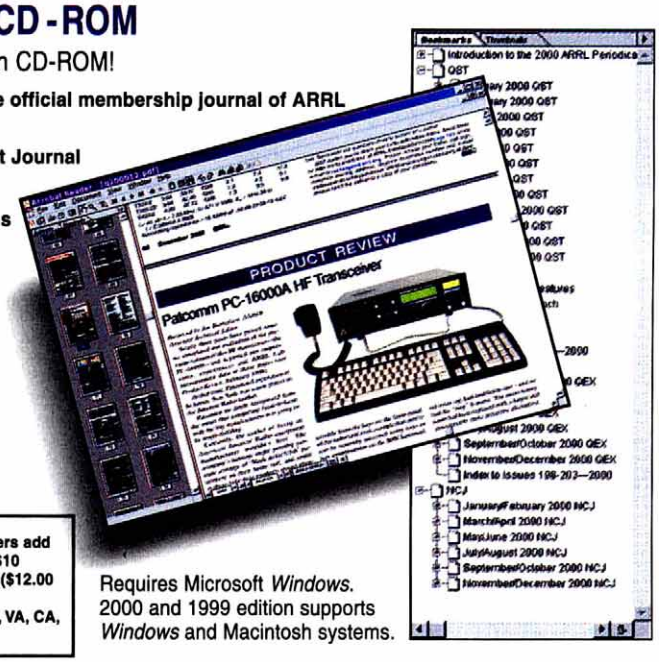

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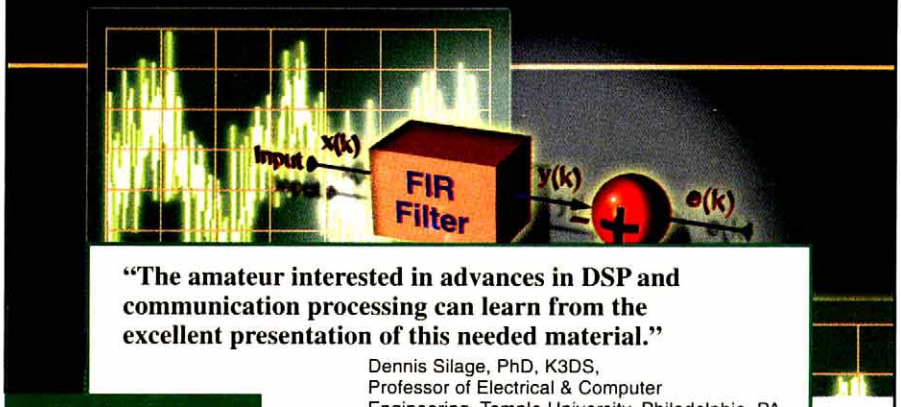

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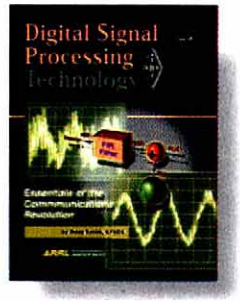

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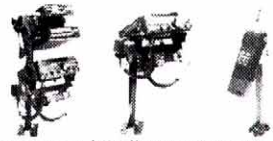

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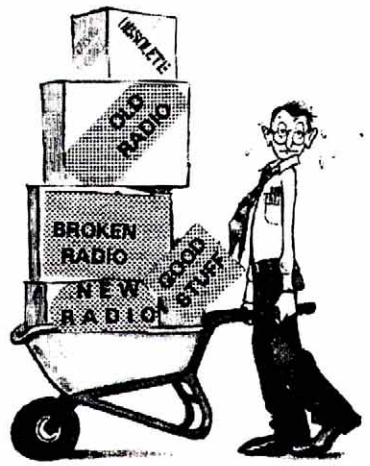

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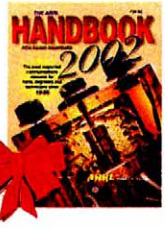

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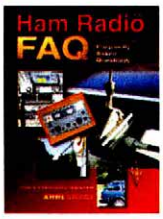

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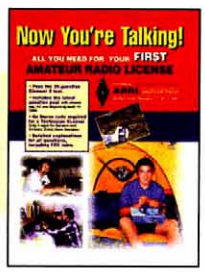

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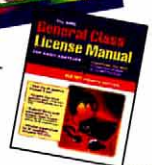

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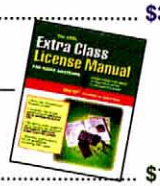

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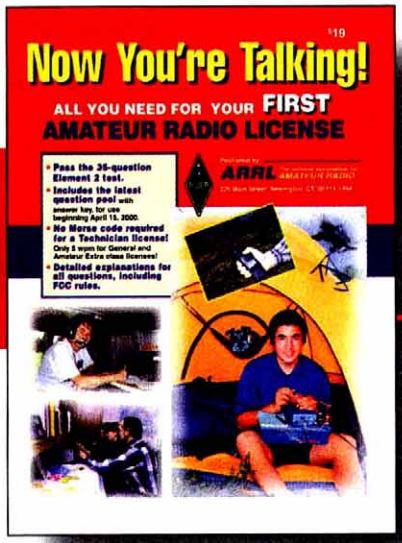

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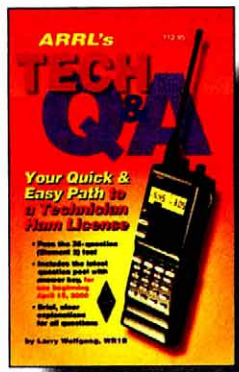

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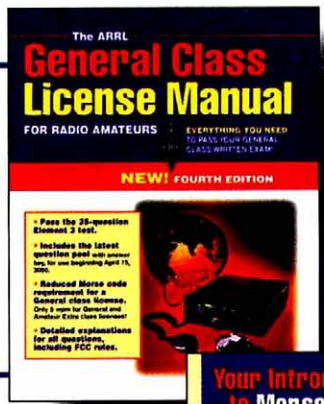

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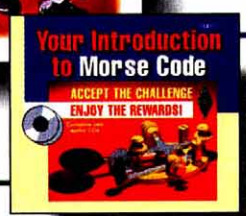

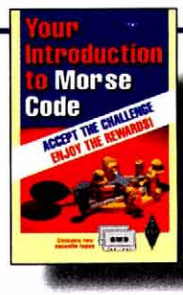

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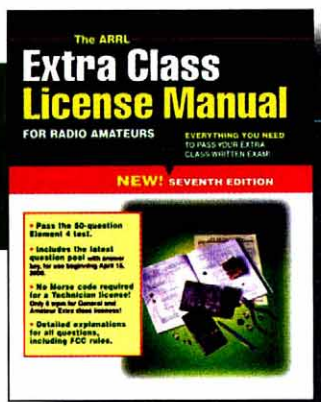

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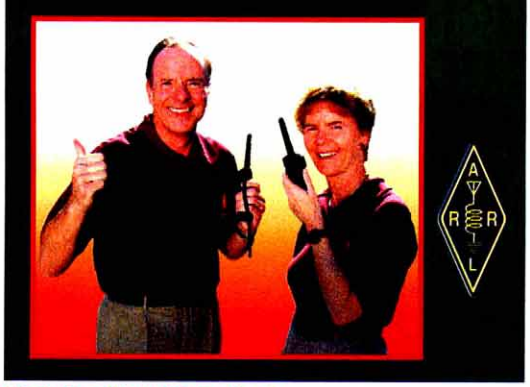

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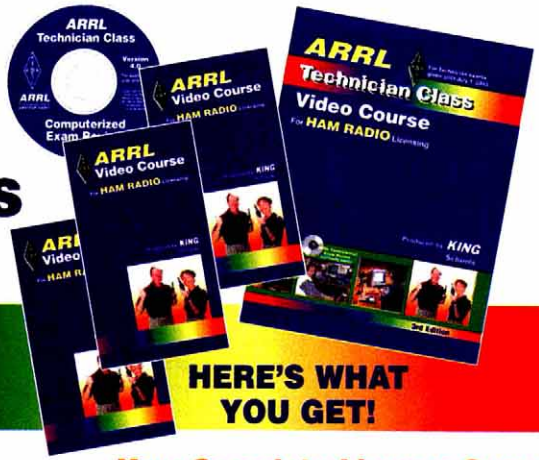

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1. Publication Title	2. Publication Number	3. Filing Date
QST	0 0 3 3 - 4 8 1 2	September 25, 2001
4. Issue Frequency	**5. Number of Issues Published Annually**	**6. Annual Subscription Price**
Monthly	12	$39.00

7. Complete Mailing Address of Known Office of Publication *(Not printer) (Street, city, county, state, and ZIP+4)*
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T200-96	96', 15 square feet	$2049
T300-88	88', 22 square feet	$1989
T400-80	80', 34 square feet	$1939
T500-72	72', 45 square feet	$1879
T600-64	64', 60 square feet	$1799

Many more Trylon towers in stock!

BENCHER / BUTTERNUT

Skyhawk, Triband Beam	$1129
HF2V, 2 Band Vertical	$219
HF5B, 5 Band Minibeam	$429
HF6VX, 6 Band Vertical	$299
HF9VX, 9 Band Vertical	$349
A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$129
RMKII, Roof Mount Kit	$159
STRII, Roof Radial Kit	$125
TBR160S, 160m Kit	$119

More Bencher/Butternut–call

M2 VHF/UHF ANTENNAS

144–148 MHz

2M4/2M7/2M9	$89/109/119
2M12/2M5WL	$149/189
2M5-440XP, 2m/70cm	$159

420–450 MHz

440-470-5W/420-450-11	$129/89
432-9WL/432-13WL	$169/219
440-18/440-21ATV	$119/139

Satellite Antennas

2MCP14/2MCP22	$169/219
436CP30/436CP42UG	$219/259

ROHN TOWER

25G	$89
45G	$189
55G	$239
25AG2/3/4	$109/109/139
45AG2/4	$209/225
AS25G/AS455G	$39/89
GA25GD/45/55	$68/89/115
GAR30/GAS604	$35/24
SB25G/45/55	$39/89/109
TB3/TB4	$85/99

Please call for more Rohn prices

US TOWER

MA40/MA550	$849/1399
MA770/MA850	$2359/3649
TMM433SS/HD	$1139/1379
TMM541SS	$1499
TX438/TX455	$979/1599
TX472/TX489	$2459/4579
HDX538/HDX555	$1269/2269
HDX572MDPL	$5899

Please call for help selecting a US Tower for your needs. Shipped factory direct to save you money!

COMET ANTENNAS

GP15, 6m/2m/70cm Vertical	$149
GP6, 2m/70cm Vertical	$139
GP9, 2m/70cm Vertical	$179
B10NMO, 2m/70cm Mobile	$36
B20NMO, 2m/70cm Mobile	$49
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$49
SBB7NMO, 2m/70cm Mobile	$75
Z750, 2m/70cm Mobile	$55
Z780, 2m/70cm Mobile	$69

Much more Comet in stock–call

M2 ANTENNAS

50–54 MHz

6M5X/6M7JHV	$199/239
6M2WLC/6M2.5WLC	$419/449

10/12/15/17/20m HF

10M4DX, 4 Element 10m	$379
12M4DX, 4 Element 12m	$379
15M4DX, 4 Element 15m	$419
17M3DX, 3 Element 17m	$379
20M4DX, 4 Element 20m	$499

More M2 models in stock–please call

GLEN MARTIN ENGINEERING

Hazer Elevators for 25G

H2, Aluminum Hazer, 12 sq ft	$359
H3, Aluminum Hazer, 8 sq ft	$269
H4, HD Steel Hazer, 16 sq ft	$339

Aluminum Roof Towers

RT424, 4 Foot, 6 sq ft	$159
RT832, 8 Foot, 8 sq ft	$229
RT936, 9 Foot, 18 sq ft	$389
RT1832, 17 Foot, 12 sq ft	$499

Please call for Glen Martin info

UNIVERSAL ALUMINUM TOWERS

4-40'/50'/60'	$569/809/1149
7-50'/60'/70'	$1039/1509/1969
9-40'/50'/60'	$799/1149/1619
12-30'/40'	$609/959
15-40'/50'	$1069/1529
23-30'/40'	$949/1419
35-30'/40'	$1069/1659

Bold in part number shows wind-load capacity. Please call for more Universal models. All are shipped factory direct to save you money!

DIAMOND ANTENNAS

D130J/DPGH62	$79/139
F22A/F23A	$89/119
NR72BNMO/NR73BNMO	$39/54
NR770HBNMO/NR770RA	$55/49
X200A/X3200A	$129/210
X500HNA/700HNA	$229/369
X510MA/510NA	$189/189
X50A/V2000A	$99/149
CR627B/SG2000HD	$99/79
SG7500NMO/SG7900A	$75/112

More Diamond antennas in stock

MFJ ANTENNAS

259B, Antenna Analyzer	$219
269, Antenna Analyzer	$299
941E, 300W Antenna Tuner	$109
945E, 300W Antenna Tuner	$99
949E, 300W Antenna Tuner	$139
969, 300W Antenna Tuner	$169
986, 3kW Antenna Tuner	$289
989C, 3kW Antenna Tuner	$309
1798, 80–2m Vertical	$239
1796, 40/20/15/10/6/2m Vert.	$179

Big MFJ inventory–please call

COAX CABLE

RG-213/U, (#8267 Equiv.)	$.36/ft
RG-8X, Mini RG-8 Foam	$.19/ft
RG-213/U Jumpers	Please Call
RG-8X Jumpers	Please Call

Please call for more coax/connectors

TIMES MICROWAVE LMR® COAX

LMR-400	$.59/ft
LMR-400 Ultraflex	$.89/ft
LMR-600	$1.19/ft
LMR600 Ultraflex	$1.95/ft

TOWER HARDWARE

3/8"EE / EJ Turnbuckle	$11/12
1/2"x9"EE / EJ Turnbuckle	$16/17
1/2"x12"EE / EJ Turnbuckle	$18/19
3/16" / 1/4" Preformed Grips	$5/6

Please call for more hardware items

HIGH CARBON STEEL MASTS

5 FT x .12" / 5 FT x .18"	$35/59
11 FT x .12" / 10 FT x .18"	$80/125
15 FT x .12" / 16 FT x .18"	$105/185
17 FT x .25	$267
23 FT x .12" / 21 FT x .18"	$155/235

GAP ANTENNAS

Challenger DX	$289
Challenger Counterpoise	$29
Challenger Guy Kit	$19
Eagle DX	$299
Eagle Guy Kit	$29
Titan DX	$329
Titan Guy Kit	$29
Voyager DX	$409
Voyager Counterpoise	$49
Voyager Guy Kit	$45

Please Call for Delivery Information

LAKEVIEW HAMSTICKS

9106 ... 6m	9115 ... 15m	9130 ... 30m
9110 ... 10m	9117 ... 17m	9140 ... 40m
9112 ... 12m	9120 ... 20m	9175 ... 75m

All handle 600W, 7' approximate length, 2:1 typical VSWR ... $24.95

HUSTLER ANTENNAS

4BTV/5BTV/6BTV	$149/189/209
G6-270R, 2m/70cm Vertical	$169
G6-144B/G7-144B	$129/179

Hustler Resonators in stock–call

ANTENNA ROTATORS

M2 OR-2800P	$1219
Yaesu G-450A	$249
Yaesu G-800SA/DXA	$329/409
Yaesu G-1000DXA	$499
Yaesu G-2800SDX	$1089
Yaesu G-550/G-5500	$299/599

ROTATOR CABLE

R62 (6, #18)	$.32/ft.
R81/82	$.25/.39
R83/R84	$.52/.85/ft

PHILYSTRAN GUY CABLE

HPTG1200I	$.45/ft
HPTG2100I	$.59/ft
PLP2738 Big Grip (2100)	$6.00
HPTG4000I	$.89/ft
PLP2739 Big Grip (4000)	$8.50
HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$12.00
HPTG11200	$1.69/ft
PLP2558 Big Grip (11200)	$18.00

Please call for more info or help selecting the Phillystran size you need.

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IC-775 DSP.. New Lower Price!

The Icom IC-775DSP is a competition class HF transceiver featuring 200 watt RF output, digital signal processing, automatic antenna tuner, true dual RX, CW memory keyer, CTCSS tone encode, twin pass band tuning, dual antenna inputs, 101 memory chanels, built-in power supply, and much more. Supplied with AC power cord.

PW-1 ..... New Lower Price!

The Icom PW-1 is a 1000 watt solid state linear amplifier for HF and 6m operation, featuring a high power automatic antenna tuner, built-in power supply, and a removable front control panel, and more.

IC-746 ..... Icom Special!

The Icom IC-746 is an all mode transceiver covering HF/6m/2m. The radio features digital signal processing, 100 watt RF output on all bands, twin PBT, a 4.9"multifunction LCD display with band scope, automatic antenna tuner, and more. Supplied with a hand mic and DC power cord.

IC-756PRO ..... New!

The Icom IC-756 PRO is an all mode HF/6m transceiver featuring DSP, automatic antenna tuner, 100 watts RF output, digital twin PBT, a 5" multifunction LCD display with band scope function, and more. Supplied with hand mic and DC power cord.

FT-1000MP Mark-V ..... New!

The Yaesu FT-1000MP Mark-V is a competition class HF DSP transceiver with auto tuner, 200 Watts RF output, and more!

FTV-1000 ..... New!

6m transverter for the FT1000MP-Mark V.

FT-1000D ..... In Stock!

The FT-1000D is a competition class HF XCVR featuring true dual RX, automatic tuner, 200 watts RF output, and more.

Quadra System ... Lower Price!

Solid state 1 kW autotuning amplifier.

FT-847 ..... Yaesu Special!

The Yaesu FT-847 is an all mode transceiver covering HF/6m/2m/70cm! The radio is perfect for satellite operation, and features digital signal processing, built-in RS-232 interface, tone encode/decode, and more. Supplied with an up/down microphone and DC power cord.

FT-920 ..... Yaesu Special!

The Yaesu FT-920 is an all mode HF/6m transceiver featuring digital signal processing, automatic antenna tuner, CW memory keyer, CTCSS tone encode/decode, 127 memories, and more. Supplied with up/down hand mic and DC power cord.

IC-706MK2G ..... Icom Special!

The Icom IC-706MK2G is a compact HF/6m/2m/70cm all mode transceiver with digital signal processing, automatic repeater offset, built-in CW keyer, built-in CTCSS tone encode/decode/scan, 107 memory channels and more. A detachable front panel offers convenient mounting, even in compact vehicles.

IC-718 ..... New Lower Price!

The Icom IC-718 is an all mode HF transceiver featuring a front panel mounted speaker, IF shift, optional DSP module, multiple scanning modes, noise blanker, RIT, and more.

IC-2800H.... New Lower Price!

The Icom IC-2800H is a 2m/70cm dual band mobile FM transceiver with a 3" color TFT display. The radio features a separate control face, video input, bandscope display, 9600 bps Packet jack, CTCSS tone encode/decode/scan, 232 memories, cross band duplex, and more. With DTMF hand mic, mounting brackets, and power cord.

IC-2100H ..... Great Low Price!

The IC-2100H is a rugged 2m mobile XCVR with CTCSS tone encode/decode/scan, DTMF paging/squelch, 113 memory channels, switchable display color and more.

FT-90R ..... New!

New ultra-compact 2m/70cm dual band mobile transceiver with detachable control panel, and huge extended RX range.

FT-2600M .. New Lower Price!

Rugged 2m mobile with intermod-proof receiver, big display, and an illuminated DTMF mic. Built to MIL-STD 810.

FT-7100M ..... New Lower Price!

Great 2m/70cm dual band mobile, 45/35 Watts, removable front panel, and more!

FT-100D ..... New!

Ultra-compact all mode XCVR for HF/6m/2m/70cm.Features DSP, CW memory keyer, tone encode/decode, 200 memories, VOX, and more. Supplied with a DTMF hand mic, DC power cord and mounting bracket.

FT-817 ..... Now In Stock!

A truly tiny self-contained all mode HF/6m/2m/70cm QRP XCVR featuring DSP, tone encode/decode, 200 memories, VOX, and more! With hand mic, DC cord and bracket.

IC-W32A ..... New Lower Price!
IC-Q7A ..... Icom Special!
IC-T7H ..... Icom Special!
IC-T81A ..... New QuadBand HT!
IC-T2H ..... Amazing Low Price!
IV-V8 ..... New, Please Call!

IC-207H ..... Great Low Price!

The Icom IC-207H is a 2m/70cm dual band mobile transceiver featuring CTCSS tone encode/decode, 182 memory channels, removable front control panel, and more. Supplied with a back-lit DTMF hand mic, mounting bracket, and a DC power cord.

IC-PCR1000 ..... Icom Special!
IC-R8500 ..... In Stock!
IC-R75 ..... New, In Stock!
IC-R2 ..... In Stock!
IC-R10 ..... Icom Special!
IC-R3 ..... Video RX, In Stock!

G-2800DXA $1089

Heavy duty antenna rotator handles 34 sq. ft. of antenna load, and features 450° rotation, preset and variable speed.

G-1000DXA $499
G-800SA/DXA $329/409
G-450A $249
G-5500 ..... $599
G-550 ..... $299

VX-5R ..... In Stock!

Tiny 6m/2m/70cm triband HT, with CTCSS tone encode/decode/scan, high capacity Lithium-Ion battery pack, extended RX with AM/FM and FW Wide modes, and more.

FT-50RD ..... Yaesu Special!
VX-1R ..... Yaesu Special!

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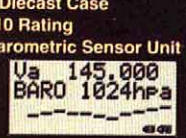
HEAVY DUTY FM TRANSCEIVER
VX-5RS
(Silver version)

50/144/430 MHz TRIPLE-BAND
HEAVY DUTY FM TRANSCEIVER
VX-5R
(Black version)

Features

- Ultra Compact: 2.4" x 4.1" x 1.3"
- Aluminum Diecast Case
- MIL-STD 810 Rating
- Optional Barometric Sensor Unit



- Frequency Coverage
  Wide Band Receive
  RX : 0.5-15.995 MHz 48-728.990 MHz
  800-998.990 MHz (Cellular Blocked)
  TX : 50-54 MHz 144-148 MHz
  430-450 MHz
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- AM Aircraft Receive
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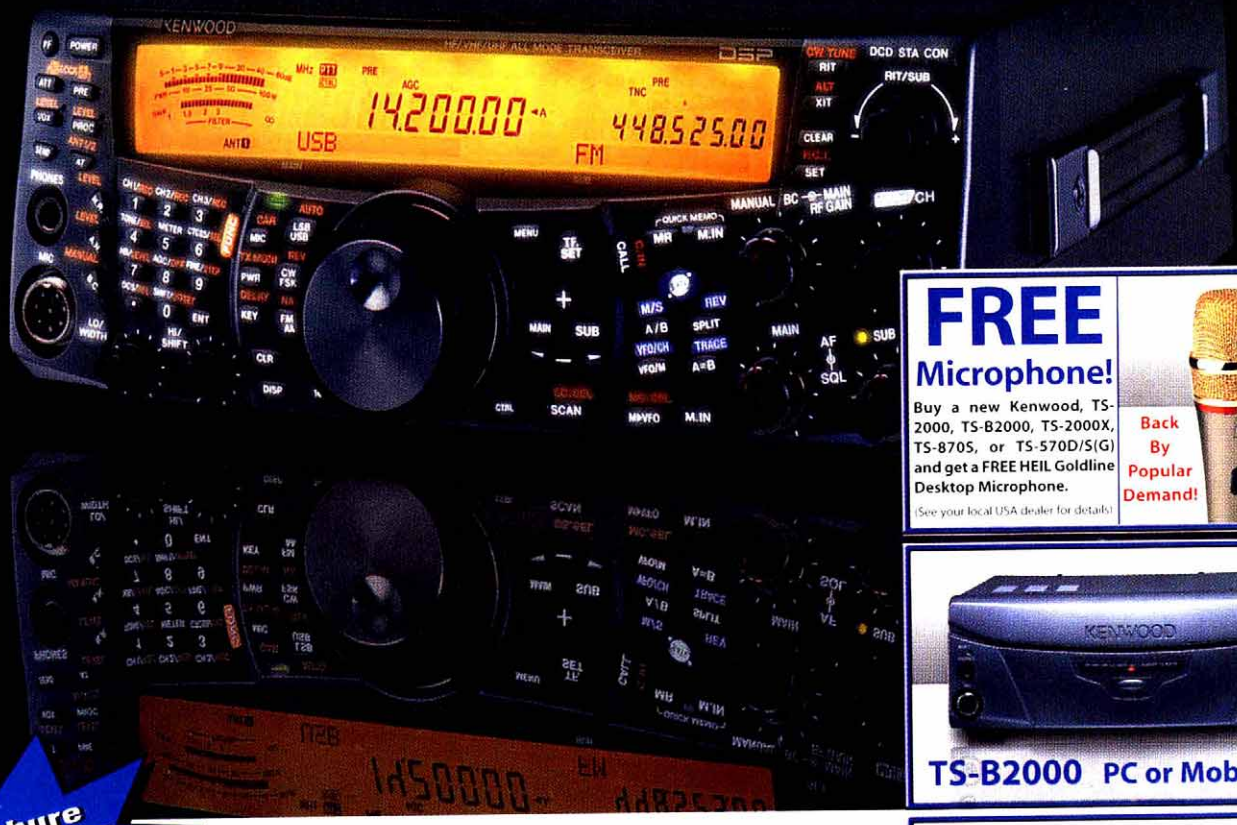

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The all new Kenwood **TS-2000** series transceiver offers today's demanding Amateur operator high performance operation without the compromising limitations found in other similar multi-band, multi-mode transceivers. The **TS-2000** offers three distinct operation platforms, the traditional transceiver with full functio front panel, or the high-tech looking "silver box" version that allows mobile operation with the new **RC-2000** compact control head, or th ARCP-2000 computer control program making the **TS-B2000** functional from your personal computer. The new **TS-2000** offers 100 watts on H 6 meters and 2 meters, 50 watts on 70cm. **TS-2000X** will also include 1.2GHz. (available March 2001) You will be happy to know the **TS-2000** transverter frequency display function ready to work the latest satellite frequencies available.

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

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