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December 2001

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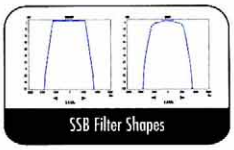
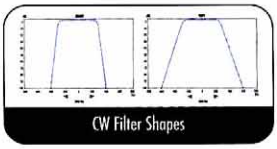

SSB Filter Shapes


CW Filter Shapes

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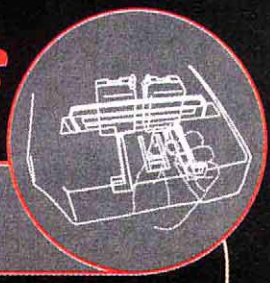

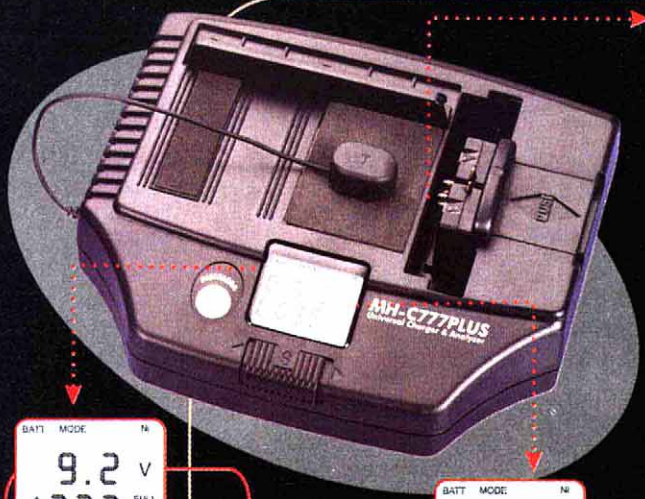

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Sample LCD read out during charging. Shows current voltage, time, and charging capacity

Sample LCD read out during discharging, showing current voltage, time, and discharging capacity.

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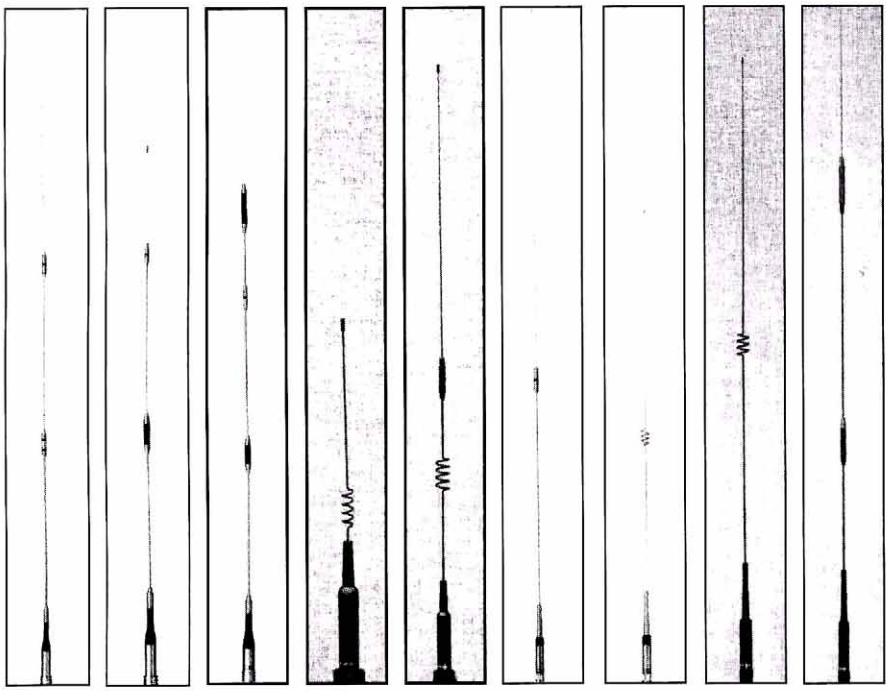

SG2000HD | SG7500A SG7500NMO | SG7900A | NR72BNMO | NR73BNMO | NR2C | NR770HA NR770HB | NR770HNMO NR770HBNMO | CR627B CR627BNMO

HV7A Mobile Antenna System

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

Optional Loading Coils

HVC7	40m
HVC14	20m
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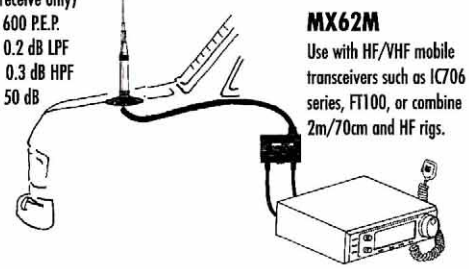
Recommended Antenna Mounts: K400C or K600M

MX62M Duplexer
Specifications:
HF/6m & 2m/70cm bands
1.6-56 MHz LPF
76–470 MHz HPF
(76–120 receive only)

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

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

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



MX62M
Use with HF/VHF mobile transceivers such as IC706 series, FT100, or combine 2m/70cm and HF rigs.

SPECIAL FEATURES:

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- 24 Kt gold plated connector pin
- No grounding required unless noted
- Fold-over feature on most models

FOLD-OVER

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

MODEL	BAND (MHz)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
NR72BNMO*[6]	2m/70cm	100	NMO	13.8	1/4λ, 1/2λ
NR73BNMO	2m/70cm	100	NMO	33.5	1/2λ, 1-5/8λ
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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QST Workbench

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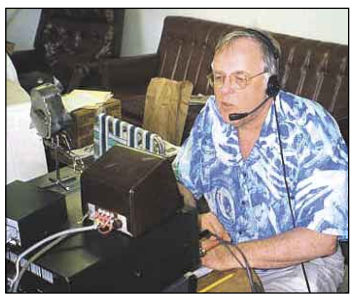

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Our Cover:
Greetings of the Season and Peace on Earth to all!

Operating

Departments

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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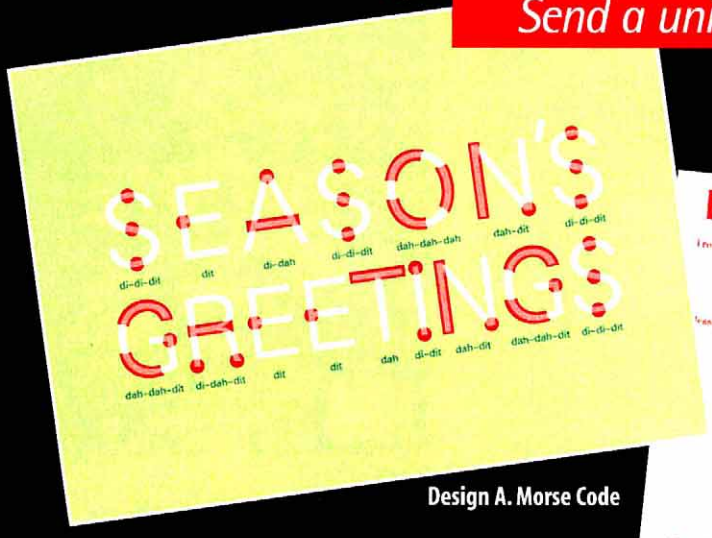
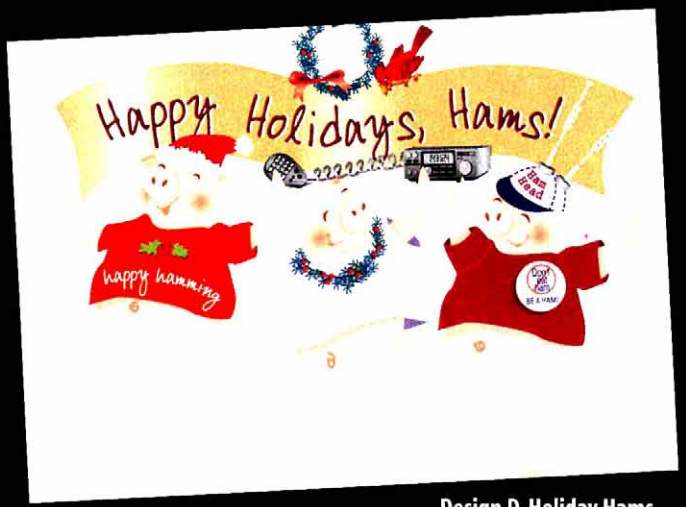


Design A. Morse Code

Reverse side for all cards

Design B. Radio Rudolph

Design C. Mobile Santa



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[1] Note that certain frequencies are unavailable. [2] 5W output

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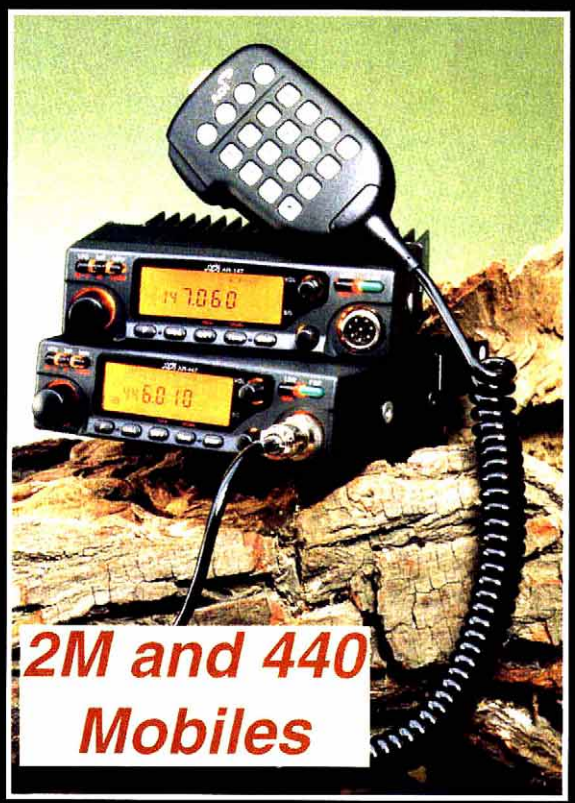

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"IT SEEMS TO US..."

Unlicensed to Kill

Every so often we are forced to use page 9 to issue a "call to arms" to ARRL members to defend amateur spectrum. This is one of those times. We face a grave threat that could kill much of the usefulness of the 70-cm amateur band. Here's the story.

A few years ago Congress required the FCC to conduct a "biennial review" of some of its rules to determine whether they should be modified or eliminated. The FCC decided to go even farther and reviewed them all, not just those parts mandated by Congress. Included in the FCC's non-mandatory review was Part 15, governing unlicensed devices that emit RF energy. Part 15 covers a wide range of emitters, from devices that are not intended to emit RF energy such as computers and receivers to short-range communications devices such as garage-door openers and cordless telephones.

In January 2001 the FCC released an "Updated Staff Report" that recommended, among other things, consideration of several modest changes in the Part 15 rules—for example, removing a prohibition on data transmissions by certain remote control devices. These do not pose much of an interference threat to licensed services because they are operated infrequently and the rules require their transmissions to be short. Also recommended was a review of the emission standards above 2 GHz, a timely suggestion in view of the rapid growth in the use of this spectrum by both licensed and unlicensed devices. So far so good.

In October 2001 the FCC adopted and released a Notice of Proposed Rule Making (NPRM), OET Docket No. 01-278, to implement the staff recommendations—and more besides. If the NPRM had stopped with the staff recommendations we would not be sounding the alarm. Unfortunately, grafted onto the document are two proposals for far more radical changes to Part 15, at least one of which should never have seen the light of day in its present form. It represents a grave threat to amateur operation in the 425-435 MHz band.

In November 2000 SAVI Technology, Inc. filed a petition, RM-10051, seeking to legitimize a product that it had already developed, inappropriately, for operation on 433.9 MHz. Let's be clear about this: there is *no technical justification whatsoever* for the selection of that frequency. Its selection results *only* from the fact that 433.92 MHz ± 870 kHz is designated for industrial, scientific and medical (ISM) applications in ten European countries (half of them being the former Yugoslavia and one of the other five being Liechtenstein). Because licensed radiocommunication services must tolerate a certain amount of interference in the so-called ISM bands, it is not unusual for these bands to be designated for use by unlicensed devices with power levels and duty cycles that would be inappropriate elsewhere. So it has come to pass that unlicensed devices have sprung up on 433.92 MHz, with or without regulatory authorization. This has caused nightmares for our amateur colleagues in Europe and Australia and has led numerous administrations to prohibit unlicensed devices with high duty cycles from operating on this frequency.

The product that SAVI wants to legitimize is an RF identification (RFID) tag. There is certainly nothing wrong with the concept; it is easy to see why shipping and warehousing operations would like to identify the contents of a container simply by "reading" such a tag. Had SAVI's designers (dare we say they lacked savvy?) chosen a more appropriate frequency we might have devoted this page to the 80th anniversary of the first successful amateur transatlantic transmissions. Had the FCC staff considered our well-reasoned opposition to the SAVI petition you might be reading here about the 40th anniversary of the first amateur satellite. Instead, we must ask you to join the battle against this potential disruption of the 70-cm band.

How serious is the interference potential? The proposed rules would permit an average field strength of 11,000 microvolts per meter measured at 3 meters, for continuous periods of two minutes. In the event of a transmission error a retransmission could be initiated immediately; otherwise a silent period of at least 10 seconds would be required. As a practical matter that amounts to continuous operation of a device that could obliterate weak-signal receivers a mile away and cause significant interference to amateur television, FM, and other modes. Among the supporters of the SAVI petition is UPS. Picture RFID in every brown panel truck in the country; nothing in the proposed rules would prevent it.

It's true that in the event of harmful interference to a licensed station the operator of a Part 15 device is required to eliminate the interference, including ceasing operation if that is the only remedy. However, this presupposes that the source of the interference can be easily located and the operator of the offending device understands this obligation.

In the FCC's own words taken from the NPRM, "The limits are intended to minimize the possibility of unlicensed Part 15 devices causing interference to licensed radio services." The proposal to permit RFID tags in the 70-cm amateur band clearly fails to meet this standard.

If you care about this band here's what you must do. (1) Read the original SAVI petition. (2) Read the ARRL opposition. (3) Read the relevant parts of the NPRM in ET Docket 01-278. All three documents can be found at **www.arrl.org/news/bandthreat/**. (4) File comments opposing the addition of proposed Section 15.240 by following the instructions in paragraphs 51-54 of the NPRM.

And (5) Be as generous as you can in supporting the ARRL Fund for the Defense of Amateur Radio Frequencies. A request was just mailed and should reach every member in the United States about the same time as this issue of *QST*. If you prefer, visit **www.arrl.org/defense** to make your gift.

The mailing was prepared before the FCC released this NPRM, so its focus is on WRC-03. The NPRM is an unfortunate reminder—as if we needed one right now—that defense also requires action closer to home.
—*David Sumner, K1ZZ*

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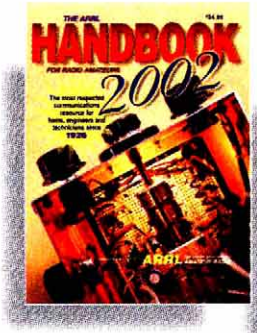

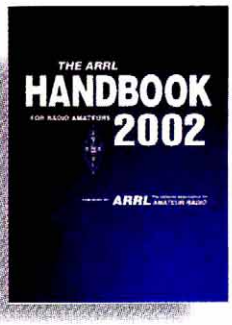

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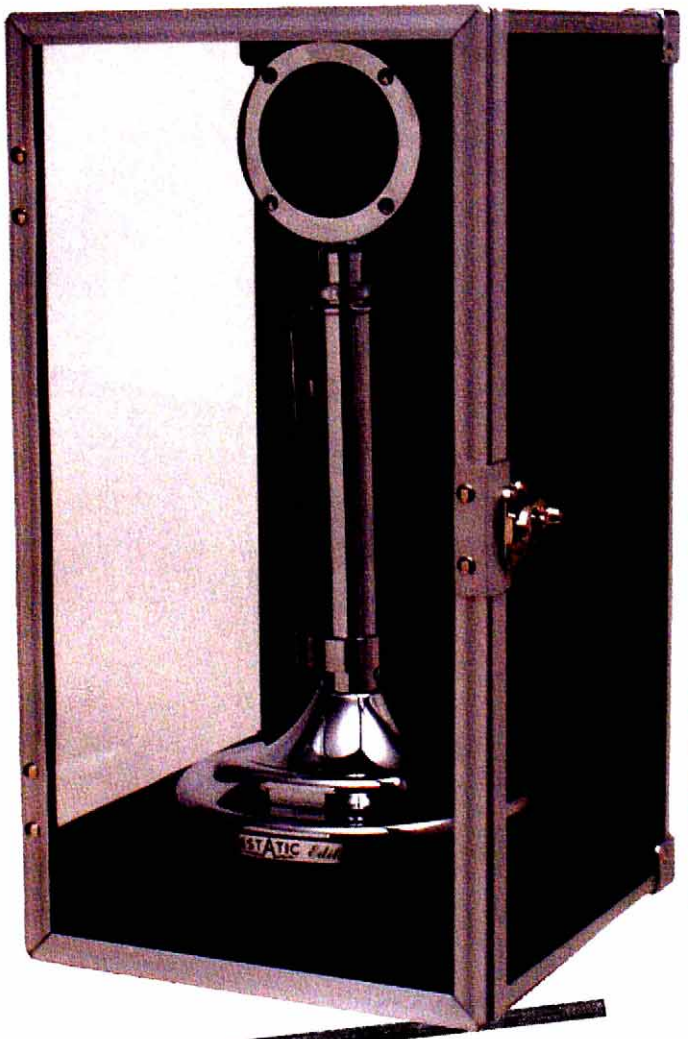

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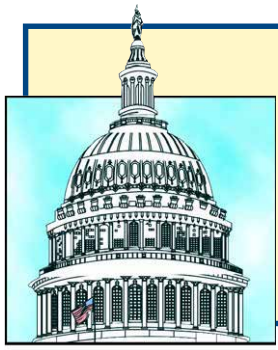

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By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs

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.

Terrorism Bugs Capitol Hill

Terrorism, which had earlier reared its ugly head at New York's World Trade Center and just across the Potomac River from our nation's capital at the Pentagon, a month later struck Capitol Hill in a germ attack that may set all legislative activity back a year or more. The discovery of anthrax spores in the incoming mail of Senate Majority Leader Tom Daschle brought the wheels of the Senate to a grinding halt, and while that train of government was coming to a stop, Speaker of the House Dennis Hastert heard about the bugs across the Hill on the Senate side and pulled the plug on House operations until the three buildings that shelter House operations could be "swept." Not long afterward, the entire Senate side of Capitol Hill also took a mid-autumn break to ensure that the hundreds of young men and women who work there would be safe from contamination by what had actually proven to be anthrax spores, presumably from a mailed package. ARRL staff on the Hill that day visiting Representatives and Senators narrowly avoided a meeting in the suddenly contaminated area by luckily arriving *after* the area had been cordoned off.

As we went to press, there was no word on how quickly the House and Senate would finish up their business. The top priority legislation involved the thirteen appropriations bills, and as we went to press, only three of those had made it through the process. In addition, the issue of domestic terrorism had moved high up on the agenda as the result of recent events. However, it is a safe bet that work on most other types of legislation will slow substantially until possibly being revived during the 108th Congress. That a primary focus will remain on the causes of terrorism, and the adequacy of US responses to it, depends largely upon newspaper headlines. The new, 108th Congress convenes some time after the November elections and probably has begun forming as you read this.

Technology National Guard Proposed

• The press has frequently speculated that, although public evidence is far from clear, the latest outbreaks of computer viruses, worms, Trojan horses and other nasties that have crippled the Internet temporarily might have been acts of terrorism and a preview of things to come.

And that very possibility has caught the attention of many on The Hill. Just recently, for example, Senator Ron Wyden of Oregon has proposed what he says is "essentially a technology equivalent of the National Guard that could be mobilized when the nation's technological infrastructure was plagued by such events.

Wyden calls the concept "a national volunteer organization of trained and well-coordinated units of information technology professionals from our leading technology companies [that] ought to be in a position to stand at ready with the designated computer equipment, satellite dishes, wireless communicators and other equipment to quickly recreate and repair compromised communications and technology infrastructure."

The idea, which is said to have originated with a computer expert in New York, would apply to the nation's telephonic, Internet and wireless communications, and Wyden had dubbed it the NET Guard (for National Emergency Technology Guard). It is by no means universally popular among hams (see Op Ed, this issue, page 91). However, the role for Amateur Radio in all of this has not yet been sorted out.

"Demilitarized Equipment" Rumor Mill Spins, Nowhere To Go

♦ If the intention of terrorism is to spin-up the rumor mill, the events of the last few months succeeded in spawning one of the more interesting (and confusing rumors) about Amateur Radio. Reminiscent of the sort of rumors that inevitably seem to be born around the time of any military conflict, ARRL has heard the same concern from a number of hams who've become aware of a provision in the huge Department of Defense Appropriations Bill (S.1438).

The provision, Sec. 1062, that concerns them and a large number of firearm enthusiasts, creates government authority to "ensure demilitarization of significant military equipment." This provision, lamented on Web sites around the country, requires anybody who possesses "significant military equipment formerly owned by the Department of Defense" either to have it "demilitarized" or to return it to the government for demilitarization. Email has been buzzing with hams and firearms collectors wondering if the provision would affect their hobbies. While we cannot speak reliably for the issue of firearms, we did contact one of the top lawyers for the Senate Committee on Armed Forces, where the provision was added to the bill, and he ensured us that, unless a ham has custody of some kind of top secret and highly sophisticated military radio gear ("and I can't imagine what that would be," he conceded), the definition of "significant" derives specifically from the Arms Export Control Act (22 U.S.C. 2778) and that, in turn, is intended to provide "control of arms exports and imports." In other words, it does not refer to radios, but rather to

large shipments of large military ordinance like missile guidance systems and rocket launchers. Our contact on the Committee assured us that Senate discussion around this provision only referred to major weapons systems of the sort that might need to be monitored by the Defense Department, or the Arms Control and Disarmament Agency. This is neatly summarized in the committee report 107-62, pp 350-351. A "committee report" is the committee's interpretation of what they mean by each provision of a law.

The text of federal legislation may be found at: **thomas.loc.gov/home/thomas.html**.

ARRL will continue to monitor the issue to ensure that no "normal" military surplus radio gear is covered by the legislation.

Media Hits

Amateur Radio participation in the relief efforts following the attack on the World Trade Center Towers and the Pentagon was among the most widely disseminated Amateur Radio stories in the days and weeks following the early September attack. Here is just a quick selection of stories culled from the national news media to give you a hint that ham efforts were not ignored by reporters!

• Attorney Bart Lee, KV6LEE, of San Francisco, was in New York on business at the time of the Trade Center attack and volunteered some of his days assisting with emergency communication. The story was picked up by the *Santa Barbara News Press* included many aspects of the organization of Amateur Radio emergency communication.

• An article in New York's *Newsday* about how children have responded to the September 11 events featured anecdotes such as the story of 10 year old Beverly Holtz, KC2IKT of Huntington Station, New York, who operated the Amateur Radio link at the American Red Cross shelter in Valley Stream, Long Island, for travelers who became stranded while Kennedy Airport was shut down. Beverly's proud father is Fred Holtz, K2PSY.

• An article in the Lady Lake (FL) *Daily Sun* highlighted the boundary-less nature of Amateur Radio and how being able to talk with people all over the country can be useful for emergency communication. The article featured extensive comments from local resident Jim Johanson, K2SCU, of The Villages.

• A writer in the Parsippany (NJ) *Daily Record* wrote very proudly about his state's Amateur Radio contribution to the search and rescue effort in lower Manhattan after the World Trade Center disaster. While the article named no hams in particular, it did feature how local emergency authorities were able to utilize significant numbers of hams to handle communication between, relief shelters, police, fire and emergency organizations. Interviewed were largely county emergency authorities who gave substantial credit to local hams.

• *The Daily Gazette*, of Schenectady, New York, showcased local hams who put in 12 to 16 hour days to coordinate radio communication among Red Cross shelters in Manhattan. Dennis Hudson, N2LBT, took the lead with a large color photo at the top of the article. Hudson noted that about a dozen hams from the area pitched in. Mentioned by name were Raleigh Keeter, K2RI, Russell Greenman, WB2LXC, Bob Rivenburgh, W2RCR, Bob Rivenburgh Jr., KB2SWS, Thomas Walker, KC2GAT, Dave Pizzino, WB2EAR, Rob Leiden, KR2L and Joseph Tomasone, AB2M. Tampa-based Tomasone managed a "registration" page on the Web for hams wishing to get involved.

• A story in the *Loudoun Times-Mirror*, of Leesburg, Virginia promotes the efforts of the Loudoun Amateur Radio League (LARL) in its drive to collect blood for victims of terrorist attacks. In addition to noting how hams are helping out locally, the story discusses their unique emergency communication capability.

• The Radio Amateur Civil Emergency Services (RACES) set up a "health and welfare" traffic operation in Rockville, Maryland to let local residents try to send messages to friends and loved ones in New York City after September 11. The story, which appeared in the Frederick, Maryland *The News*, noted participating operations members in the city would then try to contact the intended recipient.

• On the morning of September 11, Bill Nesbitt, KG0ZI, of North Grand Junction, Colorado, took a break from the TV, turned on his radio, and happened to meet Victor Carnuccio, KD2HE, in New York City. Bill learned that Victor lived only a mile from the World Trade Center and had witnessed the horrific events that morning and he shared his experience with Bill. An article about their ham radio connection ran on September 12 in *The Daily Sentinel* out of Grand Junction.

• Richard Krajewski, WB2CRD, of Jersey City, New Jersey, was said by the *Jersey City Reporter* to have helped pump some new life into the Jersey City Amateur Radio Club when the group got the call from the Red Cross on September 11. Rich, along with club members John Hunter, KE2ZZ, Stanley Daniels, KB2FY, and Mike Janeczko, set up a station at the Red Cross building in Jersey City and were involved with passing emergency traffic to New York City and taking part in local emergency nets. The article covered the group's activities in this emergency and other aspects of Amateur Radio as well.

• *The Morning Call* of Allentown, Pennsylvania, did a nice feature story on the Delaware-Lehigh Amateur Radio Club and that group's efforts after the terrorist attacks. Club members spent 48 hours in New York assisting the Red Cross with emergency communications. Club members mentioned in the article were: Dick Dech, KA3MOU, Barry Vogt, N3NVA, Bruce Bobo, Jr., KB3FIH, Mike Stanton, N3OUC, Bob Puharic, WF3H, Cliff Wagoner, W3ZL, Don Jennings, K6QDT, and Jeff and Chris Kelly, N3MFT and N3RPV.

• Joseph Heck, K1LBG, of Wrentham, Massachusetts, was interviewed by *The Sun Chronicle* for an article on what he and eight other hams from Massachusetts, Rhode Island and New Hampshire were able to do for the Red Cross in New York City. This dedicated group helped with shelter communications and performed other emergency communications services as needed. Rick Myers, KB1FLR, of Plainville, Massachusetts, and Stephen Schwarm, W3EVE, of Wrentham were also mentioned in the article.

• *The Winston-Salem (NC) Journal* ran a lengthy feature piece on communications after the terrorist attacks, focusing on the human need to reach friends and loved ones during times of disaster. The article called ham radio operators a "reliable and enduring source of communication." The piece featured four hams in North Carolina who were on the air waiting to pass messages or assist in any way needed. Woody Kinney, KF4PLQ, president of the Forsyth Amateur Radio club was interviewed, as was local ARES coordinator Jim Mansfield, WA4NOT, Ken Hoglund, KG4FGC, and Raymond Taber, KG4NTC.

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Real innovation in a multi-mode VHF transceiver was long overdue. Introducing the Ten-Tec model 526 "6N2" VHF transceiver. Amateur radios' first IF-DSP multi-mode VHF rig. For a long time, there have been no affordable choices for either 6 or 2 meters in a single band VHF multi-mode transceiver. Active hams planted the idea with us - why not offer a single rig that has BOTH 6 and 2 meters, without sacrificing performance? Multi-mode HF/VHF rigs have been around for years, at over a thousand dollars and with compromised performance on the VHF bands at best. The "6N2" provides serious multi-mode VHF performance in a small, take-anywhere package at a significantly lower price than HF/VHF multi-mode transceivers. Why buy another HF rig to get VHF coverage, when you already own one?

Ten-Tec's years of experience designing DSP radio equipment for amateur, commercial, and military applications comes together to deliver a VHF multi-mode transceiver to meet performance demands of weaker signal VHF operators. Let's take a look:

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- 35 IF-DSP bandwidth filters are built in. No extra filtering to buy! Instantly select the best one for band conditions with the twist of a knob.
- Can be used as your main 2-meter FM rig. 100 memories, repeater splits, CTCSS tone encode are all built in. Memories will retain mode, tone, and split information. You can even program (and scan!) memories for different modes. Memory lockout function allows skipping constantly busy channels while scanning.
- Two SO-239 antenna connectors, one per band, allow you to leave antennas for both 6 and 2 meters connected. Separate amp keying lines allow connection of separate linear amplifiers for each band.
- 20 watts output power, front panel knob adjustable. Front panel meter does double duty as S-meter on receive and power output meter on transmit.
- Separate low level drive connection from 144 MHz for UHF and microwave transverters.
- All-mode squelch useful for FM repeaters or for quiet monitoring of SSB calling frequencies. Never miss a band opening again!
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HAM-IV, $529.95. ***The heavy duty Ham-IV is the most popular rotator in the world!*** It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower mast bracket. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New low temperature grease permits normal operation down to -30 degrees Fahrenheit. New wire-wound potentiometer gives reliable and precision directional indication, new ferrite beads reduce RF susceptibility, new Cinch plug connector plus 8-pin plug at control box (no screwdriver needed). Dual 98 ball bearing race for load bearing strength. Strong electric locking steel wedge brake prevents wind induced antenna movement. Easy-to-use Control Box has illuminated directional meter with North or South center of rotation scale, separate snap-action brake and rotation switches. Uses low voltage control for safe operation. Accepts masts up to $2^{1}/_{16}$ inches diameter. Rotator size is $13^{1}/_{2}$Hx8D inches.

T-2X, $619.95. ***Extra heavy duty Tailtwister antenna rotator!*** For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to $2^{1}/_{16}$ inches diameter. Rotator size is $14^{1}/_{16}$Hx$9^{3}/_{16}$D in.

CD-45II, $369.95. ***Medium duty antenna rotator.*** Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to $2^{1}/_{8}$ diameter. Includes light duty lower mast support, Rotator size is $17^{3}/_{8}$Hx8 D inches.

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!

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.

HAM IV

$529.95
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T-2X

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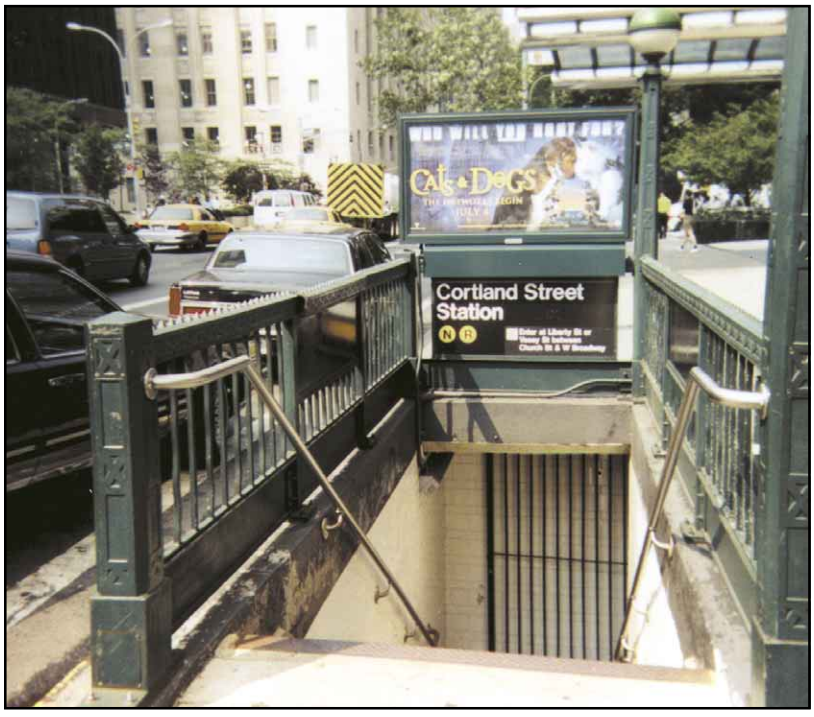


Before the World Trade Center disaster, Dr Maurice Sasson, W2JAJ, of Port St Lucie, Florida, sent us this photo of the subway station entrance that was familiar to the thousands of radio enthusiasts who returned home from New York's fabled Radio Row, laden with (as Maurice remembers it) "radio parts, miscellaneous junk and equipment, before and after World War II."

Requiem for Radio Row

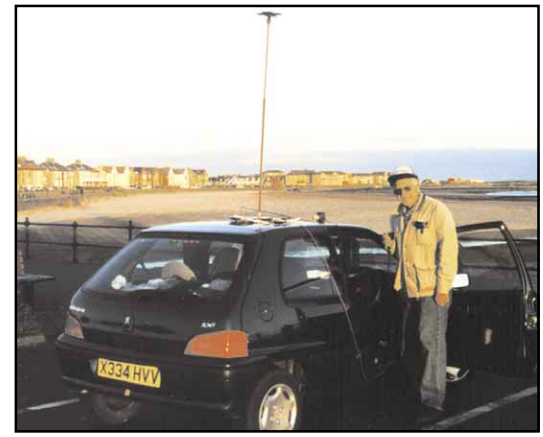
In his April 1969 *QST* article, Gerald Samkofsky, W2YSF, wrote:

Alas, gone forever is that fabled Mecca born from Marconi's vision…all I saw was a vast excavation… for progress *had toppled our idol and was replacing it with another gigantic idol in praise of "World Trade" …the World Trade Center of New York.*

Gone forever were the treasure troves of surplus. Gone were the happy days of the regenerative receiver, the era of the spark gap, the brass based 201s, 211s and the first ac tubes…Oh for a glimpse into the windows of such fabled stores as "Blan the Radio Man," Try-Mo Radio, the kind of low priced short-wave kits. Gone is Deotone Radio whose genial owner could find anything you wanted in his poorly lit aisles…

From the April 1969 article: New York's Radio Row during its last days. The view is looking east from West Street toward Cortland and Washington Streets.

Unique (and crazy)! Alencar Aldo Fossa, PY3CEJ, of Porto Alegre, Brazil, reports that his unique 160-meter vertical dipole (117 feet high) "is very good in TX and RX." He adds, "Sorry, I'm crazy for top band, and *QST*!"



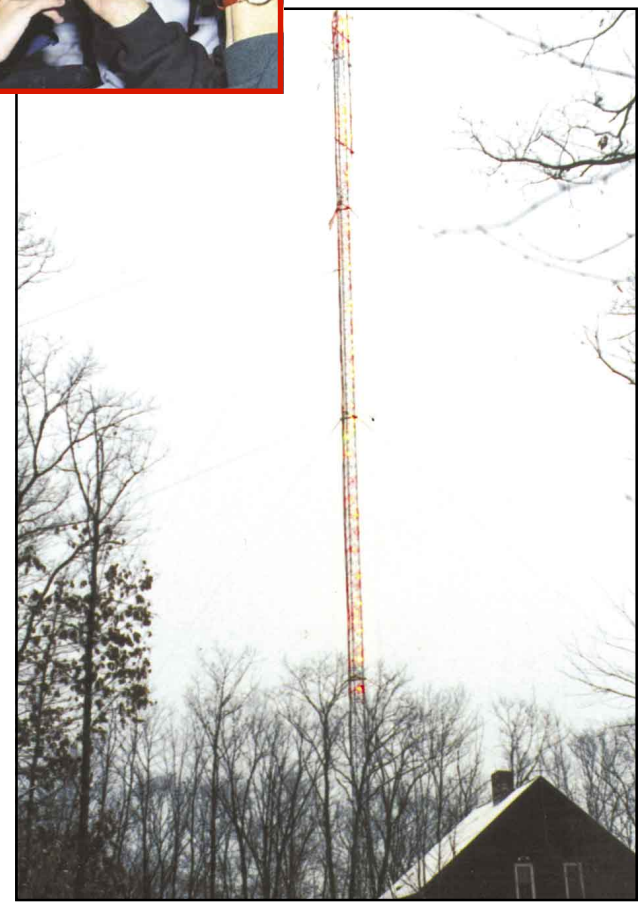
Fourscore years later, Ardrossan looks far different than it did when Paul Godley, 2ZE, heard 30 stateside stations from here in December 1921, paving the way for the first transatlantic QSO. Back in June, while passing through the small Scottish town, Roger Wagner, K6LMN, contacted several New England stations with this mobile setup in commemoration of the 80th anniversary of Godley's achievement. For more on the anniversary of the 1921 Transatlantic Tests, see page 45.

Season's Greetings

ROGER READER, KA9BKK

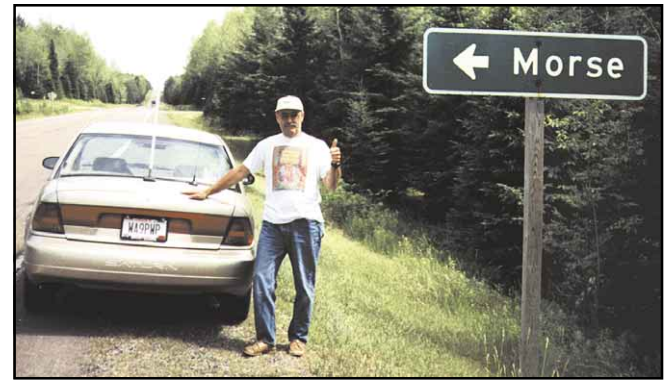
As part of the annual Rotary Lights celebration at Riverside Park, La Crosse, Wisconsin, community groups are invited to decorate and display a tree that represents their organization. The Riverland Amateur Radio Club's contribution sports this 2-meter Yagi.

"He knows me!" North Pole Network founder April Moell, WA6OPS, has been spreading Christmas cheer for 25 years among children who find themselves in Orange County (California) hospitals at holiday time. For more information, see **members.aol.com/emcom4hosp/npn.html**.



Harry Chase, WA1VVH, of Pepperell, Massachusetts, has been decorating his 160-foot tower every year since 1986. "Believe it or not," he writes, "my neighbors enjoy it." We believe it! Since the photo was taken, Harry reports, the tower has become the home of the 224.64 repeater, several UHF/microwave repeater links, beacons and UHF CW/SSB equipment up through 10 GHz.

In 1964, when Walter Smart, N8PVT, now of Manistee, Michigan, was 15, he and his family drove from their home in rural Illinois to the New York World's Fair. Although he didn't yet have his license, he writes: "The guys at K2US were friendly and allowed me to come in and hear the action. My parents waited patiently as I had my biggest moment of the Fair (although the ride in the car at the Ford pavilion was pretty cool)."



No phone ops allowed: Paul Goemans, WA9PWP, of Stoughton, Wisconsin, couldn't just pass by the road sign for the town of Morse while he was on vacation in Ashland County, Wisconsin last summer. Not surprisingly, he writes: "Yes, CW is my favorite mode."

If code is so hard, how come *they* can do it? At the left, Bill Ewan, W1VH, seems pleased with what he's hearing from Andrew Crowthers, age 1 1/2, who's learning code before he can speak, according to his granddad. It's not surprising to see the Ege sisters, Mercy, age 2, and Grace, age 3, pounding out code, since they have ham radio in their genes. Their older brothers are N2EGE and KB1GCS; dad, who sent in the photos, is N1EGE, and granddad is W9EGE. Steve, N1EGE, came up with a fitting photo caption: "Hey, OM, your fist sounds a little pudgy this morning!"

Field Day 2001

WA6WZO

It's a good thing the TRW ARC (W6TRW) Field Day site didn't also prohibit tall antenna support structures!

WA6WZO

The Ventura County Amateur Radio Society chose the Ronald Reagan Presidential Library in Simi Valley as the site of their 2001 Field Day effort.

When Field Day came along, 8-year-old Sami Raihala, was determined not to be left out of the fun. Working as a guest op using the club call W0AU from a Field Day site in Warrensburg, Missouri, Sami first made contact with a Florida station. She soon got the hang of it, and after a while, with more than 30 contacts under her belt, her dad, Keith, N0VJ, reports that he had to pry the mike from her hands and put her to bed at 2300 hours.

WA6WZO

Before Field Day fans filled the high school stadium, the Palos Verdes Amateur Radio Club antenna stood proud against the California sky.

Field Day, Maine-style: George Caswell, W1ME, works a satellite from his vehicle at the Portland Amateur Wireless Association Field Day site, Fort Williams Park, in Cape Elizabeth. Complete Field Day results begin on page 99.

MOBILE DX MASTER

Since its introduction over a year ago, Yaesu's FT-100 HF/VHF/UHF Transceiver has been widely acclaimed for its outstanding performance and flexibility. Now the FT-100D builds on this success story, adding the convenience of factory-installed modules for today's Ham on the go!

FT-100D HIGHLIGHTS

The FT-100D is a high-performance, ultra-compact transceiver operating on the 160-10 meter HF bands, plus the 50, 144, and 430 MHz VHF/UHF bands. Known for its outstanding receiver performance, the FT-100D's easy-to-access DSP system is the cornerstone of the outstanding receiver capability. Providing Noise Reduction, Auto-Notch, and Narrow-Bandwidth Filter selection, the DSP system also includes a Microphone Equalizer for the transmit side.

The new and enlarged speaker of the FT-100D (ϕ66 mm) provides spectacularly clean audio output, to help you dig out those weak signals.

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MICRO MOBILE

FT-100D

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I. Interlocked Digital Bandwidth Tracking System (IDBT)

II. Variable RF Front-End Filter (VRF)

III. 200 Watts of Transmitter Power Output

IV. Class-A SSB Operation

V. Multi-Function Shuttle Jog Tuning/ Control Ring

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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MARK-V FT-1000MP

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- **VSPC (Variable Side Pressure Control) Technique** (Patent Pending)
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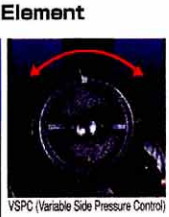

VSPC (Variable Side Pressure Control)

APPLICABLE TRANSCEIVERS

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

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

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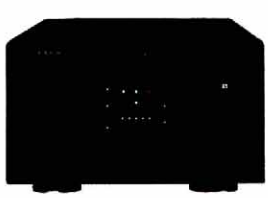

Specifications

Frequency Range:	50-54 MHz
Antenna Impedance:	50 Ohms
Power Output:	200 Watts PEP
Spurious Emissions:	At least 60 dB down
Power Source:	DC 30 V and 13.8 V (supplied by FP-29 Power Supply of MARK-V)
Dimensions:	9.6" x 5.4" x 13" WHD (243.5 x 136.5 x 331 mm)

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

LET'S BE PREPARED

♦ I think that the amateur radio community should work to build up additional communications capabilities for the long term war against terrorism.

A good place to start would be the suggestion from Alvin Mahler, N5VZH, in the Correspondence section of October 2001 *QST*: "I would like to see in *QST* a 220 MHz transceiver that is easy to build. It could be a one channel rig that could be set to one local repeater or a two channel rig with 1 repeater and 1 simplex channel."

Each and every ham could carry this simple ham radio station in his pocket, briefcase, or purse and have it ready should an emergency (terrorist or natural disaster) strike. The most effective version of this would have a common simplex frequency that hams around the nation would share. In an emergency, hams could turn to this frequency and know that other hams are there. If the repeater is down, hams can relay the messages manually from station to station as they have since the founding of the American Radio RELAY League.

These little 220 MHz transceivers would be even better if they are well shielded so that they would not be disabled by any terrorist flux compression generators (FCGs).

God Bless America.—*Nickolaus E. Leggett, N3NL, Reston, Virginia*

PUBLIC PERCEPTIONS COUNT

♦ It is through the eyes of others that we can truly see how we look to the rest of the world. Recently *PassageMaker* magazine, a publication focused on ocean voyaging power boats, presented a very unflattering view of amateur radio.

The author, magazine editor-in-chief Bill Parlatore, criticized amateur radio for an on-air refusal by the Seafarers Net to recognize an improperly licensed maritime mobile station. The author referred to "this ham radio thing" as "self-imposed exclusivity, that seems so counterproductive for a service that is actually useful for cruising boats." The article goes on to refer to hams as "more concerned with getting postcards from each other because they have no real purpose in today's globally communicative environment. The world and technology have passed them by, and amateur radio lives in the dark ages."

While we can all refute such statements, we need to ask ourselves why this image is there in the first place. We need to make more of an effort to acquaint the public and potential users of our services, such as the maritime community, with what we are doing now, not what we did 40 years ago. CW is nice, but what about satellite communications, APRS and digital modes. I venture to say these things are not known outside of our little circle. In the push for more spectrum space for an ever expanding communications explosion, if we don't make our mission and capabilities very clear, we won't continue to have the privileges we presently enjoy.

I see this as a wake-up call. Let's not ignore it until it's too late.—*Bill Moran, KB1DHW*

BEGINNER'S LUCK

♦ Having read the articles about other people having made contact with the space station, I thought you might be interested in my experience. On June 23 at 12:32 local time I was monitoring with my Nova software and heard "any station this is NA1SS." I immediately responded with my call sign and Susan answered me right away. Considering that the station was only 10 degrees above my horizon, working with a simple J-Pole antenna, and Sierra Vista is surrounded by mountains, I was very lucky to make contact. The next day, June 24, at 9:52 with the station still over Canada and just 4 degrees above my horizon I called NA1SS and got an immediate reply. At 77 years young and having just got my Tech license, I am enjoying this new hobby. —*Hal Miles, KD7MOL, Sierra Vista, Arizona*

WHAT'S NEXT?

♦ A recent ARRL e-mail newsletter indicates "with no fanfare or public announcement the FCC began collecting date-of-birth information on its FCC Form 605 earlier this year. The information is a required entry (on line 11a) of the Form 605 as modified in March 2001 for both Amateur Radio and commercial operators, including Restricted Radiotelephone applicants. The FCC has said it's not making the information public but will use it for internal purposes."

First it was Social Security Numbers, even though the FCC is not a part of the Social Security Administration. Now, it's dates of birth. Of course, we're "assured" the information will remain confidential.

What's next? Fingerprints and a DNA sample?—*Michael Weaver, KD7DDG, Phoenix, Arizona*

2001 JAMBO

♦ I wanted to thank the ARRL for supporting the K2BSA efforts at the 2001 Boy Scout National Jamboree. I was able to attend the Jambo and I had the pleasure of visiting the K2BSA station. I was pleased to see the literature and materials that the ARRL provided to help the youth at the Jamboree and I was privileged to be able to offer my help at a couple of the VE testing sessions.

The boys in attendance were able to see amateur radio at its best and I appreciate the contributions that the ARRL made to help make that effort a success. I know that K2BSA was able to teach the Radio Merit Badge to a number of young men *and* teach a Technician license course to a number of folks sufficient to get them pass their first VE examinations.

Efforts like this are the reason that I became a Life Member of the ARRL.—*Jim Rice, N0OA, Burnsville, Minnesota*

BEST I'VE SEEN

♦ I find the ARRL Web site to be very informative. The articles are professional, up-to-date, and very well done. Please keep up the good work. Your site is the best I've seen. Thanks.—*Henry Voelker Jr, W2HV, Gilbertsville, New York*

[If you haven't headed over to **www.arrl.org** recently, you'll probably be surprised at the amount of useful news and information you'll find there. We're constantly adding features, so check *ARRLWeb* frequently.—Ed.]

MORE ON RESTRICTIVE COVENANTS

♦ Anyone who feels that restrictive deed covenants (CC&Rs) of homeowners' and condominium owners' associations are not a threat to the future of Amateur Radio, is simply not familiar with the current real estate market. I have acquired four residential properties in the past five years, all in new developments. Having done that much house shopping, I have seen firsthand that choosing to purchase a home in a locality that permits ham radio antennas is simply not a viable option for many new homeowners. I had

visited one new housing development after another after another, only to discover that in nearly all cases, the original convenant rules tendered by the original developer totally prohibited outdoor antennas, right from the outset.

My personal experience in three diverse geographical regions of the country is that hams looking for new housing may well have virtually no choice in the matter of antennas, period. A prospective home buyer hardly enters "voluntarily" into a CC&R contract when a cartel of devel-opers has had the de facto effect of prohibiting residential antennas entirely within a given region. And what about stealth modes? The increasing use of metallic wallboard studs and the ever-popular foil-lined attic insulation make many indoor antennas ineffective. And I have recently found one very large developer of sprawling "planned" communities in Florida that had already taken the extra step of expressly stating that flagpoles shall only be used for that specific purpose! What is next, covenant restrictions on RF flux density wafting over the community's common elements?

In RM Docket 87633 (DA 99-2569), the FCC's Wireless Telecommunications Bureau held that the Commission, "strongly encourage(s) associations of homeowners…to follow the principle of reasonable accommodation and to apply it in any and all instances of amateur service communication." Therefore, homeowners' associations that fail to reasonably accommodate Amateur Radio antenna installations, while not violating the letter of the law, are engaging in patently unethical practice. In my own community of residence, we have made from our very inception, what I feel is a reasonable facility for amateurs and others within our development to erect antennas. Regardless, any licensed ham who sits on a homeowners' association board or community and acts to prohibit antennas within their own community, should seriously consider turning in his ticket. There is no room in Amateur Radio for those who do not play by the rules, just as there is no place for those who would disrespectfully flout the voice of proper authority.—*Alan Dixon, N3HOE, Monaco Estates, Florida*

TIME TRAVEL

♦ During the afternoon of August 24, after hearing a Philadelphia 6 meter beacon, I made a blind call on 50.125 MHz, KN4SM responded with, "Long time no hear, welcome back." Who was this and how did he know me, if he really did?

Because KN4SM was once WA2CJK. (I'm sure glad I didn't get a vanity call!) Jerry worked me as his first North Dakota 2 meter contact, as did many others during the late '60s and early '70s. Jerry was *my* first complete 2 meter meteor scatter contact (8/10/69). I was Kelly, then K2YAZ/8, his brother's first 2 meter ND contact (4/22/70) as well. I have both cards and they are where they have been since I received them 32 and 31 years ago in a plastic display sleeve side by side, my 5th and 6th state worked on 2 meters from ND.

I had missed that he was once WA2CJK, until we exchanged e-mails the following weekend. It *was* real. We all had known each other in the late '60s and early '70s while being active in Central States VHF Society. Since then I have even located an audio tape of the 30 plus second meteor burst that we worked on.

Even 8 watts and a dipole can take one far farther than we know anytime we push that mike button. 5 miles, 500 miles, 5000 miles or 30 years, it can make time travel possible!—*Bill Davis, Jr, K0AWU, Grand Rapids, MN*

LOGBOOK OF THE WORLD

♦ Now that ARRL has their own electronic QSL system in place or about to be launched, I can't help but wonder how much longer it will be until the art and tradition of QSLing will be lost.

Don't get me wrong...I am not trying to be "anti-technology" here. I love being able to access info that only a few years ago would have required a trip to the library. E-mail, games, research, etc are all fantastic. (This letter is submitted electronically.)

But do we really need to take away one of the last vestiges of human interaction? I know that some will say "you can still do it if you want...," but like any other "commodity," how long will it be until electronic QSLs will be ALL that you can get?

Before, getting certain awards meant that you made a certain amount of QSOs, exchanged QSL cards and made your application. It didn't require any special equipment or access. Electronic QSLs will now MANDATE (eventually) the ownership of a computer, access to the net and the prerequisite software, not to mention a printer and the consumables that go with it.

Let's not lose that personal contact that binds ALL amateurs worldwide together. —*Steve Robeson, K4YZ, Dunlap, TN*

♦ In the late '60s I jokingly remarked that it would be great if everyone had the same QSL manager. What took you so long?—*Jim Roux, W4YA, Longwood, Florida* QST

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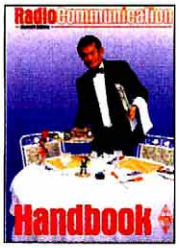

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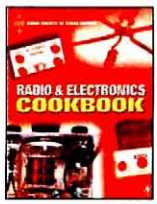

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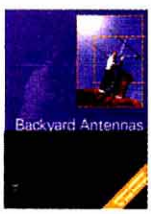

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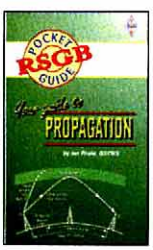

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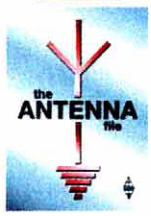

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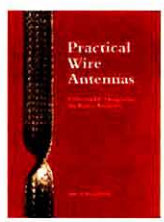

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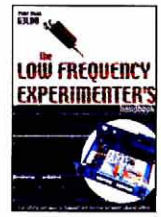

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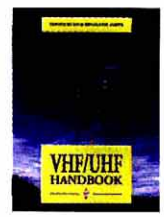

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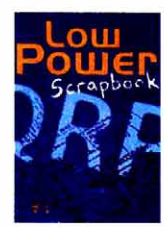

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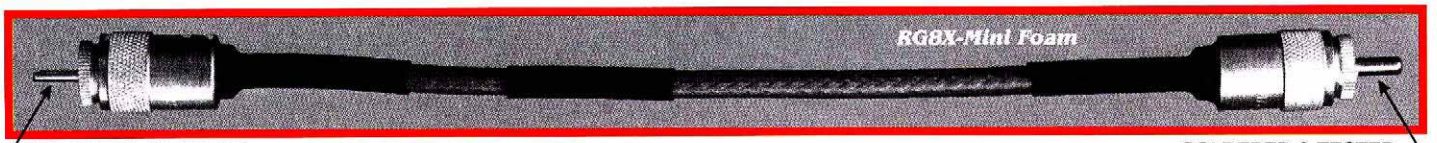

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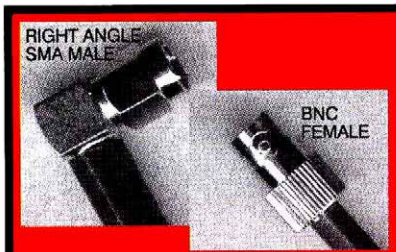

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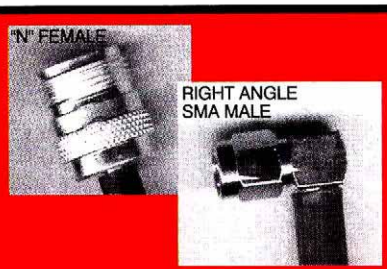

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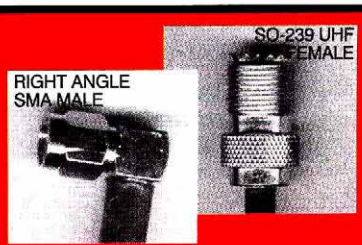

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By Maria Melchiori, K4MFM

Field Day was a Blast!

Those who have done it know that chairing a Field Day effort gets easier with experience. The author, Field Day Co-Chair (with husband John, K4JBM), for the Orlando Amateur Radio Club's 2001 Field Day, made it through unscathed—mostly!

John and I have participated in various Field Day events for the Orlando ARC. However, nothing could have prepared us for what we experienced as this year's Field Day Chairs. As we said when we agreed to do it: how hard could it be?

Planning is Everything

One of the hardest tasks was finding a suitable site. The club had always gone to a local private camp site, but several factors including price, public access and the fact that it was a radio dead zone made us decide that we would start fresh and look for a new, more accessible site. We considered several Orlando city parks, but encountered problems with the overnight stays. Then, we looked at one called Turkey Lake Park which happened to be right near our home, and much to our surprise discovered it had all the facilities we could have wanted and more. And the park staff couldn't have been nicer and more accommodating, although I suspect they never really understood what we were going to do until it was too late.

Having settled on the location, we agreed John would focus on the technical (easy) part, and I would do everything else. The first task was soliciting volunteers. Those who know me know I have many shortcomings, but shyness is not among them. I will ask anyone for just about anything, and in asking people to volunteer one on one, I discovered that the membership of our club (and probably most others) is incredibly generous and willing to step up to the plate when asked. We could not have done it without them!

Details, Details and More Details

The details were endless, ranging from downloading and understanding the Field Day rules to making sure we had the right insurance certificate, equipment, what

The co-chairs, John and Maria, prepare to unload several Field Day antennas.

Showing the value of teamwork, Quentin, KU4WD, and Matt, K4MLS, assemble their VHF/UHF antenna.

seemed like miles and miles of wire, connectors and thingamajigs (technical ham term). All told, John and I made almost a dozen trips to the club storage shed and moved hundreds of pounds of antennas, spools, equipment, poles, coolers, pots and supplies.

We made several trips to the park to work out logistics in and out of the place. We also kept a notebook full of "to do" lists—shopping lists, checking of equipment, and (my favorite) menu planning. We made a bunch of trips to the local warehouse stores, surplus electronics stores and RadioShack. After a while, we settled on renting a small U-Haul van because when all was said and done, we would easily have had a dozen truckloads of stuff to cart back and forth. Then there were phone calls to check out technical stuff and confirm arrangements with the volunteers. We even arranged for a Public Information and Registration Table. And all that was before the event!

Herb, KF4WW, shows perfect slingshot form.

Joe, W4LUW, and Harry, W3GU, handle the CW station, one of four in the main pavilion.

It was Here—and it wasn't Christmas!

When the big day finally arrived, we were both excited and terrified. About 15 minutes after we arrived at the park (we arrived early to set up the signs pointing the public to our event) we were inundated by all the volunteers who had previously committed to help us set up at 7:30 that morning. It was an incredible sight to see them all arrive, ready for action. As the coffee started to brew, the guys were busy planning out the layout of antennas and digging of holes for the push-up poles. Field Day had begun!

A Little Humor Goes a Long Way in Times of Stress

I can't make up my mind which one of these sights is more amusing: a bunch of grown men running through the woods with slingshots trying to string wire, or the view from below when you're trying to hold a ladder steady while some guy wearing baggy shorts at the top tries to put up an antenna. As for the heat, I almost took a dive into one of our coolers. I guess the best way to describe the Florida weather for Field Day is one continuous 24-hour hot flash.

Overall, Field Day proved to be uneventful from a safety perspective, although we were ready for just about any contingency. One of the priority items on our list was a complete First Aid Kit—Deluxe Model. Since we assumed everyone who volunteered would be at our experience level, we thought it would be safer to prepare for the worst. Luckily, one of our volunteers was certified in First Aid. Well, as fate would have it, when our first emergencies happened, she was doing an ice run. No need to worry; I was ready.

Our first incident was a small cut on someone's knuckle—the kind guys are used to sucking up and wiping on their shirt. But this was not to be. First, I insisted on an antiseptic wipe of the area after many assurances that it would not sting (boy, guys can be such weenies!). Then, there was the application of antibiotic ointment. Finally, the application of not one, but two fat band aids. I think by the time I got done with my first aid experience, my poor victim was expecting me to sell him HMO insurance!

The next two first aid emergencies consisted of one nasty mosquito bite and a wasp sting, both of which were successfully treated with anti-itchy wipes from our Deluxe First Aid kit. Just imagine

how much more I could have done if I had First Aid certification!

Lastly, a choking incident was successfully avoided when I quickly put away the shrill whistle I was blowing to get people's attention during the day. Lots of applause followed.

Of course, there was the one little inevitable argument between the co-chairs. *He* said the lights in the pavilion will not be bright enough when it starts to get dark. *She* said go get the lamps. *He* said we don't have any. *She* said they're at home in the garage. *He* said *%@#!. *She* said *%$#!&^))?+|!!~*. *She* won—there was light.

Technical Stuff

Since this was our first time at Orlando's Turkey Lake Park, we expected some bumps in the road. If we go back, which is likely given the park is planning to improve their facilities and provide *air conditioning*, we will know exactly how to avoid antenna interference. Nothing like having two stations in the same pavilion QSLing each other!

I also learned that men who are capable of stringing antennas and taking apart all sorts of equipment and putting it back together become totally useless when it comes to making coffee—as if the coffee pot required a user's manual as complicated as that of a '756PRO. What's wrong with you guys? And, did you know that an electric skillet draws lots of power and can blow a fuse that causes a chain reaction that turns off all your logging computers? Thank goodness for the super duper generator one of our members lent us; otherwise, no cheese omelets for Sunday breakfast—major catastrophe!

We ended up with four stations (Class 4A) plus a UHF/VHF station. Our operators were just spectacular, and worked pretty much through the night with only a brief break. We even had a crackerjack op using PSK31. Interesting thing about serious hams: they are capable of traveling with an entire station (antennas included) in their cars, including chairs, fans and cushions. The best part was that all of our operators took the time to show visitors what they were doing, and how. Some visitors even had the chance to try everything out.

Of course, as fun as operating on Field Day can be, it also has its dull moments—like 1½ hours of message handling in order to get several extra points. I know now that Field Day messages are the most boring, time consuming communications anyone could ever have. "Having a great time at Field Day . . ." must have come up a zillion times. And what's with the "Love, Pop Pop" signatures? Then there was "Love, Brad the Stud Muffin." I think next year we should try for more exciting messages.

Food, Glorious Food!

John and I might have shopped and selected the goodies, but we could not have served it up without the help of some serious cooks. Breakfast Saturday was fresh bagels, donuts, cream cheese, butter, jam, juice and coffee. Lunch was hamburgers, hot dogs, Italian sausage with deliciously simmering onions and pepper in sauce, and sauerkraut. There were chips and cheese doodles galore, lots of cold drinks, delicious fresh fruit, candy and tasty fresh cookies.

Dinner was another great hit, since it included well seasoned and marinated chicken and country style ribs. The evening' s side dishes were tasty dinner rolls and, for musical entertainment purposes, baked beans. Dessert was chocolate chip cookies and munchies, which were available all night to keep the night operators energized.

In addition to the Saturday breakfast goodies, on Sunday we added assorted muffins and breads, milk and cereal bars and fresh cheese omelets and eggs with bacon. Boy that was good! Then, for lunch, we supplied assorted fresh sandwiches and watermelon plus all the leftover munchies.

Taking it Down

When closing time came, it was amazing how well organized and quickly everything went. We learned that it's a heck of a lot easier to pack up with all the food and drinks and ice that were carted in being taken away in people's tummies! Everyone who helped was just terrific, and even better was all the talk about what we might do next year given what we learned this first time around—especially with the prospect of an air-conditioned facility.

The Aftermath: Aches and Pains, New Black and Blues—and Thoughts of Field Day 2002

One observation John and I made after the event was the number of muscles we discovered just through the sheer pain we were in afterwards. I guess we should have included some workouts in our preparations. I would say it takes about a week for the body to recover and then another two weeks to gather up the computer log files, paperwork and other details and get everything buttoned up. We still have antennas and poles in our garage that need to go back to their owners and there's a final accounting to be done.

Was it worth it? Just check out the pictures at our Web site, **www.oarc.org**. All said, OARC's Field Day was an incredible success!

You can contact the author at 1840 Cleek Ct, Orlando, FL 32835; **k4jbm@cycat.com**.

NEW PRODUCTS

VERSATILE AUDIO AMPLIFIER/ ATTENUATOR FROM TDL TECHNOLOGY

◊ TDL's new Model 412—a general-purpose audio attenuator and amplifier suitable for a wide range of amateur applications—features 80 dB of attenuation in four decade steps plus fine attenuation in each step with a single-turn pot; 40 dB of gain in steps of ×l, ×10, ×20, ×50 and ×l00; wide bandwidth, low noise, low dc offset and low harmonic distortion.

The unit uses TI's new 0PA227 and 0PA228 low-noise op-amps and was developed to condition a computer's sound card output to drive other instruments, but is said to be useful any time you need to attenuate or amplify an audio signal.

Price: $187. For more information or to download the Model 412's user manual in PDF format, contact TDL Technology, 5260 Cochise Tr, Las Cruces, NM 88012, tel 505-382-3173, fax 505-382-8810, **www.zianet.com/tdl**.

A SPECIAL CHRISTMAS KEY

◊ In celebration of the Season, Morse Express has commissioned a special telegraph key that doubles nicely as a Christmas tree ornament. Designed by Marshall Emm, N1FN, and manufactured by Llaves Telegraphicas Artisanas, the Christmas Key is a fully operational miniature key, machined from solid brass and plated with gold. It measures only 1¾ × 15/16 inches at the base and weighs a mere 2 ounces. The Morse Express Christmas Key is $49.95, plus shipping and handling, and is available only from Morse Express, 2460 South Moline Way, Aurora, CO 80014-1833; tel 303-752-3382. See it on the Web at **www.MorseX.com**.

Next New Products

By Ken Stuart, W3VVN

Honey, They've Shrunk the Batteries!

Microminiaturization of electronic components has taken a giant leap forward in the past few decades. Combining these components into integrated circuits has also resulted in squeezing more and more circuitry into smaller and smaller space to the extent that couldn't have been imagined some 40 or 50 years ago. For example, one prophet of the electronics industry went on record around 1950 as saying that he foresaw computers in the year 2000 as weighing less than one-and-a half tons! Well, he was right, and then some. Today's laptop has a capability that vastly exceeds the computer of his day, which took up rooms of space and gobbled up electricity at a rate that would supply several of today's homes.

With the ensuing emergence of electronic miniaturization has come a formidable market of personal electronics products such as the cellular and portable phone; laptop computers and pocket organizers; H-Ts; compact disk, cassette and MP3 players; pocketable GPS navigation units; and many others. The development of these mini electronic gadgets has brought about the need for smaller and smaller batteries with greater stored energy.

Driven by the development of these consumer products with their smaller power sources, battery technology has taken giant leaps forward in the past decade. Consumer items like the laptop computer, cellular phone and similar portable products have forced technology to produce lighter, smaller cells with increased energy storage. As a result, new battery chemistries—for example, nickel metal hydride (NiMH) and lithium—are rapidly replacing older technologies such as nickel cadmium. As in any technology, however, one doesn't get something for nothing, and there are few miracles. It pays to know the tradeoffs before making a switch in battery types. This article is an overview of some of the new varieties of battery cell now available, and will provide comparisons between new and old technologies.

Nickel Cadmium (NiCd): The Old Standby

For many years the reigning king of the miniature rechargeable battery, the NiCd cell still has a number of things to recommend it. Although largely superseded by the nickel metal hydride, the NiCd cell still leads the field in the number of charge/discharge cycles, easily reaching to a thousand or more for larger volume cells like the "C" and "D" sizes. It is also the undisputed champ in providing extremely high output currents for its cell size, which is why it is still the predominant battery in Amateur Radio hand-held transceivers (HTs).

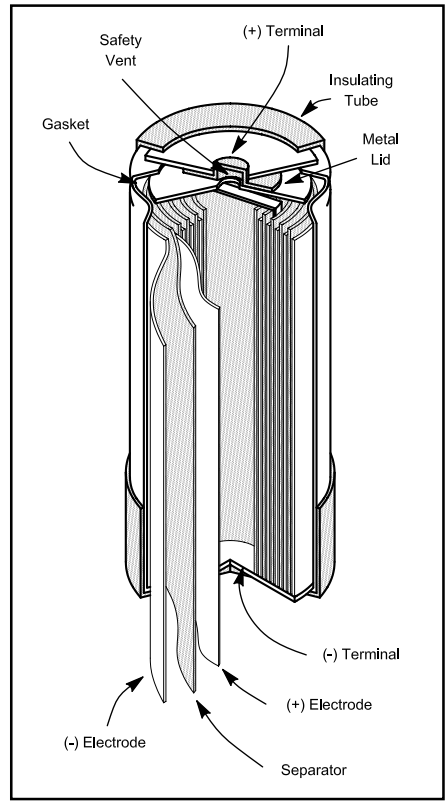


Figure 1—Cutaway drawing of a NiMH cell. Except for the cathode, which is made of hydrogen-storage metal instead of cadmium, the construction is similar to that of the NiCd cell.

Recently, the environmental impact of landfill disposal of NiCds has become an issue. Cadmium metal is used to form the anode of the cell (the *negative* terminal of a cell, since the anode of a device is defined as the terminal into which current flows). Cadmium is one of the most toxic of metals, and disposal of these cells has become a serious problem. In fact, there are recycling programs in several areas of the country for used NiCds, and we should take advantage of them. The Rechargeable Battery Recycling Corp (1000 Parkwood Cir, Ste 450, Atlanta, GA 30339, tel 678-419-9990, **www.rbrc.org**) is a nonprofit organization that provides recycling assistance in the US. With the improvement in the capability of NiMH cells, the thrust now is to change to nickel metal hydride, which eliminates the cadmium problem.

Memory

NiCds have gotten a lot of bad press because of the "memory" effect, which is now often referred to as "voltage depression." It's not nearly as prevalent a problem as it sounds, and if it does occur, it is completely reversible. We now know that this effect is caused by crystallization of the nickel electrode which reduces the area of the active material available for chemical action. Nickel metal hydride (NiMH) cells also have nickel anodes, however. Therefore, contrary to popular belief, the NiMH cell is also subject to anode crystallization and therefore memory. The memory effect is not seen in NiMH cells as often as in NiCd, simply because the NiMH cell does not have the longevity of NiCd.

The memory effect can be avoided and reversed by subjecting the battery to a hefty discharge and full recharge once every couple of months. Note that this does *not* mean discharging the battery to zero, since full discharge can cause cell

reversal which can shorten cell life.

Nickel Metal Hydride (NiMH): Serious Contender

The nickel metal hydride (NiMH) cell has been evolving for a number of years, and until recently it was not a serious contender for the throne occupied by the NiCd. Figure 1 is a cutaway view of an NiMH cell. Recently, the state-of-the-art of the NiMH cell has advanced to where it can often be considered as a one-for-one replacement, although it has only about one-third the number of charge-discharge cycles (cyclic lifetime) and higher internal resistance than nickel cadmium. Figure 2 shows a NiCd (left) and NiMH battery pack for a popular H-T, while Figure 3 shows three AA cells—from the left, an older NiCd, a higher-rated NiCd and an NiMH.

Advantages

NiMH batteries have approximately the same electrical characteristics as NiCd with one exception—they have about 30 to 50 percent more energy capacity per cell.

- Per-cell cost is now competitive with NiCd.
- Readily available in single cells or in ready-to-go battery packs for popular ham transceivers.
- Can be recharged using the same charger as the NiCd battery that it replaced; no new charger is needed.

Disadvantages

- NiMH cells have fewer charge-discharge cycles than NiCd. Typical cyclic lifetimes are around 500 charge/discharge cycles as compared to about 1500 for NiCd. For most hams, this is not a significant problem.
- Internal resistance is about twice that of NiCd, which means that NiMH will not provide as much output power in higher power H-Ts as NiCds.
- NiMH self-discharge is greater than NiCd—about 30% per month, compared with NiCd's 20%.

As the NiMH technology continues to improve and prices drop, the NiMH cell will, in all likelihood, supplant nickel cadmium.

Lithium-ion (Li-ion): Up and Coming

In the past decade, Lithium battery technology has made Li-ion batteries an up-and-coming contender in the portable battery field. Already, rechargeable lithium cells are making their way into cellular phones, where their superior energy storage capability provides increased talk and standby time.

Lithium primary (non-rechargeable) cells were the first of the family to evolve. Starting about a dozen years ago, the lithium button cell first appeared in electronic watches where it gave years of operating life before its power was consumed. Its main advantages are that it has an energy storage capability of about twice that of alkaline cells by volume, and about four times by weight, as well as an extremely long storage life. Lithium primary cells are now available in the popu-

Figure 2—Two 13.8-V battery packs for my ICOM IC-2GAT H-T. The pack on the left is an older NiCd unit having a rating of 1200 mAh. The one on the right is an NiMH with a rating of 2700 mAh. They have identical case sizes.

Figure 3—Three different types of AA-size cells. At left, an older NiCd cell rated at about 600 mAh; in the middle, a newer NiCd cell with an 1100 mAh rating; at the right, an NiMH cell rated at 1600 mAh. Note that 1300 mAh is a "comfortable" rating for an NiMH cell of this size; higher capacity cells are readily available.

Figure 4—Removable Li-ion battery back for ICOM H-Ts.

Figure 5—Small Li-ion battery pack for the Yaesu VX-5R H-T.

lar "flashlight" sizes, but they are expensive and not readily obtainable. These cells are commonly seen in such applications as key-chain flashlights, wristwatches and memory backups in computers and ham rigs.

Lithium secondary, or rechargeable, cells are becoming popular for cell phone and laptop battery packages. Their light weight and high energy storage capacity provides longer life while not burdening the consumer with a heavy power pack. Although many lithium rechargeable technologies have been developed, the most popular is the lithium-ion (Li-ion). See Figure 4.

Rechargeable lithium cells, however, have had some problems. In its pure state, lithium metal is extremely reactive, and any contact with water results in the liberation of hydrogen and possible fire or explosion. In lithium cells, the lithium is normally in the form of a salt, which makes it non-reactive. Certain battery manufacturers, however, have stated that with overcharging, lithium metal can be extracted from the salt inside the cell casing, and that reactions have taken place causing rupturing of cell cases, and damage to the equipment in which they were installed. Therefore, charging of lithium batteries is usually handled by special protective balancing and charging circuits built into the battery package. These circuits carefully regulate the state of charge, and terminate charging before overcharge can occur.

Early lithium batteries had a relatively high internal impedance that was about three times higher than that of NiCds. Recently, this internal impedance has been lowered as a result of improved manufacturing techniques and research. Although the impedance is still not as low as NiCds, it is sufficiently low for application in some Amateur Radio H-Ts. Yaesu's VX-5R is a 5-W unit with a small Li-ion battery as standard equipment (see Figure 5).

One negative point is that Li-ion batteries do not have a particularly long lifetime even if they are not used. One manufacturer has stated that the lithium rechargeable cell can last only about two to three years after manufacture. On the good side, their rate of self-discharge is very low—only about 10 percent per month—which means they are excellent for standby equipment applications.

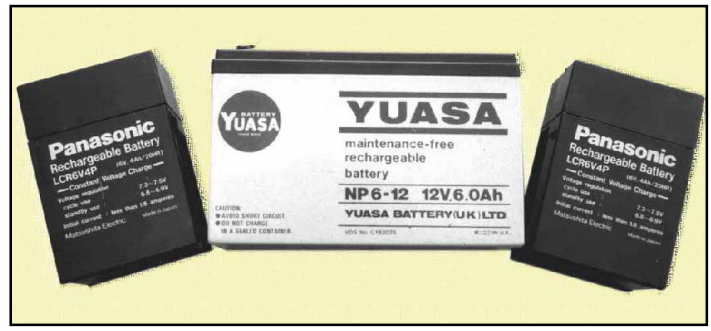


Figure 6—These gel-cell lead-acid batteries are rechargeable and won't leak.

Sealed Lead-Acid (SLA): Old Standby

Although the rechargeable sealed lead-acid (SLA) cell is heavy and bulky, and doesn't hold a lot of energy for its size and weight, it has the advantage of a very low self-discharge rate. In addition it is relatively inexpensive and very reliable. Complete batteries are readily available at electronics dealers. One can come across batteries that have been routinely pulled from emergency lighting systems that still have lots of life left in them. One manufacturer, Quantum, used to provide a battery pack specifically made for ham radio use; although they have discontinued this model, they have a higher power alternate with state-of-charge indication and included charger.

Larger SLA battery packages, which can power a desktop or automotive transceiver for hours on end, can also be found at automotive accessory dealers, discount buyer's "clubs," and so forth. These are sold as emergency automobile starting units, complete with jumper cables and cigarette lighter outlets. The author has used one of these units over the past few years to power a Kenwood TM-V7A for an entire day of communications at Scouting events. Figure 6 shows different sizes of gel-cell lead acid batteries.

Reusable Alkaline

Before nickel cadmium cells were readily available, it was fashionable to "recharge" flashlight batteries by passing a very small current into them for a day or two. Devices to perform this recharging function were sold at novelty and specialty stores, and under certain circumstances a certain amount of energy could be restored to a discharged cell. Unfortunately, the amount of energy that could be recovered was nowhere near what a new cell from the dealer's shelf could deliver, and continued recharging could result in leakage of electrolyte into a flashlight or radio.

With the thrust to provide a cheaper cell than NiCd and the desire to give the consumer a cell that would provide the

Table 1
Comparison of Types of Cell Chemistries

	Nickel Cadmium	*Nickel Metal Hydride*	*Sealed Lead Acid (Gel Cell)*	*Lithium-Ion*	*Reusable Alkaline*
Energy density (watt-hours per kilogram)	40-60	60-80	37	100	80 (initial)
Cycle life	1500	500	200-300	500-1000	10
Self discharge, % per month	20	30	5	10	0.2
Maximum load current	Greater than 2C	0.5-1C	0.2C	Less than 1C	0.2C

Table Glossary

Energy density—Stored energy versus weight. The higher the number, the more total energy available.
Cycle life—The approximate theoretical number of charge/discharge cycles which the cell can sustain before its energy storage capacity degrades to a specific level (about 60%). Many factors influence this figure, including the depth of discharge, average temperature, etc.
Self discharge—The amount of stored energy lost per month with the cell lying unused.
Maximum load current—The amount of discharge current that the cell can provide without significant terminal voltage drop. This is an indicator of the cell's internal resistance. Note: "C" is the cell's ampere-hour rating which is stated by the manufacturer as a 10 hour discharge rate.

higher terminal voltage of the alkaline cell, the idea arose to return to the old flashlight battery recharger, and the reusable alkaline was born.

Reusable alkalines do not have a high cyclic life. Testing performed on these cells showed that after one initial discharge and recharge, the energy capability was down to only about 60 percent of the original capacity. Cyclic life is also highly dependent upon the depth of discharge. Only about 10 charge/discharge cycles can be expected if the cell is repeatedly discharged to depletion, more if the cell is only slightly discharged and then recharged.

A rechargeable alkaline's internal resistance is also higher than an equivalent regular alkaline cell, which limits the reusable cell's capability for high discharge current applications. This all but eliminates the reusable alkaline for most ham radio applications.

Self discharge, however, is excellent for these cells and is only about 0.3 percent per month. This makes them a good choice for emergency flashlights that are used for home power outages and other occasional purposes.

Comparison of Rechargeable Cell Types

Table 1 is a quick comparison of the capabilities of the most popular rechargeable cell types. Included in this chart is the popular "Gel Cell," a sealed lead-acid type.

Figure 7 is a graph showing the ability of cell types to provide high levels of discharge current versus the energy storage capacity of each cell. As can be noticed, although Li-ion is rated to have lots of capacity, this is not the case under high discharge conditions, such as during transmit mode in an H-T. Note that only NiCd, NiMH and Li-ion are depicted on the graph. Lead-acid and rechargeable alkaline are in classes by themselves.

Making an Intelligent Choice

Handheld Transceiver

The first step is to decide what is important to you. Do you want minimum battery weight and lots of power regardless of the cost, and are willing to sacrifice battery life? Or perhaps you are located in northern climates where you need a battery that will still pump out the watts even if the temperature is sub-zero. Maybe you need a battery that has the capability to sit in a ready state for many months, that you can just "grab and go." Or how about a battery that is a good compromise? Let's look at the options.

If you are an avid hiker, biker or camper, you will appreciate something which gives minimum size and weight without compromising performance. Lithium-ion is what you will want. With the highest energy density of all types of rechargeables, it will be comfortable to carry or pack. Expect to pay a higher price, however, for replacement batteries and a shortened lifetime. Lithium is also top choice for emergency standby use since it has a low self-discharge rate, and is therefore going to have more energy available when called upon for action after a lengthy period of sitting idle.

Nickel cadmium has the edge for cold weather operation as well as having the lowest internal resistance. It allows you to put out the maximum RF watts in the coldest extremes. Cost is also relatively low, and it has the highest charge/discharge cycle capability and lifetime of all types, meaning that it is a battery which will stay with you for a long time.

Emergency Shack Power

The leader here is still the lead acid. Whether you opt for the classic top-cap battery or the sealed gel cell type, the charging and maintenance is similar. If the battery is going to be inside the house, the sealed unit is the optimum choice due to its cleanliness and minimal gas evolution. Also, if it gets knocked over, there is no safety issue from spilled acid. Expect to pay more at the time of purchase, however. If the shack is basement or garage located, a deep cycle variety of marine or golf cart battery is possible. These are cheaper than the sealed variety and easier to find (see Figure 8).

Whichever type you choose, don't make the mistake of using a cheap automotive charger. Make sure that the charger is of the automatic variety, preferably one that has two or three charging states such as bulk charge, current limited, and float (by the way, a small 7-A power supply from Astron or similar manufacturer is good substitute for maintaining a charged battery, but it will not bring it to a fully charged state).

Getting the Most Life from your Battery

Nickel Cadmium and Nickel Metal Hydride

These cell types are so similar in chemistry that they can be considered together.

First, remember that both of these cell types tend to lose their stored energy quickly with time. NiCds should be recharged about once every two months, and NiMH cells about once every 4-6 weeks if they are to be kept in a ready state. Another thing is that these chemical powerhouses are like human muscles—both need exercise to retain their capability. If you use your H-T a lot, like every day or two, the battery is getting all the exercise it needs; but if your radio sits on the shelf unused, the battery can get lax and weak. If this is the case, fire up your H-T once a month and give it a day or two of good usage followed by a generous recharge afterwards. It's like a shot of vitamins.

Don't, however, allow the battery to fully discharge. To do so means that one or more cells will discharge first and will be pushed into a reverse charged state. When that happens, the cell can generate gas from the breakdown of electrolyte, which will vent into the air. The cell is robbed of some of its capability as a result and will be even more likely to reverse charge again. A basic rule of thumb

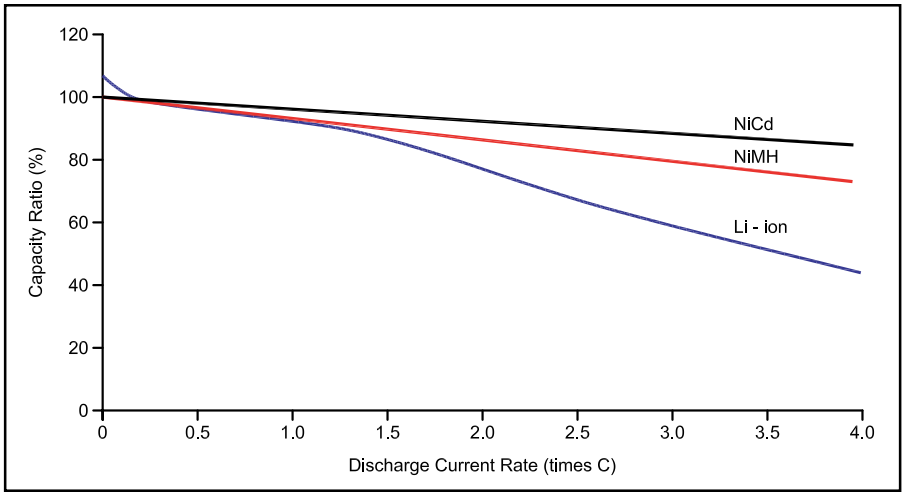


Figure 7—The graph shows capacity ratio percentage versus discharge current rate.

is *never* let the battery discharge to the point where the "battery low" indicator comes on, since this indicates that one or more cells have already been subjected to reverse charging.

Sealed Lead Acid

The SLA cell has requirements that are different from the NiCd and NiMH cells. Whereas the NiCd and NiMH cells don't mind being in a partially charged state (or even fully discharged, as long as they haven't been reverse charged), the SLA must be kept in a near full charge condition continuously for best life and energy content. These batteries should be recharged frequently or kept on a float charge (note the reference to a small voltage regulated power supply in a preceding paragraph). The problem of plate sulphation, capable of destroying the unit, can occur if the battery becomes fully discharged for a length of time. Maintain your battery near full charge for the best life and service.

Lithium-ion

The lithium-ion is the closest of the group to being a no maintenance cell. The only real concern is overcharging, and that is usually prevented by a charge maintenance system either built into the battery pack or contained externally. Self discharge is also less than the other types, and a recharge once every two or three months should suffice.

I hope this article has provided a little insight into what's going on in that little package of power in your hand or on the shack floor. If you follow the tips on charging and maintenance, your portable equipment will be ready to serve you fully on a moment's notice.

Figure 8—This type of marine deep-cycle battery can be discharged hundreds of times.

A power systems design engineer for the last 40 years, Ken Stuart, W3VVN, has developed equipment for spacecraft and deep ocean environments as well as airborne and shipboard. He has served as ARRL Technical Advisor and lecturer on power supplies and batteries since 1980, and has held a ham license continuously since 1953. Ken presently works for Lockheed Martin in Baltimore. You can reach Ken at 1235 Hillcreek Rd, Pasadena, MD 21122, **w3vvn@arrl.net**.

NEW PRODUCTS

NEW WORLDPACK II TRANSPORTS ANY MODERN MOBILE RADIO

◊ Want to take your modern mini mobile radio to the beach, the mountains or even a five-star hotel—with style and amazing functionality? Check out the new WorldPack II from Cutting Edge Enterprises. Your radio expeditions—QRP, DX and otherwise—will never be the same!

The WorldPack II is a compact, comfortable backpack that holds your radio in the upper compartment and an optional 8-A/h power supply in the zippered lower compartment. The pack is constructed of padded, heavy-duty nylon. An adjustable interior sling secures a variety of radios.

Antenna pockets on the left side allow you to carry multiple antennas or antenna elements, while the pockets and tie downs on the right side secure a working antenna so you can walk and talk.

Price: $67.95 (pack); $63.95 (optional power supply kit). For more information, contact Cutting Edge, 620 Highland Ave, Santa Cruz, CA 95060; tel 800-206-0115, fax 831-426-0115, **www.powerportstore.com**.

Previous • Next New Products

STRAYS

I would like to get in touch with...

◊ anyone who owns a Motorola HT-200 that has been converted for 6 meters. I am also looking for a copy of the schematic. Rich Ballieu, WB0TML, 3508 E 10th St, No. 6, Sioux Falls, SD 57103.

◊ anyone with information on Russian Volna (or Volya) military receivers from World War 2. Louis D'Antuono, WA2CBZ, 8802 Ridge Blvd, Brooklyn, NY 11209.

HISTORIC RADIO DATES

1883: Edison demonstrated that an electric current could pass between a heated filament and a cold plate in a vacuum.

1886: Hertz proved that electromagnetic waves could be sent through space.

1895: Marconi sent and received wireless signals in Italy.

1901: Marconi received at Newfoundland the letter S transmitted from Poldhu, England.

1904: Fleming invented the diode vacuum tube detector.

1906: Lee de Forest invented the audion, a triode tube.

1912: Saving of 705 lives after *Titanic* disaster proved value of wireless at sea. De Forest invented regenerative circuit.

1915: First radiotelephone communication between Arlington, VA and Paris, France.

1920: Regular radio broadcasting begins with sending of Harding-Cox election returns by KDKA, Pittsburgh.

1921: Practical horn loudspeakers were developed.

1922: Superheterodyne demonstrated by inventor E. H. Armstrong.

1923: Hazeltine announces his invention of the neutrodyne circuit.

1925: Heater-type vacuum tubes made possible the first all-electric receivers. Dynamic loudspeakers appeared.

1926: Dirigible *Norge* broadcasts from North Pole.

1927: Single-dial tuning featured on radio receivers.

1929: Screen grid tubes developed; pentodes one year later.

1934: WLW in Cincinnati increases power to 500,000 watts.

1935: Frequency modulation system of broadcasting demonstrated by E. H. Armstrong.

1936: Regular television broadcasts begin in London.

1938: Regular television broadcasts begin in New York.

1940: Frequency modulation broadcasting begins.

1941: Nearly 800 U.S. broadcast stations change frequency by order of F.C.C.

1942: Radio production drastically curtailed by divergence of vital materials for military purposes as a result of U.S. War Production Program.

From A Dictionary of Radio Terms, *Allied Radio Corporation, 1942*

Next Strays

By Joe Taylor, K1JT

WSJT: New Software for VHF Meteor-Scatter Communication

Interplanetary dust particles are plunging into Earth's atmosphere continuously. With this revolutionary software you can communicate over distances up to 1400 miles by bouncing signals off the ionized trails of these tiny meteors.

In February 2000 I started playing with meteor scatter on the 2- and 6-meter bands, using the relatively new computer-assisted high speed CW technique (HSCW). I had done some meteor and ionospheric scatter work in an earlier hamming life, more than 40 years ago.[1] My long-dormant interest in Amateur Radio having been warmly rekindled, I was anxious to see what advantages modern equipment and techniques might bring to this fascinating and always-available communication mode for VHF DX.

I quickly learned that the high-speed CW mode of carrying out meteor-scatter QSOs can be very effective. The mode was entertainingly described by Shelby Ennis, W8WN, in a recent *QST* article.[2] HSCW makes it possible to use the very brief "pings" of signals reflected from the ionized trails of meteors entering the Earth's atmosphere some 100 km above the surface. On the 50 and 144 MHz bands these pings can be received at almost any time from a moderately well equipped station at a distance of 500 to 1100 miles (800 to 1800 km). The pings typically last no more than a few tenths of a second at 144 MHz, so they are useless for voice communication or normal-speed CW. Indeed, single-sideband operators who get on during the peaks of major meteor showers call them "the abominable pings," and in order to make QSOs they wait patiently for the much less frequent "blue whizzers" whose stronger ionization can support two-meter SSB exchanges for a few seconds or longer. Outside the major showers, blue whizzers are so rare that they, too, are essentially useless for communication unless you are extremely lucky or willing to run in unattended "beacon" mode. As a result, SSB meteor-scatter contacts are virtually nonexistent on 2 meters except near the peaks of major showers.

On the other hand, pings from meteor trails with "underdense" ionization are nearly always available in usable numbers. Even 100-W, single-Yagi stations at suitable distances can usually hear several pings from each other in a 10 to 20 minute period. At typical HSCW speeds around 8000 letters per minute, a ping lasting 0.1 second contains about 13 characters—just about enough for your call, the other station's call, and perhaps a signal report. With coordinated timing, good frequency calibration, and some diligence, operators who take the time to learn the technique can easily complete QSOs this way. It's a fascinating way to work a bunch of new states, VUCC grid locators, or (if you live in Europe) DXCC entities. It can also work wonders for fattening your multiplier total in a VHF contest. You do not need an EME-class station, and best of all, you don't need to wait for a meteor shower or for one of those all-too-elusive band openings that usually happen when you had to be out of town.

Alas, all too few stations in North America have cared to put the effort into learning the HSCW technique for working meteor scatter. Our European friends have put us to shame in this respect; many hundreds of amateurs over there use the technique regularly. In our own hemisphere, HSCW meteor scatter has attracted surprisingly few converts. A North American High Speed Meteor Scatter Contest has been run for each of the past four years, and I've had great fun taking part in the 2000 and 2001 events. The total number of participants, however, has been under two dozen in any given year—and it seems that these include nearly all of the North American hams who have been active and HSCW-capable in those years.

Having learned International Morse as a youngster and never having lost my proficiency, I love CW as a mode of communication. But I also appreciate the progress that modern digital methods have brought to our hobby. Motivated in part by a desire to make VHF meteor-scatter communication accessible and attractive to a much larger number of fellow hams, and in part by a simple desire to show that it could be done, in April 2001 I set out to design a digital encoding scheme and software package to enable amateur QSOs using the brief pings from underdense meteor trails. The result has led to a computer program called *WSJT* (for "Weak Signal Communication, by K1JT") that implements a signal protocol called FSK441. The mode works so well that it has been rapidly embraced by the VHF fraternities in Europe and North America, and is now making inroads in Africa and the South Pacific, as well.

If your station is capable of weak signal SSB work on the 6 meter or 2 meter bands—say, if you have 100 W or more

[1]Notes appear on page 41.

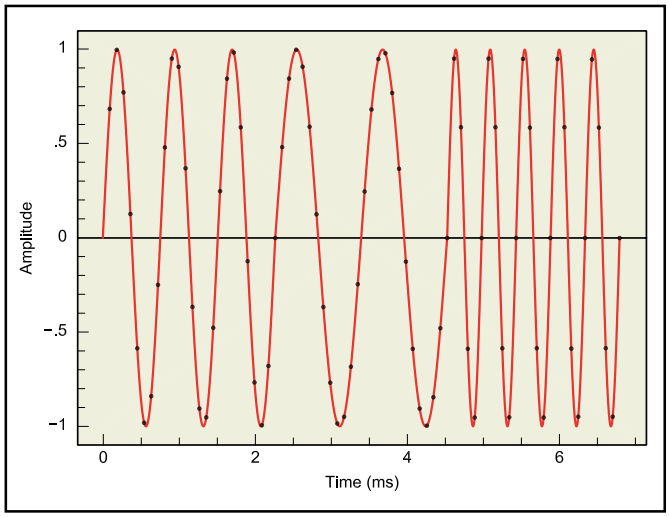


Figure 1—Audio waveform corresponding to the letter C in an FSK441 transmission. Each tone lasts for exactly 25 samples (filled circles) at the 11025 Hz sampling rate, or about 2.3 ms. Each character requires three tone intervals. The code for the letter C is 103, which means that the transmitted tones are at the frequencies 1323, 882 and 2205 Hz.

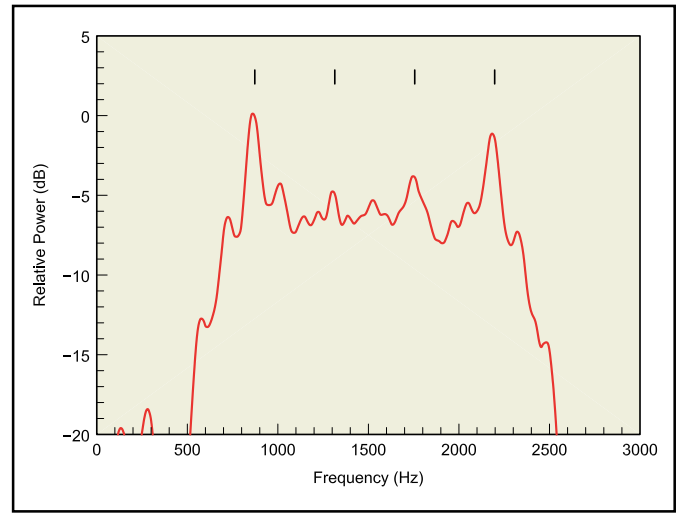


Figure 2—Computed spectrum of the FSK441 message "W8WN 27 K1JT 2727." The frequencies of the four basic tones are indicated by the tick marks above the spectrum. Note that nearly all of the transmitted power falls in the range 660–2425 Hz.

to a modest Yagi up at least 40 feet—then with the help of *WSJT* you should be able to work similarly equipped stations in the 500-1100 mile range at nearly any time of the day or year. (On the minimum end of the scale, *WSJT* QSOs have been made with as little as 10 W, and I have worked N4KZ rather easily at 610 miles when he was using an 80-meter loop antenna on 6 meters.) With a higher antenna and more power, QSOs out to 1300 or 1400 miles become possible. A few QSOs have already been made with *WSJT* on 222 MHz, as well, and contacts on 432 MHz might be possible near the peak of a major meteor shower.

What Do I Need?

Like a number of other digital and quasi-digital communication modes that have recently become popular on the amateur bands, such as PSK31, MFSK16 and Hellschreiber, *WSJT* requires an SSB transceiver, a computer running the *Windows* operating system, and a soundcard interfaced to the radio's "microphone in" and "speaker out" ports. A 75 MHz Pentium-class computer is a minimum, and you will be happier with a faster CPU, especially if you want to use other programs (such as a Web browser) when running *WSJT*. Your computer should have at least 24 MB of RAM, 40 MB of free disk space, and a monitor with 800 × 600 or higher resolution. Microsoft *Windows* 95, 98, NT, 2000 and XP have all been used successfully. You will, of course, need a station capable of weak signal work on one or more VHF bands.

The *WSJT* program is available for download free of charge at the Web site **pulsar.princeton.edu/~joe/K1JT** and at the European mirror site **www.vhfdx.de/WSJT**. Download the file *WSJT100.ZIP* for Version 1.00, or a similar file name with a higher version number, if one exists. Unzip the distribution file into a convenient directory such as C:\TEMP and then run SETUP.EXE in that directory to install *WSJT* to a permanent location of your choice. The default installation directory on most computers will be C:\Program Files\WSJT.

You will need a simple computer-to-radio interface like those required for such modes as PSK31, MFSK16, and Hellschreiber. The DTR or RTS line of one of the computer's serial communication (COM) ports is used to key your transmitter's push-to-talk (PTT) line. Connections are also required between the transceiver audio output and computer sound card input, and vice versa. Station accessories that accomplish these things are easy to build[3] and are available commercially from a number of sources advertising in *QST*. You will need a method of synchronizing your computer clock with UTC to an accuracy around one second or better. I heartily recommend a free software utility[4] called *Dimension 4*, which synchronizes your computer clock with atomic time standards at national timekeeping laboratories whenever you are connected to the Internet.

Sometime during the beta-test phase of developing *WSJT*, when I was getting swamped with requests for enhancements, Andy Flowers, K0SM, took pity on me and volunteered to help flesh out the online instructions I had written. With that collaborative effort as a start, further work at my end led to the presently available 13-page *User's Guide and Reference Manual*. If you plan to give *WSJT* and VHF meteor scatter a try, I urge you to download the *User's Guide,* print it out, and read it carefully. Although many have shown that it is possible to install *WSJT* and learn to use it by trial and error, the manual should definitely be read by anyone serious about getting the most from *WSJT*.

How Does It Work?

The encoding scheme used in *WSJT* was designed to make the best use of signals just a few decibels above the receiver noise, exhibiting rapid fading and Doppler shifts up to 100 Hz, and typically lasting from 20 to a few hundred milliseconds. The Doppler shifts and effective path-length variations make any sort of phase-shift keying (for example, a system analogous to PSK31) a poor candidate for this kind of signal. Large and rapid signal strength variations make on-off keying difficult to decode reliably. In addition, such modulation is inefficient in spectral usage at high speeds, and is very prone to errors caused by atmospheric noise. After considering many possible encoding schemes and testing several of them under real meteor-scatter conditions (thanks to the patient and tireless early morning efforts of Shelby, W8WN, who has seldom refused my request for a schedule!) in early June I decided on a scheme that uses four-tone frequency shift keying at a rate of 441 baud. The adopted scheme has been given the technical name FSK441, although most people seem to be calling it simply "the *WSJT* mode."

In a normal FSK441 message, each character is encoded as three audio-frequency tones sent sequentially. Each tone

can have one of four possible frequencies, so the maximum number of encodable characters is 4 × 4 × 4 = 64. For reasons described below, the four sequences that have the same tone sent three times in succession are reserved for a special purpose; in addition, the 15 remaining sequences that begin with the highest frequency tone are not used. This leaves 45 character codes available for general use. For the sake of consistency, and because I intended for *WSJT* also to implement the weak signal mode called PUA43, designed by Bob Larkin, W7PUA, I chose to use the same 43-character "alphabet" that is incorporated in that mode. This character set includes 26 letters, 10 digits, the space character, and the six special characters: . , ? / # $. Two available character codes remain undefined in FSK441.

Digital computers use binary arithmetic, and the basic unit of information is given the contracted name "bit" for "binary digit." When expressed in numerical terms, a bit can have the value 0 or 1. Since the FSK441 scheme uses four basic tones, base-four notation is the most convenient way of describing its code. For want of a better term, I call the digits of the base-four code "dits," rather than "bits." Each character in the FSK441 alphabet is described by a sequence of three dits, whose numerical values fall in the range 0 to 3. The full coding scheme of FSK441 is presented using this notation in Table 1. Three-digit numbers represent the three-tone sequences corresponding to each character. Tones 0 through 3 correspond to the audio frequencies 882, 1323, 1764 and 2205 Hz. Since the modulation rate is specified as 441 baud, or 441 dits per second, the character transmission rate is 441/3 = 147 characters per second. At this speed a ping lasting 0.1 seconds can convey a very respectable 15 characters of text.

The timing of FSK441 is such that each dit of each character consists of exactly two full cycles of the audio tone at 882 Hz, three cycles at 1323 Hz, four at 1764 Hz, or five at 2205 Hz. *WSJT* runs the computer sound card at a sampling rate of 11025 Hz and therefore each dit, 1/441 of a second long, requires exactly 25 samples for its representation in the digitized waveform. Each generated tone blends into the next one in a phase- and amplitude-continuous manner. An example of the generated signal is presented in Figure 1, which shows the audio waveform corresponding to the letter "C" (code 103; see Table 1). An FSK441 transmission contains no dead spaces between tones or between characters; the typical short messages exchanged in meteor scatter QSOs are sent repeatedly and continuously, usually for 30 seconds at a time. Different tones do not overlap in time, so there is little opportunity for even a poorly adjusted transmitter to produce intermodulation products. For all of these reasons, the audio signal used to generate FSK441 signals is spectrally clean and largely confined to the range 660-2425 Hz, thereby making very effective use of the audio bandwidth of a modern SSB transceiver. In a well-designed and well-adjusted transmitter, the resulting RF spectrum will be similarly clean, and it will remain so even if Class C power amplifiers (or poorly designed solid state amplifiers driven into their limiting regions) are used. An example audio frequency spectrum is shown in Figure 2, computed for the message "W8WN 27 K1JT 2727." The four individual tones can be seen in the spectrum, as well as the sidebands produced by their keying pattern in this particular message. Tones 0 and 3 happen to be used more frequently than tones 1 and 2 in this message, so their spectral peaks are proportionally higher in the average spectrum.

Table 1
FSK441 Character Codes

Character	*Tones*	*Character*	*Tones*
1	001	H	120
2	002	I	121
3	003	J	122
41	010	K	123
5	011	L	130
6	012	M	131
7	013	N	132
8	020	O	133
9	021	P	200
.	022	Q	201
,	023	R	202
?	030	S	203
/	031	T	210
#	032	U	211
space	033	V	212
$	100	W	213
A	101	X	220
B	102	Y	221
C	103	0	223
D	110	E	230
F	112	Z	231
G	113		

WSJT has another highly effective ploy in its bag of tricks, based on the use of the reserved character codes 000, 111, 222 and 333. Originally I identified these four codes with the ASCII characters +, *, % and @, but I recognized that if a message were composed of any one of these characters sent repeatedly, with no intervening spaces, the transmitter would send a pure tone: an unmodulated carrier at the frequency of the suppressed SSB carrier plus that of the appropriate audio tone. I decided to define such transmissions as having the meaning of the most frequently used short messages in high-speed meteor scatter QSOs, namely R26, R27, RRR and 73. Because these shorthand messages are transmitted as single tones, they have very narrow bandwidths upon reception, even after allowing for the vagaries of propagation. They are therefore easy to recognize, both by ear and by the software. The narrow bandwidth means that a suitable DSP algorithm can dig the signals out of the noise very effectively, even if they are significantly weaker than the weakest decodable multi-tone messages. Single-tone messages have proven to be very effective and reliable, except where co-channel QRM is a severe problem. When pings are few and weak, they can speed up the average time to complete a QSO by a factor of two or more.

Decoding the Pings

The computer algorithm for decoding a received FSK441 message must be able to detect pings, carry out two stages of synchronization on the signals within the pings, and finally translate a sequence of measured frequencies back into a text message. The code that finds pings and determines their length starts by measuring the received power in the full receiver passband, smoothed and sampled at 20 ms intervals. When the signal exceeds the background level by more than a specified threshold, a ping is said to have started. When the power has dropped to at least 1 dB below the threshold, the ping is said to have ended. Pings with deep fading may be interpreted as several closely spaced pings.

The synchronization required for message decoding occurs in two stages. The program first identifies the starting points of the sequences of 25 consecutive waveform samples that convey each transmitted tone. This task is tractable because within properly phased 25-sample intervals, FSK441 signals always consist of a single tone. The decoding software therefore needs to align things so that a mixture of tones is not found in any such 25-sample sequence. The result of this process is a series of measurements of the received audio tone frequencies that reproduce the sequence generated at the transmitter. In practice, the software also needs to account for some frequency offset between transmitter and receiver, perhaps up to 200 Hz or so. Having made its best estimate of the frequency error, the program identifies each received tone with one of the four nominal FSK441 frequencies and labels it with a dit value in the range 0–3, as defined earlier.

The second necessary synchronizing step is to establish which dits in an arbitrary sequence are the *leading* members of the three-dit sequences defining charac-

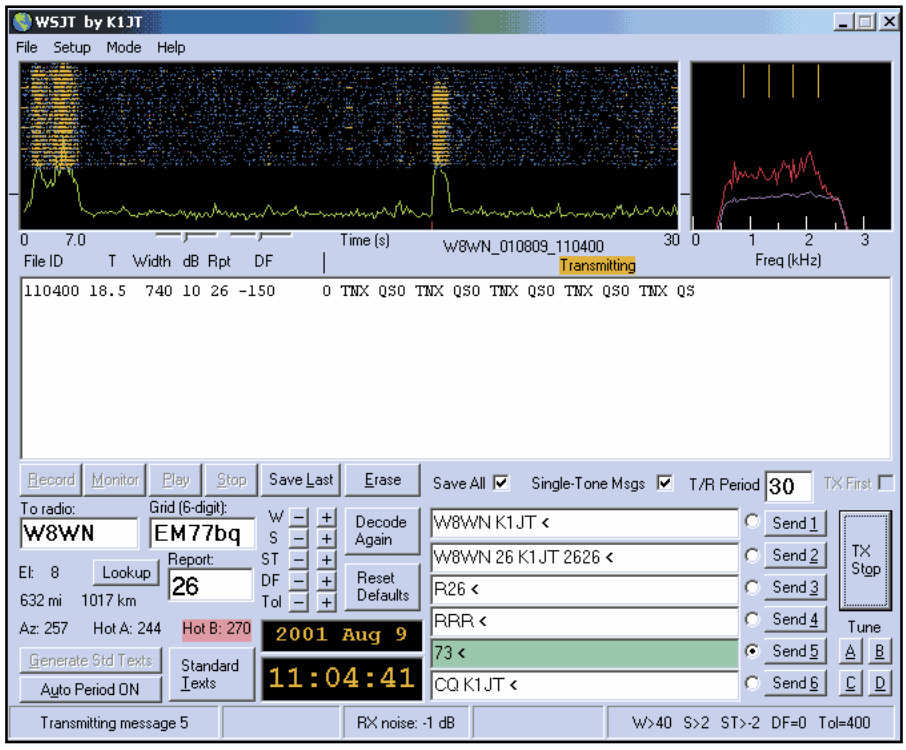


Figure 3—This screen-capture photo shows the main *WSJT* screen during a meteor scatter QSO with W8WN. Thunderstorms were present to the west of K1JT at the time, explaining the two static crashes near the beginning of the displayed 30-second recording as well as the noisier-than usual baseline of receiver background noise (the green line). The signal about 18 seconds into the record is a ping from an underdense meteor trail, and the message it conveyed is displayed in the central text box.

ters in the message. For reasons of transmission efficiency, no special synchronizing information is embedded in an FSK441 message. Instead, the proper synchronization is established from the message content itself, making use of the facts that (a) three-dit sequences starting with "3" are never used, and (b) the "space" character is coded as 033, as shown in Table 1. Messages sent by *WSJT* always contain at least one trailing space—the software inserts one, if you do not include it explicitly—and most messages will include additional spaces to improve readability. Other characters may have dits with value 3 in the second or third positions, but never in the first. Therefore, to properly synchronize a received signal the decoding algorithm examines the sequence of measured dit values, skipping through the time series in steps of three, and selects as the properly synchronized starting point a dit numbered N in the sequence such that none of the dits N, N+3, N+6, N+9, ... has the value 3. Under the conditions specified above, such a dit will necessarily be the leading one of an FSK441 character code.

After synchronization has been accomplished, message decoding is a snap. The sequences of dit values are converted from base-four notation into the computer's native binary arithmetic, and the numerical codes are converted to characters by means of a lookup table.

Two other subtleties of the decoding software are worth mentioning here. As you will quickly learn from listening to an FSK441 transmission, the audio waveform has a distinctive and easily recognizable "burbling" sound that is largely independent of the exact message content. This character can be described in terms of modulation of the signal power in each of the four tone frequencies, at the 441 Hz keying rate and its harmonics. The software readily detects this modulation; its absence implies that the signal being examined is *not* an FSK441 signal and that it may be safely rejected as interference or noise.

Single-tone messages are transmitted as pure carriers, and their effective bandwidths upon reception are essentially equal to the inverse of the duration of the ping. Even an extremely short ping of 20 ms duration will exhibit a bandwidth of only 50 Hz, far less than the modulated widths of the individual tones in a multitone message. Consequently, a different and much more sensitive detection method is appropriate. The spectrum of a ping suspected of carrying a single-tone message is examined with a spectral resolution of about 40 Hz, leading to very high sensitivity and an excellent ability to avoid spurious decodings.

Normal Operation

Figure 3 shows a screen-capture image of *WSJT* in operation at my station. At the top of the form are two graphical areas. The larger one displays a "waterfall" spectrogram in which time runs left to right and audio frequency increases upward. The signal displayed here is a 30 second recording from a QSO with W8WN; it includes two strong static crashes near the beginning, followed by a moderately strong ping about 18.5 seconds into the record. The green line at the bottom of this plot area represents the power in the full receiver passband, sampled every 0.1 second. The vertical displacement of each point on the green curve is proportional to the total power in all of the waterfall pixels directly above it, on a dB scale.

The smaller graphical window at the right displays two spectral plots, also on a dB scale. The purple line graphs the spectrum of audio-frequency noise, averaged over the full 30 seconds; in the absence of any strong signal, it effectively illustrates the receiver's passband shape. The red line displays the spectrum of the strongest detected ping. Yellow tick marks at the top of this plot area (and also at the left, center, and right of the larger area) indicate the nominal frequencies of the four FSK441 tones. The 441-baud modulation broadens out the pure tones so that their widths begin to approach their spacing, thereby creating an approximately flat transmitted spectrum for most messages. (Note, however, that local peaks may still exist in the spectrum, as illustrated in Figure 2.) In the red curve of Figure 3 you can just about recognize the peaks corresponding to the four basic tones. Each tone has been shifted slightly to the left, relative to the yellow tick marks, because of a small frequency offset between transmitter and receiver.

The large text box in the middle of the *WSJT* screen displays decoded text from any pings detected in the receiving interval. One line of text appears for each validated ping. Information in the text line in Figure 3 shows that the recording interval began at 11:04:00 UTC and that a ping was detected 18.5 seconds into the interval. The ping was 740 ms long, and peaked 10 dB above the noise. According to the somewhat arbitrary criteria coded into *WSJT* (which are made to be roughly equivalent to the operator-judged signal reports sent in high-speed CW meteor scatter work), such a signal rates a "26" signal report. The next number shows that the program estimates W8WN to have been transmitting at a frequency offset by –150 Hz relative to my receiver's frequency. Finally the decoded message is shown, with Shelby thanking me for another fine 2-meter meteor-scatter ragchew over our 640-mile path.

You may have noticed that the two

ping-like signals near the start of the 30-second receiving interval did not produce any decoded text. In the green-line plot and even in the waterfall spectrogram, these signals look very similar to the real ping later in the recording. However, they would not have sounded the same. As described earlier, the *WSJT* program has been taught how to recognize the "burbling" characteristic sound of an FSK441 signal. In the present instance the program would have examined the two early pulses, decided that they did not "smell quite right," and properly rejected them as noise.

A few additional comments on the decoded text in Figure 3 may be helpful. At 147 characters per second, a 740 ms ping should contain more than 100 characters. All displayed messages are truncated to 40 characters, however. Since the actual messages transmitted by *WSJT* are limited to a maximum of 28 characters, even the longest ones can be displayed to their full extent, perhaps with some repetition. Under some circumstances, *WSJT* gains additional sensitivity by detecting the repetition pattern of a message and averaging over all the cycles contained in the length of a received ping. This process is most useful for weak pings whose duration is 0.2 seconds or longer, and it can be especially effective on 6 meters where ping lengths are greater. When the program has taken advantage of message averaging, an asterisk is appended to the line of decoded text.

You can control the behavior of *WSJT* by selecting items from the four menus at the top of the screen and using the controls and text boxes in the lower part of the form. As one example, the "Options" item on the "Setup" menu causes the screen shown in Figure 4 to be displayed. This form permits the entry of various station parameters that typically do not change very often. I will not describe the functions of the on-screen controls any further here; you can readily guess the purpose of many of them from the labels visible in Figures 3 and 4, and they are described in full detail in the downloadable *User's Guide and Reference Manual*.

Standard Procedures

Meteor scatter is not a communication mode well suited to ragchewing! QSOs can be completed much more easily if you adhere to a set of standard procedures that have evolved from HSCW and other earlier techniques. A standard message format and message sequence helps the process considerably. *WSJT* generates standard messages automatically, as illustrated in the text boxes at the lower right of Figure 3. The formats of the messages are designed for efficient transfer of the most essential information: the exchange of both call signs, a signal report or other information, and acknowledgments of same. Timed message sequences are a must, and *WSJT* defaults to 30 second transmitting and receiving periods. Although other intervals can be selected, it helps to minimize QRM from nearby stations if everyone adheres to one standard. According to the procedures used by common consent in North America, the westernmost station transmits first in each minute.

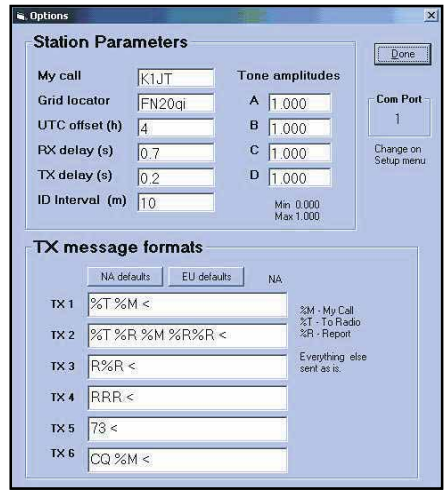


Figure 4—The "Options" screen of *WSJT*, called up from an item on the "Setup" menu. Use this screen to set a number of station parameters, typically ones that do not change frequently. Amplitudes of the four FSK441 tones can be set individually, if desired, to correct for certain transmitter idiosyncrasies. Programmable templates are available for establishing the format of standard messages, and default standards are provided for both North American and European conventions.

At the start of a QSO you should send the other station's call and your own call alternately. Then, as the QSO proceeds…

1. If you have received less than both calls from the other station, send both calls.

2. If you have received both calls, send both calls and a signal report.

3. If you have received both calls and a report, send R plus signal report.

4. If you have received R plus signal report, send RRR.

5. If you have received RRR—that is, a definite acknowledgment of all of your information—your QSO is officially complete. However, the other station may not know this, so it is conventional to send 73 (or some other conversational information) to signify that you are done.

Signal reports are conventionally sent as two-digit numbers chosen from non-overlapping ranges. The first digit characterizes the lengths of pings being received, on a 1-5 scale, and the second estimates their strength on a 6-9 scale. The most common signal reports are "26" for weak pings and "27" for stronger ones, but under good conditions reports such as "38" and higher are sometimes used. Whatever signal report you decide to send to your QSO partner, it is important that you do not change it, even if stronger pings should come along later in the contact. You never know when pings will successfully convey fragments of your message to the other end of your path, and you want your received information to be consistent.

Slightly different standard procedures have been adopted for high-speed meteor-scatter in Europe. You will undoubtedly find it useful to seek out and read additional information on current practices available on the Internet. Some good starting places are listed in the sidebar entitled "Meteor Scatter Resources."

The 6- and 2-meter calling frequencies in common use for *WSJT* in North America are 50.270 and 144.140 MHz. Typical practice for calling CQ is to send something like CQ U5 K1JT or CQ D9 K1JT, indicating that you will listen for replies up 5 kHz or down 9 kHz from your transmitting frequency, and will respond on that frequency. However, the easiest way to initiate a QSO is to post a one-line invitation on a Web page known as "Ping Jockey Central" (see sidebar). Someone at a suitable range from you will

Meteor Scatter Resources

For additional reading on the history and astrophysics of amateur meteor-scatter communications, as well as operating hints and details concerning practices in current use, the following references and Internet addresses are recommended.

1. The classic papers on amateur meteor-scatter communications are the two by Walter F. Bain, W4LTU: "VHF Meteor Scatter Propagation," Apr 1957 *QST*, p 20, and "VHF Propagation by Meteor-Trail Ionization," May 1974 *QST*, p 41. The second one is reprinted in the ARRL publication *Beyond Line of Sight.*

2. Many additional papers, unpublished hints, and extremely useful bits of information can be found on the Web pages **www.qsl.net/w8wn/hscw/hscw.html** and **www.meteorscatter.net/hsms.htm**, and links contained therein.

3. A number of highly useful explanatory files are bundled with a freely available program called *MS-Soft*, by OH5IY, available at **www.sci.fi/~oh5iy**.

4. At least two subscriber reflectors are devoted to meteor scatter communications. Their addresses are **hsms@qth.net** (primarily used in North America) and **meteor-scatter@qth.net** (primarily in Europe).

5. Meteor scatter schedules can be made in near real time by posting a message on the Web page known as Ping Jockey Central at **www.pingjockey.net/cgi-bin/pingtalk**.

likely reply to such a posting, suggesting a specific frequency, and your QSO can begin. The ranges of frequencies now being used for *WSJT* in North America are 50.270-50.300 and 144.100-144.150.

Increasing Levels of Activity

Version 0.82 of *WSJT* was first made available to a group of about 20 volunteer beta-testers, nearly all of them HSCW veterans, on June 20, 2001. A majority of this group started making QSOs immediately, and they helped me to polish some of the program's rough edges and root out some bugs. An open beta release of Version 0.92 was announced on July 7, and within two more weeks the program was being widely used and discussed on VHF- and meteor-scatter Internet reflectors and DX clusters in both America and Europe. Release of a stable and more polished Version 1.0 of *WSJT* was announced on August 26. Since that time the installation package has been downloaded more than 1700 times from my own Web site, and more than 3000 times from the European mirror site.

I have made more than 150 contacts with *WSJT* myself, including 45 "initials" (first contacts with a new call sign). These QSOs include 19 states and 38 Maidenhead grid locators on 2 meters, and they do not include stations within 500 miles of me. Most of my contacts were made with a 160 W brick and an 11 element Yagi at 45 feet. Many other stations have been far more successful; for example, K0PW told me recently that in three months he had worked 73 initials and 30 states on 2 meters, using *WSJT*. I have counted more than 120 North American hams that are actively using the mode now, and additional calls are showing up every week. In Europe the activity levels appear to be substantially higher: I have heard estimates suggesting that at least 500 amateurs there are using *WSJT*, representing more than 50 DXCC entities. These numbers include extra activity centered around the Perseids meteor shower, which peaked on August 12, and it is likely that similar increases will occur near the peaks of the remaining members of the "big four" of the annual meteor showers: the Leonids around November 18, Geminids around December 13, and Quadrantids around January 3.

Another indicator of the growing interest in *WSJT* is its significant presence in the September 2001 VHF QSO Party, the first major North American VHF contest since the release of the program. I have no idea how many QSOs and multipliers were made using the mode during the contest, but I suspect the answer must be at least in the hundreds. I saw plenty of efforts to make *WSJT* schedules in advance of the contest period, and in the East, at least, the larger mountaintop "super stations" were involved. Without really trying very hard, I made 18 meteor scatter contacts during the contest, 17 of them being multipliers I would not otherwise have worked. These were not the quickest QSOs made during the contest, but they were not unreasonably long either. The median time to complete a QSO was 5 minutes on 6 meters and 13 minutes on 2 meters.

Looking Ahead

On a time-available basis, I hope to make further improvements in *WSJT*'s decoding algorithms and its convenience of use. Even more interesting, from a technical point of view, will be the incorporation of the extreme weak-signal mode known as PUA43. Unlike FSK441, PUA43 is designed for signals that are more or less constant in amplitude but buried deep below the level of the receiver noise. Even though quite inaudible, such signals can convey a slow but steady stream of information that is decodable by using DSP integration techniques. W7PUA and his collaborators have demonstrated the impressive capabilities of the PUA43 mode by making EME (moonbounce) contacts with 150 W and single Yagis on 2 meters, and with 5 W and 10 foot dishes on 1296 MHz. To my knowledge, the PUA43 mode is presently available only in software written for the elegant home-brewed DSP-10 2-meter transceiver,[6] also designed by W7PUA. I hope to incorporate the mode into *WSJT*, as well, thereby making its capabilities available to amateurs using a much wider range of equipment.

As a sort of enticement for things to come, let me quote some numbers comparing the theoretical sensitivities and transmission rates of modes being discussed here, as well as the more familiar CW and SSB. In a typical transceiver's 2.5 kHz bandwidth, an SSB signal needs to be 4-6 dB above the noise to be copyable. Normal speech rates are two or three words per second; when one is sending call signs by voice as part of a minimal QSO, this means about three or four letters per second. In the same receiver bandpass, FSK441 signals can be copied at about 2 dB above the noise, and the special single-tone messages used in *WSJT* are copied down to 4 or 5 dB *below* the noise. The FSK441 transmission rate is a hefty 147 characters per second, but of course the useful throughput depends on the availability of meteors. Morse code at 20 WPM can be copied if it is about 6 dB below the noise in a 2.5 kHz bandwidth. (Note that such a signal would be about 1 dB *above* the noise in a 500 kHz bandwidth.) At 20 WPM, the throughput of CW is about 1.7 characters per second.

Amateurs customarily think of CW as being the most effective mode for weak signal communication, and the numbers just quoted seem to bear this out. However, please take note that a one-minute PUA43 transmission, containing 28 characters sent at 0.5 characters per second, can be copied all the way down to *some 27 dB below the receiver noise*. Post-detection averaging can yield nearly another 6 dB improvement in half an hour of alternating one-minute intervals of transmission and reception. The slower transmission rate, and even more importantly the coherent detection of the narrow band signal over 2-second intervals, accounts for the very substantial increase in signal to noise ratio.

PUA43 is a highly effective mode for VHF/UHF tropospheric propagation, in addition to EME. Because it works well with weak but steady signals, it nicely complements the short-ping capabilities of FSK441. With both PUA43 and FSK441 in its bag of tricks, the modest VHF station described earlier should be able to work out to 500 miles or so at any time with tropospheric propagation and the PUA43 mode, and from there out to 1100 miles and beyond by using FSK441 and meteor scatter. If you are within those distances of central New Jersey, I look forward to working you with one of these modes soon!

Joe Taylor was first licensed as KN2ITP in 1954, and has since held the Amateur Radio call signs K2ITP, WA1LXQ, W1HFV, VK2BJX and K1JT. Trained in the academic fields of physics and astronomy, he was Professor of Astronomy at the University of Massachusetts from 1969 to 1981 and since then has been Professor of Physics at Princeton University. His research specialty is radio astronomy, and he was awarded the Nobel Prize in Physics in 1993 for discovery of the first orbiting pulsar. He currently serves as Dean of the Faculty at Princeton and chases DX from 160 meters through the microwave bands. You can contact Joe at 272 Hartley Ave, Princeton, NJ 08540-5656; **k1jt@arrl.net**.

Notes

[1]Joe Taylor, K2ITP, "Working Ionospheric Scatter on 50 MHz," Dec 1958 *QST*, p 28.

[2]Shelby Ennis, W8WN, "Utilizing the Constant Bombardment of Cosmic Debris for Routine Communication," Nov 2000 *QST*, p 28.

[3]Steve Ford, WB8IMY, "PSK31 2000," May 2000 *QST*, p 42.

[4]Download the computer clock utility *Dimension 4* from **www.thinkman.com/dimension4**.

[5]The *WSJT* home page is at **pulsar.princeton.edu/~joe/K1JT**.

[6]Bob Larkin, W7PUA, "The DSP-10: An All-Mode 2-Meter Transceiver Using a DSP IF and PC-Controlled Front Panel," Sept 1999 *QST*, p 33, Oct 1999 *QST*, p 34, and Nov 1999 *QST*, p 42. QST

By John Hansen, W2FS

A PC Keyboard Interface for the Kenwood D700

Make a great APRS-capable transceiver even better!

Last year I picked up a Kenwood D700 dual-band transceiver. Since this radio is a voice rig that includes a 1200/9600-baud packet TNC, the whole is greater than the sum of the parts. Kenwood has optimized the D700 for use with APRS, the Amateur Position Reporting System developed by Bob Bruninga, WB4APR. APRS is now much more than simply a position reporting system; it also (among other things) provides a relatively transparent way to send short text messages in near real time to other hams either locally or across the country. It also has the capability to send e-mail via the Internet from most areas in the United States.

In designing the D700, Kenwood took advantage of these capabilities by having incoming messages displayed right on the front panel display. You can send and receive text messages without hooking up a computer or terminal of any kind. Furthermore, depending on how active APRS is in your area, other services (such as notification of satellite passes) may be available as well.

The principal problem with the D700 is that the text entry process for originating messages is pretty awkward. The radio provides three ways to enter text. First, you can enter text using the main tuning dial and the front panel push buttons. To do this, first turn the tuning dial until the proper letter shows up on the radio's display and then push keys on the front panel to advance the cursor to the next letter's position. This is easiest to do if you use two hands, one for the tuning dial and one for the entry buttons (don't try this while driving!). Alternatively, you can enter text from the microphone's DTMF pad. However, this often takes multiple key presses to enter a single character. Entering an "@" sign, for example, as one might want to do when addressing e-mail, requires 18 presses of the microphone's "#" key. The final way to enter text is to connect a computer or terminal to the radio's serial port. While this eases text entry, it does require that you carry a computer around with your radio.

Some months ago WB4APR suggested that it ought to be possible to hook a standard PC-style keyboard up to the D700 to enter text. Indeed, since the radio itself provides the display, all we really need for a workable system is a keyboard. Because PC keyboards are probably the single cheapest keypad available today (and are available practically everywhere) they seemed to be the obvious choice for this application. Some manufacturers even make miniature keyboards that would work well in a mobile environment.

Project Overview

This project provides an interface allowing users to connect any PS/2 style keyboard to a D700 for the purpose of entering text. The interface installs in the microphone line, and a parallel RJ-45 jack allows the microphone and a keyboard to be connected at the same time. The interface reads the input from a keyboard and simulates the microphone button presses that would be required to enter the text. For example, when you press the F key on the keyboard, the interface sends the number "3" DTMF tone 3 times as is required by the D700 to enter an "f" on the radio's display. This may seem like a clumsy process, but it actually works quite well. I can touch type at over 50 WPM and the radio interface can keep up with me, displaying the text as I type it on the keyboard. Exceptions to this are when capital letters are entered (which require 4 or more DTMF tones), or when certain punctuation is entered. For example, it takes the interface just over a full second to send the 18 tones required for the "@" sign. In these cases, if you are a fast typist, it is necessary to pause slightly between the capital and punctuation keys.

The interface is not limited to simply entering text. In addition to simulating the microphone's DTMF keypad, the unit can also simulate all six of the function keys that are included on the microphone. This allows a number of processes to be automated. For example, to send a message on the keyboard, one simply presses the F2 function key. This takes the radio directly to the message entry screen and places the cursor at the beginning of the "To" field. Normally this would require four keystrokes on the front panel of the radio. After typing in the text for the "To" field, the user presses the ENTER key and is taken immediately to the text field it-

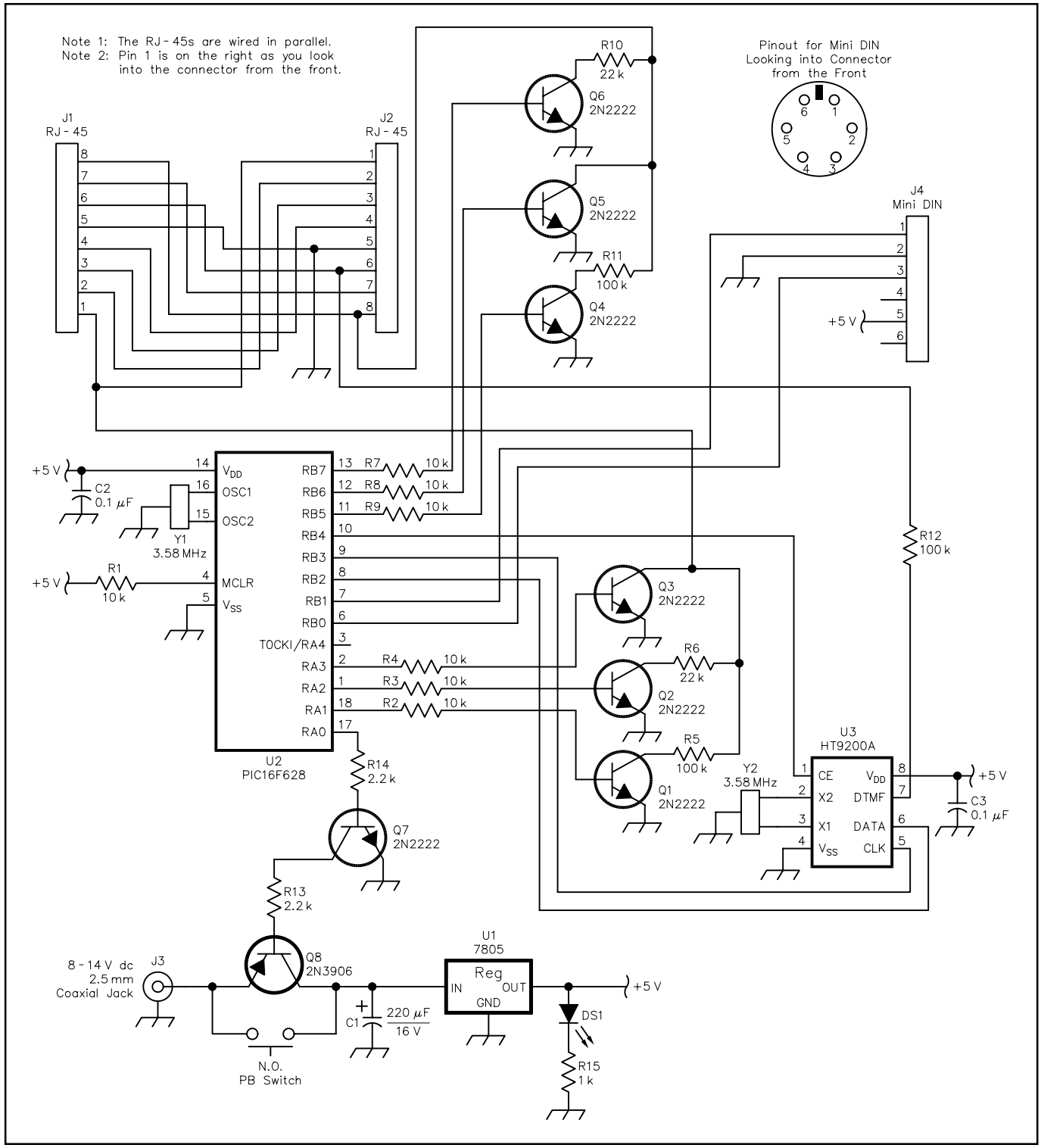


Figure 1—Schematic diagram of the D700 interface. Resistors are 1/4 W carbon composition. A complete kit of parts (less enclosure) is available for $40 postpaid in the US ($43 elsewhere) from the author at 49 Maple Ave, Fredonia, NY 14063. More information is available on the author's Web site at john.hansen.net/Kenkey.htm. The PC board only is available for $5 from FAR Circuits, 18N640 Field Court, Dundee, IL 60118; www.cl.ais.net/farcir/.

C1—220 µF electrolytic, 16 V.
C2, C3—0.1 µF ceramics.
DS1—LED, red.
J1, J2—RJ-45 jacks.
J3—Coaxial dc power connector.
J4—6-pin mini DIN jack.
Q1-7—2N2222 transistors.
Q8—2N3906 transistor.
R1-4, 7-9—10 kΩ resistors.
R5, R11, R12—100 kΩ resistors.
R6, R10—22 kΩ resistors.
R13, 14—2.2 kΩ resistors.
R15—1 kΩ resistor.
U1—7805 5-V voltage regulator.
U2— PIC16F628. Available from DigiKey, 701 Brooks Ave South, Thief River Falls, MN 56701; tel 800-344-4539; www.digikey.com. Must be programmed before use (see text).
U3—HT9200A TouchTone encoder. Available from the author or Holmate Technology, 48531 Warm Springs Blvd, Suite 413, Fremont, CA 94539; tel 510-252-9880.
Y1, Y2—3.58 MHz ceramic resonators. Available from Mouser Electronics, tel 800-346-6873; www.mouser.com. Part number 520-ZTA358MG.
Enclosure—Pac-Tec HB9VB, available from Mouser Electronics, part number 616-62006 (bone) or 616-60620 (black).

self. The message text can then be typed. When done, pressing the ENTER key again sends the message, while pressing the ESC key aborts the process and returns the user to the radio's main screen. Note that with this interface and a keyboard, it is possible to send a message without ever touching the radio itself.

There are function keys to automate other processes as well. Pressing F3 for example, takes the user directly to the list of APRS stations heard. The up/down cursor keys permit scrolling through the list of stations. Hitting the ENTER key brings up the detail for the selected station. The ESC key returns the radio to its main screen. The F4 key performs the same function for the list of messages received.

Finally, functions keys F5 through F8 allow the user to access up to four text memories that can be used for frequently typed text. Holding down the CTRL key while pushing one of these keys will initiate recording. The user can then type up to 31 text characters to be recorded. At the end of the recording, the user simply holds down the CTRL while tapping the function key again. To send a recorded message, the desired function key is pressed without using the CTRL key.

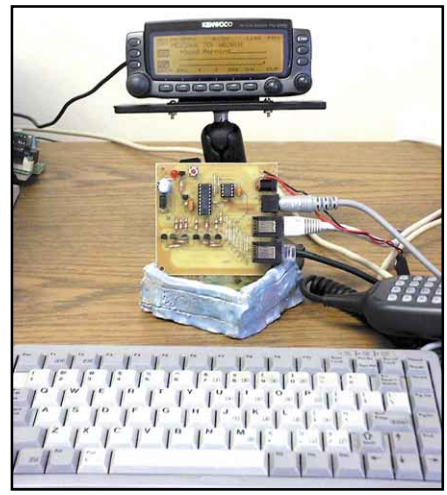
In order for the interface to work with your D700, it is necessary to make some changes to the menu dettings on the radio itself:

Set menu 1-8-1 (setting PF1 (PF)) to CTRL.
Set menu 1-8-2 (setting PF2 (MR)) to MUTE.
Set menu 1-8-3 (setting PF3 (VFO)) to MSG.
Set menu 1-8-4 (setting PF4 (CALL)) to LIST.

Circuit Description

The project is implemented with just three ICs. A PIC16F628 microcontroller reads the keyboard and controls an HT9200A TouchTone generator chip. Six NPN transistors, connected through resistors of various values, simulate the D700 microphone function keys.

The 16F628 is a relatively new chip that is destined to replace the venerable PIC16F84 as a starting point for many experimenters interested in learning to program embedded microcontrollers. It has twice the memory of the F84 (2 Kbytes), over 3 times as much RAM data storage space (224 bytes) and twice as much EEPROM data storage (128 bytes). It also has an on-board USART for easy serial communication, three internal timers (the 16F84 has 1), and supports easy low-voltage programming. In some applications, you can even use an internal oscillator in the 16F628 and do away with the need for either a crystal or ceramic resonator. What's more, it costs about half as much as the 16F84. Is it any wonder that it has been called the "F84 killer" in some quarters?



The interface board undergoes testing at the author's station.

Construction of the unit is fairly straightforward. Figure 1 contains a schematic drawing for the project. The hex file image for the PIC is available for those who have the ability to program their own PICs. You can download it at **www.arrl.org/files/qst-binaries/**. Look for *APRS.hex*. The HT9200A chips can be tough to find, so I am offering them for sale at $5 each. A complete kit of parts (including the HT9200A and a pre-programmed PIC) is on hand for those who prefer one-stop shopping (see the Figure 1 caption).

A PC board for the project (the same one that is included in the kit) is available that is specifically designed to fit the standoffs in a standard Pac-Tec HB9VB enclosure. This box also contains a separate compartment for a 9-V battery. The unit can either be powered from a battery or from an 8-14 V dc power supply. Do not try to power the unit from the voltage that appears at the D700 mike jack. It simply does not have an adequate current rating to support this application. *Damage to your radio could (and probably will) result from trying this!*

The system of powering the unit merits some explanation. An early tester of the unit thought that it would be useful if the unit could automatically completely power down (zero current) when not in use. The theory was that it could then be more easily used for emergency applications, since it could be stored with a battery in it and it would not matter whether the user remembered to turn it off or not. This also makes sense for mobile operation where operators often forget to turn things off before leaving their cars. As a result, the pushbutton and transistors Q7 and Q8 were added. In conjunction with the PIC, this circuit completely powers down the unit after no keystrokes have been entered for a period of three minutes. The feature can be defeated, if desired, by permanently jumpering the pushbutton terminals. In this case, transistors Q7 and Q8, resistors R13 and R14, and the pushbutton itself may be safely omitted.

This process works as follows. The pushbutton causes power to be applied to the PIC. The first thing the PIC does is to place 5 V on pin 17. Through Q7 and Q8, this provides power to the circuit even when the pushbutton is released. The pushbutton turns the unit on and begins the timer. If the timer reaches three minutes, pin 17 is allowed to drop to ground, switching off Q7 and Q8 and thereby removing power to the system. Every time the interface senses that the user has pressed a key on the keyboard, the timer is reset, and power down is delayed for at least another three minutes.

A Few Problems

This system of simulating microphone key presses using a DTMF generator chip is an effective, but somewhat crude system. While the overall result is quite satisfactory, there are a few problems.

First, there is no way for the interface to determine what screen is currently being displayed on the radio. If someone's position is currently being displayed on the radio, for example, you cannot move to the message composition screen by pressing F2. However, you can first restore the default frequency screen by pressing the escape key and then send a message using the F2 key. If you try to send a message while someone's position is on the screen, you may find that the "cntl" feature is accidentally turned on. If this happens, you can turn it off by pressing the ENTER key. Similarly, if you press the ESC key at the wrong time, you may find that the audio is muted (the word "mute" appears in the upper right hand corner of the screen). If this happens, it can be undone by pressing the ESC key twice.

Because of the very high speed at which the DTMF tones are being sent to the radio, you may find that the radio makes occasional errors in interpreting the letters typed. However, I've found that these errors occur in fewer than one percent of the characters typed.

Conclusion

Many users of the D700 were originally attracted to the radio because of its messaging capability. However, they soon discovered that the awkwardness of the radio's text entry mechanisms made messaging difficult. Adding a keyboard to the D700 dramatically improves its usefulness by making text messaging relatively pain free.

You can contact the author at 49 Maple Ave, Fredonia, NY 14063; **hansen@fredonia.edu**.

QST

By Steve Ford, WB8IMY

Across Oceans of Time

In December we celebrate the 80- and 100-year anniversaries of two technological feats that shaped the modern world.

The Earth has circled our sun 100 times since December 12, 1901. Nations have risen and fallen. Four generations of humanity have made their entrances and exits on the cosmic stage.

Time has a way of diminishing the echoes of people and events. As eyewitnesses vanish into history, milestones blur and become abstract. We struggle to keep the memories alive through repetition. Stories are told and re-told. Events are re-enacted. We do this not only to honor the past, but also to retrace our footsteps so that we can understand how we came to be where we are.

Almost no one reading these words was alive on December 12, 1901, but we were all profoundly affected by what took place on the cold windswept coast of St John's, Newfoundland, Canada. Two days earlier a hydrogen-filled balloon had taken to the sky, trailing a thin copper wire. The wire snapped and the balloon drifted out to sea. On the next day yet another balloon floated above the sand, carrying yet another mysterious wire. But this cable parted as well, and the balloon was lost.

On December 12 a large silk-and-bamboo kite gingerly crept toward the clouds. This time the wire held. At 11:30 AM a telegram was hurriedly dispatched to Poldhu, on the southwest tip of England. It was the order to begin transmission. The Poldhu operators obeyed, keying sparks of blue electric fire.

In St John's, a young man named Guglielmo Marconi strained to hear the clicking signals that he prayed would come. His assistant warned that the winds were increasing, and that the kite mooring could fail at any moment. At about 12:30 Marconi heard three distinct clicks, the Morse letter "S." For the first time in human history a radio signal had spanned the Atlantic Ocean. Marconi had proven to the world that long-distance wireless communication was indeed possible. It was the first day of the global radio age.

W1AW Celebrates the Transatlantic Tests on the Air

ARRL Headquarters station W1AW will be on the air December 3-7 to honor the 80th anniversary of the transatlantic tests. Listen for W1AW/80 on many HF, VHF and UHF bands (including satellites). A special QSL will be available for contacts or SWL reports. Please send QSL requests to W1AW/80, 225 Main St, Newington, CT 06111. Include a self-addressed, stamped envelope (or appropriate number of IRCs).

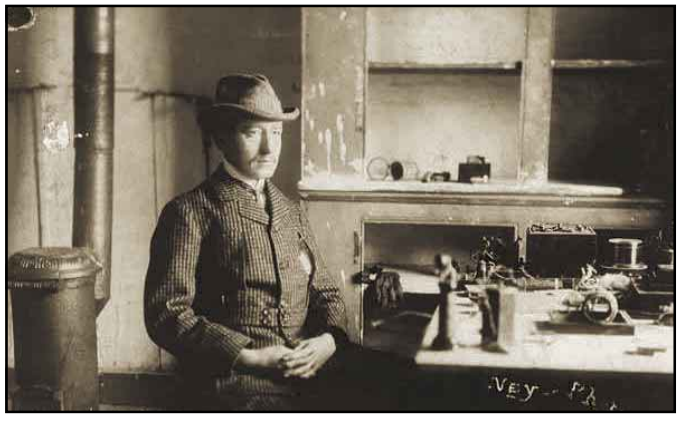
The Birth of Amateur Radio

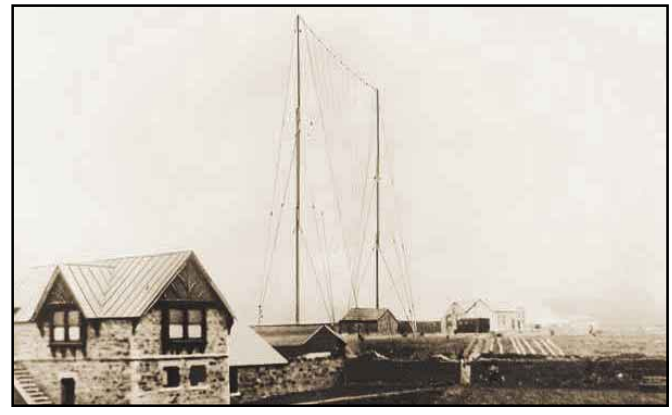
Although Marconi never obtained a license, it's safe to say that he and his contemporaries (such as Tesla and Fessenden) were among the first amateurs. They lit the fuse that would launch a communication medium unlike anything that had come before.

As news of their achievements spread, others were drawn to the fascination of radio. Less than a decade later, hundreds of experimenters were filling the airwaves with signals—much to the consternation of the US Navy, which had deployed radios for ship-to-shore communication. Remember that these were the days before selective receivers. The radios of a century ago were designed to detect signals across a broad bandwidth. "Selectivity," as we know the term today, was almost nonexistent. To compound the problem, everyone transmitted with a technique that involved generating arcs of electricity across carefully calibrated air gaps. The resulting *spark-gap* signals were wide, raspy buzzes.

The constant spark chatter among the experimenters made it difficult for Navy operators to communicate. They relied on

Marconi at St John's.





Marconi's transmitting station at Poldhu.

Marconi in His Own Words

Guglielmo Marconi's own record of the historic experiments of December 12, 1901 reads as follows:

"On November 26, I sailed from Liverpool in the liner *Sardinian* accompanied by two assistants, Messrs. Kemp and Padget. As it was clearly impossible at the time of the year, owing to the inclement weather and especially in view of the shortness of the time at our disposal, to erect high posts to support the aerial, I had arranged to have the necessary aerial supported in the air by a small captive balloon. We brought with us two balloons as well as six kites.

"We landed at St John's on Friday, December 6, and the following day, before beginning operations, I visited the governor, Sir Cavendish Boyle, the premier, Sir Robert Bond, and other members of the Ministry who promised me their heartiest cooperation and placed the resources of every department of the government at my disposal in order to facilitate my work. They also offered me the temporary use of such lands as I might require for the erection of depots at Cape Race, or elsewhere, if I should eventually determine to erect the wireless stations which they understood were then being contemplated.

"After taking a look at the various sites which might prove suitable, I considered that the best one was to be found on Signal Hill, a lofty eminence overlooking the port and forming the natural bulwark which protects it from the fury of the Atlantic gales. On top of this hill there is a small plateau of some two acres in area, which I thought very suitable for the manipulation of either the balloons or the kites.

"On a crag on this plateau rose the new Cabot Memorial Tower which was designed as a signal station, and close to it was an old military barracks which was then used as a hospital. It was in a room in this building that I set up my apparatus and made preparations for the great experiment.

"On Monday, December 9, barely three days after my arrival, I began work on Signal Hill together with my assistants. I had decided to try one of the balloons first as a means of elevating the aerial and by the Wednesday we had inflated it and it made its first ascent during the morning. Its diameter was about fourteen feet and it contained some 1000 cubic feet of hydrogen gas, quite sufficient to hold up the aerial which consisted of a wire weighing about 10 pounds. Owing, however, to the heavy wind that was blowing at the time, after a short while the balloon broke away and disappeared to parts unknown. I came to the conclusion that perhaps the kites would answer better, and on Thursday morning, in spite of the furious gale that was blowing, we managed to elevate one of the kites to a height of about four hundred feet.

"It was a raw day and, at the base of the cliff, three hundred feet below us, thundered a cold sea. Oceanward, through the mist I could discern dimly the outlines of Cape Spear, the easternmost reach of the North American continent, while beyond that rolled the unbroken ocean, nearly 2000 miles of which stretched between the British coast and me. Across the harbour the city of St John's lay on its hillside, wrapped in fog.

"The critical moment had come for which the way had been prepared by six years of hard and unremitting work in the face of all kinds of criticisms and of numerous attempts to discourage me and turn me aside from my ultimate purpose. I was about to test the truth of my theories, to prove that the three hundred patents that the Marconi companies and myself had taken and the tens of thousands of pounds which had been spent in experimenting and in the construction of the great station at Poldhu, had not been in vain.

"In view of the importance of all that was at stake I had decided not to trust to the usual arrangement of having the coherer signals recorded automatically through a relay and a Morse instrument on a paper tape, but to use instead a telephone connected to a self-acting coherer, the human ear being far more sensitive than the recorder. Suddenly, about half past twelve there sounded the sharp click of the tapper as it struck the coherer, showing me that something was coming and I listened intently. Unmistakably, the three sharp little clicks corresponding to three dots, sounded several times in my ear, but I would not be satisfied without corroboration.

"'Can you hear anything, Mr Kemp?' I said handing the telephone to my assistant. Kemp heard the same thing as I, and I knew then that I had been absolutely right in my calculations. The electric waves which were being sent out from Poldhu had traversed the Atlantic, serenely ignoring the curvature of the Earth which so many doubters considered would be a fatal obstacle, and they were now affecting my receiver in Newfoundland. I knew that the day in which I should be able to send full messages without wires or cables across the Atlantic was not far-distant and, as Dr Pupin, the celebrated Serbo-American electrician, very rightly said shortly afterwards, the faintness of the signal had nothing to do with it. The distance had been overcome and further development of the sending and receiving apparatus was all that was required.

"After a short while the signals stopped, evidently owing to changes in the capacity of the aerial wire which in turn were due to the varying height of the kite. But again at 1:10 and 1:20 the three sharp little clicks were distinctly and unmistakably heard, about 25 times altogether. On the following day the signals were again heard though not quite so distinctly. On Saturday a further attempt was made to obtain a repetition of the signals, but owing to difficulties with the kite we had to give up the attempt. However, there was no further doubt possible that the experiment had succeeded, and that afternoon, December 14, I sent a cablegram to one of the directors of the Marconi Company, informing him that the signals had been received but that the weather made continuous tests extremely difficult. That same night I also gave the news to the Press at St John's whence it was telegraphed to all parts of the world."

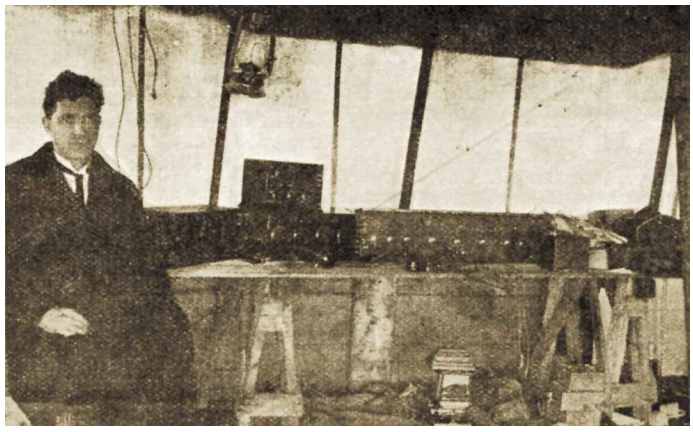
tightly orchestrated transmission schedules to keep interference to a minimum. The experimenters, on the other hand, transmitted whenever they felt like it. The Navy radiomen cursed the undisciplined operators and what they perceived as their obnoxious, ham-fisted ways. "I can't hear you because of those [expletive] *hams!*" The radio experimenters, many of them teenagers, defiantly turned the pejorative moniker into a badge of honor. Almost overnight "ham" became a label for anyone who dabbled in the black magic of wireless communication.

It wasn't long before the raucous radio bandits were brought under the yoke of law. The hams complied and soon became respected wizards of technology.

Hams Dare to Cross

In the years that followed, conventional wisdom assumed that the Atlantic couldn't be bridged with mere amateur gear. Besides, hams had been relegated to wavelengths shorter than 200 meters. Everyone knew that such wavelengths were all but useless. Transoceanic radio would remain securely in the hands of commercial and military interests . . . or so they thought.

On November 15, 1921, the ARRL sent Paul Godley, 2XE, to England aboard the ocean liner *Aquatania*. By December 7



Inside the listening tent at Ardrossan with D. E. Pearson, Godley's "checking operator."

The site at Ardrossan.

In November 1921, the ARRL sent Paul Godley, 2XE, to Ardrossan, Scotland to listen for amateur signals from the United States.

Godley had set up his receiving equipment in the middle of a damp, fog-bound moor on the coast of Scotland near a sleepy village known as Ardrossan. There he huddled in a drafty tent with his official witness (known as a "checking operator") D. E. Pearson of the Marconi Marine Communications Company.

They waited for midnight when they hoped propagation to the United States would be best. At 1:42 AM Godley clearly heard the call sign 1AAW as it rose out of the static. In the hours and days that followed he would hear more than 30 amateur signals from the US, the most consistent coming from a special transmitter near Greenwich, Connecticut christened 1BCG.

A Special 100th Anniversary Longwave Broadcast

The centennial of Marconi's transatlantic transmission will be commemorated with a special multilingual CW broadcast on 147.3 kHz at 2230 UTC on December 12, 2001 from the powerful Deutscher Wetterdienst transmitters in Germany. The broadcast will end at 2300 UTC with a slow-CW transmission. The dits will be of three-second duration each "broadcasting a most interesting word for our wireless friends at far distances!"

In fact, Godley heard so many signals from the US that he regretted not having a transmitter so that he could reply. He made the following note in his journal: "It comes home to me that ours *is* a history making set of tests—that American Amateur Radio has the world by the ears. I would give a year of my life for a 1-kW tube transmitter, a nice, upstanding aerial and a British Post Office license to operate it on 200 meters. To be forced to listen to a Yankee ham and *only* listen is a hard blow."

The transatlantic tests were a double triumph for Amateur Radio.

- We proved that "useless" 200-meter signals could be sent across the ocean, even with amateur equipment. This would be the catalyst for increased experimentation on even shorter wavelengths, which would eventually bring the astonishing discovery of "shortwave" propagation.
- We demonstrated the superiority of continuous wave (CW) signals over spark emissions. The transatlantic tests clearly showed that the clean CW signals, which concentrated their energy into a narrow spectrum, could be heard across much greater distances. The successful tests marked the close of the spark era.

The Legacy

There is a line in Arlo Guthrie's song "City of New Orleans" that goes, "And the sons of Pullman porters, and the sons of engineers, ride their fathers' magic carpets made of steel." Keep that in mind the next time you sit down in front of your transceiver. You're operating a piece of equipment that would be science fiction to the likes of Marconi and Godley. But you are their direct descendent, communicating throughout the world and beyond, riding their magic carpets made of electromagnetic waves.

Steve Ford, WB8IMY, is the editor of QST. *You can contact him at* **sford@arrl.org**.

NEW PRODUCTS

HAMCALC VERSION 53

◊ Not many software packages reach the venerable age of 53, but thanks to the continuing efforts of George Murphy, VE3ERP, *HAMCALC* 53 is now available for only the cost of duplication and shipping. Now distributed via CD, VE3ERP's extensive collection of electronics, radio design, antenna design and math programs is used by students, engineers and hams the world over.

Although the installation process is still somewhat convoluted by modern standards, many of the programs can be run directly from the CD. The latest version is always available from the author for a $7 (US) fee to cover materials and airmail shipping worldwide.

For more information, or to order your copy, contact George Murphy, VE3ERP, 77 McKenzie St, Orillia, ON L3V 6A6, Canada; e-mail **ve3erp@encode.com**.

Previous • Next New Products

By Cesar Pio Santos Andino, HR2CPS

Swan Islands DXpedition

Ten members of the Radio Club de Honduras encounter roiling seas and tame iguanas on an enjoyable journey to a remote Caribbean island.

It was 4 AM, March 16, 2001, when we prepared the luggage we had to take to Swan Islands, a group of small islands in the northeast Caribbean Sea. The DXpedition was organized by 10 radio amateurs of the Radio Club de Honduras. For some of them, the trip represented a dream to be fulfilled. This dream had existed for 30 years, and now within a few hours would become reality, as Henry Handal, HR2HM, explained. For others, it meant a challenge to their spirit of adventure, their courage and satisfaction as radio amateurs, to bring Amateur Radio to a faraway island.

These islands were some of the first places where Christopher Columbus touched land in 1502. He called them first Islas de Santa Ana. Later they were named in the diminutive form Islas de Santanilla. Another name was Islas de los Pozos, because the sailors had to dig wells in order to get water for the crew. The name Swan Islands seems to have appeared after Captain Swan, master of the *Cygnet*, was sent to the Caribbean by London's merchant marines in 1680.

In 1938, the US Weather Bureau established a meteorological station on the islands to help detect hurricanes. After the Second World War, the US Agriculture Department established a quarantine station for cattle being transported from Latin America to the US.

In 1960, a 50,000-W broadcast station operated on the largest island, transmitting radio programs in Spanish. Until 1961 it was known as Radio Swan, but it later went off the air. The Honduran government regained sovereignty over the islands in 1972.[1]

The Dream Becomes Reality

Our dream became reality thanks to the help of Lieutenant Commander Oscar Mejia, commander or the Naval Base in Puerto Castilla. He facilitated our transportation, when he had to relieve the military detachment station on the islands.

At 8 AM Friday, we set out with three cars with trailers for Puerto Castilla in the Department of Colon. We had to drive 500 km, and we did not expect any delay. One part of the road is paved, and the other part is in very bad condition because of the damage caused some years ago by hurricane Mitch. The road runs along the Atlantic coast. We had prepared for extra cars in case something went wrong. We had driven only about 10 km when the oil pressure started to fail in one car. We decided that this car should not go on. We immediately started to load our luggage so we would be ready for departure on schedule. At 6:15 PM we started our sea voyage, and Captain Mejia gave us a friendly welcome and instructions for our safety.

We knew that after a trip over land of 9 hours we were starting on a sea voyage of about 14 to 16 hours, a passage of 143 nautical miles. This time could be reduced or lengthened according to sea wind or the current. The latter occurs often during the trip toward the islands.

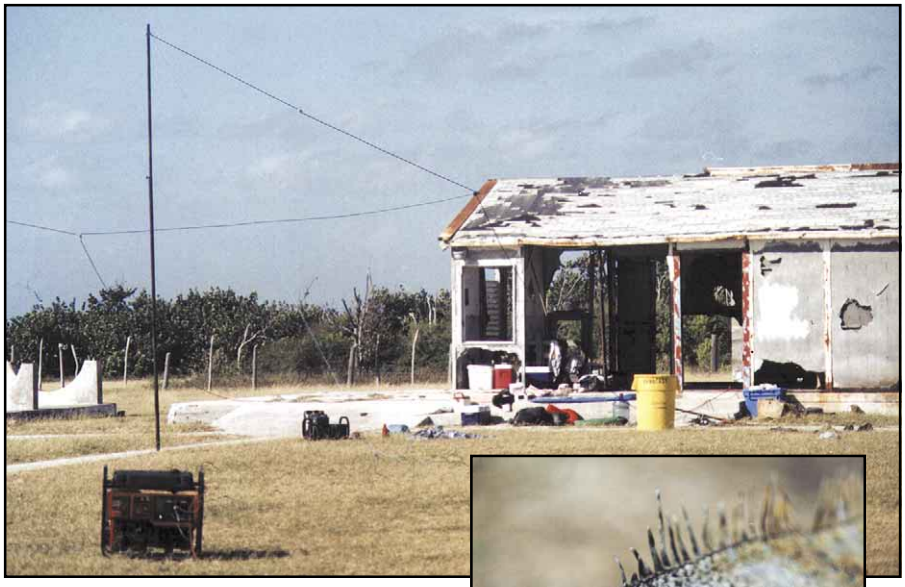
During the trip, we installed a 40-meter antenna on deck, and made contact with several Central American countries and with our families, telling them about our position and personal conditions.

During the night the captain explained the different orientation methods and pointed out some stars and constellations. Although we had taken pills against it, seasickness did not leave us alone. The waves got very strong, and they got even stronger with time. We all had had little experience with sea voyages.

The trip lasted 18 hours, two more than expected because of heavy waves. We left the boat at 12 noon Saturday, and we could see and feel the blue and green of the sea around us and the two islands, and we had the most pleasant sensation of the beautiful surroundings in spite of the tiring voyage. The splendid scenery helped to calm and refresh our spirits, so we could start on our task.

Members of the Swan Islands DXpedition. Standing, left to right: Captain Bustillo; Jose, HR2JEP; Rene, HR5RJG; Manuel, HR5MJC; Carlos, HR2CSX. Front, left to right: Henry, HR2HM; Rene, HR2RDR; Heriberto Reyes; and Cesar, HR2CPS.

[1]Swan Island was a separate DXCC entity (KS4) at one time. Only contacts made August 31, 1972 and before count for KS4 DXCC credit. Contacts made September 1, 1972 and after count as Honduras (HR).



Our dipole antennas, electric generators and other equipment in front of part of the abandoned meteorological station.

Swan Island's most populous resident looks for dinner.

The Swan Islands (IOTA NA-035)

The Swan Islands consist of two islands, a larger one with a length of 2 miles and a smaller one with a length of less than 1.5 miles. There is also a small key southwest of the larger island with a length of only 100 yards. The naval commander welcomed us in a friendly manner on the larger island. He showed us a sign that reads *Islas del Cisne, paraíso creado por Dios. Cuidémoslo*. (Swan Islands, a paradise created by God. Let us take care of it.) After settling down close to the meteorological station we started to install our dipoles for 15, 20, 40 and 80 meters, and we started our generators. Two radio operators who were not as tired as the others started to transmit, and later the others took their turns. We transmitted for 22 hours with about 2000 QSOs, particularly on 15 and 20 meters SSB.

Some of the expeditionaries were able to take photographs of the island's fauna.

A scene in the northwest of the main island, with two Bobo birds in the foreground.

Iguanas are plentiful and very docile—one can touch them easily. There is also the Bobo bird, which lives, in great numbers, near the sea. We found the birds sitting on eggs or taking care of their chicks. They have so little contact with humans that they allowed us to approach up to a distance of less than a meter; this was a very nice experience on the island.

Our attention was also drawn to the absence of mosquitoes, possibly owing to the sea breeze, which is blowing constantly. The temperature rose to as high as 28 degrees centigrade during the day and fell to 4 degrees centigrade during the night. There is an annual rainfall of about 50 centimeters.

Some members of the DXpedition took a walk over the island, and found the remains of the hangars of the airport and buildings where the meteorological station was until 1970.

There were no coconut trees; they had been razed by Hurricane Mitch several years ago. Only brush, which resisted the furious storm, remained.

The time to leave the island came. We started the return trip on Sunday at 6 PM with the boat *Rio Coco* of the Honduras Naval Force. The journey lasted two hours less than the expected 18 hours, because current and wind were in our favor. The journey was also calmer and more pleasant because of our wonderful experiences on the islands.

A Bit of History

In relative isolation, the Swan Islands lie in the western Caribbean, 95 miles north of the coast of Honduras and 320 miles west of Jamaica. They consist of Great Swan and Little Swan Islands, of which neither has any dimension of more than about 2 miles. In 1863 the area was certified as islands appertaining to the United States under the Guano Islands Act of August 18, 1856, and guano operations were carried on there for many years.

The United States' later interests in the Swan Islands involved agricultural production in coconut plantations and aids to navigation and communications, resulting in continued United States occupation and use of the islands. In San Pedro Sula, Honduras, on November 22, 1971, American and Honduran representatives signed a treaty by which the United States recognized Honduras' long-standing claim to sovereignty over the Swan Islands. The treaty entered into force on September 1, 1972.—*US Department of the Interior, Office of Insular Affairs*

Back to the Mainland

We reached Puerto Castilla on Monday at 10 AM, where we received a nice welcome. Now we could call ourselves amateur sailors as well as DXpeditioners. Before we left for San Pedro Sula, we expressed our gratitude to Captain Mejia and to the Armed Forces of Honduras for all the help we had received.

So the greatest dream of the Honduran radio amateurs, that is, to transmit and receive messages from a faraway island, became reality. At our club, we received many favorable comments and personal congratulations as well as a special diploma for our participation. Colleagues in various countries also congratulated us by radio and e-mail. We will keep these signs of appreciation in our hearts and in the history of the Radio Club de Honduras.

The memory of this exciting and singular DXpedition will remain with us. In addition, we will prepare for a new adventure to another beautiful island off the coast of our lovely Honduras.

Cesar Pio Santos Andino, HR2CPS, is a doctor of internal medicine. Licensed since 1998, he participated in emergency communications and medical relief during the disaster caused by Hurricane Mitch in 1998. In 2000, he took part in the Utila-Rock Key DXpedition. Cesar, who also enjoys various international contests, can be reached at PO Box 747, San Pedro Sula, Cortes, Honduras, Central America; psantos56@hotmail.com.

By Jean Wolfgang, WB3IOS

Kid's Day Holds Many Possibilities

You and/or your club can make Kid's Day a real adventure whether you invite one child or the whole school! The kids certainly like to talk on the radio but they can't all talk at one time. Here are a few suggestions to keep the others busy and show them more about Amateur Radio!

1. Allow the kids to look through some of your old QSL cards, or give them markers, pencils, and index cards. Let them design their own QSL cards.

2. While one child is on the radio, allow another to log the contact. Depending on the age of the children, you may want the child to work on the "backup log."

3. Kids always have more fun if there is food involved. Set aside a break time for the snacks. When everyone has had their fill be sure to get all the hands and faces washed. (There's nothing worse than a sticky mic or keyer!)

4. Take a digital picture of the kids while they are making a contact. Print it and give them the picture to take home.

5. Use a variety of radios if possible. Don't forget about the handheld and the mobile unit.

6. Introduce kids to the Phonetic Alphabet. They can practice identifying the state or their name.

7. Kids love Morse code. You had a chance to decide if you liked it, now you can give them a chance to make the same decision. Actually, many kids learn Morse code quickly, so get out the keyer and see what they can do!

Kid's Day and camping is a great combination. George Anderson, W7ON, had a wonderful time with grandsons Adam (7) and Ryan (5) during the June 2001 Kid's Day.

Kid's Day Rules

Purpose: Kid's Day is intended to encourage young people (licensed or not) to enjoy Amateur Radio. It can give young people hands-on, on-the-air experience so they might develop an interest in pursuing a license in the future. It is intended to give hams a chance to share their station with children.

Date: January 5, 2002.

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

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

Suggested Frequencies: 28350 to 28400 kHz, 21380 to 21400, 14270 to 14300 kHz and 2-meter repeater frequencies with permission from your area repeater sponsor. Observe third party traffic restrictions when making DX QSOs.

Awards: All participants are eligible to receive a colorful certificate (it becomes the child's personalized sales brochure on ham radio). You can help ARRL keep track of the Kid's Day activity and responses. Please visit **www.arrl.org/FandES/ead/kids-day-survey.html** to complete a short survey and post your comments. You will then have access to download the certificate page or send a 9×12 SASE to Boring Amateur Radio Club, PO Box 1357, Boring, OR 97009. QST

STRAYS

QST congratulates...

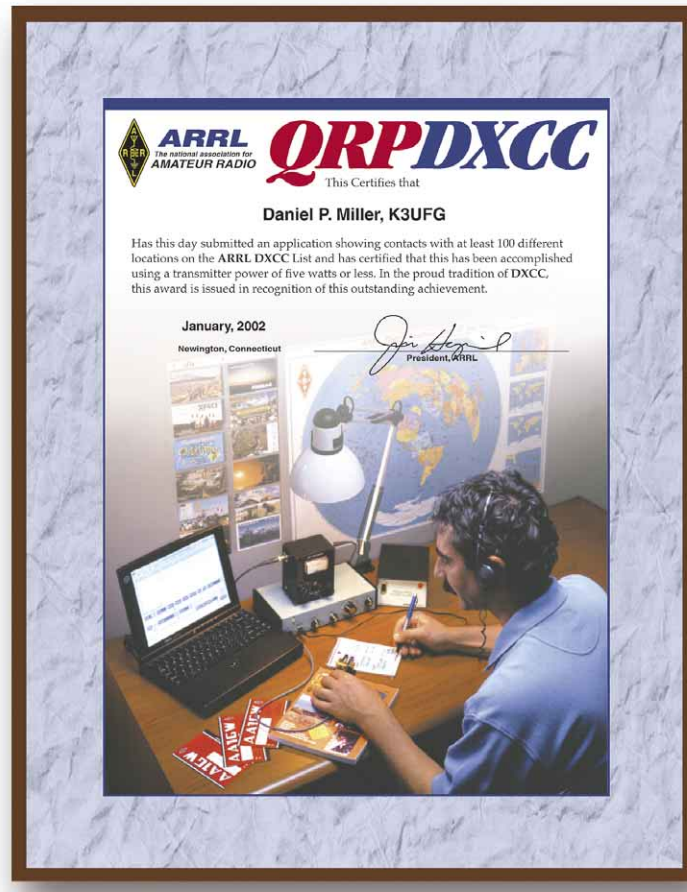
◊ Tamara Stuart, KF6RIV, who has been named one of nine national winners of the 2001 Discover Card Tribute Award and Scholarship. Tammy's award in the science, business and technology category includes a $27,500 scholarship to the college of her choice. In the photo, she is holding her gold medal winning helical antenna science project. Then a senior at Palm Springs (CA) High School and an ARRL member, Tammy comes from a ham family: her father is KF6RIW, her grandfather (who got her interested in Amateur Radio back in 1998) is KE6GMC and her grandmother is KF6RIX.

Previous • Next Strays

By Wayne Mills, N7NG

QRP DXCC

A new ARRL award for hams who do more with less!



In the lexicon of universally recognized *Q signals*, "QRP?" means "shall I reduce power?" In the amateur community, however, QRP has a meaning that extends well beyond its origins. QRP symbolizes a way of life for tens of thousands of hams throughout the world who've adopted the creed of doing more with less. They use no more than 5 W output—and often much less—to span distances that many amateurs believe can only be crossed with kilowatts and monster antennas.

QRP operating was probably born out of necessity. In the past, a few watts was the best some amateurs could achieve with homebrew tube rigs. Over the years, as hams evolved toward using full-featured 100-W transceivers, the interest in communicating with the lowest possible output power never really disappeared. In fact, the attraction of QRP has *grown* as amateurs seek new challenges in the face of increasing antenna restrictions and interference woes.

QRP Enthusiasm

The ARRL has been a strong QRP advocate for decades. QRP-oriented articles and projects have been staples in ARRL publications, including *QST*. In 2000, regular QRP columns debuted in *QST* and on *ARRLWeb* (**www.arrl.org**).

Ed Hare, W1RFI, ARRL Laboratory supervisor, is a well-known QRP enthusiast. He notes that it is hard to beat the enthusiasm of the QRP community, or their ability to overcome operating challenges. QRPers are among the most active amateur homebrewers. Of all the project articles submitted to *QST* in recent years, the majority have come from QRP operators.

QRP DXCC

In recognition of the popularity of QRP, the ARRL is pleased to announce a new operating award—the QRP DX Century Club, or QRP DXCC. The award is available to amateurs who have contacted at least 100 DXCC entities (see the list on the Web at **www.arrl.org/awards/dxcc/**) using 5 W output or less. The QRP DXCC will be available beginning in January 2002. Contacts made any time in the past will count, and no QSLs are required.

The QRP DXCC is a one-time award and is non-endorsable. You do not have to be an ARRL member to qualify.

To apply for the QRP DXCC, just send a list of your contacts including call signs, countries/entities and contact dates. *Do not send QSLs.* The list must also carry a signed statement from you that all of the contacts were made with 5 W RF output (as measured at the antenna system input) or less.

Along with your contact list, include a $10 application fee in the form of a check or money order in US funds. Make sure to indicate your mailing address and *your name as you want it to appear on the certificate*. Mail everything to: QRP DXCC, ARRL, 225 Main St, Newington, CT 06111.

Downloadable QRP DXCC application forms are available on the Web at **www.arrl.org/awards/dxcc/qrp/**. And beginning January 1, you'll be able to apply on-line at the same address.

An Award for Everyone

The QRP DXCC award is not just for the QRPer, although it is a proud recognition of the achievement of working 100 countries with minimal power. It is an award for all hams who want to experience the magic, or who want to use QRP as a way to start DXing from scratch all over again. Working a British station within only 5 W on 20 meters, for example, will offer the same thrill as it did the first time you crossed the Atlantic with 100 W. And you don't need to invest in new equipment to try for your QRP DXCC. Most rigs today can easily operate QRP with a simple twist of the DRIVE control.

So the next time you hear a rare, or not-so-rare, DX station on the air, give that DRIVE knob a counterclockwise twist and find out for yourself how much fun QRP can be. And when you do it 100 times, for 100 DXCC entities, celebrate your achievement by applying for the QRP DXCC award.

Wayne Mills, N7NG, is the ARRL Membership Services manager. You can contact him at **wmills@arrl.org**.

By Steve Ford, WB8IMY

The Conference Goes On—DCC 2001

The ARRL/TAPR Digital Communications Conference continues in the shadow of disaster.

The 2001 Digital Communications Conference was scheduled to be gin in Cincinnati just 10 days after the horrific terrorist attacks in New York and Washington. The first impulse was to cancel the conference. Travel was difficult, and an atmosphere of fear gripped the nation. Surely the idea of attending an Amateur Radio conference would be the farthest thing from anyone's mind.

E-mail messages and telephone calls flew back and forth among the organizers at the ARRL and TAPR (Tucson Amateur Packet Radio). They knew attendance would be sharply reduced, but even a small conference seemed preferable to the prospect of conceding to terrorism. The choice was clear—the 2001 Digital Communications Conference would get underway as scheduled at the Airport Holiday Inn with an APRS (Automatic Position Reporting System) symposium on September 21.

The APRS symposium at DCC 2001.

APRS Symposium

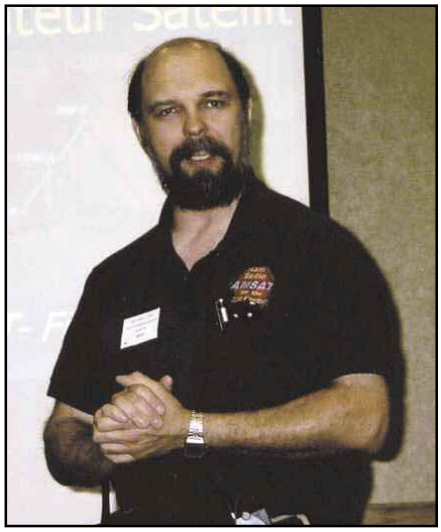
APRS is the most popular application for packet radio today, and this point was driven home at the Friday APRS Symposium.

An APRS portable or mobile station is created by combining a GPS (Global Positioning System) receiver, an FM transceiver and a packet terminal node controller (TNC). All other APRS receivers in the network can track beacon signals from the mobile station on graphic maps. As you might guess, APRS hardware and techniques are hot topics.

The highlights of the symposium included a talk by Byon Garrabrant, N6BG, who introduced the Tiny Trak II, a miniature TNC designed for portable and mobile applications. Its innovative features include *SmartBeaconing* in which the Tiny Trak increases the beacon rate automatically according to the speed of the tracked object (such as an automobile). It was invented by HamHUD developers Tony Arnerich, KD7TA, and Steve Bragg, KA9MVA. SmartBeaconing also attempts to detect when the moving object makes a sudden course change, such as a car turning a corner, and immediately sends a beacon to update the position. During public service events

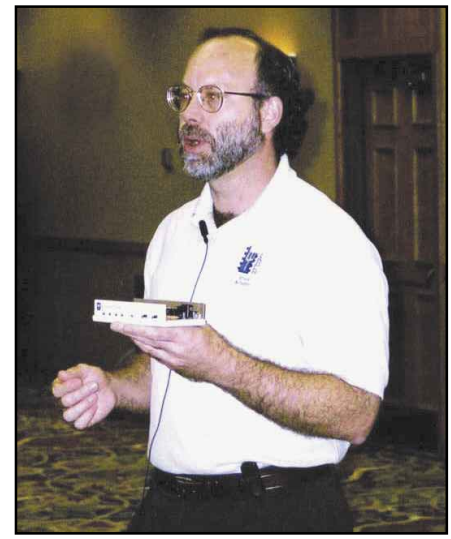
The discussions continued even between forums.

Jay Craswell, W0VNE, entertains (and informs) the crowd with his presentation on *CirCad* software.



Steve Coy, K8UD, describes the capabilities of the current amateur satellite fleet.

Tony Curtis, K3RXK, was the featured speaker at the Saturday evening banquet.



Steve Bible, N7HPR, discusses updates to the Easy Trak antenna rotator controller.

where many APRS stations are active in the same area, the Tiny Trak II provides the means to assign precise beacon intervals to each station so that interference is kept to a minimum.

Other presentations included one from Steve Bible, N7HPR, in which he updated the audience on the evolution of the Easy Trak antenna rotator controller. He raised eyebrows in the audience when he introduced the Tiny Trak Jr, a truly tiny rotator controller approximately the size of a human thumb. The Tiny Trak Jr is designed to plug into any PC serial port and provide azimuth/elevation antenna rotator control when using software such as the popular *Nova* satellite tracker and the *WISP* digital satellite software. According to Bible, the Tiny Trak Jr should be available by the end of the year and sell for less than $100.

Saturday

Saturday forums began with a greeting from Gary Johnston, KI4LA, ARRL Great Lakes Division vice director. He also delivered a statement from ARRL Executive Vice President David Sumner, K1ZZ.

The forums that followed covered a broad range of topics. For example, Steve Coy, K8UD, offered a comprehensive presentation on amateur Satellites. Many at the conference were unfamiliar with our current fleet of spacecraft, so Steve addressed everything from the FM repeater satellites such as UO-14 and AO-27 to the new AMSAT-OSCAR 40. He made a point of mentioning that the digital satellites are presently underutilized and encouraged the audience to investigate their capabilities.

Jay Craswell, W0VNE, led a discussion of *CirCad*, a software package for designing circuits and making PC boards. This wasn't your typical dry tutorial. Jay did what might best be described as a combination of lecture and stand-up comedy. Hardly a minute elapsed without laughter as he described the pitfalls of circuit design software. The bottom line was that with applications like *CirCad* hams could easily design their own projects and even create PC boards at reasonable prices simply by sending the appropriate *CirCad* files to PC board manufacturers.

Steve Bible, N7HPR, and Gary Barbour, AC4DL, offered back-to-back forums on software-defined radios, DSP and digital voice. According to their presentations, the future of Amateur Radio could soon include transceivers that are essentially software devices from the IF stages onward. And in the not-too-distant future we'll see radios with digital processing that begins at the antenna input!

John Ackermann, N8UR, led an interesting discussion of emergency applications for amateur digital communications in the Third World.

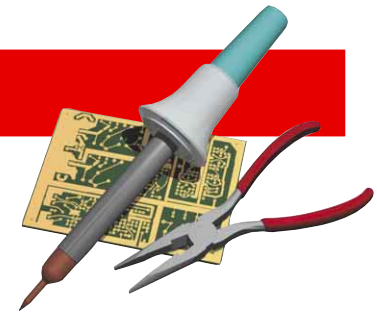
The evening was capped with a banquet and talk by Tony Curtis, K3RXK, on the history of Amateur Radio in space. Tony writes a regular column on space communications for *ARRLWeb*.

Conference attendance was indeed reduced, but enthusiasm reamined high. The demo room buzzed with conversations as hams examined ultra-small GPS/TNC combos, a software-defined radio and much more. Every presenter was greeted with an attentive audience and the discussions were lively.

And for a few days a gathering of Amateur Radio operators did what all Americans have been encouraged to do: look to the future with confidence.

John Ackermann, N8UR, leads a discussion of emergency digital communications for the Thrid World.

Steve Ford, WB8IMY, is the editor of QST. You can contact him at **sford@arrl.org**.



The Doctor is IN

Q Thomas, WB2LEB, writes: I am interested in 2-meter SSB from my location in New Jersey. I would like to know if there are set rules and a limit of frequencies available for SSB. I have heard about the calling frequency of 144.200 MHz. Could you explain how this works?

A Yes, you do not want to operate below 144.100—144.000 to 144.100 is CW only. The way the calling frequency works is that you use it to locate other stations—you call or listen for CQs on this frequency. Then, when you have located another station, you move off frequency, preferably by more than 10 kHz. This allows other stations to use this frequency to locate stations. It is quite rude to monopolize this frequency, unless you happen to be a rare DX station. In this case, many people wish to contact the rare DX station, so it is often desirable for the DX to sit on 144.200 and work everyone. If the DX station moved off 144.200, many people might miss an unusual band opening.

For example, I worked a station in West Virginia, on the microwave liaison calling frequency of 144.260 MHz. Normally, I'd move off to 144.270 or 144.250, but he was 400 miles away. It was also the first time I'd heard WV in several days of listening. By staying on 144.260, I was able to give K1TEO an excellent chance of working K4EFD/8 on 10 GHz; immediately I worked K4EFD/8 on 10 GHz. However, if you aren't sure whether it is a good idea to stay on the calling frequency, you should probably move off. In this case, I wanted to inform other stations of the band opening.

Using just one frequency for CQing simplifies operating with a highly directional beam. Otherwise, the chances of having both the frequency and direction right are significantly reduced—contacts are much harder.

Q Larry, K6DEF, writes: How do you measure resonance of an antenna? Some articles say something like "make it too long and prune it for lowest SWR." This *only* tunes the entire system for lowest SWR and includes the feed line. Years ago we used to measure resonance with a grid dipper but recall that somewhere somebody said this was a very poor way. There surely must be a good simple way other than "cut to freq and forget it" or "put it up, work 'em, and shut up."

A "Resonance" is the condition in which the feed-point impedance of the antenna is entirely resistive. From a purely technical point of view, an antenna does *not* have to be resonant to radiate efficiently. For example, many hams use a 135-foot long dipole, fed with low-loss open-wire transmission line, on all amateur bands from 80 to 10 meters. Down in the shack they use a balanced antenna tuner to tune the system so that their transmitter sees a 50-Ω load at each frequency. Here, the dipole itself is definitely not resonant in most of the bands. In fact, the feed-point impedance varies all over the place, meaning that the SWR on the open-wire line also varies all over the place. What keeps things perking is that open-wire line has low losses, despite relatively high levels of SWR.

Coaxial transmission line is another matter. Let's look at another typical situation, where you use the same 135-foot long dipole on 80 meters, but now you feed it with high-quality RG-213 coaxial cable. Here, you want your dipole to be at least close to resonance. Why is this so? While coax is convenient to use, it is also far more lossy than open-wire line, and coax losses increase when the antenna's feed-point impedance departs from 50 Ω.

Since the exact feed-point impedance of an antenna varies with its height over ground and with influences from nearby conductors (power lines, other antennas, guy wires, support wires, etc), you must usually prune the length for the lowest SWR when you use a coax-fed antenna. A simple rule-of-thumb is to keep the SWR below about 5:1 in the lower HF bands to keep cable losses within reasonable limits. This is the kind of SWR range you'll see across the 3.5-4.0 MHz band for a simple dipole. You will still need an antenna tuner down in the shack to present your transmitter with a load into which it can properly operate.

And yes, trying to use a grid dip meter to indicate resonance in an antenna/feed-line system can be a frustrating exercise. This is because the transmission line itself acts as an impedance transformer and can thus mask the actual frequency of the antenna itself. Pruning for a low SWR is far more reliable.

Q Neil, KC9AFA, writes: I have always admired Grundig radios and am really impressed by the Satellit 800 Millennium but now that I am a ham, I was wondering…is there a portable transceiver under $1000 comparable to the 800 in reception capabilities but that would allow me to transmit on the ham bands?

A Yes and no. In terms of performance, virtually any multiband HF transceiver will equal the Satellit 800. What sets dedicated shortwave receivers apart from the "general coverage" receivers built into ham transceivers is the features. For one thing, you'll never find synchronous detection in a ham rig, not even in top of the line models. For another thing, you will find the AM filter bandwidths in a ham rig are much narrower than those in a dedicated shortwave receiver.

The net result is that the audio quality on shortwave AM broadcast stations is much better on a dedicated shortwave receiver (well, at least on the tabletop and "luggable" types—some of the miniature portables aren't very impressive).

However, if you just want to be able to listen to foreign BC stations and you can accept sub-optimal fidelity, then ham transceivers such as the Alinco DX-77, ICOM IC-718 and Yaesu FT-840 would do the job.

Q Jim, WA2DMP, writes: I volunteer at an infirmary for the indigent. Recently a Realistic DX-302 communications receiver was donated to the Volunteer Department. The facility presently has PCs installed so that those who are able may access the Internet. I'm planning to install a dipole on the roof of this building (10 stories) so they may listen to worldwide shortwave and demonstrate the operation of a ham station at some time. What antenna would you recommend for

this range of frequencies and what precautions must I take since there are fire and emergency communication antennas on the roof?

A If you are interested only in short-wave/ham listening to start with, I recommend a random, single wire as long as possible—RadioShack even sells such a complete kit (278-758, $9.99).

If you feel that the building wiring and lighting might cause some RFI with a single wire snaking through the walls to get to the roof (possibly the fluorescent lights interfering with the AM broadcast short-wave stations), then run coax—RG-58 will do nicely—and continue with a single wire once you get to the roof. The coax need only be "grounded" at the connection to the receiver.

Place any antenna as far as possible from the other antennas on the roof. There should not be much interference from the VHF/UHF antennas when you are receiving.

Q Maury, WB6RLP/0, writes: I have a 134 foot dipole feed with a ladder line. On the farm I have trees and buildings for support. The end result is that the south end is at a height of 27 feet and the north end is at a height of 16 feet. The feed point is at a height of 18 feet. When I model this antenna on EZNEC 3.0 it shows greater gain on the lobes in the northeast and northwest direction in comparison to the lobes in the southeast and southwest direction. According to my EZNEC manual, +Y is at the top of the AZ antenna plots. The runs were made with a real earth and an elevation angle of 20 degrees. My actual antenna has a bend on the south end that I included in the model. To verify this behavior I modeled the same antenna without any bends and got the same result, more gain in the lobes on the low end. Is this a characteristic of sloping dipole antennas? And is the gain greater in the direction of the lower end or is my reference off by 180 degrees?

A Yes, in a sloping dipole over "real" ground, the directivity is indeed slightly higher toward the lower end. This is due to the fact that real earth has both loss and capacitance and the amount of phase shift that occurs from the reflections off real earth varies at different angles from the antenna. The result is that the pattern shows directivity — more signal is transmitted in one direction than another. Try it again with "perfect" ground and note the difference!

I would not use the term "gain" though, because the losses in the ground reflections that show this pattern actually subtract a few dB from the pattern one would get with a horizontal antenna. Try modeling a horizontal half-wave dipole in free space and note the gain. Then, put the antenna up about a half wavelength over "average" real ground and notice the gain that is added by the ground reflection. Then, try it again over perfect ground. The term dBd is often used in describing antenna gain. It is a reference to a half-wave dipole in free space. Over perfect ground, a half-wave dipole has 6 dBd of gain—6 dB more than a half-wave dipole—because of the ground reflection.

Q Jon Maguire, W1MNK, writes: I've got a question regarding the 15.25 kHz TV horizontal sync pulses. I can receive them (I think that's what I'm hearing) on many frequencies and with multiple receivers (Yaesu FT-847, ICOM IC-756PRO, Ten-Tec Jupiter and Kachina 505DSP. My antenna is a Cushcraft R5 vertical, mounted at about 6 feet above ground on a steel mast. The signals have the characteristic raspy sounds of H sync. The nearest TV in my home is about 15 feet away, but I can hear the pulses with all the TVs and computers shut down (which means they are probably coming from the neighbors' houses, which are 30 feet away on either side). I was wondering if you have any ideas.

A If you are hearing buzzy signals every 15.75 kHz on HF, you are listening to the harmonics of the horizontal circuitry in TV sets. This is usually radiated by the TV's antenna/cable system or its connection to the ac line.

If it is an antenna-connected TV, try a high-pass filter on the antenna lead. This will prevent the HF signals from getting to the TV antenna, where they can be radiated. You should also try a common-mode choke on the TV's feed line. Wrap about 10 turns of the line onto a Palomar F-240-43 ferrite core. You need a number of turns onto a suitable ferrite material to expect any common-mode suppression at HF. Try a similar choke on the TV's ac line cord. In extreme cases, you may need a "brute-force" type ac line filter, similar to the RadioShack catalog #15-1111. Note that this is *not* the same as a surge filter.

Q Bob, W6XS, writes: Can Yagi antenna elements be made of wooden dowel rods covered with aluminum kitchen foil? I've never seen anything published on this subject. A recent article in *QST* (July 2001, p 38) may be relevant. Elements of a 20-meter Yagi are made of fiberglass fishing poles paralleled with #14 copper wire. This seems reasonable. Yet the author recommends lightweight carbon-fiber composite sections as a substitute. Carbon-fiber is a lossy material, even more so than wood. Can you sort this out?

A Certainly elements can be made out of wood and either covered with foil or strung with wire. Of course, they would be far heavier than the carbon fiber poles, and nowhere near as strong.

As to loss, almost all insulating materials have some loss. Air is just a bit worse than a vacuum and steatite (a specialized form of ceramic often used in roller inductors) is probably next best. However, steatite is not particularly suited to portable Yagi applications for obvious reasons.

There are several forms of plastic that are fairly low loss, but these are either very brittle (like Lexan) or very heavy (like Micarta). Fiberglas is a good compromise between loss and strength, but basic "mixes" of fiberglas (the white, yellow and greenish ones) are rather heavy in the sizes needed for decent stiffness.

Carbon fiber is a very stiff material indeed. In its original form, it is also quite brittle and is actually unsuitable for use in making things. Everything you see that is labeled "carbon fiber" is not pure carbon fiber, but is actually a kind of fiberglas made with carbon fiber strands (incidentally, there is a really good series of articles on this topic in recent issues of *Sports Car* magazine, which I receive for being a member of the Sports Car Club of America).

Anyway, the carbon fiber strands in finished products are isolated from each other by the binder material as well as (depending upon the "mix") strands of other materials. This isolation prevents circulation of RF current, therefore limiting the loss.

Generally speaking, "carbon fiber" poles are only slightly more lossy than "standard" fiberglas ones (which are not widely available anymore due to the structural advantages of carbon fiber based material).

For what it's worth, the fellow who evaluated the antenna prior to its publication in *QST* also did an "extreme case" RF loss test—he placed a sample of the material in a microwave oven, whereupon it was irradiated with 1500 W continuous of RF for two minutes. The result was moderate warming, indicating some amount of loss, but not a great deal. As a best guess to what the actual antenna material loss would be, the Lab's estimate is something less than 1 dB.

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 Online" at www.arrl.org/members-only/qst/doctor/. QST

RIGblaster Plus

Computer sound card interfaces began as basic units—they offered transmit/receive switching, audio matching and little else. But as more amateurs discovered that they could put their computers to work as multimode tools (PSK31, RTTY, SSTV, etc), there was a need for interfaces that could streamline station operations.

The RIGblaster Plus from West Mountain Radio represents this new interface generation. The RIGblaster Plus essentially automates the entire interfacing process, bringing all switching and audio-routing functions under its control.

Installation

At about the size of a small paperback book, the RIGblaster Plus can find a home on just about any station desk or table. You're supplied with all the cables you need, along with a "wall wart" 12-V dc power supply. As they say on TV, no additional purchase required.

The first thing you have to do is configure the RIGblaster's internal jumper block according to the wiring of your radio's microphone jack. The RIGblaster Plus manual only provides jumper positions for radios with eight-pin round screw-on connectors. If your radio uses an RJ45 mike connector, you'll need to get optional adapter cables. West Mountain Radio can provide details on the proper jumper settings for those transceivers.

The rest of the installation is straightforward—a cable between the accessory jack on your transceiver and the computer sound card input for receive audio, and a cable from the sound card output to the RIGblaster Plus. There is a small potentiometer on the back panel that you can use to adjust the audio level to the interface. As long as you don't change the sound card settings on your computer, this is a set-once-and-forget operation.

One Serial Port, Three Applications

Unless an interface uses VOX switching, you need to run a serial cable between your computer COM port and the interface. This allows the computer to send transmit/receive switching pulses to the radio. The only problem arises when you want to use the computer serial port for FSK RTTY or CW keying. Now you have to disconnect the interface serial cable and install another, or use a serial switch to select between the sound card interface and your FSK or CW keying device. Not so with the RIGblaster Plus.

The RIGblaster Plus automatically isolates and routes FSK and/or CW keying pulses from a *single* serial cable to ports on the back panel of the interface. So, a single serial cable does triple duty: microphone PTT switching (for modes such as AFSK RTTY, PSK31, MFSK16, SSTV and so forth), FSK keying and CW keying. When you have the RIGblaster installed, all of this is transparent. You simply boot up the software for the mode you desire and go—at least that's how it should work.

In my case, pilot error intervened. I had blithely ignored the little serial jumper block (separate from the main block) because I assumed that its default settings would work just

fine for keying my transceiver using FSK in the RTTY mode. Wrong! Instead of the dulcet songs of RTTY, I was transmitting dead carriers. The problem boiled down to the fact that both of the RTTY programs I use (*WriteLog* and *MMTTY*) do their FSK keying using the TXD line on the computer's serial port. I needed to reconfigure the RIGblaster Plus serial jumpers to allow the interface to work with the signals on the TXD line. The bright diagnostic LEDs inside the RIGblaster were a huge help. The moral of the story is to check and re-check the jumper blocks. Assume nothing.

Automatic Microphone Switching

If you operate the digital modes, you've probably heard *hot mike syndrome* more than once. That's the condition where the operator is sending in his or her mode of choice (PSK31, for instance) without realizing that the microphone is on and operating at the same time. Hot mike syndrome treats the world to a symphony of audio from the unknowing ham—background music, *very* private conversations, you name it.

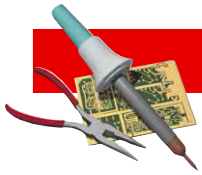
Fortunately, this can't happen when you're using the RIGblaster Plus. Your microphone plugs into the RIGblaster and the RIGblaster controls audio routing to your radio. When you're transmitting from your computer, the microphone is automatically cut off. However, you can still grab the mike and transmit, which will seize control of the interface and instantly interrupt the audio stream from your PC. I love this feature for SSTV contacts. I can hold the mike in one hand, click my computer mouse to send an image after I announce the mode, and then be ready to resume talking after the image is sent. Once again, no cables to connect or disconnect and no switches to manipulate.

Conclusion

Other RIGblaster Plus features worth noting include the 1/4-inch headphone jack on the front panel and a PTT/footswitch jack on the back panel. The RIGblaster Plus also comes with a CD-ROM that includes over 65 programs including freeware for almost every digital mode plus voice and analog modes.

Besides performance and good looks, the RIGblaster Plus sets a new standard for convenience and elegance. Thanks to the RIGblaster's ability to centralize the all audio and switching connections between your computer and your transceiver, what may have been a phone-only station can easily become a facility for CW, packet, SSTV, PSK31, RTTY, MFSK16 and more. *Manufacturer: West Mountain Radio, 18 Sheehan Ave, Norwalk, CT 06854; 203-853-8080;* **www.westmountainradio.com**. *$139.95.* QST

Steve Ford, WB8IMY ♦ *QST* Editor



By H. Ward Silver, N0AX

Test Your Knowledge!

"Board to Tears"

Printed-circuit boards (PCBs) form an integral part of almost every piece of electronic equipment. There are many PCB types and techniques. How PC *are* you?

1. Which type of PCB material is most likely to be encountered in a microwave circuit?
a. epoxy
b. Bakelite
c. Teflon
d. glass

2. The copper area to which a component is soldered is called the _____
a. trace
b. jumper
c. pad
d. through-hole

3. Which is a type of RF transmission line constructed on a PCB?
a. microstrip
b. twisted-pair
c. unterminated
d. G-line

4. The name of the coating applied over the exposed copper areas is _____
a. jacket
b. potting compound
c. silk-screen
d. solder mask

5. What does "SMT" stand for?
a. Surface Machine Tool
b. Surface Mount Technology
c. Solder Mask Transfer
d. Suitable for Microwave Transistor

6. Which type of circuit-board technology is used with leaded components?
a. through-hole
b. single-sided
c. pick-and-place
d. dead-bug

7. After finishing the assembly of a PCB, solder flux on the board should be _____
a. covered with a waterproofing compound
b. passivated
c. sanded down to the copper
d. left in place—it has no effect

8. Which type of component package is designed for surface-mount construction?
a. TO-92
b. SOT
c. DIP
d. BNC

9. If you encounter a silk-screened designator "U" with a number on a circuit-board, to what type of component does it usually refer?
a. test point
b. power supply
c. transistor
d. integrated circuit

10. How is copper removed from a double-sided PCB in order to make the circuit pattern?
a. chemical etching
b. copper is deposited, not removed
c. ultraviolet light
d. RF sputtering

11. What is the term for the large copper areas under and around components on RF PCBs?
a. registration mark
b. ground
c. ground plane
d. image negative

12. Which of these PCB features are usually "plated through"?
a. edge connectors
b. holes
c. registration targets
d. power planes

Bonus—What is a "blind via"?

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

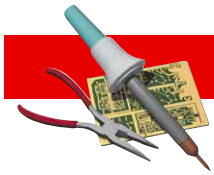
10-12 You can find errors on a PC board while blindfolded
8-11 You can find PCB errors without a magnifying glass
4-7 You can fix PCB errors if someone tells you what's wrong
1-3 You need to read Chapter 25 of *The 2002 ARRL Handbook*

22916 107th Ave SW
Vashon, WA 98070

Answers

1. c—This type of material has low losses at very high frequencies.
2. c—Pads take the form of rings on through-hole boards and rectangles on surface-mount boards.
3. a—Microstrip lines can even be designed to include stubs and matching sections.
4. d—This coating repels solder and keeps the traces and pads insulated from each other.
5. b
6. a—Holes are drilled in the PCB for the leads of the components.
7. d—Most solders now use a flux that does not need to be removed.
8. b—SOT packages contain diodes and transistors.
9. d—"U" or "IC" is the most common method of labeling integrated circuits or modules.
10. a—A masking pattern is applied to the clean copper before immersion in an etchant solution.
11. c—The ground plane provides a low-impedance connection to the RF circuit's common voltage.
12. b—By plating the inside surface of holes, connections can be made to a component lead or wire on any desired layer of the board.

Bonus—Blind vias are connections made between the internal layers of a multi-layer PCB.



The Protector

Think of *downconverters* as your rungs on the ladder to microwave. They're elegantly simple in function. A downconverter receives signal energy at one frequency and converts it to a lower frequency. This makes it possible for you to listen to, say, a 2.4-GHz signal on a radio that only receives as high as 2 meters. The downconverter conveniently transforms the microwave signal so that you can eavesdrop with your "normal" receiver—or, more likely, *transceiver*.

And there's the rub.

If you're receiving microwave signals using one of today's HF/VHF multiband transceivers (the ones that usually include all-mode capability on 2 meters), you are undertaking a certain amount of risk. You may be the most careful operator on the face of this planet, but I'm willing to bet that the day will come when you accidentally key the wrong radio. You may be working OSCAR 40, transmitting on 435 MHz and listening to 2.4 GHz with your nifty downconverter feeding your HF+6+2-meter rig. In a scramble to work that new DX station you'll grab the wrong microphone and blast substantial wattage into the downconverter, instantly dispatching it to radio heaven.

I've done this myself. The funny thing about RF energy is that you rarely get a second chance. Unless your downconverter is built like battleship, just a few watts is all it takes to roast the sensitive components. In a fit of impatience I once managed to key 100 W into a microwave downconverter. I recall shouting "No!" at the very instant when I recognized what I was doing—as if that would somehow prevent the inevitable. Before the sound of my cry even reached the drywall in front of me, the downconverter was gone.

In my OSCAR 40 article in the September 2001 *QST* ("OSCAR 40 on Mode U/S—No Excuses!") I opined the following:

"Perhaps some clever amateur will come up with a circuit to sense RF from the transceiver and automatically protect the downconverter."

Guess what? The remedy has arrived from SSB Electronic and it's called *The Protector*.

The Protector

You can hold The Protector in the palm of your hand with room to spare. It only measures $1^1/_2 \times 1^1/_2$ inches. The Protector's tiny metal cube is sealed, so I couldn't get a peek inside, but it feels remarkably dense. There is a female N connector on one end marked "Converter" and a female N on the opposite end marked "Transceiver."

The Protector installs at the output of your transceiver, typically with a short coax jumper. Once that's in place, the coax to your downconverter attaches to the "Converter" connector and you're all set. Insertion loss is less than 0.1 dB. The Protector also passes dc, so it won't present a problem if you use the coax to feed power to your downconverter.

The Protector is rated for 50 W SSB/CW and 30 W FM. This may not sound like much, but it is adequate for most applications. Even if you blast higher levels of RF into The Protector, chances are it will still save your downconverter. This is because most modern rigs include SWR protection circuitry that automatically reduces RF output when the SWR rises above 2:1. When The Protector is active, it not only acts as a limiter, it also creates a gross mismatch, forcing the output to nearly nothing in a fraction of a second. If you're uncertain about whether your transceiver includes SWR protection, check the manual before you depend on The Protector to shield your downconverter. If you choose to use The Protector with a non-SSB Electronic downconverter, check with the manufacturer and make sure its output stage can safely tolerate 150 mW of RF at 2 meters.

ARRL Lab Testing

We turned The Protector over to ARRL Laboratory engineer Mike Tracy, KC1SX, for testing. He placed The Protector between a Kenwood TS-2000 transceiver and a 50-W dummy load with a microwattmeter (accuracy 2% of reading) to measure the actual RF power reaching the load. Subjecting The Protector to 50 W from the TS-2000 at 145 MHz, Mike determined that the dummy load was shielded from all but 150 mW of power.

Can a downconverter safely withstand 150 mW of RF? It depends on the design. The worst-case scenario is a downconverter that consists of a bare mixer—nothing between the mixer and IF output but some low-loss coax and connectors. In that instance you could see damage at 150 mW, but most downconverters place an IF stage between the mixer and the output. A well-designed IF should be able to handle 150 mW.

It is important to point out that The Protector is designed for use with SSB Electronic downconverters and 144 MHz IFs. The Protector is *not* guaranteed to protect downconverters purchased from other manufacturers, regardless of whether the IFs are at 2 meters. Even so, The Protector has already saved my modified Drake 2.4-GHz downconverter at least once. It is a small investment for a great return in peace of mind.

Manufacturer: SSB Electronic, 124 Cherrywood Dr, Mountaintop, PA 18707; tel 570-868-5643; **www.ssbusa.com/**. *$60.*

Steve Ford, WB8IMY ♦ QST Editor

HINTS & KINKS

A POOR MAN'S ANEMOMETER

◊ When I started this project, I already had a Davis weather station, but wanted to design and build one as cheaply as possible for a friend of mine. I wanted to be able to use parts that were readily available to 95% of most hams and do it in such a way that everyone could build one without a college degree. I want to thank Jack Demaree, WB9OTX, for his input. Jack told me how he built them with small toy dc motors and Leggs egg-style panty-hose containers. I took his information, converted it to another style, added a visual weather vane and here it is in Figure 1.

Figure 1—N9PUG's junk-box anemometer for stingy meteorologists. The horizontal CD (at left below center) is the anemometer. The horizontal pipe and CD at the top form a weather vane for visual observation. (Perhaps readers could adapt rotator direction sensors for remote reading or develop new techniques for the task. Send in the hints!—*Ed.*) The wind-speed meter is cleverly mounted to the pipe at center, but it would normally be located conveniently indoors. Although Greg made this complex PVC arrangement to stand on its own, one made for roof or tower installation could be much simpler, as fewer legs and bends are needed.

I used an AOL CD for the rotor, a small dc motor—this one was out of a handheld fan that used two AAA batteries. The meter in this case reads 150 mA at full scale. It was loaned to me by John Charlton, W9DIH. The structure is made from PVC pipe, but this is not the permanent mount. Use the smallest tubing that will accept your motor.

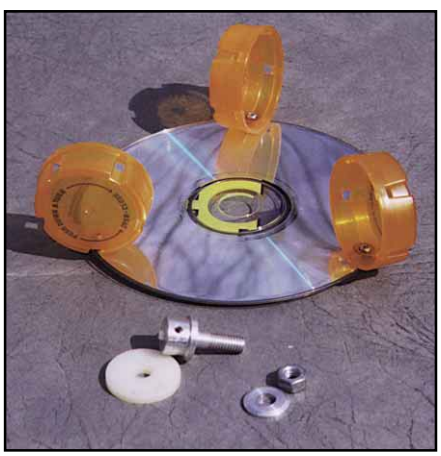
The only part of this that is not from my junk box is a blade adapter (see Figure 2), which came from a hobby shop. This adapter mates a propeller from a model airplane gas-engine drive shaft (about $^1/_4$ inch diameter) to fit an electric motor shaft. I used some heat-shrink tubing on the motor shaft to help secure it in the blade adapter. The blade adapter comes with a compression washer: When this is turned upside down, it not only helps to secure your disk, but also centers it!

Check Tower Hobbies[1] or your favorite hobby shop, or make your own, but make sure to use aluminum or lightweight material. (The center hole of a CD is about $^1/_2$ inch. Any adapter that mates the motor shaft to the CD or to a flat plate secured to the CD will work.—*Ed.*)

The cups to catch the wind are from pill bottles, the ones I used are $2^1/_8$-inch in diameter and seem to work well with the diameter of the disk. The holes are equally spaced around the disk. You can lay out three equally spaced radials by measuring 104 mm straight between the points where the radials cross the disk circumference. (Or, you could draw an equilateral triangle with 104-mm sides and lay it on the disk.—*Ed.*) Secure the cups to the disk with some very small screws and a little silicone caulk to help keep them in place.

The circuit is simple: A wire pair connects the motor leads to the meter. Almost any wire will do; I used telephone wire on one and wire from an old Motorola Motrac radio on the second. Solder the wires to the motor but not to the meter—yet. First,

[1]Tower Hobbies, PO Box 9078, Champaign, IL 61826-9078; tel 800-637-6050; www.towerhobbies.com/.



(A)

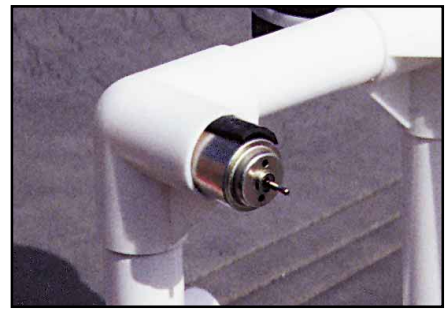
(B)

(C)

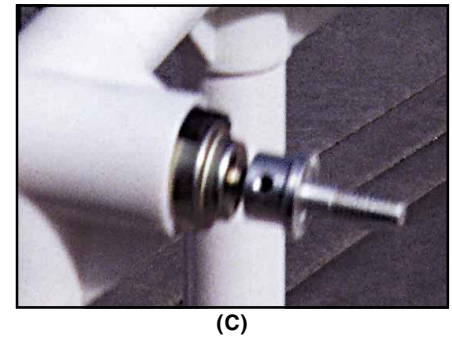
Figure 2—The anemometer CD assembly. (A) shows the CD with pill-bottle tops attached. The hardware in front is for the shaft-adapter assembly. Notice the setscrew hole in the side of the shaft adapter. (B) is a top view with the shaft adapter installed. (C) is a bottom view. The small hole in the center of the shaft adapter accepts the electric motor shaft, which is secured with a setscrew.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

(A)



(B)



(C)

Figure 3—The dc motor mounts in the pipe structure by means of a friction fit facilitated by a builder-fitted rubber shim. At (A), the motor hangs free before fitting. (B) shows the rubber shim at the top and right side of the motor. (C) shows the shaft adapter in place on the motor.

route the wires through the PVC assembly and mount the motor.

The motor is held within the PVC tubing by a friction fit. I achieved this with a piece of rubber cut from a bicycle inner tube (see Figure 3). Any pliable rubber should work. (You could also do this by wrapping the motor with electrical tape for a snug fit—*Ed.*)

Now, connect the wires to your meter, but don't solder them yet. First, give the motor a spin to check the polarity for the meter. (That is, the meter needle will deflect upward when the CD spins.—*Ed.*) If it works, permanently connect the meter leads; if not, reverse them first.

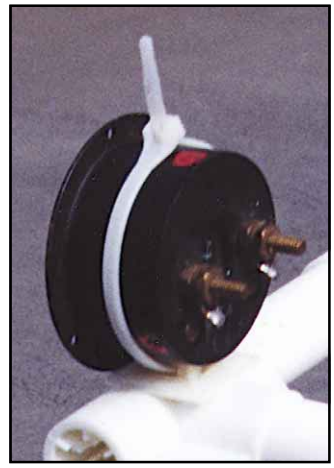


Figure 4—The meter is mounted to the pipe by a tie-wrap and adhesive mounting pad: a handy technique!

Once the system is installed and working, use silicone caulk to seal the motor mount against the effects of weather. The PVC pipe ends can be sealed with caps made for that purpose or many alternatives: plain rubber sheeting, plastic caps from pill bottles, rubber chair-leg tips or whatever you can dream up, also attached with silicone.

The weathervane was made from a length of PVC about a foot long. I attached a disk on one end, found the balance point of the weathervane and installed a ball bearing to support it. The ball bearing makes this vane spin very easily. Make sure your ball bearing is a snug fit. To make sure it will keep spinning easily for a long time with no upkeep, I used a nylon washer underneath the vane and a stainless-steel screw.

Now, here comes the work: How do you calibrate it? There are several ways. Since I already had a calibrated anemometer, I mounted this one within two feet of it, and with a good steady wind, was able to mark the meter and label it with 5 mph, 10 mph and so on. Alternatively, you could mount it to a car, then have a helper drive at steady speeds as you mark the dial. Don't try this alone! (Be sure that you choose a calm day and mount the instrument well clear of the car body for accurate readings.—*Ed.*)

Most panel meters can be disassembled and repainted or marked as needed. In addition, a variable resistor can be put in line to help with calibration if needed. Well, that's about it. A project that's simple, fun and pretty darn accurate. Best of all, you will probably have less than five bucks in it. Don't forget to seal up all holes or the bugs and bees will have a new home.[2]—*Gregory Tatlock, N9PUG, 637 East 15th St, Seymour, IN 47274-1138;* **n9pug@hotmail.com**

[2]Actually, it's a good idea to leave one very small opening unsealed, so that pressure and moisture are not trapped inside.—*Ed.*

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

QST invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters (see page 10), or via e-mail to **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

NEW PRODUCTS

NEW "RADIO GLOVE" FOR YAESU'S VR-120 COMPACT HAND-HELD

◊ Whether you're looking for classy good looks or extra protection for your VR-120 hand-held transceiver, the new Radio Glove from Cutting Edge Enterprises can do double duty. The soft, supple radio protector, available in leather or neoprene, features a sturdy belt clip and a Velcro-style cover.

Price: Leather, $19.95; neoprene, $14.95. For more information, contact Cutting Edge, 620 Highland Ave, Santa Cruz, CA 95060; tel 800-206-0115, fax 831-426-0115, **www.powerportstore.com**. QST

Previous • Next New Products

Kenwood TH-F6A Triband FM Handheld Transceiver

Reviewed by Rick Lindquist, N1RL
ARRL Senior News Editor

My very first handheld transceiver was a Heath 2021 for 2 meters. It was bulky, balky and fickle. "Features" included the ability to select from among a few crystal-controlled channels and the fact that it was pretty hard to misplace. It permitted me to communicate with nearby repeaters albeit with marginal reliability.

The Kenwood TH-F6A epitomizes the sort of quantum leap that H-T technology has taken in the intervening decades since the Heath 2021 was considered state of the art. While this latest edition to the Kenwood FM line is not only the first handheld to cover the 146, 222 and 440 MHz bands, it is also proof that H-Ts are not just for repeater work anymore. This one offers multimode receive-only coverage of a considerable portion of the viable RF spectrum—starting at 100 kHz and extending all the way to 1.3 GHz (cellular reception excluded, of course).

In a package that's probably one-quarter the size—and substantially lighter—than my old Heathkit H-T, the TH-F6A cranks out five times more power—a full 5 W on the three FM bands—yet fits neatly in the average palm. We measured almost 0.5 W of audio to the small, but clear and efficient, speaker, too. It's quite well-endowed for such a tiny package.

Add such niceties as direct frequency selection via the keypad, a display that remains quite readable despite its compactness, and memories that are a snap to program and label and you can quickly come to the conclusion that Kenwood did it right with the TH-F6A.

Let's review its strengths and weaknesses.

Highlights

The TH-F6A is a rugged little unit that offers all the features you'd expect to find in an H-T and then some. The ability to receive on two bands at the same time plus the "split-screen" display were welcome features. We're always amazed to see what the designers and manufacturers are able to squeeze into packages that seem to shrink a bit more with each new outing. There are tradeoffs with such a compact form factor. For example, the TH-F6A can't dissipate heat as easily as a larger H-T; it will automatically shut down if it gets too warm. Some of the tiny topside display legends were a challenge to decipher as well.

The TH-F6A transceives on three amateur bands—2 meters, 1.25 meters and 70 cm—on either A Band or B Band. So, you can be listening on one band while set up to transmit on another (or on another frequency in the same band). A Band is optimized for best ham-band performance while B Band includes the expanded coverage. On the three ham bands on which it can transmit, the TH-F6A's receiver sensitivity is slightly better on A Band.

But wait, there's more! And *less*! Like others of its ilk, the 'F6A covers the HF shortwave bands. Kenwood has taken this capability to the next level by including LF bands and LSB, USB and CW modes in addition to AM and FM reception (I'm listening to my favorite AM talk show on the TH-F6A as I write). The downside here is that if you'd hoped to be able to troll around on the HF ham bands using the built-in antennas to keep abreast of the latest chatter, you're likely to be disappointed in its performance. We'll have more to say about this in a bit.

With the TH-F6A, if you weary of working FM, you can put on your SWL cap and just listen (that, itself, is a novelty for many amateurs more used to having a ready finger on the PTT button).

Need to catch up on the latest news? Tune in your favorite FM or AM radio station with the TH-F6A. Hundreds of memory channels let you file away your pet stations for quick retrieval and name the memories for easy identification. More on that later, too.

On a mountaintop or trekking the forest trails but just can't miss the latest episode of "Survivor," "Millionaire" or "The Weakest Link"? The TH-F6A lets you listen to both VHF and UHF TV audio (handy charts in the *Instruction Manual* reveal the channel frequencies in the US and several other parts of the world). Using the 7.5-inch rubber-duckie antenna, I got decent TV audio from all stations in the Springfield-Hartford market. Need a weather forecast or enjoy listening to police calls? The 'F6A offers those too.

Given the two VFOs on the TH-F6A, users also can program many functions separately. For example, you can set different frequency step parameters on each. Of course, mode is also independent. You can have a repeater set up on A Band, a local broadcast station on B Band, and be able to listen to both. In a more practical vein, in a disaster or emergency response situation where both VHF-UHF and HF nets were active, a participant could be active on VHF while monitoring a local HF net at the same time.

You can set squelch levels independently on each band, too. Not only that,

Bottom Line

With FM transceive capabilities on the 146, 222 and 440 MHz bands and multimode receive on a huge chunk of the RF spectrum, the Kenwood TH-F6A elevates the H-T to a whole new level.

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1
Kenwood TH-F6A, serial number 30500061

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency Coverage: Receive, 0.1-50 MHz (CW, SSB, AM, FM), 50-470 MHz (CW, SSB, AM, FM, WFM), 470-1300 MHz (AM, FM, WFM), cell blocked; transmit, 144-148, 222-225, 430-450 MHz (FM only).	Receive and transmit, as specified.
Power requirements: External dc, 12.0-16.0 V[1], receive, 0.17 A[2]; transmit, 2.0 A (maximum, high power); 7.4 V battery, 5.5-7.5 V[1], receive, 0.17 A[2]; transmit, 2.0 A (high power).	External dc: receive, 0.29 A (maximum volume, no signal), transmit, 1.9 A, tested at 13.8 V; PB-42L, 7.4V battery pack, receive, 0.27 A; transmit, 1.8 A.
Size (HWD): 3.4×2.3×1.2 inches; weight, 8.8 ounces.	
Receiver	**Receiver Dynamic Testing**
CW/SSB Sensitivity[3], 10 dB S/N: 3-30 MHz, 0.45 μV; 30-50 MHz, 0.4 μV; 144-148 MHz, 0.22 μV; 430-450 MHz, 0.22 μV.	Noise floor (MDS)[3]: 3.5 MHz, –125 dBm; 14 MHz, –125 dBm; 50 MHz, –127 dBm.
AM Sensitivity[3], 10 dB S/N: 0.3-0.52 MHz, 7.08 μV; 0.52-1.8 MHz, 2.24 μV, 1.8-50 MHz, 0.89 μV, 118-250 MHz, 380-500 MHz, 0.4 μV.	AM, 10 dB S+N/N[3]: 1.02 MHz, 1.9 μV; 3.8 MHz, 0.95 μV; 29 MHz, 1.1 μV; 53 MHz, 0.82 μV; 120 MHz, 1.1 μV.
FM Sensitivity, 12 dB SINAD, A Band: 144-148, 222-225, 430-450 MHz, 0.18 μV. WFM (30 dB S/N): 50-108 MHz, 3.16 μV; 150-222 MHz, 2.82 μV; 400-500 MHz, 3.98 μV. B Band: 5-108 MHz, 0.4 μV, 118-144 MHz, 0.28 μV, 144-225 MHz, 0.22 μV; 225-250 MHz, 0.89 μV; 380-400 MHz, 0.4 μV; 400-450 MHz, 0.22 μV; 450-520 MHz, 0.4 μV; 520-700 MHz, 7.08 μV; 800-950 MHz, 1.26 μV; 950-1300 MHz, 0.4 μV.	FM, 12 dB SINAD[3], A Band: 146 MHz, 0.16 μV; 222 MHz, 0.17 μV; 440 MHz, 0.17 μV. B Band: 29 MHz, 0.44 μV; 52 MHz, 0.33 μV; 902 MHz, 0.45 μV; 1240 MHz, 0.47 μV. WFM, 100 MHz, 1.4 μV.
FM Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 60 dB*[4]; 10 MHz offset from 146 MHz, 73 dB. 20 kHz offset from 222 MHz, 57 dB*; 10 MHz offset from 222 MHz, 75 dB. 20 kHz offset from 440 MHz, 57 dB*; 10 MHz offset from 440 MHz, 72 dB.
FM Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 60 dB. 20 kHz offset from 222 MHz, 57 dB. 20 kHz offset from 440 MHz, 57 dB.
Spurious response: Not specified.	IF rejection, 146 MHz, 83 dB; 222 MHz, 86 dB; 440 MHz, 100 dB; image rejection, 146 MHz, 59 dB; 222 MHz, 84 dB; 440 MHz, 73 dB.
Squelch sensitivity: 0.13 μV (A band).	At threshold, VHF, 0.16 μV; UHF, 0.17 μV.
Audio output: 300 mW at 10% THD into 8 Ω.	405 mW at 10% THD into 8Ω.
Transmitter	**Transmitter Dynamic Testing**
Power Output: With PB-42L 7.4 V battery pack, 5.0 W / 0.5 W / 0.05 W; with external dc (13.8V), 5.0 W / 2.0 W / 0.5 W.	With PB-42L battery pack: 146 MHz, 5.3 / 0.4 / 0.05 W; 222 MHz, 4.8 / 0.5 / 0.07 W; 440 MHz, 4.9 / 0.4 / 0.1 W; with external dc (13.8V), 146 MHz, 5.4 / 2.3 / 0.5 W; 222 MHz, 4.7 / 2.0 / 0.5 W; 440 MHz, 5.0 / 2.0 / 0.5 W.
Spurious signal and harmonic suppression: 60 dB.	VHF, 70 dB; UHF, 63 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, VHF and UHF, 68 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	200 ms.
Bit-error rate (BER), 9600-baud: Not specified.	146 MHz: Receiver: BER at 12-dB SINAD, 2.1×10^{-3}; BER at 16 dB SINAD, 5.9×10^{-5}; BER at –50 dBm, $<1.0\times10^{-5}$; transmitter: BER at 12-dB SINAD, 2.5×10^{-3}; BER at 12-dB SINAD + 30 dB, $<1.0\times10^{-5}$. 440 MHz: Receiver: BER at 12-dB SINAD, 1.1×10^{-3}; BER at 16 dB SINAD, 4.9×10^{-5}; BER at –50 dBm, $<1.0\times10^{-5}$; transmitter: BER at 12-dB SINAD, 1.8×10^{-3}; BER at 12-dB SINAD + 30 dB, $<1.0\times10^{-5}$.

*Measurement was noise limited at the value indicated.
[1]External dc, 13.8 V nominal; battery voltage, 7.4 V nominal.
[2]Receive, no signal, dual-band operation.
[3]Measurement taken on the B Band unless otherwise noted.
[4]Dynamic range measurements were all performed on the A Band.

pressing the BALance button and turning the tuning knob (or using the joystick) lets you determine how much audio you want from each channel. Want A to be loud and B to be in the background? It's simple to do.

It is to Kenwood's credit that it decided to include 222 MHz on this unit (the European unit, the TH-F6E, covers only 2 meters and 70 cm on transmit). With 2 meters overwhelmed with traffic in some regions, the 1.25-meter band is a viable, but underutilized, alternative, and it's one that would be even more handy during emergencies and disasters if only equipment were readily available.

The failure of manufacturers to offer more multiband gear that includes the 222 MHz band relates to the fact that it's not an international allocation. But for US licensees, this is a band that all hams—including Novices—can use. (Novices may transmit voice, CW, MCW, RTTY, data and image from 222 to 225 MHz running up to 25 W.)

While the TH-F6A will receive on the 6-meter and 23-cm (1.2 GHz) bands, it does not transmit on either. Still, the addition of 222-MHz band transceive capability is a step in the right direction, and perhaps Kenwood will consider a *quadbander* for its next H-T model.

Ode to the Joystick

Beyond offering three bands, what's probably *the* standout feature on the TH-F6A is its multi-function joystick—actually, more of a thumb stick—on the front panel. The joystick—Kenwood calls it a MULTI-SCROLL KEY—adds considerable convenience to accessing and setting up menu items and making adjustments. It also incorporates the traditional UP/DWN button function.

The menu offers 31 setting choices. Getting to these is as simple as pressing down on the joystick itself, which, you'll notice—if you have really good eyesight—bears the legend MNU. Then, you scroll up or down until you reach the menu item you want. Joyfully, they're all in plain language.

At first I was a bit apprehensive to see this joystick controller on the 'F6A. I was relieved to discover that it worked quite smoothly—unlike a similar implementation in a fairly recent offering from a competing manufacturer that yielded unpredictable results. It was super convenient to have the transceiver's menus so close at hand. Pushing the MULTI-SCROLL KEY toward OK selects the item to change. Pushing it toward ESC (escape) lets you back out when you get yourself into a corner or are done using a menu.

Kenwood's advertising says the TH-F6A is designed for one-handed operation. I'm right-handed, but I found the radio a tad easier to control while holding it in my left hand. The joystick was an enormous help in this regard.

Single-handed operation is quite possible for most things you'll need to accomplish, although I did find that trying to press the F (function) button and the MON/ATT button at the same time taxed my dexterity. My only gripe about the ergonomics concerns the concentric TUNING (ENCoder) knob and surrounding VOLume ring. It was just too easy to inadvertently alter the volume setting while tuning.

A 16-key keypad offers one-touch access to most-commonly used functions. Each button is dual-function.

Rousting the Repeater

I employed the tried-and-true method of seeing how much I could figure out on my own about the TH-F6A with minimal assistance from the *Instruction Manual*. It's remarkably easy to figure out—and I say that as someone who remains baffled by his current dualband H-T even after owning it for more than five years now. Getting the TH-F6A up and running on a couple of the local machines was straightforward. To make this painless, the *Instruction Manual* includes a page called "Your First QSO" that outlines the bare essentials to get you on the air on simplex. It's not a big leap to accessing your local machine.

Repeater operation is simplified by the inclusion of the automatic repeater offset feature (in the US version only) that follows the ARRL band plan. Dial up or enter a recognized repeater frequency, and the TH-F6A automatically adds or subtracts the proper offset on transmit. It took a couple of minutes more to figure out how to set the CTCSS tone, mainly because the H-T expects you to activate the tone function on a given channel before you select the necessary tone from the 42 available (some VHF-UHF transceivers offer 50 different tones).

The 'F6A offers a feature I don't recall seeing before (although it seems I'm always more than a few degrees behind the curve anymore). It's called *Automatic Simplex Check*, or ASC. When communicating with someone through a repeater and with ASC enabled, the H-T periodically checks the strength of the other station's simplex (input) signal. If the system determines that the signal is strong enough for direct contact, a blinking "R" will appear in the display. The trick here—at least for someone my age—is seeing the tiny blinking icon, but it's a neat idea—despite the fact that my experience has been that few operators who already know they're within simplex range actually will elect to vacate the repeater. Whether this phenomenon owes to sloth or poor operating habits I'll leave for you to decide, gentle reader.

Tone scan is a feature users have come to expect and even rely on these days, especially as more and more repeaters have enabled CTCSS tones for access. On the TH-F6A engaging this is as simple as pressing the F (function) key then holding the TONE button for a second. You can reverse the scan direction with the TUNING knob or by using the MULTI-SCROLL KEY.

When the unit identifies the CTCSS tone on the signal, it beeps. But that's not all! The 'F6A then lets you program the CTCSS tone it detects (to replace one already programmed). One caveat here: for this to work, a repeater has to "pass" the tone (some repeaters filter the tone from signals before re-transmitting them). Otherwise, you'll have to scan another station's input signal. A similar feature lets users scan and identify DCS (digital code squelch) tones too, using the *DCS Code ID* feature.

A Multiplicity of Memories

You could eat up gobs of time just trying to come up with enough frequencies to fill the 400 memories the TH-F6A has to offer. These are arbitrarily divided into eight groups of 50 apiece (GP 0 through GP 7). While it really does not take that much cranking on the tuning (ENC) knob to whip through the memories, there's a much easier way to access a programmed memory slot (I discovered upon closer reading of the *Instruction Manual*). You can use the keypad to simply enter the number of the desired memory channel. Unfortunately, this works only for channels that have already been programmed; you can't use the keyboard to jump to an open memory slot. You also cannot use the keypad to recall the program scan, information or priority channels, either. Bummer!

If you've got a lot of channels in memory, you can take advantage of the memory group function to access the desired memory channel more quickly. This gets you to the lowest memory channel number in each group (assuming you've programmed at least one channel in that falls into a given group).

The TH-F6A also lets you copy data from a memory channel to the VFO or from one memory channel to another. Dedicated *Call* channels can be programmed on 2 meters, 1.25 meters and 70 cm for your favorite repeater or simplex channel for quick access via the

CALL button (naturally).

Under typical circumstances, you can store the expected parameters in any memory—including receive, transmit and tone frequencies, whether the tone (CTCSS or DCS) is enabled, offset, step, mode, and even reverse on and fine tuning on. Exceptions include the inability to store "reverse on" or offset frequency or direction when programming an "odd split" (think W6NUT repeater here).

Let's not forget the dedicated memory channels. There are 10 information (I) channels—default programmed for the NOAA weather radio band channels—plus 10 program upper (U) and 10 lower (L) scan limit channel pairs and two priority (P) channels.

I derive great pleasure from applying "labels" to memories. The TH-F6A lets you apply alphanumeric labels of up to eight characters to memory channels using both upper and lower-case letters plus numerals and a wide range of other characters. The TH-F6A can be set to display the name whenever you go to the memory recall (MR) mode (this is the default), although you can opt to display the actual frequency with a single keystroke.

If you like the military approach—or if you have selected tactical channels for a public service or emergency event and want everyone reading from the same sheet of music—you can set up the 'F6A to display just the memory channel numbers. This is a power-up mode that also limits the functions you can access from the keypad controls. This could prove extremely convenient if someone else, say a fellow club or ARES member, needs to borrow your H-T in a pinch for an event or activation.

One menu item lets you determine whether you want the TH-F6A to recall any and all memories—regardless of band—or only the memory channels in the band that's currently active. This is handy, especially if you have programmed multiple channels (and possibly in no particular order) in various parts of the spectrum. Enabling "ALL BANDS" for memory recall is a bit like pressing the random play button on your CD player. It lets you scroll through adjacently programmed AM stations, TV audio channels, shortwave broadcasters and repeaters with impunity.

Scan City

The TH-F6A offers scads of scanning options, including an all-memory-channel scan, band scan or programmed scan. It's really simple to set up scan limits (upper and lower) for programmed scans. This works very smoothly. You also can do a MHz scan at the press of a button. It will scan the 1-MHz segment you happen to be tuned to.

In addition, the little unit gives you the ability to scan a memory group or to select two or more groups to scan using the *Memory Group Link* function, plus you can do a call scan or priority scan, an information channel scan and something called *Visual Scan*. This lets you visually monitor frequencies near your operating frequency. It graphically displays the busy status of frequencies (five above and five below, depending on the frequency step size you have selected). The height of the vertical bars relates to their signal strength.

Performance Notes

Size, ease of use, extended receive and great battery life are among the best features of this little H-T. In terms of those liabilities alluded to earlier, I'd have to include the rather mediocre dynamic-range numbers measured in the ARRL Lab (see Table 1). On 2 meters, for example, it was 60 dB (noised-limited) at the Lab's standard 20-kHz offset. At 10-MHz spacing, you'd expect the dynamic range number to be significantly higher, but it only went up another 13 dB.

A recent "basic" 2-meter H-T we reviewed had dynamic range of more than 90 dB at the 10-MHz offset.

For those with little appreciation for numbers, let's just say the lower figures we measured (they were comparable on the other VHF and UHF bands) mean the 'F6A is less immune to the effects of nearby signals.

IF image rejection was rather modest on 2 meters as well, but better on 222 and 440 MHz. I quickly discovered that a strong repeater will "bleed" considerably into the adjacent channels. For example, the nearby 146.94 MHz repeater slopped over 10 kHz or so on either side. It's also possible that this H-T could run into difficulties in the presence of multiple strong signals in the VHF or UHF spectrum as a result of what's commonly called "intermod," although I didn't experience this while I was using the unit.

I did notice the presence of certain signals that were audible without any antenna attached—so-called "birdies." Kenwood acknowledges that the A Band receiver generates "internal spurious harmonics." The manual outlines numerous cases for "internal beats." These primarily occur when the A Band receiver is a multiple of 59.85 MHz (the A Band's first IF).

One of the major reasons someone would buy an H-T like this is because of the expanded receive coverage, which—as already mentioned—includes HF. The TH-F6A uses only the B Band for wideband reception.

A little digression here: There are two onboard antennas on the 'F6A. Kenwood calls the rubber duckie a "wide-band helical antenna." For reception above 10.1 MHz, the unit uses the rubber duckie; below that frequency, an internal ferrite-loop antenna automatically switches in (Kenwood calls it a "bar" antenna). The user can enable or disable the "bar" antenna via a menu setting.

The good news is that you can flip on the TH-F6A with just the rubber duck or "bar" antenna enabled and usually hear a few signals on the HF amateur and broadcast bands. The bad news is that they'll have to be at rock-crushing signal strength for you to hear them very well. Using just the attached flexible whip or the internal "bar" antenna, I got fair results on the HF broadcasting bands, but amateur signals were much harder—and often impossible—to detect. Since we'd measured reasonable sensitivity on HF (–125 dBm—maybe 10-15 dB worse than the desktop transceiver I have sitting at home), I found this a bit puzzling.

Kenwood concedes in an *Addendum* to the manual that the supplied flexible whip "may not be suitable for the frequency you want to receive" and advises users to "use an appropriate antenna for the frequency if the sensitivity is low." Kenwood failed to further explain what it considers an "appropriate antenna," however.

Connecting the TH-F6A to an HF multiband dipole (you'll need an SMA adapter) only made things worse. It sounded as though every signal in the HF spectrum were coming through—all at once! Even engaging the attenuator didn't help. The answer turned out to be a compromise. I obtained satisfactory results—particularly on the amateur bands—while using an HF mobile antenna system. The TH-F6A does not have single-signal reception, so on either SSB setting, you'll hear the signal on both sides of zero beat.

Given the rather limited IF filtering (Kenwood calls it a "general purpose" IF filter), HF SSB or CW reception is pretty "broad." Even with an optimal antenna attached, you'll find selectivity is compromised, although we did not test for two-tone, third-order dynamic range on the HF bands. Anyway, the HF reception is almost a gimme on this radio, so as long as your expectations aren't too high, you'll enjoy what it has to offer. And to borrow a phrase from Dirty Harry, an H-T's gotta know its limitations.

Other Really Neat Stuff

- The 76×16 dot matrix LCD display is small but commodious, and you can il-

luminate it and adjust the contrast—although some legends are pretty tiny.

- The display includes a multisegment S/power meter. It reads out in S units in receive.
- The radio comes with a 1550 mAh 7.4 V lithium ion battery pack. It seemed to hold up quite nicely under typical use.
- A simple display gauge—available at the touch of two buttons—lets you monitor the battery level: three bullets for high, two for medium and one for low (no bullets mean it's time to recharge or the battery's dead—but you'd probably already know that). If you're charging the battery, the display will show CHARGE. You can engage a feature that will change this indication to STANDBY once the battery charging cycle is complete.
- The DTMF audiodialer is convenient for autopatch or other repeater control functions. You also can name the DTMF memory positions.
- The fine-tuning feature is necessary for trying to listen to CW or SSB signals. The step size is adjustable—from 33 Hz to 100 Hz (the default), 500 Hz and 1 kHz. Fine tuning only works below 470 MHz and it does not work in the FM mode.
- There are two choices for FM deviation. The default is ±5 kHz, but if necessary, you can drop it down to ±2.5 kHz.
- A *Beat Shift* menu function lets the user slightly shift any spurious signals from the CPU clock oscillator from interfering with a desired signal. I came across a loud "birdie" on 157.3 MHz. Actuating the beat cancel function shifted the heterodyne to 157.270 MHz.
- VOX (voice-actuated transmit) is a potentially handy inclusion on the TH-F6A and permits hands-free operation of the H-T—great for public service applications. You need to use a headset to use VOX, since there's no anti-VOX feature. You can set the VOX gain and VOX delay via the menu. When using VOX, you lose the second band display. It's replaced by the VOX gain and VOX delay settings.
- It's possible to use the TH-F6A to remotely control certain models of Kenwood multiband mobiles using control codes.
- The 'F6A is particularly easy to pack for travel, although you'll probably be forced to bend the flexible antenna at least a little. The rubberized radiator is a little sticky, however, and I found that it quite quickly collected a coating of lint and pet hair.
- You have a choice of three transmit-power levels. With the battery pack, high is around 5 W, low is around 0.5 W and extra-low is almost too low to be measured with known instruments. Well, not quite. With the battery pack, we measured the output at the "EL" setting to be anywhere from 50 to 100 mW. With external power, the low and extra-low settings jump to around 2 W and 0.5 W respectively.
- You can program the VFO to tune only a particular range.
- It's possible to use an optional interface cable plus software to manage the memories in the TH-F6A using your PC. The best part here is that Kenwood offers the software free for downloading via its Web site!

Odds and Ends

- Portions of the *Instruction Manual* are very elementary—sometimes annoyingly so—although it's never cute. The manual offers solid examples of how to perform basic functions. The edition that came with our unit was in English and Spanish. Curiously, the only languages the menu on our unit lets you select are English and Japanese.
- The TH-F6 can operate at up to 14 V. Kenwood says it considers 12 V to be the "optimal voltage."
- The attenuator is nominally 20 dB. It works on both bands at the same time; it cannot be set independently on each band.

The "key beep" that sounds when you press a button on the H-T emits an aural cue when direction is involved, such as when using the joystick controller in the UP/DWN function. The tone is higher when going "up" and lower when moving "down."

- The charger that comes with the TH-F6A is larger and heavier than the H-T. In fact, it's almost as large as the charger/power supply for my older laptop PC. The manual cautions against using it to charge batteries other than the lithium ion pack.

Wind It Up, Baby!

On balance, the Kenwood TH-F6A offers a lot of features for a unit in this price range—most notably transceive ability on three bands plus wideband receive—while still maintaining reasonable all-around performance.

I found this radio as simple and straightforward to program and use as any you're likely to find, and most of the others won't have nearly so much to offer in the way of frills.

Kenwood followed the Goldilocks principle here, by and large. Most hams will find that the TH-F6A is "just right."

Manufacturer: Kenwood Communications Corp, 2201 Dominguez St, Long Beach, CA 90810; 310-639-4200, fax 310-537-8235; **www.kenwood.net**. Manufac-turer's suggested list price: $449.95 Typical current street price: $390. List prices of selected optional accessories: BT-13 alkaline battery case, $25.95; PG-3J cigarette lighter cord, $36.95; PG-4P PC interface cable, $32.95.

Cushcraft A627013S 6-Meter/2-Meter/70-Cm Yagi Antenna

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

Over the last few years we've seen an ever-increasing variety of multimode/multiband HF/VHF/UHF transceivers appear in the ham radio marketplace. Assembling a fixed-station antenna farm that will allow you to take full advantage of the frequency agility of these modern marvels, however, can be challenging.

The most common "bonus" bands on this relatively new breed of radios are 6 meters, 2 meters and 70 cm. If you're fortunate enough to be one of the many whom have recently added one of these rigs to their collection—and already have antennas up for the HF bands—you are now likely in search of some effective radiators for VHF and UHF. Let's see what the Cushcraft A627013S can bring to the party.

Bottom Line

A great match for the new multiband wonders! The Cushcraft A627013S can add respectable 6-meter, 2-meter and 70-cm capabilities to your existing HF-only antenna farm.

Three Yagis, One Boom

The A627013S embodies three separate multi-element arrays. Five-element 70-cm and 5-element 2-meter Yagis are mounted vertically on opposite sides of the boom. A 3-element 6-meter Yagi is positioned perpendicular to these—the director and driven element actually pass through the planes of the other arrays.

Those already familiar with Cush-

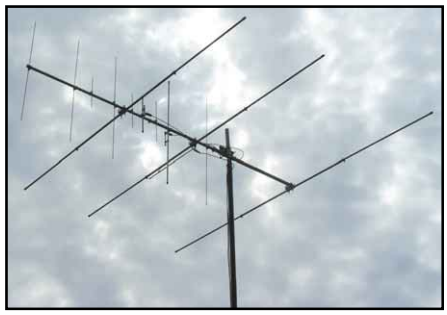


Table 2
Cushcraft A627013S
Triband Yagi Antenna

Manufacturer's Claimed Specifications

Frequency Coverage: 50-54, 144-148, 430-450 MHz.
Number of Elements: 6 meters, 3; 2 meters, 5; 70 cm, 5.
2:1 Bandwidth (MHz): 6 meters, ≥1; 2 meters, ≥4; 70 cm, ≥10.
Power Rating (PEP): 6 meters, 1000 W; 2 meters, 350 W; 70 cm, 350 W.
Boom Length: 103.5 inches.
Longest Element: 119 inches.
Turning Radius: 74 inches.
Mast Size Range: 1.25 to 2.0 inches.
Wind Load: 2.52 square feet.
Weight: 9.5 lbs.

craft's amateur antenna line may recognize the A627013S as an amalgam of two of its other products: the A270-10S 2-meter/70-cm Yagi and the A50-3S 6-meter Yagi. Close comparisons will reveal that the 70-cm antenna elements are positioned slightly farther forward on the boom of the '13S than they are on the '10S—most likely to reduce interaction with the 6-meter array.

Piece By Piece

Cushcraft's nine-page *Assembly and Installation* instructions are excellent. (Have a look for yourself; a PDF version is available on the company's Web site.) The booklet starts out with a page of tips on antenna location, mounting, grounding, assembly and tuning. Next is a "Master Parts List" that provides "key" designators and Cushcraft parts numbers for the antenna's 189 parts. (*Don't panic!* A significant portion of these is screws, nuts and washers.)

The assembly process is divided into seven steps. Each step is about a page long and includes some brief text and very detailed "exploded view" line drawings. The specific components called out in that stage of assembly conveniently appear in tables on the same page. The tables include pictorial depictions of the individual parts—right down to the hex nuts and washers! The parts shown in the exploded-view drawings are clearly identified by their corresponding two- or three-digit key numbers.

Tooling Up

Assembly requires only a few common hand tools: a medium-sized standard screwdriver; $^{11}/_{32}$, $^{5}/_{16}$, $^{7}/_{16}$ and $^{1}/_{2}$-inch hex wrenches; and a tape measure. All dimensions are given in both US and metric units of measure.

I recommend that you get nut drivers for the two smallest hex sizes. These work much better than wrenches for tightening the small fasteners used on this antenna, and are the perfect tool for cranking stainless steel worm clamps. You'll need some electrical tape and a knife as well.

Let's Dig In!

The antenna comes packed in $10^{1}/_{2}$-pound $4^{1}/_{2} \times 4^{1}/_{2} \times 51$-inch shipping carton. After popping the box open and spreading its contents out on my patio, I began to have serious doubts that I had enough parts to put together the impressive-looking array pictured on the front of the instruction booklet.

I spent a couple of minutes sorting out the various element and boom components into associated groups (see Figure 1). Things were already looking much better.

The bulk of the small hardware pieces—screws, nuts, washers and clamps for example—come packaged in two double-bagged factory-sealed plastic bags. This made me feel confident that I could dive right into the assembly process without taking the time to perform a full-blown inventory of every tiny piece. Cushcraft didn't disappoint me...much. When all was said and done the only thing missing was a $1^{1}/_{4}$-inch plastic end cap that seals the back end of the boom. While I'm sure Cushcraft would have been happy to send me one, I found a suitable replacement at my local home center.

Assembling this antenna will take awhile. From the time the parts hit the patio blocks to the point when I was ready to clamp the finished antenna to a mast and hook up the coax cables was a little over two hours. Allow me to offer a few tips that might serve to enhance your enjoyment of the assembly experience.

Assembly Tips, Tricks and Techniques

Choose your location for this project carefully. A driveway or garage floor is much less likely to swallow up a handful of the 60-some-odd small nuts and washers than a grassy knoll. At the very least, spread out a large drop cloth before you rip open any hardware bags.

Perhaps the most challenging phase of construction is Step 2: "Reddi-Match

Figure 1—The parts of the A627013S presorted into piles of associated components and ready for assembly.

Assembly." In this stage you'll be building the driven elements/gamma match assemblies for the 2-meter and 70-cm arrays. Gather up all the pieces shown in the corresponding table (measure the machine screws to verify that you've got the right ones), grab your screwdriver, $^5/_{16}$-inch nut driver, tape measure and page 4 of the *Instructions*, and head for a workbench.

There are several different ways to put these together upside down or backward (I'm convinced I stumbled on *all* of the possible combinations). Begin by passing the long screws that secure the coax connector mounts to the driven elements—and eventually the boom—through the holes in the components and temporarily thread nuts on them (if you don't—*well, you'll see!*). Before you head back to the assembly site with these completed components, carefully compare them to the diagrams and make absolutely darn tootin' you've got everything pointing in the right directions. (Yes, I know the photograph of the antenna that appears on the cover of the booklet has the matching arms pointing in the exact opposite directions as those shown in the instructions. It probably doesn't make a lick of difference—but stick with the way they're depicted in at least two of the diagrams in the assembly steps just in case! Careful inspection will reveal that the antenna in the cover photo also has the entire 70-cm array positioned farther back on the boom—*hmmm*…)

Once you've got all of the 2-meter and 70-cm elements fastened to the boom, you'll encounter your next obstacle. Until this point, the project was essentially one-dimensional. In order to fasten the three 6-meter elements perpendicular to the already-installed elements, you'll need to come up with a way to support the boom so that the 2-meter and 70-cm elements are in a vertical position. After pondering the situation for several minutes (think "807") I came up with a solution. I located a 5-foot section of mast I had kicking around and hammered one end of it into the ground a foot or so. I skipped ahead in the instructions a couple of steps, mounted the boom-to-mast clamp, and fastened the partially constructed antenna to this temporary support. At this point it was a simple matter to bolt on the 6-meter elements and (using a tuning chart in the instructions) set the lengths of the elements and position of the tuning strap on the gamma match for resonance in my favorite part of that band.

It immediately became apparent that the completed A627013S is very "front heavy." The center of gravity is considerably further forward on the boom than the point where the boom-to-mast clamp is located. The antenna is designed this way to avoid interactions between the 2-meter and 70-cm arrays and your (most likely) conductive mast material. While this really isn't a big deal, it will translate side forces to antenna supports and rotators. Cushcraft recommends using a medium-duty rotator to turn this relatively small antenna, and I suspect that this is partially due to the added strain that results from the unbalanced load.

Take extra care when you are handling this antenna on a roof or tower. While the total weight is under 10 pounds, the offset center of gravity and the 3-dimensional shape of the '13S makes it a bit unwieldy—particularly at that point when you are attaching the boom-to-mast clamp to the mast. *And wear safety glasses*—it's a real "porcupine." (I don't *wanna* be a pirate!)

The Wide World of VHF and UHF

I set up the antenna on a 20-foot portable mast. Two separate feedlines are required—one connects to a "T" harness that feeds the 2-meter and 70-cm arrays, and a second attaches directly to the 6-meter array. Use the lowest-loss coax you can afford. While you might be tempted to settle for RG-8X, the loss through 50 feet of that cable at 70 cm is nearly 3 dB (half of your power—and receive signal strength—will be lost in the feedline!).

I made some informal checks of SWR and 2:1 bandwidth with both a common VHF/UHF SWR meter and a popular antenna analyzer. I observed measurements that closely coincide with Cushcraft's claimed specifications for these parameters (see Table 2). With the tuning bars of the gamma matches set precisely at the positions recommended in the instructions, my antenna's 2-meter resonant point was close to 147 MHz. The 70-cm resonant point was in the neighborhood of 434 MHz. The instructions include a section on making adjustments, if so desired.

The vertically polarized 2-meter and 70-cm arrays on this antenna are particularly well suited for FM repeater and FM simplex applications. Repeaters and mobile stations will almost always employ vertical antennas. Weak-signal (SSB and CW) operators on these bands, however, will often set up their antennas for horizontal polarization. Cross polarization over relatively short paths (where a station using a horizontally-polarized antenna is communicating with a station using a vertically-polarized antenna) can result in a whopping 20 dB of additional path loss. Longer paths and enhanced propagation mechanisms—such as ducting and E-skip for example—will skew a signal's polarization, though, and this makes station antenna polarization less of an issue. What this all boils down to is that while you may not be the strongest signal into the regional 2-meter or 70-cm CW or SSB net, when the bands are open over enhanced paths you'll be on pretty equal footing—at least polarization-wise—with the rest of the weak-signal gang.

Using parallel (or perhaps this would be "perpendicular") reasoning, I'd say the 6-meter portion of this array is probably best suited for weak-signal operation on that band. While you can definitely use it for casual local 6-meter FM repeater and simplex operations, its horizontal polarization coincides with that more typically used for CW and SSB operation.

Cushcraft's claimed forward gain and front-to-back ratios—while perhaps optimistic for these interlaced arrays—are on the order of what could be expected from optimized individual Yagis of the same boom lengths and numbers of elements. (See Chapter 11 of *The ARRL Antenna Book* for a more complete discussion of this topic.)

It's also important to note that the claimed performance figures are at the specific design frequencies of the individual arrays. While the telescoping 6-meter elements allow for precise length adjustment of all three elements, the 2-meter and 70-cm element lengths are fixed. As you tune those two arrays away from their design center frequencies (down to the extreme low end of band for weak-signal work on 2 meters, for example), the gain and front-to-back ratio will—of course—be somewhat degraded.

Nevertheless...

Overall, I think the A627013S is a great choice for adding 6 meters, 2 meters and 70 cm coverage to an antenna arsenal. Its relatively small size and light weight would allow you to easily stack it on the same mast above an existing HF Yagi. It can also be partially disassembled for occasional hill topping or Field Day use.

If you're looking for a decent directional antenna to connect to the 6-meter/VHF/UHF antenna jacks on one of those new multiband wonders, perhaps Cushcraft's got you antenna!

Manufacturer: Cushcraft Communications Antennas, 48 Perimeter Rd, Manchester, NH 03103; 603-627-7877, fax 603-627-1764; **sales@cushcraft.com**; **www.cushcraft.com**.

Price: $169.95.

TECHNICAL CORRESPONDENCE

TRACKING RFI

By David Holtkamp, K5KH, 509 Brighton Loop, Los Alamos, NM 87544; **k5kh@arrl.net**

◊ Here is an interesting case study of what unusual sources of RFI can arise from the neighbors' homes or from one's own station.

I live in a typical suburban setting and I'm blessed with wonderful neighbors. They didn't fuss when I put up my tower, and they are understanding and patient when my signal interferes with their telephone, smoke alarm, TV or whatever. Of course, it helps that area hams were very active during our recent disastrous fire ("Wildfire!" *QST*, Feb 2001, p 96) and they remember that emergency service. Nevertheless, I try to go out of my way to solve their problems and that goodwill is reciprocated. Recently, I noticed that some man-made HF noise sources were not only stronger than ever before, but they were all over the bands from 160 through almost 10 meters! So, I did a bit of fox hunting, and I want to share the unusual sources of noise I found with my neighbors' friendly cooperation.

The worst source of noise was intermittent. After logging the time and amplitude of the signal over several days, I noticed that it seemed to be temperature related—it would appear late in the morning and then disappear late in the afternoon. Using my HF Yagi as a direction finding tool (particularly the deep nulls off the ends of the elements), I was able to establish a bearing toward a neighbor down the block. Using a small shortwave receiver for final pinpointing, I found the source. It's a familiar one to rural residents near ranchers: a high-voltage fence to confine animals. Here, the neighbor across the street had installed one to restrain his German shepherd (an energetic digger). The fence didn't start to interfere until a recent snowfall buried part of the high-voltage wire in a snowdrift. This explained the diurnal variation in the noise signal: only when the snow was actively melting (during the warmest part of the day) was it shorting the fence. Moving a few shovels of snow fixed that problem. This neighbor was especially grateful because he had been seeing "snow" on his television (particularly the lower VHF channels, 2 through 5) for the last few weeks and couldn't figure out where it was coming from. When we turned off his "dog wire," it immediately went away; his gratitude and future cooperation was assured.

Unfortunately, that wasn't the end of the noise problems. The next sources were isolated to a nearby neighbor, who has helped quite patiently in the past when I caused him problems. There was a strong (S9+10 dB) "hashy" source at 19.4 MHz coming from a paper shredder (Royal, Model Orca-9512x). It may be generated by the LED sensor (continuously powered) that triggers the shredder when paper is inserted. A worse offender was a NiCd/NiMH battery charger (Digipower Solutions, Model DPS-2000) that generated harmonics from 2 through 24 MHz every 160 kHz (each one 10-kHz wide). Because their frequency drifted and they were present at all times (his batteries were on constant charge), these signals were a constant source of background noise in many of the HF bands.

There are several lessons to be learned about RFI and neighborhood relations:

1. Always be polite and actively helpful when solving any neighbors' RFI/TVI problems caused by your station. Those neighbors might return the favor one-day.

2. Use a directional antenna (HF beam in this case) and a portable shortwave radio to pinpoint sources. This provides a demonstration for the neighbor when the problem originates in their home.

3. If possible, use the electrical breaker box at the source building to help narrow the noise search to a single branch circuit. (Walking around with a portable radio can be very time consuming, particularly when you are a guest in a neighbor's house.)

4. Emergency communication activities pay off in ways that go beyond the present emergency and generate long-term goodwill in a community.

LOCATE AND FIX POWER-LINE INTERFERENCE

By Gene Preston, K5GP, 4710 Fawn Run, Austin, TX 78735-6403; **k5gp@arrl.net**

◊ I worked for a power company for 28 years as an engineer and helped my company track down radio-noise complaints. Now, I'm retired and help hams here in Austin, Texas, track down their power-line noise. The big problem for both the power company and hams (working together) is to find the exact pole where the noise originates. You can greatly speed things up by helping the power company find the noise source. Start looking for the noise source with a loop-stick antenna on HF (or an AM-band receiver) to find a likely pole. If loose hardware is the problem, the noise will cut in and out with a little motion of the pole and/or wires. *(Do not attempt to move any wires or the pole! Leave that for qualified personnel.—Ed.)* If motion causes the noise to vary, ask the power company to tighten up all the hardware on the pole. This type of noise has the characteristic of going away when it rains. If the noise is present when it rains, try another approach.

If the noise is present when it is raining, the faulty component is probably a bad fuse, bad lightning arrestor or a leaky insulator. It is probably not a bad transformer because oil-filled transformers tend to self-destruct with any internal arcing. Noise intensity from these components does not change with pole movement.

To pinpoint the exact pole for bad components requires a hand-held beam antenna on VHF or UHF in AM or SSB mode. An S-meter is not needed. I use a six-element Yagi on 440 MHz with a Yaesu VX-5R H-T in its AM mode. A 2-meter quad or three-element 2-meter Yagi will work fine. The FM mode will not work. You should be able to hear the noise up to about 100 feet from the source on 144 and 440 MHz.

Once the pole is located, call the power company and schedule them to meet you at that specific pole. Get them to schedule a specific date and time. Your knowledge of the specific source of noise helps in getting this meeting scheduled.

You should be present at the noise site with your receiver listening to the noise when the power company is working on the pole so you can tell them if their work has fixed the problem.

As a professional, I have several suggestions for the power company:

1. Use a "hotstick" to push on different wires and see if they are associated with the noise source.

2. Tighten all the hardware, especially the hardware supporting the main conductors and/or crossarms. They usually have leakage currents that make noise on the galvanized bolts going through the wooden pole.

3. Disconnect the lightning arrestor(s).

4. To test the fuse, install a jumper around the fuse disconnect(s) and then disconnect the fuse from the circuit.

5. Replace the insulators (this is a difficult task and insulators are usually not the problem, unless there is a slack

span with bell insulators). If slack-span bell insulators are the problem, ask the power company to spray WD-40 inside the bell insulators and then tighten up the slack or change out the bell insulators with a single-section fiberglass insulator.

Sweep the beam antenna back and forth across the noise source to help pinpoint the maximum signal location. Rotate the beam polarization to see how the source is polarized. The noise will be greatest when the antenna elements are parallel with the wires immediately connected to the bad component.

Following the above procedures should help expedite the elimination of your power-line noise. Send me e-mail at my address above if you have questions.

A PROPOSED KEYER CONNECTION STANDARD

By Jack A. Speer, N1BIC, 6196 Jefferson Hwy, Mineral, VA 23117-9411

◊ This suggestion could solve many interconnection problems for CW key hookups, much like the ARRL standard (two-conductor Molex Series 1545 connectors) for 12-V power wiring published in *QST* and elsewhere.

I propose a three-wire connection for CW keys, keyers, transmitters and so on. It makes for the quick connection of any key/keyer combination in ham shacks. It's great at field day, where operators and their keys may change often.

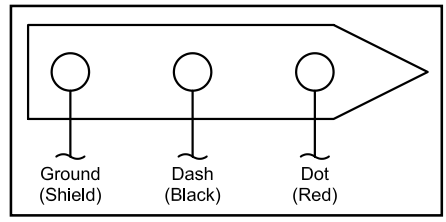


Figure 1—Key/keyer-connector wiring proposed as a standard by N1BIC. See text for details.

Table 1
Key/Keyer-Connector Parts for Proposed Connection Standard

Appropriate Molex connectors and pins from Mouser
538-03-06-1038 male three-pin connector (with tabs)
538-03-06-1103 female pin (0.062)
538-03-06-2033 female three-pin connector (with tabs)
538-03-06-2103 male pin (0.062)

Use a male connector with female pins and a female connector with male pins. Crimp and solder all of the connections. Use small tie-wraps for strain relief at the key if desired. Use shielded three-conductor #22 AWG stranded wire. Heat shrinkable tubing is a nice touch at all of the connections.

Figure 1 shows the connector wiring (straight keys use only the red and ground conductors):

Table 1 lists appropriate Molex connectors and pins from Mouser.[1]

SMALL AMPLIFIER DOUBLES AS HEARING AID

By Adelbert Kelley, AA4FB, 2307 S Clark Ave, Tampa, FL 33629-5707; **aa4fb@mindspring.com**

◊ I have found that a RadioShack #33-1097 amplifier can substitute for a hearing aid under certain circumstances. It is compact, has built-in microphones, plenty of gain and an equalizer. The equalizer is used to boost the highs if needed. It can be used to monitor the conversation in a room or listen to a football game on TV without driving your spouse out of the house. RadioShack also has the 20-foot extension and earphones needed. Get the kind with the volume control in the cord; they have several to choose from.

SOME *JAVASCRIPT* TO FOIL SPAMMERS!

By Phil Karras, KE3FL, 3305 Hampton Ct, Mount Airy, MD 21771-7201; **ke3fl@yahoo.com***; AEC Carroll County Maryland, OES, ORS, Life Member, VE, Software Consultant*

◊ In *QST* for April 2001 (page 25), Doug Smith, W9WI, warned us not to pepper our

[1]Mouser Electronics, 1000 N Main St, Mansfield, TX 76063; tel 800-346-6873, 817-804-3888, fax 817-804-3899; **sales@mouser.com**; **www.mouser.com**.

Table 2
***Javascript* Code to Foil Spammers**

Snippet A

```
<head>
<script language="JavaScript" src="EMAIL.JS">
</script>
</head>
```

Snippet B

```
<script language="JavaScript">
<!--Hide from non-JavaScript browsers
MailMe("ke3fl", "yahoo");
     //  un-hide -->
   </script>
   [Click Here to send me email]
   </a>
```

Snippet C

```
//
// This function Starts the e-mail <a href= tag
// inputs: two email address strings
  // output: nothing
  // Action: none
// return: complete mailto <a href= html line

function MailMe(add1, add2) {
    var atsign = "@";      // Just the at @ sign
    var dotcom = ".com";   // The ".com" of my email address
var Mail2 = "mailto:"; // The mailto: part of the <a href line

    //
// The next line is the onMouseOver line placed into the
// browsers status line. It simply says "Send us an Email"
    //
var Ovr = "onMouseOver=\"window.status="Send us an Email"; return true;\"";
    //
// The next line clears the browsers status line when the
// mouse is no longer over our link text.
    //
var Out = " onMouseOut=\"window.status="\"";

    //
// This line returns the completed <a href=mailto line to
// our web page and prints it into our html page as if it
// were always there.
    //
return(document.write("<a href=",Mail2+add1+atsign+add2+dotcom+Ovr+Out, ">"));
  }
```

Snippet D

```
<a href="mailto:notme@nowhere.com"></a>
```

Snippet E

```
<html>
<!— Search my pages at your own risk! -->
<a href="mailto:notme@nowhere.com"></a>
<a href="mailto:notme2@nowhere.com"></a>
<a href="mailto:notme3@nowhere.com"></a>
<a href="mailto:notme4@nowhere.com"></a>
  .
  .
  .
<a href="mailto:notme99@nowhere.com"></a>
<a href="mailto:notme100@nowhere.com"></a>
</html>
```

Web pages with e-mail addresses because "spam" companies can look into our HTML files and extract e-mail addresses.

I know of at least three ways to keep your e-mail addresses safe from spam robots. First, we can use a cgi/*Perl* program/script to write the html page. Since the page does not exist until the cgi script creates it, it cannot be searched for an e-mail address. Unfortunately, this solution is way too involved to present here. Second, we could write a cgi-*Perl* script to put up a fill-in form. Again, there are no e-mail addresses in any html files, but again the process is too complicated to describe here. (I've implemented both of these solutions on the **www.eldersong.com** Web site.)

The third way uses a rather simple *JavaScript* script. This is small enough, and simple enough that almost all of you can get it up and running in your Web pages. I wrote this as a class assignment during my *JavaScript* class.

Inside your Web-pages put code snippet A from Table 2.[2] The two lines of *JavaScript* must be placed between the <head></head> tags on your page. Now, wherever you want an e-mail address to appear, put code something like snippet B. The file "EMAIL.JS" is a *JavaScript* file that holds the actual function "MailMe." This file *must* also be on your Web site; the function looks like snippet C.

None of the comment lines (except one) are needed for the code. Those lines start with "//". The one that is needed is the "// un-hide -->" line. In this case, *JavaScript* would not know what to do with just the "un-hide -->" portion of the html end-of-comment.

I realize that this may be too difficult for some of you, but try simply cutting and pasting from the download file onto a backup version of your Web page on your computer (not on your Web site). Try it and see if it works by sending yourself an e-mail. As long as you're hooked to the Internet and you've correctly replaced "ke3fl" and "yahoo" with the items in your e-mail address—mine is: (**ke3fl@yahoo.com**)—then it should work. I have tested and used this code. As long as you do not place it into a table or inside a table inside a table, it should work without a problem—even in version-3 browsers (*Netscape* and *Internet Explorer*).

If you are not at a ".com" address, you must modify the MailMe function variable "dotcom =" line to have your dot-whatever in it. I now have this up and working on my KE3FL Web pages, along with the following fun line (snippet D) of html.

[2]You can download Table 2 from *ARRLWeb* at **www.arrl.org/files/qst-binaries/**. Look for 01TC12.ZIP.

Last, we might all pepper our Web pages with snippet D, which will do nothing to our users but will give spammers some spam of their own. Their programs will pick up the "**notme@nowhere.com**" address, which I hope doesn't exist, but our users don't have a link since there is nothing between the <a href...> and tags.

I can see it now. We can each put an **e-mail.htm** page on our Web sites with hundreds of dummy e-mail addresses like those in snippet E. We might even cause spammers to stop searching Web sites for e-mail addresses. Good luck and have some fun!

A CURE FOR RECURRENT INSENSITIVITY IN GE MASTR II REPEATERS

By John A. Diefenbach, K1TLV, 231 Meeting House Hill Rd, Mason, NH 03048-4118; **jdief@tellink.net**

◊ The following may be of some use to *QST* readers, especially those who own or service GE or Ericsson/GE MASTR II series repeaters (including the Exec II). Many amateur repeater owners have converted GE MASTR II sets for use as VHF and/or UHF repeaters.

Although the mobile radios were introduced in the early seventies, their conversion to repeaters (and stations) came in the mid-seventies. They proved excellent pieces of equipment with one exception: The receiver often loses sensitivity, testing at anywhere from 5 to 50 µV, or more, instead of the usual 0.25 µV to 0.5 µV! Even low-band sets are affected.

As a two-way radio service technician, I first encountered this in a VHF station. The sensitivity was about 15 µV. First, I attempted to "touch-up" the front-end alignment starting with the first alignment slug of the RF/Mixer section, that is in the "casting." Just barely turning this slug (or any slug on the casting) greatly improved the sensitivity. Touching up the remaining slugs brought the sensitivity back to specifications, but other, non-casting, slug adjustments made no improvement.

When the problem occurred again months later in a radio on a different band, I contacted GE in Lynchburg, Virginia, for some input. There were no clear answers. The problem could recur in the same station at irregular intervals. In my experience, however, it *never* occurred in mobiles.

According to my contacts at GE, the original castings—the "shiny, silvery" looking castings—contain an unknown impurity that was introduced during the plating process. This impurity allows crystal formation within the cavities of the tuned circuits. The crystals grow until RF de-tuning occurs within affected cavities.

When a cavity is "retuned," the movement of the slug (or capacitor in low-band units) and associated miniscule vibrations shatter any crystals, thus restoring sensitivity. Obviously, a gentle tapping on the casting could yield the same results. Because mobile transceivers are subject to vibration during over-the-road travel, crystal build-up is rare in mobiles.

An accepted temporary fix is to open the casting (Yes! Remove all those screws!), clean each cavity with a small brass-wire brush, and then spray the inside of each cavity with several light coats of clear Krylon spray paint. After reassembly, a thorough front-end alignment will be necessary.

This problem was later solved when GE introduced a replacement casting. The replacement can be identified by its dull gray finish. I hope this tip helps you folks in the field to keep those repeaters going for many years.

Technical Correspondence items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can't guarantee that a given idea will work for your situation, we make every effort to screen out harmful information.

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

FEEDBACK

◊ In "The Micro-M Charge Controller" (Oct 2001 *QST*, page 30), the reference to R2 in the shaded sidebar should read, "from 49.9 kΩ 1% to 82.5 kΩ 1%."

◊ Press Jones, N8EUG, of The Wireman, has called our attention to the fact that some information was left out of the New Products announcement for the CQ113PE coaxial cable (New Products, October 2001, page 100). The description should have read: The center conductor, solid polyethylene dielectric and 97% copper braid follow the specification for Mil SpecRG-213/U and its predecessor RG-8A/U, but CQ113PE then includes a moisture blocking material and adds a tough, UV resistant, abrasion fighting, moisture impermeable, black polyethylene jacket.

◊ Georg, DJ1YJ, points out an error in Figure 2 of "Uncle Albert's Touch Pad Keyer," by Sam Ulbing, N4UAU (Oct 2001 *QST*, page 33). The connecting dots at the wire intersections for Q4 through Q7 are not shown, making it appear that the sources are not connected to ground. QST

MOVED & SECONDED

MINUTES OF EXECUTIVE COMMITTEE
NUMBER 468
IRVING, TEXAS
OCTOBER 13, 2001

Agenda
1. Approval of minutes of May 5 and May 14 (by teleconference) Executive Committee meetings
2. FCC matters
3. Antenna and RFI cases and local regulatory matters
4. Other legal matters
5. Legislative matters
6. International matters
7. Organizational matters
8. Recognition of new Life Members
9. Affiliation of clubs
10. Approval of conventions
11. Date and place of next EC meeting
12. Other business

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 8:30 AM Saturday, October 13, 2001, at the Dallas/Fort Worth Airport Marriott North, Irving, Texas. Present were the following committee members: President Jim Haynie, W5JBP, in the Chair; First Vice President Joel Harrison, W5ZN; Executive Vice President David Sumner, K1ZZ; and Directors Frank Butler, W4RH, Frank Fallon, N2FF, Tom Frenaye, K1KI, and Fried Heyn, WA6WZO. Also present were International Affairs Vice President Rodney J. Stafford, W6ROD, and General Counsel Christopher D. Imlay, W3KD.

A moment of silence was observed in memory of the radio amateurs and others who were victims of the September 11 attacks as well as for FCC staff member Steve Linn, N4CAK.

1. On motion of Mr. Butler, the minutes of the May 5 and May 14, 2001, Executive Committee meetings were approved in the form in which they had been distributed.

2. FCC matters:

Mr. Haynie reported on Amateur Radio Day at the FCC, held September 18. All of the FCC Commissioners stopped by during the day. He expressed his appreciation to ARRL staff for their exceptional work to make the event a success. Mr. Harrison and Mr. Imlay concurred, adding that the ARRL personnel present were busy with FCC visitors all day, right up to 5 PM.

Mr. Imlay reported on the status of pending FCC matters as follows:

2.1. ET Docket 98-153, Ultra Wideband (UWB) Transmission Systems. It is expected that this proceeding will be resolved by the end of the year. The ARRL has continued to participate in a telecommunications industry coalition that is fighting to limit the interference potential of UWB devices.

2.2. ET Docket 00-47, Software Defined Radios (SDRs). On September 14 the FCC issued a First Report and Order in this proceeding, amending Part 2 of its Rules to create a new class of equipment for SDRs with streamlined authorization procedures. ARRL will continue to monitor the proceeding to make sure it does not result in inappropriate restrictions on amateur use of SDRs.

2.3. Petition for Rule Making, 2300-2305 MHz Amateur Primary Allocation. The FCC is under considerable pressure to increase the commercial use of spectrum in this general frequency range. For the past five years the ARRL has been seeking the upgrading of the Amateur Service in this segment to primary. The request was renewed in a petition, RM-10165, filed on May 7, 2001. A petition by AeroAstro, RM-10166, proposes a co-primary allocation but would place new restrictions on amateur operation in the 2300-2305 MHz band in order to protect a new use that is not contemplated in the international table of frequency allocations. A resolution of the issue is not expected for several months.

2.4. ET Docket 00-221, Reallocation of Government Transfer Bands, and RM-9797, Microtrax Petition for New Personal Location System at 2300-2305 MHz. It is our understanding that the FCC is not planning to accommodate Microtrax at 2300-2305 MHz. However, another aspect of this proceeding relates to increased commercial use of 216-220 MHz. This may further erode the usefulness of our limited access to 219-220 MHz.

2.5. ET Docket 00-258, 2390-2400 MHz. Comments on a FCC Further Notice of Proposed Rule Making are due October 19. Mr. Imlay distributed a draft of comments and requested feedback. The draft comments conclude that additional commercial use of 2390-2400 MHz is incompatible with the amateur primary allocation, but it may be possible to accommodate some government sharing.

2.6. RM-9949, Amateur Primary Allocation, 2400-2402 MHz; RM-9404, Petition for New Amateur Allocations at 135.7-137.8 kHz and 160-190 kHz; RM-10209, Petition for New Amateur Allocation at 5.250-5.400 MHz. It is anticipated that these three ARRL petitions may be combined into a single FCC proceeding in early 2002.

2.7. PR Docket 92-257, Concerning Maritime Communications. In this proceeding the FCC seeks to convert the Automated Maritime Telecommunications System (AMTS) from site-specific licensing to geographic area licensing, thus permitting auctions for AMTS licenses. The ARRL took the opportunity to comment that AMTS licensees can, and do, refuse to consent to amateur operations in the 219-220 MHz band even if there is no technical justification for the withholding of consent.

2.8. RM-10051, SAVI Technology Petition for Part 15 Periodic Radiators at 433.9 MHz. SAVI Technology seeks a dramatic increase in the duty cycle, and therefore of the interference potential, of Part 15 devices in this band. The ARRL filed strong opposing comments. A demonstration of the proposed devices at Mr. Haynie's residence confirmed the significant interference potential of the devices, which are incompatible with amateur reception of weak signals.

2.9. ET Docket 99-231, Further Notice of Proposed Rule Making Regarding Part 15 Spread Spectrum Devices. The ARRL filed comments opposing the elimination of the processing gain requirement for direct sequence spread spectrum systems in the 2400-2483.5 MHz band because the requirement gives manufacturers an incentive to design spectrum-efficient systems.

2.10. Application for Review, RM-8763, PRB-1 Modification and Clarification. One focus of Amateur Radio Day at the FCC, reported earlier, was to acquaint FCC Commissioners and staff with the obstacles faced by many amateurs who want to install unobtrusive antennas on property governed by private deed restrictions. Opportunities for Congressional hearings are also being pursued. However, there is considerable reluctance at the federal level to take up the issue.

Mr. Imlay noted that the FCC has requested parties to "refresh the record" in IB Docket 95-59 regarding reconsideration of rules adopted in 1996 on preemption of local zoning regulation of satellite earth stations. He observed that this may provide an opportunity to argue against inconsistent interpretation of the Commission's authority to preempt private land use restrictions. On motion of Mr. Heyn, the General Counsel was instructed to prepare and file appropriate comments in this proceeding.

2.11. A petition filed by Jeff Briggs, K1ZM, and Bill Tippett, W4ZV, seeks FCC restrictions on frequencies available for wideband modes in the 160-meter band. The petition has not been assigned an RM-number and no ARRL action is required at this time.

2.12. Similarly, the FCC has not yet assigned an RM-number to a petition by Kenwood Communications Corporation seeking amendment of Section 97.201(b) to permit auxiliary operation in the bands 144.5-145.8 MHz and 146-148 MHz.

2.13. Mr. Imlay noted the filing by Loea Communications Corp., Lihue, Hawaii, of a petition seeking the allocation of 71-76 GHz and 81-86 GHz to the fixed microwave services. It was agreed that brief comments should be filed noting that the Amateur Service continues to have access to 75.5-76 GHz until 2006.

2.14. In response to a question about FCC enforcement, Mr. Imlay observed that FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth, K4ZDH, is working on the most critical areas of concern. Much of Mr. Hollingsworth's attention currently is devoted to repeaters in Southern California.

The committee was in recess for luncheon from 11:57 AM to 1:21 PM.

2.15. Mr. Imlay reported that a request has been received for the ARRL to arrange arbitration of a repeater coordination dispute. He will be arranging for a Volunteer Counsel to serve as arbitrator.

2.16. Mr. Frenaye inquired as to whether the disclaimer appearing on the FCC Enforcement Log on the ARRL Web site makes it sufficiently clear that a licensee who receives a letter from Mr. Hollingsworth has not been found guilty of a violation of FCC rules. Mr. Imlay agreed to review the disclaimer.

3. Mr. Imlay reported that Barry Gorodetzer, N4IFE, has been awarded his attorney's fees by a Florida trial court in his successful suit against the Emerald Estates Community Association. The Association has appealed. The ARRL Antenna Case Assistance Committee has provided funding to help cover the opposition to the appeal. The status of other cases involving amateur antennas was reviewed briefly.

Other legal matters:

4.1. Mr. Imlay reported briefly on other legal matters.

4.2. The committee discussed election matters without taking formal action.

4.3. Mr. Imlay noted that the FCC frequently issues Experimental licenses authorizing operation, on a non-interference basis, in amateur bands. Some require coordination with ARRL but many do not. The General Counsel was asked to continue to monitor these license grants and to call attention to any that represent a significant interference potential.

4.4. On September 13, the FCC released the report on FCC reform prepared by Mary Beth Richards, Special Counsel to the Chairman. The report is available on the FCC Web site. Mr. Imlay said the report deserves close review.

5. Mr. Sumner gave a brief verbal report on legislative matters. Understandably, Congress presently is preoccupied with matters arising from the September 11 terrorist attacks.

6. International matters:

6.1. Mr. Stafford reported on the 14th General Assembly of IARU Region 2, held in Guatemala City September 30-October 5. Club de Radioaficionados de Guatemala did a commendable job as host. Attendance was down compared to prior conferences, with 13 member-societies present in person and 8 represented by proxy. A new Constitution and Bylaws for the Region were adopted. The Region is in good financial condition with ample reserves. Mr. Stafford was elected Secretary. Region 2 President Tom Atkins,

VE3CDM, did not seek re-election and was honored for his 18 years of service as an officer of the Region. The new Executive Committee headed by Pedro Seidemann, YV5BPG, is committed to improving communication with member-societies, working with CITEL on WRC-03 issues, and planning a program for the 15th General Assembly in 2004, scheduled for Trinidad & Tobago, that will attract more member-societies to attend.

The Bylaws of Region 2 require that before naming the chair and members of any permanent working committee, the Region 2 Executive Committee shall consult with the member-society of the country in which the prospective appointee resides.

On motion of Mr. Butler, the Executive Committee concurred with the appointment of Rick Palm, K1CE, as Region 2 Emergency Coordinator.

On motion of Mr. Heyn, the Executive Committee concurred with the appointment of Dale Hunt, WB6BYU, as Region 2 ARDF Coordinator.

It was noted that there will be further consultation regarding the appointment of a Region 2 Beacon Coordinator.

6.2. Mr. Stafford reported that the Deutscher Amateur Radio Club (DARC) of Germany has offered to assume the administration of the International Travel Host Exchange, a program that was initiated by the ARRL some years ago. On motion of Mr. Butler, the offer of DARC was accepted with thanks.

7. Organizational matters:

7.1. After review, on motion of Mr. Butler, the nomination of Evelyn Gauzens, W4WYR, for the office of Honorary Vice President was endorsed and forwarded to the Board for consideration at the 2002 Annual Meeting.

7.2. Mr. Heyn advised that the Volunteer Resources Committee had requested guidance on the significance of the sentence, "These rules and regulations shall have the force and effect of the Bylaws of the League," which appears in the Rules and Regulations of the ARRL Field Organization and the Rules and Regulations Concerning Affiliated Societies. After discussion, on motion of Mr. Heyn, it was voted to refer the request to the General Counsel and staff for investigation and recommendation. The task is to be completed prior to the November 10 meeting of the Volunteer Resources Committee.

7.3. Bylaw 25 provides that meetings of the ARRL Board of Directors shall be held in the vicinity of Newington, Connecticut, unless the Board determines otherwise by majority vote in accordance with procedures set out in the bylaw. At the request of President Haynie, staff investigated the cost of holding the 2002 Annual Meeting in other locations and determined that the cost of holding the meeting in the vicinity of Dallas was about the same as holding it in Connecticut. After discussion, on motion of Mr. Butler, a mail vote of the Directors was ordered on the following resolution: "Resolved, that the 2002 Annual Meeting of the Board of Directors shall be held in the vicinity of Dallas, Texas, beginning on Friday, January 18."

7.4. Lessons learned from the terrorist attacks and Amateur Radio's role in supporting rescue and recovery efforts were discussed.

8. On motion of Mr. Fallon, 221 newly elected life members were recognized and the Secretary was instructed to list their names in *QST*.

9. On motion of Mr. Heyn, the following clubs were declared affiliated or their earlier affiliation by mail vote was ratified:

Category 1
Battleship New Jersey Amateur Radio Station, Gloucester, NJ
Baycare Emergency Amateur Radio Service, Tampa, FL
Benton County Radio Operators, Pea Ridge AR
DeKalb County Amateur Radio Club, Smithville, TN
Empire Contest Club, Staten Island, NY
Heart of Texas DX Society, Waco, TX
High Desert Amateur Radio Club, Bend, OR
Hilltop Transmitting Association, Inc, Felton, PA
Mercer County Emergency Radio Club, Lawrenceville, NJ
Mohawk Contest Club, Athol, MA
Northern Rockies DX Association, Great Falls, MT
Oklahoma City Autopatch Association, Edmond, OK
Pinellas Amateur Radio Klub, Pinellas Park, FL
Sheriff's Tactical Amateur Radio Club, Valrico, FL
Sierra Radio Association, San Jose, CA
Spring Amateur Radio Club, Houston, TX
Summit County American Red Cross Amateur Radio Club, Munroe Falls, OH
Tri-County CW Amateur Radio Club, Irwin, PA
Ubiquitous Radio Club, Monticello, IL
Virginia Appalachian Wireless Association, Rich Creek, VA
Zanesville Amateur Radio Club, Zanesville, OH

Category 2
DelMarVa DX Association, Sanford, DE
Texas Repeater System, Dallas, TX

Category 3
Aggie Amateur Radio Club, Greensboro, NC
Community College of Indiana Bloomington Amateur Radio Club, Bloomington, IN
Vinal Tech Amateur Radio Club, Middletown, CT

Category 4
Santa Barbara Section Council of Clubs, Ventura, CA

The ARRL now has the following numbers of active affiliated clubs: Category 1, 1,735; Category 2, 31; Category 3, 112; Category 4, 16; Total, 1,894.

10. On motion of Mr. Heyn, the holding of the following ARRL conventions was approved or their earlier approval by mail vote was ratified:

2001
Arizona State, July 27-29, Flagstaff
Alabama Section, Aug. 18-19, Huntsville
New Mexico State, Aug. 25-26, Rio Rancho
Oklahoma DX Operating Specialty, Oct. 6, Bristow
Pacific Division, Oct. 19-21, Concord, CA
Georgia State, Nov. 3-4, Lawrenceville

2002
New York City/Long Island Section, Jan. 20, North Babylon
Southeastern Division, Feb. 2-3, Miami, FL
Northern Florida Section, Feb. 8-10, Orlando
North Carolina State, Apr. 14, Raleigh
EMCOMM 2002 Operating Specialty, Apr. 20-21, Palo Cedro, CA
Missouri State, May 3-4, Lebanon
Atlantic Division, May 31-June 2, Henrietta, NY
Eastern Pennsylvania Section, June 8, Bloomsburg
Midwest/Dakota Division, June 14-15, South Sioux City, NE
Georgia State, July 13, Gainesville
Arizona State, July 26-28, Flagstaff
New England Division, Aug. 23-25, Boxboro, MA
Pacific Division, Oct. 18-20, Concord, CA
Georgia Section, Nov. 2-3, Lawrenceville
Florida State, Dec. 7-8, Palmetto (Tampa)

2003
Western New York Section, Aug. 3, Williamsville

11. It was agreed that the next meeting of the Executive Committee will be held on Thursday, January 17, 2002, at the location of the Annual Board Meeting.

12. There was further discussion of radio amateurs' support of the rescue and recovery efforts on and after September 11 and the difficulty of bringing these contributions to the attention of the public.

There being no further business, the meeting was adjourned at 5:00 PM.

Respectfully submitted,

David Sumner, K1ZZ
Secretary

LIFE MEMBERS ELECTED OCTOBER 13, 2001

Douglas R. Aab, K0DA; Patricia B. Alley, KE4SOF; Brandon T. Anderson, N8PUM; David M. Armbrust, AE4MR; Robert W. Armstrong, AE0B; Raymond A. Arruda, KB1EVX; Jeffrey A. Baker, KB4YKQ; Blake A. Baldwin, AC5XN; Richard L. Barch, W1MII; Betty M. Barch, N6VZF; M. T. Barnhill, K4MQM; Samuel D. Barricklow, K5KJ; Curt R. Bartholomew, N3GQ; William M. Beck, K3ARR; Woodrow S. Beckford, WW1WW; David N. Bergthold, N0NP; David M. Berish, N3TA; Ralph C. Bose, WP4KO; Robert G. Brandon, K5PI; Richard H. Bratzenia, W6DU; Ralph H. Brock, W5MV; George Brooks, K4SSC; William R. Brown, KK2G; Dan Brown, W1DAN; Ron Brubaker, WB8IHE; Mike R. Bruck, W5MRB; Victor S. Bull, KF6RIP; Lynn A. Burlingame, N7CFO; Mark B. Carlson, N3ZFO; Chris O. Carpenter, KC5QVC; Rob Carr, N3RTR; Charles E. Carter, AA0RI; Arjun B. Chatterjee, KB6MTH; Adrian S. Cherepusko, W4ASC; Joanne Clapp Fullagar, KF6AFY; Richard Clark, KF0BK; Edward E. Clark, N8UN; Steven L. Clark, AG4V; Den Connors, KD2S; Caligo Corradi, WA2JGL; James B. Covington, AA0XJ; James W. Cox, W7QIS;Ollie L. Craig, KA9IRF; Max W. Dahlgren, NN5L; Frank Dalonzo, N3ZOM; Mark A. Dawber, N6CSM; Michael E. Dawson, KD1UC; Rebecca G. Day, KS4RX; Richard F. Debusschere, W8DOW; Clifford Dickinson, N1RCQ; Dennis D. Dietrich, W5DDD; Frank H. Dietrich, KF4GIN; Robert B. Donnell, KD7NM; E. Downs, AE4D; James R. Downs, AD4O; Drake B. Doyle, AC7FF; Marty Edwards, KC4BFF; John C. Emmons, WD4KKE; Scott D. Eskew, KB9WRQ; Andy Estes, KB1ERX; Lynnette K. Evans, KB3GZZ; James D. Ewald, N7ZFI; Walter B. Fair, KE5WJ; James R. Fellows, WA3AJD; Michael L. Fink, KB3GGB; Gerald C. Fortunato, N2LDG; Norman H. Freidin, VE3CZI; Neil S. Fullagar, K6NCX; Vincent S. Galbraith, N3OK; David B. Gibbs, KA3GLI; Dana L. Gibson, KC4ZFD; Gary M. Gilham, WG4ARC; Leonard S. Goldstein, N2ZQ; Paul H. Hansen, N1IZ; Yutaka Hara, JH1MLO; Hal G. Hazel, KM6JM; Alice M. Hebert, N5SYD; William L. Hebert, KC5GUR; William C. Herman, W3VOU; Robert J. Hill, WA6AYJ; Scott W. Hooper, KT0P; John D. Hopkins, KG4JJL; Timothy V. Horvath, WA3QCV; David W. Howell, W5DH; Gregory S. Hubert, KB2KHZ; Richard L. Hudgins, N5ALE; Theodore L. Hundtoft, KA7QCY; Jay S. Hyman, W2CSS; D Allen Jameson, KE7BG; Michael C. Joens, K1JE; Clayton L. Juckett, NC1X; John R. Kaiser, K9WI; George M. Kaneshige, AH7GK; Steven D. Katz, N4KTZ; Henry B. Kelly, KG5WQ; Dennis L. Kidder, WA6NIA; Dwayne L. Kincaid, WD8OYG;Michael J. King, KD4EZB; Douglas A. Kirk, AD5CU; Paul E. Knupke, N4PK; John C. Kountz, KE6GFF; Jay A. Kreibich, KD5EOQ;Kenneth P. Kuzma, KE4MG; Patrick Lam, VR2VF; Carol Larsen, KA9HFA; Arthur H. Laurent, KD4CSO; Matthew A. Laverty, N2RER; Jimmy F. Lee, AE4HF; John S. Lehman, K8PJ; Dave Leisman, W8QW; Jason D. Licht, KB8LPW; Philip Lieberman, WA6AZE; Hubbard J. Lindler, K4JAY; Eugene P. Loughran, KB2OT; Wylie H. Lusk, KA3BLD; Eveline M. Lyman, W6EML; Mary L. Mack, KG6GEX; Cesare Mancini, KB2NOW; Michael R. Markowitz, N6XRF; Peter J. Martin, KG4JVN; Annalee L. Mc Carthy, N9KHC; Brian E. Mc Carthy, NX9O; Scott W. Mc Lellan, W3WT; Brian Mc Minn, WE5TX; Harold Melanson, AB0QO; Richard G. Meyer, KF4CGP; Brian P. Mileshosky, N5ZGT; Timothy R. Mohr, AA9RR; George A. Moore, K3UT; Frank J. Moreno, KC7ZMW; Takashi Mori, AA9AT; Lance R. Morris, N4GMT; Aaron T. Morrison, AE4KO; Neal C. Moseley, WB4PNB; Steve A. Muncy, NI5V; James Murphy, K3JM;

[continued on page 97]

IARU Administrative Council Calls for End to Morse Requirement

Saying that it was "setting aside any previous relevant decisions," the International Amateur Radio Union Administrative Council has resolved that IARU policy supports "the removal of Morse code testing as an ITU requirement for an amateur license to operate on frequencies below 30 MHz." The Council further resolved to urge member societies—as an interim measure—to seek Morse code testing speeds "not exceeding five words per minute."

The resolution was adopted during the IARU Administrative Council meeting October 6-8 in Guatemala City, Guatemala, which followed the 14th General Assembly of IARU Region 2. The Morse resolution took into consideration the approval—without opposition—of ITU-R *Recommendation M.1544*, which sets out the minimum qualifications of radio amateurs.

The Council said it recognizes that Morse code "continues to be an effective and efficient mode of communication used by many thousands of radio amateurs" but that Morse code proficiency as requirement for an HF amateur license "is no longer relevant to the healthy future of Amateur Radio."

The principal business at the Administrative Council session was to review the status of IARU preparations for WRC-2003. Agenda items of concern to amateurs include the harmonization of amateur and broadcasting allocations near 7 MHz, the adequacy of HF broadcasting allocations below 10 MHz, and possible revisions to Article S25 of the international *Radio Regulations*.

Among other things, Article S25 spells out Amateur Radio operator qualifications. It now provides that Amateur Radio license applicants demonstrate the ability "to send correctly by hand and to receive correctly by ear, texts in Morse code signals" for operation below 30 MHz. The IARU Administrative Council supports the revision of Article S25 and the incorporation by reference of *Recommendation M.1544*.

FCC Clarifies CORES Amateur Implementation

The FCC's Wireless Telecommunications Bureau has clarified several issues regarding Amateur Service implementation of the Commission Registration System—or CORES (click on the "Commission Registration System" link from the FCC Web site, **www.fcc.gov/**). Starting December 3, everyone doing business with the FCC—including amateur licensees—must obtain and use a 10-digit FCC Registration Number (FRN) when filing. The new requirement further expands the number of FCC abbreviations, numbers and systems hams need to be aware of.

Amateur licensees now registered in the Universal Licensing System (ULS), **www.fcc.gov/wtb/uls**, already have been cross-registered in CORES and issued an FRN by mail. The FCC said it planned another cross-registration by November 28. Amateurs can check to see if they have an FRN via a ULS license search. Many Internet call sign servers, including ARRL's, also now provide this information.

Once CORES becomes mandatory, the FCC will "auto-register" all amateurs who seek to register in ULS and will issue them an FRN. Amateurs then should use their FRN in place of their Taxpayer Identification Number (TIN—typically an individual's Social Security Number) when filing applications with the FCC. New or upgrade license applicants not previously registered in ULS will be registered automatically in both CORES and ULS when they provide a TIN on a license application filed by a Volunteer Examiner Coordinator.

FCC licensing personnel emphasize that CORES and ULS are separate systems with different purposes. Starting December 3, however, a licensee's FRN will appear in both the ULS and CORES databases. Although both will contain an FRN, updating information in one will not update the other. The FCC-wide CORES is "entity registration" only and is designed to track fee payments to the Commission, such as vanity call sign fees.

For amateurs, CORES registration will replace ULS "TIN/Call Sign" registration, but the ULS will remain the Amateur Service licensing database within WTB, and only ULS will associate an individual with a particular call sign and FRN. CORES doesn't recognize or track call signs. Amateur licensees will continue to be required to keep their ULS records current, especially in regard to maintaining a current FCC-license mailing address.

Going away December 3 will be the so-called Assigned Taxpayer Identification Number, or ATIN, which the FCC has been issuing to applicants ineligible to obtain a Social Security Number, such as foreign applicants and club station licensees. An FCC *Public Notice* said applicants that have been using ATINs "must now register in CORES." The FCC said it will accept ATINs only "during a short transitional period" after December 3.

CORES will offer an "amateur club" exemption from having to provide a TIN/SSN when registering, but applicants may use a trustee's TIN/SSN or a tax-exempt club's IRS-assigned EIN. CORES will provide a similar "foreign entity" exemption for those not holding a Social Security Number to register and obtain an FRN.

Once CORES/FRN becomes mandatory, those registering in ULS, **www.fcc.gov/wtb/uls**, will be redirected to CORES registration. The FCC says the only time an amateur applicant will need to deal with CORES after that is to update registration information, such as when changing a CORES password, address or telephone number—although there does not appear to be a specific requirement to do so.

The WTB says that starting December 3, "all passwords will be maintained in the CORES database." CORES and ULS online registrants will be able to choose a common password to access either system in the future. For those already cross-registered in CORES from ULS, most CORES and ULS passwords are identical. Amateurs should contact the CORES help desk for password assistance. Call toll-free 877-480-3201.

Amateurs also may use FCC Form 160 to register in CORES, and those doing so will be mailed a CORES password for online access.

At press time, the FCC was continuing to work out the details of how amateurs, CORES and ULS will coexist. Amateur Service testing with CORES was planned for early November. The results of that testing could lead to additional changes in how CORES will be implemented for the Amateur Service.

Rick Lindquist, N1RL ♦ Senior News Editor

BATTLE LOOMS OVER PART 15 ACCESS TO 425-435 MHZ

The FCC has proposed changes to its Part 15 rules governing unlicensed devices that would allow operation of advanced RF identification devices between 425 and 435 MHz. By going along with a request made earlier this year by SAVI Technology Inc and fiercely opposed by ARRL, the FCC has set the stage for another battle between amateur and commercial interests.

"The FCC hasn't thought this through," said ARRL Executive Vice President David Sumner, K1ZZ. He contends that the Part 15 RFID proposal—included in mid-October as part of a larger *Notice of Proposed Rule Making and Order*—is "contrary to the whole philosophy of the Part 15 rules." Sumner said the RFID devices SAVI proposes more properly belong on frequencies that are also authorized for use by devices regulated by FCC's Part 18 Industrial, Scientific and Medical (ISM) rules.

The FCC *NPRM&O* proposed to modify the rules for RFID systems "to harmonize our rules with those in other parts of the world and to allow for improved operation." Sumner said that 433.9 MHz is allocated for ISM devices in 10 European countries but not in the rest of the world, including ITU Region 2 (North and South America).

Last March, the ARRL urged the FCC to deny or dismiss SAVI Technology's petition. The League argued that the field strengths and duty cycles SAVI proposed for its RFID tags were unreasonable "and would undoubtedly seriously disrupt amateur communications in one of the most popular of the Amateur Service allocations."

SAVI, which markets radiolocation and wireless inventory control products, told the FCC it needed the rules changes to satisfy customer demand for increased RFID system capabilities. The FCC said it agreed with SAVI that changes to its Part 15 rules to allow more advanced RFID systems in the 433 MHz band "would serve the public interest." It proposed to create a new section to Part 15 that would allow operation of RFIDs in the 425-435 MHz band and transmissions of up to two minutes at maximum field strengths now only permitted for extremely short-duration, intermittent control signals.

In an apparent about face, the FCC said it believes the proposed levels would offer only minimal interference potential for licensed users. The FCC in the past has acknowledged serious interference potential and has prohibited data transmission, among other things, at the proposed field strengths for that very reason.

As proposed, transmissions of 120 seconds would be permitted with just a 10-second silent period between transmissions. Under §15.231(e) periodic radiators are permitted field strengths of less than 5000 µV/m at 433 MHz measured at 3 meters, with duty cycles of less than one second and a silent period between transmissions that's at least 30 times the duration of the transmission.

The League pointed out in its earlier comments that the Communications Act of 1934 lacks authority to allow unlicensed devices with substantial interference potential. "Such devices must be licensed," the ARRL concluded. Unlicensed Part 15 devices must not interfere with licensed services and must tolerate interference received from licensed radio services in the same band.

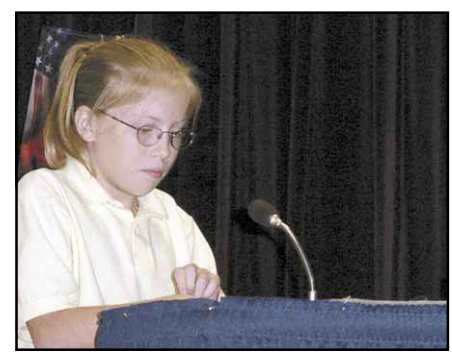
Sumner said the League would file strong opposition to the FCC's *NPRM&O*. The entire *Notice of Proposed Rule Making and Order in ET Docket 01-278* (which incorporates RM-9375 and RM-10051) is available on the ARRL Web site, **www.arrl.org/news/stories/2001/10/19/1/290a11.html**.

ISS EXPEDITION 3 CREW CONDUCTS FIRST SCHOOL CONTACTS

Youngsters at Seabrook Intermediate School in Texas got their new school year off to a banner start by speaking with the International Space Station via ham radio. The September 4 contact was carried out as part of the Amateur Radio on the International Space Station program. Crew Commander Frank Culbertson, KD5OPQ, took the NA1SS microphone for the first of several school contacts in the early weeks of his crew's four-month stay.

Among other things, the 10 curious youngsters in grades six through eight from the school's Science Magnet Program wanted to know how life aboard the ISS compared with the space shuttle. "The space shuttle is fairly small," Culbertson said, comparing it to "a camper on the back of a pickup truck." The space station is huge in comparison. "It's like night and day between the two," he said. "For living in space, the space station is the way to go." Culbertson said he's enjoying weightlessness aboard the ISS.

One youngster wanted to know if the crew was able to shower aboard Space Station Alpha. "We don't actually take showers," Culbertson explained. "That would be pretty messy." He said the crew cleans up using a wash cloth and hot water, plus



Seabrook student Stephanie Welcome prepares to ask her question of ISS Crew Commander Frank Culbertson.

ARRL Welcomes Chief Development Officer

The ARRL has a new chief development officer. Mary Hobart of Wethersfield, Connecticut, officially assumed her new duties at ARRL Headquarters on October 1.

"We are all deeply impressed by her depth and breadth of knowledge and particularly by her energy," said ARRL Executive Vice President David Sumner, K1ZZ.

Hobart's primary job will be to create fund-raising strategies, garner philanthropic support for ARRL programs and provide leadership in support of program development, advocacy and ongoing operations.

ARRL

Prior to coming to the League, Hobart served as vice president for development at Connecticut Public Television and Radio in Hartford, where she managed a comprehensive $6.8 million development program. She has been a development professional for 17 years with a career focus on public broadcasting membership organizations. A native of Washington, DC, Hobart holds a BA in history and has completed work toward an MBA.

Hobart's two main passions are gardening and international travel. Among other accomplishments, she has led several safaris in Kenya.

FCC DISMISSING OUTDATED FORM 605 FILINGS

The FCC's Wireless Telecommunications Bureau says it will dismiss all submittals it receives on Form 605 *Quick-Form Application for Authorization in the Ship, Aircraft, Amateur, Restricted and Commercial Operator, and General Mobile Radio Service* that bear edition dates prior to March 2001. This change does not affect applicants filing on-line via the Universal Licensing System (ULS). The FCC advises that amateurs can avoid problems by submitting on-line application via the FCC's Universal Licensing System Web site, **www.fcc.gov/wtb/uls**. To obtain a current copy of Form 605, visit the FCC "Forms" page, **www.fcc.gov/wtb/csinfo/orderfrm.html**. Paper copies of Form 605 also are available from the FCC Forms Distribution Center, 800-418-3676.

FCC STOPS ACCEPTING FILINGS IN ENVELOPES

The FCC announced in mid-October that, effective immediately, hand or messenger-delivered filings enclosed in envelopes would not be accepted at FCC Headquarters until further notice. The Commission encouraged everyone to file electronically or via fax whenever possible.

Filings and other documents in envelopes or packages destined for the FCC should continue to be addressed to FCC Headquarters, 445 12th St SW, Washington, DC 20554. At least temporarily, these deliveries were being diverted to the FCC's Capitol Heights, Maryland, facility for special handling. At press time, the FCC was seeking an alternative site to accept delivery of filings on a more permanent basis.

A *Public Notice* said that starting Monday, October 22, the FCC would accept originals and copies of official filings addressed to the Commission's Secretary "held together with rubber bands or fasteners" only at its Capitol Heights facility. Filing deadlines were extended in light of the new procedures.

The FCC said the changes were necessary "as a precautionary measure."

The FCC *Public Notice* made no direct reference to the anthrax scare. It also made no mention of any change in procedures regarding filings mailed in envelopes to its Gettysburg, Pennsylvania, office—where Amateur Service applications typically are sent.

Visit the FCC Web site, **www.fcc.gov**, for more information.

Amateur Enforcement

♦ **FCC prohibits automatic control on LA-area repeater:** The FCC has terminated the automatic control privileges of the W6NUT repeater in the Los Angeles, California, area until further notice. An FCC review of the repeater's operation initiated last winter followed allegations that the licensee or control operator failed to address "long periods of jamming by users, broadcasting, music playing as well as a plethora of other violations."

The latest chapter in the W6NUT saga followed a September 7 letter to repeater owner Kathryn Tucker, AA6TK, from FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth. Hollingsworth specifically cited incidents of alleged rules violations in early February on W6NUT and reiterated that extensive monitoring of W6NUT showed "no evidence that a control operator even exists for this repeater." The FCC also has reported receiving numerous complaints about W6NUT.

In her reply to the FCC, Tucker identified her husband, Roy Tucker, N6TK, as the primary control operator "24 hours a day, 7 days a week, 52 weeks out of the year." But elsewhere in her response, Tucker noted that he was not on duty during the alleged misbehavior in early February that prompted the FCC review. Tucker also told the FCC that it was not the repeater's policy "to attempt to remove unruly operators" from using W6NUT. As for complaints, Tucker told the FCC that the W6NUT policy was to let them "go in one ear and out the other."

Hollingsworth told Tucker that the FCC rules do "not exempt the repeater station licensee from responsibility for the proper operation of his or her station" nor allow a repeater licensee to ignore complaints. "Given your response, it is evident that you do not understand the duties of a control operator," he said.

Hollingsworth noted that the rules hold licensee and control operator "equally responsible for the proper operation of the station." Automatic control does not absolve the licensee or control operator of the responsibility for illegal or improper conduct that airs, he explained. While there's an exception for inadvertent communications that violate the rules, he said, FCC rules do not consider improper or illegal conduct that's repetitive or continues for hours or days to be inadvertent.

Hollingsworth requested that the licensee or the control operator conduct a time and usage study of W6NUT's operation for 14 consecutive 24-hour periods to demonstrate that the repeater can comply with FCC rules without a control operator on duty. The repeater may continue to operate using remote or local control in the meantime.

As a result of the early February incident, Gregory S. Cook, ex-KC6USO, of Chico, turned in his license, and the FCC ordered Ted R. Sorensen III, KC6PQW, of Agoura Hills off all repeaters on the 144, 222 or 440-MHz bands for the next three years.

♦ **Michigan ham granted short-term renewal, upgrade:** The FCC has acted on longstanding renewal and upgrade applications from a Michigan ham whose operation had come under Commission scrutiny. The FCC renewed the license of Allen J. Stap Sr, N8OKU, of Gobles, for a two-year term, provided he follows FCC rules. It also granted his application to upgrade to General.

Stap's upgrade was held in abeyance for more than a year while the FCC evaluated his written responses and on-the-air behavior following earlier sanctions. A letter from FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth noted that Stap had entered a plea of no contest in May 1997 to an alleged violation of a Michigan statute that makes it a misdemeanor to "prevent, interfere, obstruct or impede a public safety radio communication." Stap was accused of intentionally interfering with a RACES station engaged in test operations in support of civil defense communications, Hollingsworth said.

Stap served a "delayed" sentence of nine months after agreeing not to operate on 2 meters and to surrender his radio equipment to the police. After nine months, the restrictions against Stap were lifted and the charge dismissed.

Subsequently, Stap was notified by the FCC to answer to complaints alleging that he had interfered with with Kalamazoo repeaters. Stap received a *Warning Notice* in February 2000.

Stap's license came up for renewal in May. Hollingsworth said that since the FCC had received no recent complaints about Stap, it would grant the two-year renewal. At the same time, the FCC acted favorably on Stap's application to General class. Stap may routinely renew his Amateur Radio license, if he follows the rules during his current two-year term, but valid complaints of rules violations could lead to a license revocation hearing, Hollingsworth said.

special soap and shampoo that does not need to be rinsed off but can just be wiped dry with a towel.

"It's been a real pleasure talking with you guys," Culbertson said as he signed off from NA1SS. The students reacted with loud applause.

Participating youngsters were enthusiastic about their ARISS experience. "That was just so cool talking to people over 210 nautical miles straight up," said Banks, a sixth grader. Seventh grader Adam, who hopes to become an astronaut, called it "a very eye-opening experience." Savannah, another sixth grader, said she hoped to get her ham ticket.

Coordinating the ARISS contact at the school was Bill Wood, W5OOD, with help from the Clear Lake Amateur Radio Club (K5HOU) and the Johnson Space Center Amateur Radio Club (W5RRR). Sandy Peck, the school's science coordinator, said some of her students hope to attend a licensing class in the spring.

Students at schools in Florida and Virginia also got to talk with Culbertson in September. On September 14, 15 youngsters and their teacher at Altamonte Elementary School in Altamonte Springs, Florida, questioned Culbertson about life in space and how he and his crew are coping. Given that the contact was just a few days after the World Trade Center and Pentagon terrorist attacks, Culbertson told pupils that, for a change, he and the crew wished they had TV aboard.

"This is the only week that I have been up here that I wish I could have watched TV, because of all the things that are happening down there which obviously touch all of us very deeply," he said.

Altamonte teacher Cricket Scheer, KG4EGW, called her school's QSO "an experience of a lifetime, and a happy, positive one during a very frightening time."

Culbertson also referred to attacks during a September 19 ARISS QSO with students at Western Albemarle High School in Crozet, Virginia. Culbertson said the crew members heard about the World Trade Center and Pentagon attacks from a doctor on Earth while they were involved in a medical conference. "Obviously it was quite a shock, and it took a while to get me the details," he said. "Of course, it was hard to believe, at first."

On the lighter side, when asked by another high schooler about how the ISS smells, Culbertson replied, "We think it smells pretty good, but I bet you'll have to ask the next crew what they think when they get here."

Early on the morning of September 25, Culbertson was quizzed by 13 first and second graders at Ladysmith Primary School in Ruther Glenn, Virginia. Among other things, the pupils there wanted to know what crew members did with their dirty clothes, how they got rid of garbage (both are burned up in Progress rockets sent zooming into Earth's atmosphere) and how they washed dishes (they don't use dishes).

"It was a tremendously positive experience," said Jim Whitaker, KQ4RH, who helped organize the Ladysmith contact and whose wife, Carolyn, KF4RXJ, is a kindergarten teacher at the school. "Frank Culbertson was wonderful! You can tell he understands children and wanted to make this special for the kids."

The ARISS program is a cooperative venture of ARRL, AMSAT and NASA. For more information, visit the ARISS Web site, **ariss.gsfc.nasa.gov**.

NASA

Frank Culbertson at the NA1SS operating position aboard the ISS.

FORMER MIDWEST VICE DIRECTOR CHUCK MILLER, WA0KUH, SK

Former ARRL Midwest Division Vice Director Lyndell "Chuck" Miller, WA0KUH, of Kansas City, Missouri, died September 24 after a lengthy illness. He was 75 and had been a ham for nearly 40 years.

An ARRL Life Member, Miller served as Midwest Division Vice Director from January 1988 to December 1991 and was a founder and life member of the PHD Amateur Radio Club.

"Chuck was the main driving force behind the Club," said former Kansas Section Manager, Bob Summers, K0BXF. "Its success and the PHD hamfest were due to his undying effort." Larry Staples, W0AIB, called Miller "truly a remarkable man and a credit to the Amateur Radio Service."

Miller also helped establish the PHD Scholarship Award, **www.arrl.org/arrlf/scholgen.html**. The program awards $1000 annually to a licensee living in the ARRL Midwest Division (Iowa, Kansas, Missouri and Nebraska), who is either enrolled in a course of study of journalism, computer science or electronic engineering, or is the child of a deceased radio amateur.

Survivors include Miller's wife, Mary Carolyn, and two daughters. Services were September 27. Memorial contributions are invited to the PHD Scholarship Fund, c/o ARRL, 225 Main St, Newington, CT 06111.

In Brief

• ***CQ* asks contesters to e-mail all logs:** *CQ* magazine has requested that all participants in *CQ*-sponsored Amateur Radio contests submit their logs electronically. "In light of recent events regarding hazardous items sent through the mail, logs received through the mail at the *CQ* offices will be held unopened until all potential health risks have been evaluated," a CQ Communications news release said. *CQ* said it could not guarantee that logs submitted via the US Postal Service will be opened. All logs for the CQ World Wide DX Contest, the CQ WPX Contest, the CQ World Wide 160-Meter Contest, the CQ World Wide VHF Contest and the CQ/RTTY Journal RTTY contests should be submitted via e-mail according to the instructions in the rules for each contest. CQ Communications President Dick Ross, K2MGA, said *CQ* regrets the inconvenience to contesters lacking Internet or e-mail access or those who log by hand, but he said *CQ* did not want to risk the chance that staff members or contest committee volunteers might be exposed to dangerous packages sent through the mail.—*CQ Communications news release*

• **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**.

• **Ten-Tec opens retail store, full-line dealership:** Ten-Tec has opened an Amateur Radio retail store and full-line equipment dealership. The 1000-square-foot retail store (and ham shack) are in the lobby of the Ten-Tec manufacturing facility in Sevierville, Tennessee. "We have a large, loyal customer base that we'll be able to supply with accessories that complement our own manufactured equipment," said Ten-Tec Amateur Radio Product Manager Scott Robbins, W4PA. QST

Hams Help Enhance Researchers' Horse Sense

By James Parsons, W4JTP, Bristow, Virginia

Providing communications for equestrian events is nothing new for the Amateur Radio community. But April's Middleburg (Virginia) Research Ride was no ordinary trot in the woods for either the horses or members of the Vienna Wireless Society.

Sponsored by Virginia Tech's aptly named Middleburg Agricultural Research and Extension (MARE) Center and the Rectortown Equine Center, the 50-mile endurance ride measured the physiological effects of various types of feeds on horses' response to stress as they navigate a series of trails in the hills of Northern Virginia's "horse country." The volunteer riders participate not simply for trophies, but for the satisfaction of contributing to valuable research that will lead to better health and nutrition practices for their beloved horses.

Several area hams have long been involved with similar equestrian activities, but this event's complex logistics would likely outstrip the capabilities of the core cadre of operators. A search of affiliated clubs on the ARRL Web site led Ride organizers to the VWS, which eagerly accepted the opportunity to participate in this unique public service event. Members were asked to staff checkpoints along the route's four loops, each of which converged at a central "Vet Check" at a nearby farm. There, the horses would undergo another round of medical tests before being released for the next loop. Along with tracking the location and status of the four-legged participants, VWS ops would also provide backup communications for Ride organizers and emergency communications if necessary.

Tests of 2-meter equipment during a route survey with Ride organizers indicated that reliable simplex communication would be, at best, marginal due to the hilly terrain. Arrangements were made to use the WA4TSC 147.30 MHz repeater in nearby Bluemont, Virginia. The popular wide-coverage machine not only guaranteed that all stations could exchange information during the Ride, but also provided quick access to emergency services if needed.

W4JTP PHOTO

"Harmonic," the foal that was born while the Research Ride was going on, is getting used to the world in the pasture at the MARE Center.

Giddyap!

The Ride got under way early on the morning of April 1, as some 50 riders presented their mounts at the MARE Center for a final veterinary inspection, including temperature, pulse, respiration, and a blood sample. Meanwhile, Alan Bosch, KO4ALA, Benjamin Gelb, KF4KJQ, and John Birch, KA4YMA, set up the Net Control station in the Center's birthing barn, and other VWS members made their way to the checkpoints and Vet Check.

They didn't have to wait long for things to start happening. Within a few minutes after the official 0700 start, the first horses were galloping their way along the gently rolling 10-mile trail of Loop 1. After the "drag riders" made their way down the trail less than an hour later, Checkpoint 1's ops Maria Norton, KG4JBJ, and Linda Thomas, AC4LT, were able to secure and relocate to the busy Vet Check to assist Jim, W4JTP, and John Transue, AF4PD, in recording arrival and departure times, and relaying the information back to Net Control.

Loop 2 provided a more challenging test for horses and riders, taking them on a more rugged course 1000 feet above sea level where Kerry Kingham, WA4BQM, and David Warrington, WW4MM, awaited at the second checkpoint. Then, it was back to the Vet Check for more tests, and on to a somewhat less strenuous Loop 3 and Checkpoint 3 with Jason Hsu, AG4DG, and William Kamm, KC4VXH. After another visit to the Vet Check, the horses and riders headed out on Loop 4 (a rerun of Loop 2), returned one last time to Vet Check, and then made the short, but easy ride back to MARE Center.

During the morning and early afternoon, horses and riders were scattered along all legs of the course, requiring some extra coordination on the part of the communications team. Along with trying to keep a tight rein on the participants' locations, the VWS ops were able to alert riders to the presence of holes, muddy bogs, and other hazards ahead on the trail. The communications team at Vet Check also kept Ride organizers updated on the status of those horses that were being held back for additional observation, or withdrawn from the Race at the recommendation of their owners or the veterinarians.

Back at the MARE Center...

Not all the action took place on the trail, however. Back at the MARE Center, the Net Control ops had the rare opportunity to witness a mare giving birth in an adjoining stall. For the most part, the ops managed to keep their attention on the net operations. But watching a new foal come into the world was certainly an unexpected treat that gave the entire crew something to talk about.

By 1700, the last horses from Loop 4 received medical clearance to leave Vet Check and head home to the MARE Center. Charles Cunningham, N3TOT, logged in each homeward bound horse and rider combination, and provided an extra measure of insurance in case help was needed. Even with dozens of horses spread out over a largely remote 50-mile course, there were no incidents to speak of, aside from the occasional tardy rider. And after a full day of public service activity, the VWS members were ready to secure operations and hit the hay as well.

The Middleburg Research Ride proved

Steve Ewald, WV1X ♦ Public Service Specialist

to be a successful synergy involving a rather unique combination of horses, ham radio, and science. Ride organizers were pleased to have such detailed information about the participants, and the assurance that should the "worst" happen to either a horse or rider, help was just a short transmission away.

For the VWS, the Ride was an opportunity to participate in a fascinating, albeit unusual, service activity. The experience has sparked interest in enhancing the quality of route communications using other modes such as VHF, APRS, and perhaps even ATV.

And what about the foal? At the suggestion of the VWS ops, MARE officials named him "Harmonic"— "a nice name for a horse" according to Dr Wendell Cooper, the MARE Center's Chief veterinarian, and a fitting way to commemorate Amateur Radio's newest contribution to the spirit of public service.

RESPONDING TO AN EMERGENCY—YOU HAVE TO KNOW WHAT TO DO

By Murray Green, K3BEQ, Cheverly, Maryland

We may have the communications equipment and years of operating on the Amateur bands, but is it easily applied to emergency communications? The equipment, maybe—but you and me, no. One does not simply walk into an emergency situation unless you have had some training and/or experience.

We just don't sit down at a transceiver and control a host of other stations passing emergency or health and welfare messages, or go mobile and know what to do or set up an emergency communications system that supports a specific area. And that is why the training program is so essential to the ARES program. Sure, it can become boring and, at times, you may even question the value of it all.

Then a disaster comes along such as the attack on the World Trade Center, the Pentagon, killer tornados/hurricanes that makes it all come together. This tells you the training and countless hours spent passing exercise messages and setting up quick-reaction communications systems was worth the effort.

You may find yourself in a mass of humanity, smoke, dust, the remains of an aircraft and worse, a demolished building, people barking orders, security forces watching everyone, a temporary morgue. Through it all you find that you are making a difference; you can readily adapt to the communications role required.

It may not be a major role, but that is not the issue. What counts is when someone comes out of the rubble dirty and tired after hours of digging and simply says "thank you" as you hand him some food and drink; the same food and drink you made available through a rapid-response repeater system set up in the disaster area hours before. "No big deal" some might say. Then again, they were not there, were they?

Give this some thought: ARES is spread thin, mighty thin, across the nation. You have the equipment and the communications skills. They just have to be sharpened so that you can rapidly respond to an emergency situation. It won't take long, but you have to take the first step. And it's a big one because you have to be seriously committed to the program. The training, the ID badges you are issued to gain access to secure areas, and the hours you have invested in the program are of little value, if, when called upon, you are not available in an emergency.

If, after reading this, you would like to participate in the program, contact your ARRL Section Manager (listed on page 12 of *QST*) or other ARRL Section Leaders and Emergency Coordinators via the links that begin at this ARRL Web Page: **www.arrl.org/FandES/field/org/smlist.html**. You can read more about public service by logging onto **www.arrl.org/FandES/field/pubservice.html**. Let your communication equipment and skills be put to the task. You will never regret it.

Editor's note: The Amateur Radio Emergency Communications Courses are available on-line and in classroom settings. For more details, see the ARRL Certification and Continuing Education Home Page at **www.arrl.org/cce/**.

BASIC HAM PUBLIC SERVICE EVENT PREP LIST

By Alan Bosch, KO4ALA, Arlington, Virginia

Thanks to Alan for gathering this list to help you prepare for a public service event.

Antennas, etc—The highest gain one that will go on your handi-talkie (H-T) and not be clumsy (remembering that telescoping ones are long and fragile). Take a small mobile magnetic-mount, too (you can stick it on any nearby car if needed). Consider a "Tiger Tail" counterpoise (which is easily home-brewed—it is simply a quarter-wave piece of insulated hookup wire with a ring-style lug that will slide over your H-T's BNC below the antenna itself). A roll-up twin lead J-pole is great, and can be hung up just about anywhere. Be sure to program the event frequencies (including tones) into your H-T ahead of time, and if you are not intimately familiar with your unit, review the manual and practice the essential functions. (Don't be left out of the action by an unplanned frequency change you can't get into a memory.)

Batteries—As many as you have for your radio, all charged up and checked out. If you get a new one to add to the one that came with it, make this a higher-capacity unit (in mAh) and a higher-voltage one if your HT will put out more power that way. Also, try to get a battery-pack that will take AA alkalines, and bring along a handful. If your radio has a battery-saver circuit, enable it.

Clothing—Dress for the predicted weather and remember both the layering concept and the value of lots of pockets. Wear something (like a call sign ball cap) that will ID you as a ham. Give thought to your footwear, including the possibility of boots for muddy places. Pick gloves that will not make using your radio awkward. And don't forget sunscreen. If rain is expected, bring along a couple of sandwich baggies—with a hole punched through the sealed end for the antenna. They make nice radio raincoats and you can talk right through them.

Clipboard, etc—Actually, those smaller than 8×11 are handier, but one with a cover is a good idea. Be sure it will hold your pen, too. And bring a couple of pens for they inevitably disappear. In events that require tracking participants, a pocket cassette recorder will let you collect the information without having to scrawl as they pass—and, indeed, report it without writing at all. If it is to rain, protect any documents done on ink-jet printers or the writing will dribble right down the page. And, especially if the event has some public relations possibilities, bring a camera.

Food—Stuff your favorite snacks (avoiding salty ones) in your pockets in case the promised pizza does not get to your post. A canteen of water can prove welcome.

Maps, etc—Even if the event supplies one, bring your own (they are usually more detailed). Also, when planning event support, request a point-to-point set of written directions in addition to the sponsors' map (they are usually less-than-ideal). Fi-

nally, study the directions to your post and confirm the talk-in frequency beforehand.

HAM RADIO HELPS SAVE RAFTERS IN ALASKA

By Nick Meacher, N3WWE,
Emergency Coordinator,
Northern Southeast Alaska ARES

Just four weeks after exercising their emergency communications skills during ARRL Field Day, members of the Northern Southeast Amateur Radio Emergency Services and Juneau Amateur Radio Club put those skills to use to help to save a fellow ham operator and several companions.

On July 22, Mark Griffith, KL0MO, was rafting down the Herbert Glacier River with three friends when their raft was severely damaged. The group was stranded on a small island in the middle of the raging river. There had been 2.4 inches of rain in the preceding 24 hours, and the river was running extremely fast.

At 7:36 that evening, Griffith used the phone patch feature of the KL7PF repeater at Lena Point to call 911. The 911 operator—who also happened to be the ARES Emergency Coordinator—obtained information from Griffith, and a time schedule was arranged for him to call back to get additional information while search-and-rescue personnel were alerted.

In the meantime, Bob Dewey, WL7QC, heard Griffith's transmission and set out for the trailhead to meet with the rescue personnel. Once there Dewey worked alongside the search-and-rescue incident commander and was able to contact Griffith on simplex, providing direct contact with rescue personnel.

The rescue was hindered by the rain, which had swollen the river to the point that it covered the trail. As a result, the Juneau Mountain Rescue team had to cut its way through dense undergrowth to get to the stranded rafters. The weather at the time prevented the use of a helicopter, and the river was too fast—and had too much debris—to use a rescue boat.

During the night, the four used the remains of their raft and their life jackets to improvise a shelter and huddled together. Throughout the night Griffith provided the four with regular updates. Although his battery had died several times, it retained sufficient power to receive Dewey's communications. Bob Simpson, NL7XZ, Glenn Sicks, KL0QZ and Brent Fischer, KL1AT, maintained a listening watch on the Juneau repeater system to provide assistance, if needed.

At about 1 AM July 23, a member of SEADOGS, the search-and-rescue dog team, located the four. Although the rescuers were unable to reach the stranded rafters, their mere presence lifted their spirits. They were airlifted off the island around 7 AM by a US Coast Guard helicopter from Sitka. The four rafters suffered only mild hypothermia.

"Ham radio really saved their lives," said incident commander Bruce Bowler. "It was a great help in finding out exactly where they were and what condition they were in. We were able to get updates throughout the night on how they were doing."

Griffith noted that had it not been for the radio, "no one would have raised the alarm until 9 PM. We told them not to worry until 9 PM."

Field Organization Reports

Public Service Honor Roll
September 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.

896
NM1K
622
K9JPS
333
W7TVA
283
N9VE
260
N1SN
250
K8GA
240
N2CCN
225
KB2RTZ
222
KA2ZNZ
215
WA5OUV
211
N5NAV
208
KK3F
W5ZX
WB5ZED

207
K8PJ
205
N9KNJ
201
WB8ZYY
198
N2LTC
N5IKN
195
WA2MWT
194
KB2VRO
192
K2UL
190
WA2YL
188
KK5GY
187
W3HK
186
KA5KLU
185
WA9VND
184
KA4FZI

182
N2OPJ
179
K4RBR
WB5NKC
178
W4EAT
177
NN7H
176
W4ZJY
174
N8IO
172
KD1DSB
169
AC4CS
K9FHI
168
K6YR
KA2GJV
WN0Y
N8FPN
165
KC5OZT
164
WB2UVB

163
WB4GM
161
K0IBS
160
N2RPI
159
W6IVV
158
W8YS
K5NHJ
157
W1GMF
N8OD
156
N2KPR
W6DOB
155
N7YSS
153
W0OYH
WA4QXT
K2BCL
152
W2MTA
151
N1LKJ

150
N2AKZ
NN2H
W4AUN
149
N2JBA
148
N2YJZ
W3YVQ
KB5W
KC8CON
147
K5UPN
146
KE4PAP
145
W4DOX
KC4ZHF
AG4DL
144
N7CEU
KD5NZA
W6QZ
143
KJ9J
WB2GTG
142
KE4JHJ
WA2ZCM
W5GKH
KB5TCH
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NZ1D
N3WK
KD4GR
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WA2YBM
KF4KSN
KF5A
124
KI4YV
W5CDX
K5VV
W1ALE
KF4WIJ
WD4GDB
123
KC4VNO
W2JHO
K5IQZ
KM5YL
W0WWR
W4WXA
WI2G
KT4TD
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KG4KCC
AF4QZ
AA3SB
WB4GGS
AF4NS
N9TVT
W7QM
K7MQF
W7GHT
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NC4ML
WD0GUF
120
KB2YUR
K9GBR
K0PIZ
AA2SV
WB5NKD
119
KF6OIF
N9MN
118
W4CKS
KB0DTI
N8DD
K4WKT
KA2DBD
K4MTX
K9LGU
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W4DGH
NR2F

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WA1FNM
KB5WY
WX8Y
W3BBQ
140
N8BV
W0LAW
139
WB4TVY
N3EFW
K4SCL
N9BDL
W7ZIW
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N0SU
K3JL
WA1JVV
WD9FLJ
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KB2KLH
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KA1GWE
N2GJ
135
WD4JJ
134
KC2EOT
133
W2AKT
N2WDS
W9YCV
132
AB2IZ
WA5I
131
KD1LE
W1PEX
AA8SN
KV4AN
K4FQU
N3YSI
130
K4RLD
KC2DAA
W3IPX
129
AD4XV
KA4UIV
N5SIG
128
K4IWW
K5DPG
KG4FXG
WA0TFC
WB2QIX
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W1QU
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K1FP
KG2D
K2PB
W4VLL
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WD9F
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N4TAB
K0PY
WD9HII
KA2BCE
W2LC
W4CAC
113
W3CB
K4BEH
K8KV
WD4MIS
W7LG
W4KIX
112
KA4LRM
K2DN
K8VFZ
AG9G
K1JPG
111
W2FR
110
AB4E
K4YVX
KM5VA
109
KC2HUV
N2RTF
KB2ETO
W2MTO
W2JG
WA8DHB
WA4EOC
KG4EZQ
108
N3ZKP
KC6NBI
KG2HA
N2BVM
107
KE3FL
WA2GUP
AB4XK
106
WB4BIK
KA2CQX
105
WA8SSI

104
K5MC
W5XX
AF2K
N3RB
WB2LEZ
103
KG4FQG
KB0RUU
102
N2VQA
WA7UVX
AC5Z
101
KG5GE
100
N1IST
WA2CUW
99
AA3GV
WA9JWL
WA2YOW
KJ7SI
98
KE4DNO
K7MQF
97
WA4GLS
KC8HTP
KC2ANN
96
KE4GYR
N3SW
KT4PM
95
W4CC
KA1VED
WB2IJH
KG4CHW
94
KC3Y
WB4PAM
KF4OPT
93
W1JTH
WD8DHC
AA4AT
90
KJ5YY
AD6HR
89
AA8PI
K8AE
W3NNL
WB7VYH
88
W4QAT
WB2T

W2CC
N8NMA
WB4UHC
WB4ZNB
W7DPW
87
K8SH
W6JPH
86
N2JRS
K8ZJU
KD4HGU
84
N1LAH
KD1SM
KU6Z
WB9GIU
83
N1JBD
KG9B
82
K3CSX
W2GUT
81
K1SEC
KC4PZA
WW8D
80
N3WKE
K8LEN
N4FNT
78
AA4BN
77
W5PY
76
K6IUI
NC1X
AC5XK
75
KC8KYP
K8QIP
74
KB2WII
W2PII
KC6SKK
73
KA2ZKM
K3UWO
72
KF4NJP
W7EP
71
KE2SX
K4ZC
70
K1STV
WA4EYU

The following stations qualified for PSHR during the months indicated, but were not previously recognized in this column: (August) W5ZX 195, N5NAV 149, KA5KLU 179, N5OUJ 149, W5GKH 140, N5SIG 121, WD9F 117. (July) WB5ZED 206, NN7H 183, KB5W 154, K5VV 102, W5XX 100, WD9F 96, KJ5YY 74. (June) WD9F 84. (May) WD9F 94. (Apr) WD9F 72. Call sign corrections: N2BVM earned 104 PSHR points during August, and W5PY earned 80 PSHR points during July 2001.

Section Traffic Manager Reports
September 2001

The following ARRL Section Traffic Managers reported:
AK, AL, AR, AZ, CO, CT, DE, EMA, ENY, EPA, EWA, GA, IA, ID, IL, MDC, MN, ME, MI, MS, MO, NC, NFL, NH, NLI, NNJ, NNY, NTX, NV, OH, OK, ORG, SBAR, SC, SD, SNJ, STX, TN, VA, VT, WCF, WI, WMA, WNY, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports
September 2001

The following ARRL Section Emergency Coordinators reported:
AZ, EWA, CT, IA, IN, KS, KY, LA, MDC, NFL, NLI, NNJ, NTX, OH, SD, SFL, TN, VA, WCF, WMA, WNY.

Brass Pounders League
September 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*
NM1K	789	488	923	3	2203
KF5A	7	687	701	0	1395
W1GMF	8	496	759	29	1292
WX4H	0	604	560	10	1174
N2LTC	0	548	599	20	1167
K9JPS	0	518	36	509	1063
WB5ZED	12	422	403	15	852
W6DOB	0	335	490	18	843
W1PEX	0	16	781	17	814
KK3F	16	389	365	24	794
K5UPN	9	270	257	0	536
W9IHW	0	299	38	227	504

BPL for 100 or more originations plus deliveries: W7TVA 205, N9VE 192, K9GU 186, KK5GY 124, W3HK 122, K8GA 105, K8PJ 101.

HOW'S DX?

9-11

The terrorist attacks that took place in New York City, Washington, DC and southwestern Pennsylvania on September 11, 2001 shocked the civilized world. This terrorist incident sent emotions of sadness, anger, fear, hate and many other feelings throughout the US and the rest of the planet.

Emergency Preparedness

Amateur Radio Emergency Service (ARES) and Radio Amateur Civil Emergency (RACES) organizations quickly came together to help provide support. As last month's *QST* cover reminded us, The Amateur's Code says, in part, "**The Amateur is Patriotic …** *station and skill always ready for service to country and community*." Are you ready in case an emergency situation comes up in your part of the world?

DXers Promote Goodwill

Amateur Radio operators in the US and in every country of the world need to come together to help promote international goodwill. This is one of the principal purposes of our wonderful hobby. We must take care in what we say on the air, on our packet clusters or the Web cluster. Comments directed in a negative way do nothing to help promote Amateur Radio. DXers are international ambassadors of the world.

Future DXpeditions

This event has already impacted DXing and DXpeditions and will surely do so even more over the next months and possibly years. Some DXpeditioners have already canceled their DXpeditions and others will surely be thinking twice about where they will go next. Like our President, I too agree we need to go on with life and we cannot let the terrorists think they have won. Having said that, there may be certain spots on the globe that it would not be advisable to visit during this time, but no matter where we go in life we must pay attention to our surroundings.

DXCC

Days after the tragedy there were immediate demands to delete or remove Afghanistan from the DXCC list. This event had little to do with that Central Asian country other than the fact that it harbored some of the individuals who plotted the attack. The everyday citizens of Afghanistan had nothing to do with it. Afghanistan meets the requirements of DXCC as it is a member of the UN and has its own ITU Prefix. In addition, there are no Amateur Radio operators in the country! Should we delete or remove a country from the DXCC list every time we get ticked off at some other country?

Nodir, EY8MM (ex UJ8JMM), and Igor, UT4UX, were the last two to put on a DXpedition from Afghanistan as YA5MM in March 1992.

The Future?

I don't claim to know what is going to happen over the next few months or years. But I would not be surprised to see some Amateur Radio activity from Afghanistan, either by the allied forces or the United Nations. My guess is a new government will eventually be set up in the future. Let's hope they are friendlier to the world, their people and Amateur Radio! Let's look forward to the day when we can work a national YA station on the air—one who enjoys this great hobby as much as we do and will talk to anyone regardless of his or her race, religion, sex or political beliefs. We are Amateur Radio DXers, international ambassadors; let's promote international goodwill!

DX NEWS FROM AROUND THE GLOBE

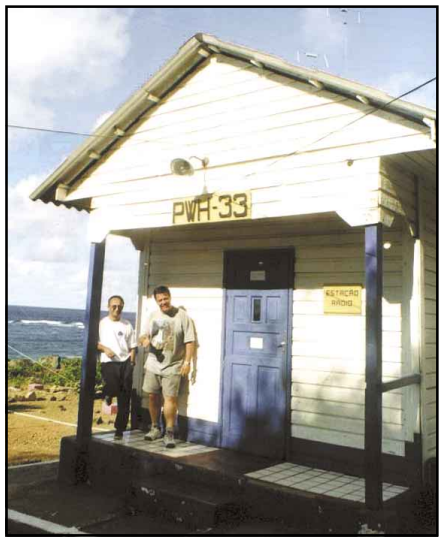
D44TC—CAPE VERDE ISLANDS

Look for D44TC to be active during the ARRL 10 Meter Contest on December 8 and 9. This new station, located on Sal Island (AF-086), is a group effort by Italians and Portuguese operators. QSL via IV3TAN.

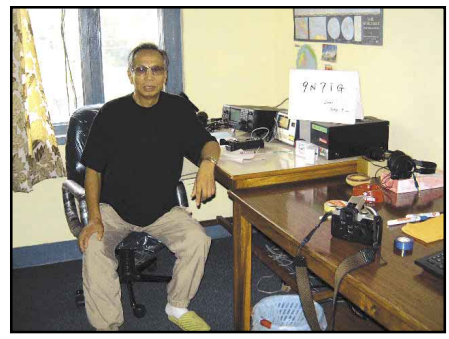
HS—THAILAND

Members of the Royal Amateur Society of Thailand (RAST) have obtained permission to operate from Tarutao Island (AS-126) in December. The group expects to be QRV as E29AL from December 8 to 15. Team members include HS0GBI, HS1CKC,

Bernie McClenny, W3UR ♦ 3025 Hobbs Rd, Glenwood, MD 21738-9728 ♦ w3ur@arrl.org



Ricardo, PY1VOY, and Jose, PY1LVF, were on Trindade Island in August this year operating as PT0T.



Yuu, JA3IG, operated from Nepal as 9N7IG in early September.

E21EIC, E20NTS, HS0/G3NOM, E20RRW, HS0XNO, HS4BPQ, E20HHK, HS9EQY and HS0ZCW (K4VUD). Look for them on the normal IOTA frequencies and on RTTY on 14086, 21086 and 28086, on PSK31 on 14070, 21070 and 28070 on SSTV on 14230, 21340 and 28680. On the low bands they will try 1834 and 3524. QSL via HS0GBI, Cherdchai Yiwlek, PO Box 1090, Kasetsart, Bangkok 10903, Thailand.

TT8DX—CHAD

Christian, TT8DX, will be in Moundou, Chad until December 2002. He is mostly active on 6 meters with 400 W and an HB9CV 2 element beam. On HF Chris is using a dipole and 1 kW mostly on SSB and CW if you ask him. Chris is a personal friend of the Telecommunication Minister of Chad and he was on the air as TT8SA and TT0A in 1989/1992 from N'Djamena, the capital city. QSL via F5OGL.

VK0LD—QSL CARDS

As most of you know Alan, VK0MM/VK0LD/AX0LD, was only QSLing via E-QSL, which was no good for DXCC. Now anyone who had a valid QSO with VK0LD and prints out VK0LD QSL card from the eQSL Web site who wishes to submit such a card to DXCC can forward the printout card to Alan for personal authentication. Alan will check the card against the original log and sign the reverse of the card, stamp it with a special VK0LD rubber stamp and return the card to the sender. The ARRL DXCC Desk will accept these QSL cards for DXCC credit for Macquarie Island. Cards should be sent to the following address and it is important that the envelope is clearly marked PRIVATE & CONFIDENTIAL: Alan Cheshire, c/o Station Engineer, West Coast Radio, PO Box 688, Mandurah, Western Australia 6210, Australia. Alan asks that you not send Australian postage or IRCs. You must include a self-addressed envelope and postage. One US dollar will cover the cost.

VP6—DUCIE ISLAND

By the time you read this, members of the Pitcairn Island Amateur Radio Association will have started their planned DXpedition to Ducie Island. The call sign had not been released to the public as of press time. It is very possible it could be VP6DI. The group expects to be active on all bands from 6 to 160 meters starting at 0000Z on November 16, 2001. As of press time we still do not know the status of this potentially new counter. Operators include VP6TC, VP6DB, VP6BK/JA1BK, JF1IST, JA1SLS, K9AJ, K5VT and FO3BM. The main goal of this initial operation will be to work as many stations as possible to give them a new one. With this in mind they will probably have 3 stations on the air. One of the stations will be on 15 meters CW (21,020) and one on 15 SSB (21,295) around the clock. The third station will be active on the other bands. Check the normal DX frequencies on CW, SSB and RTTY. The low band operation will take place near the end of the DXpedition. The team expects to be on the island for 5 days; however, it is possible they may stay longer depending on transportation. The Ducie logs will be posted at **www.big.or.jp/~ham/dx.html**. QSL information for this operation is via Garth Hamilton, VE3HO, PO Box 1156, Fonthill, ON L0S 1E0, Canada.

VP8—SOUTH ORKNEY & SOUTH GEORGIA

Mike Gloistein, GM0HCQ, expects to be doing a lot of traveling through the South Atlantic Ocean via the RRS *Ernest Shackleton* between mid October 2001 and March 2002. His first expected stop will be from Factory Cove (60° 43' South 45° 36' West), Borge Bay, Signy Island, South Orkney Islands. He hopes to be able to operate as VP8SIG some time between November 17 and 22.

Operating from this island is going to be difficult, as it will involve Mike taking a boat ashore. His time will be limited to the last boat going back to the ship from the base at the end of the day. This means that he will most likely be able to operate around 1500Z for a few hours only. There is no guarantee that Mike will be able to operate during any or all of the visits, as it is dependent on his workload onboard the ship.

After the mission is complete the RRS *Ernest Shackleton* will head for King Edward Point (54° 17' South 36° 30' West), Cumberland Bay West, South Georgia. Here Mike plans to operate as VP8SGK some time around the November 24 to 30 time frame. During this trip Mike will take a side trip to Bird Island so this will hamper the operation, possible to only two evenings.

Earlier this year Mike was active for a few days in late March early April as VP8SGK from South Georgia. While he was there his favorite hiding place was 14052 on CW from 2000 to 2300Z. When he is on the boat he uses VP8CMH/MM. Keep an eye on Mike's Web page at **www.qsl.net/gm0hcq/vp8sgk&.htm**. QSL via GM0HCQ.

V5—NAMIBIA

San Hutson, K5YY, was back in Africa in late September and early October operating as V51/K5YY. He was there on a photo shoot and on the air during the evenings from a 4×4 jeep. He was battery power and running 80 W into a Hustler vertical. His CW may have been a little erratic due to the fact his key was on the seat next to him as his log was on his left leg and his flashlight was in his mouth! Not exactly the best working conditions; he did manage to make some 1000 QSOs from 58 countries, however. San stayed on the 30, 17 and 12-meter bands 90% of the time to try to give a needed band country to everyone. QSL cards go via K5YY.

YB—INDONESIA

Adi, YC3MM, will be on Siberut Island (OC-215) the third week of December. This IOTA group, the Mentawai Islands, has only been on once, by 8A5ITU in May 1996.

ZD9—TRISTAN DA CUNHA ISLANDS

Chris DeBeer, ZS6RI (ex-ZS5IR, ZS8IR, 5H4IR and 5H9IR), is now stationed on Gough Island (AF-030) in the Tristan da Cunha Islands. He'll be working on the island for the next 12-13 months and will be operating as ZD9IR on all bands from 10-160 meters on CW, SSB and RTTY. Tristan da Cunha ranked #54 on the ARRL 2000 Most Wanted List. Currently Chris is running 100 W into a dipole, but soon hopes to have a beam for the high bands and wire antennas for the low bands. When his responsibilities as team leader and medic allow, he'll play some radio. He has a beam (C4H) and lots of wire, and expects to be active on all bands. He has two radios and an amp. Much support was provided by the NCDXF. A Web page has been set up at **zs6ez.za.org/zd9ir.htm**. QSL via ZS6EZ. Please note that a single IRC does not cover airmail postage to most areas.

ZL—NEW ZEALAND

A small group of members of the NZART branch 33 will be going to Whale Island (OC-201) for a little radioactivity. The group will be active on all HF bands from November 23-26. Whale Island is a small island located some 16 km off shore from Whakatane. It should not be confused with the active volcano of White Island, a much larger neighbor to the northeast. The island is presently managed by New Zealand's Department of Conservation. Access is very limited, with strict controls for any who may be lucky enough to be allowed a short visit. The special call sign of ZL6WI is being applied from the MED (NZ's licensing bureau).

WRAP UP

Well that's it for this month. I am sure I will get many comments on this month's issue. I am just as upset as the rest of you and have been reminded just how precious life really is. Thanks this month go to F5OGL, G3NOM, GM0HCQ, JA1BK, VK0MM, ZL1FMA and ZS6EZ. Until next month, see you in the pileups! QST

Part 15 Devices

The amateur bands at VHF and higher have come under considerable pressure during the past decade and will continue to face a variety of threats for some time to come. Commercial users have coveted large segments of the UHF and microwave spectrum for new digital wireless devices, including portions of the microwave bands amateurs have amicably shared with government services for decades. It is uncertain whether we can continue to share this space with commercial users or how much spectrum will be allocated to the Amateur Service on a primary basis.

Reallocation of the UHF and microwave bands, which began in the early 1990s and will continue for the next decade, is only one potential threat to amateur access to the spectrum at UHF and higher. A more immediate problem is the rapidly expanding presence of so-called Part 15 devices on the amateur bands. Most SSB/CW operators at 50 MHz and higher have already noticed an increase in the number of birdies, beeping tones, hash and unidentifiable noise of all types on the bands. Many of these signals originate with a variety of consumer, commercial and scientific devices that legally emit radio signals within the amateur bands.

Part 15 Devices

Many unlicensed electrical and electronic devices that intentionally or unintentionally radiate signals in the radio spectrum are regulated by Part 15 of Title 47 of the Code of Federal Regulations. Part 15 devices have been around for several decades, but in recent years they have proliferated such devices include with advances in technology. Such devices include electric motors, light dimmers, computers, televisions, wireless garage-door openers, radio-controlled toys, portable telephones, cordless home-speaker systems and countless other modern electronic gadgets. Within certain limits, they are all allowed to radiate signals in the 50-MHz to 241-GHz range, even within frequency ranges that are assigned to licensed services—including the Amateur Radio bands.

Part 15 regulations distinguish among three classes of unlicensed devices: intentional, unintentional and incidental radiators. Intentional radiators are designed to radiate radio signals as a part of their normal operation. They include such things as cordless telephones, wireless data networks (such as Bluetooth), microwave motion sensors and remote surveillance cameras. They may carry voice, data, video or other kinds of information in a variety of transmission modes.

Unintentional radiators generate RF energy as a result of their normal operating functions, but are not intended to do so. Televisions, scanning receivers, computer games and many other electronic devices incorporate oscillators, frequency multipliers and other digital circuits that produce low-level RF energy over broad frequency ranges. Some of this RF energy may unintentionally radiate outside the confines of the device. Nearly all electronic gadgets that incorporate computer chips are apt to be low-level radiators of RF energy.

Incidental radiators include a wide range of electrical equipment that generate RF in the course of normal operation, but are not designed to do so. Examples include electrical power transmission lines, light switches, motors, spark plugs and other similar equipment that produce sparks in their normal operation. Sparks generated by the on-off action of switches and brushes generate electromagnetic radiation over a wide frequency range, from radio energy to light. Such incidental radiators have been the bane of radio and television reception for a long time.

Part 15 devices are regulated and must be certified that they meet minimum standards, but they are not individually licensed or type accepted. Low-power intentional radiators may operate nearly anywhere in the radio spectrum above 50 MHz, subject to certain field-strength limits that depend on frequency. They are banned only from certain sensitive parts of the radio spectrum, such as those reserved for radio astronomy and the aeronautical band.

Some intentional radiators, especially those that are permitted higher power levels, may be assigned to specific frequency bands, usually on a shared secondary non-interference basis. One example is cordless-telephone operation in the 902-928 MHz band, which radio amateurs also use on a secondary basis. Certain kinds of local-area networks (LANs) operating within 2400-2483.5 and 5725-5850 MHz may be allowed up to 1 W of transmitted power and the use of high-gain antennas.

This Month

December 9	Good EME conditions
December 14	Geminids meteor shower peaks

Protection against Interference

However defined and regulated, no Part 15 device may cause harmful interference to any licensed service. That principle is incorporated into the printed notice required on all Part 15 devices: *"This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."* This warning suggests that radio amateurs are fully protected, but the definition of "harmful" actually requires amateurs to accept quite a bit of offending interference in practice.

Harmful interference means the offending signal must endanger the functioning of another device (like a radio receiver) or seriously degrade, obstruct or repeatedly interrupt a licensed service. Mere detection of a Part 15 device on an amateur band, no matter how annoying, is unlikely to meet the test of "harmful" unless it can be demonstrated that the interference seriously degrades normal operations.

The reality is that for radio amateurs, most kinds of interference—however inconvenient or annoying—do not meet the test to be considered "harmful." The FCC is likely to point out that merely moving the operating frequency slightly (which amateurs can easily do, unlike operators of most other licensed services) can effectively avoid the offending interference in most cases. For example, many 6-meter operators are bothered by the 14th harmonic of television color-burst oscillators, which appears around 50.113 MHz. It is clearly a nuisance, as this signal lies within the DX window and is adjacent to the international DX calling frequency. So what happens? That frequency is simply avoided by most serious weak-signal operators.

In other cases, the solution may not

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be so simple. Interference to established repeaters might be more difficult to resolve, for example. More insidious is the potential for interference from broadband modes, such as video, spread spectrum and the cumulative interference from many low-power digital devices. In these cases, moving the operating frequency may not help. These problems are likely to worsen over time.

What Can Be Done?

Weak-signal operators at VHF and higher will probably spend more time and ingenuity dealing with interference from Part 15 devices in the future. The warning labels on consumer devices do not provide a great deal of protection in practice. Neighbors are unlikely to be sympathetic when you tell them that their entertainment equipment is interfering with your radio, and the FCC will not spend time investigating annoying interference that does not meet the test of "harmful." The FCC is more likely to take notice where manufacturers have clearly overstepped the bounds of Part 15 or sold devices that are likely to create harmful interference, such as imported high-power cordless telephones operating on the 2-meter band.

Even so, there are several options. If you can track down the offending Part 15 device to a particular neighbor, it may be worth the trouble to discuss the problem and help resolve it. There are usually things that can be done to mitigate interference of unintentional radiators, such as installing ferrite beads on external wiring, shielding or grounding the devices, shortening wires, bypassing connectors with small-value capacitors and so forth. Some consumer electronics are shielded better than others; maybe some do not radiate signals within your favorite band. In these cases, convincing a neighbor to purchase a different product may resolve a problem and perhaps have other benefits to the user.

Ironically, one solution may come from the very technology that has caused the recent explosion in wireless digital devices. Sophisticated digital filtering and signal processing holds out some expectation that receivers of the future may automatically remove many more varieties of unwanted signals. We might also hope that manufacturers of low-cost digital devices would take better care to shield cases and otherwise minimize RF radiation. This good engineering practice would do a great deal to improve the general RF environment for all such devices.

The *ARRL RFI Book* has many suggestions for resolving a wide range of radio-frequency interference.[1] If a problem is serious or persistent, you may need to file a complaint with the FCC. Thoroughly document the situation and send a copy to Ed Hare, W1RFI, at ARRL (**w1rfi@arrl.org**). Other sources of information include the text of the Part 15 regulations (**www.arrl.org/tis/info/part15.html**) and the "Report of the ARRL Ad Hoc Spectrum Strategy Committee" (**www.arrl.org/announce/board.html**).

Part 15 devices are everywhere. This collection was scavenged from an Editor's work area. Part 15 covers most any electronic device that keeps time or interacts with the user in any way. In this group, the cat meows when there is movement nearby and the stuffed cowboy sings a digitally recorded Christmas tune.

ON THE BANDS

Activity during September lived up to its billing as a month for tropospheric ducting and transequatorial propagation. Tropospheric conditions were above average across much of the eastern half of the US and adjacent Canada during the first two weeks of the month, including the VHF-contest weekend. Solar activity continued at surprisingly high levels, suggesting that Cycle 23 will have a double peak and may provide one more season of worldwide 50-MHz DX before beginning its long decline. The hopes of 6-meter DXers were raised further with the appearance of widespread openings across the geomagnetic equator as early as the first week in September. Thanks to K1WVX, WB2AMU, K4TAX, W7GJ, AB7UQ, N8PUM, EA2LU, G3FPK, G4ASR, G4UPS and VK3KK for their reports not otherwise acknowledged in the summaries. Dates and times are in UTC.

Six-Meter DX

The summer sporadic-E season had hardly ended when the first signs of F-layer propagation commenced in late August with early transequatorial (TE) contacts in various parts of the world. On September 1, W5UWB (EL17), N8II (FM19) and many others worked CE3SAD and CE4WJK after 2200, perhaps the first TE contacts of the fall season from the US. Subsequently, stations scattered across the southern part of the country reported several additional days with CE, LU, PY and ZP contacts, mostly in late afternoon.

Europeans experienced their full share of TE propagation into South America, southern Africa and the adjacent Indian Ocean. Noteworthy calls in European logs included 5N6EAM, 5R8EE, C98RF, D44DV, FR1GZ, TT8JE and G0KZG/mm in the Indian Ocean. Japanese reported the usual VK, YB and ZL crowd, along with 3D2AG, 9M2/JI1ETU, FK8CA and P29ZTC. This is no doubt just a sample of what was accomplished during the September TE openings.

More interesting perhaps were the east-west DX contacts adjacent to equator. VU2ZAP hooked up with HZ1MD, JY9NX, ET3VSC, TT8JE and TR8XX all on September 7 after 1400, and added D44TD and 9N7QJ later in the month. DU1EV worked A45XR among his September catches, while DU1ZV and DU1/GM4COK also found HZ1MD. The Saudi station also worked others in Southeast Asia, including 9V1DJ and YF1OO. VR2XMT worked FR1GZ, G0KZG/mm and VU2RM.

Tropospheric Ducting

Excellent tropospheric conditions blanketed the northeastern part of the US and adjacent Canada, primarily from Minnesota and Iowa east to Connecticut and New Jersey, for much of the first week in September. On the evening of September 2-3, Dick Hart, K0MQS (EN31) was on the western side of the opening. He worked several dozen 2-meter stations in Michigan, Ohio, Pennsylvania, New Jersey, New York and Connecticut, as far eastward as W1COT and W3EP (both FN31) up to 1670 km distant.

N0DQS (EN22) in western Iowa took his rover station out for a spin that evening and

[1] E. Hare, W1RFI, Ed., *The ARRL RFI Book* (Newington, Connecticut: ARRL, 1998, ISBN: 0-87259-683-4). Order No. 6834, $20. ARRL publications are available from your local ARRL dealer or directly from the ARRL. See the ARRL Bookcase elsewhere in this issue or check out the full ARRL publications line at **www.arrl.org/shop/**.

50-MHz Standings

Published 50-MHz standings include call-area leaders as of October 1. For a complete listing, check the Standings Boxes on the World Above 50 MHz Web pages at **www.arrl.org/qst/worldabove/**. To insure that the Standings Boxes reflect current activity, submit reports at least every two years by e-mail to **standings@arrl.org**. Printed forms are available by sending a request with SASE to Standings, ARRL, 225 Main St, Newington, CT 06111.

Call Sign	QTH	States	DXCC	Grids	Best DX (in km)†
K1TOL	ME	50	145	965	14,595
W1JJM	RI	50	137	—	—
W3EP/1	CT	50	120	772	15,750
W1JR	NH	50	120	606	14,455
K1SG	MA	50	119	—	14,521
KA1A	NH	50	118	—	14,533
W1AIM	VT	50	106	351	14,928
K1MS	MA	50	100	—	14,498
K1LPS	VT	50	96	442	12,013
K1TEO	CT	50	83	667	13,890
N1RZ	NH	48	62	423	12,538
K1WVX	CT	47	53	354	14,663
K2ZD	NJ	50	130	—	15,502
K2MUB	NY	50	124	—	—
WA2BPE	NY	50	118	—	15,390
W2CNS	NY	50	104	531	15,120
K2AXX	NY	50	101	512	12,115
K2YOF	NJ	50	100	405	12,667
W2MPK	NY	50	100	—	—
K2QE	NY	49	83	526	—
K2OVS	NY	50	79	367	13,124
W3HHN/2	NY	48	60	441	13,054
W3JO	PA	50	125	—	14,929
W3VZ	MD	50	122	700	14,038
W3BO	PA	50	114	587	12,840
W3TC	PA	50	114	565	14,945
AE3T	PA	50	101	—	14,500
K3ZO	MD	50	100	—	—
W3CMP	PA	50	79	—	—
WA3DMF	MD	50	76	537	11,645
N3II	MD	49	73	—	15,876
N3VBG	MD	50	67	493	12,285
N3DB	MD	48	59	257	9017
AE4RO	FL	50	128	—	16,326
W4DR	VA	50	121	800	14,500
W4MW	NC	50	115	—	—
N4CH	VA	50	111	710	15,000
N4MM	VA	50	110	730	—
WA4LOX	FL	50	109	—	15,664
W4UM	FL	49	103	—	—
K4ZOO	VA	50	102	631	13,946
W4TJ	VA	50	72	362	15,688
W4WTA	GA	49	70	555	15,550
K4RF	GA	50	69	375	16,288
N4TL	NC	30	62	118	15,034
NJ2F/4	FL	48	52	363	13,394
W5FF *	NM	50	130	927	—
K5CM	OK	—	126	—	—
N5KW	OK	—	121	—	—
W5OZI	TX	50	120	875	15,141
WD5K	TX	50	110	915	14,927
N5JHV	NM	50	109	775	15,750
WA5IYX	TX	50	108	384	14,592
K5AM	NM	50	107	733	15,744
WA5JCI	TX	50	91	661	—
WB5HJV	TX	50	73	—	—
AA5XE	TX	50	67	500	15,142
W4UDH/5	MS	50	52	667	14,192
K5TN	OK	50	52	465	13,380
K6QXY *	CA	50	119	—	15,555
W6BYA	CA	50	109	719	16,708
N6CA	CA	50	106	—	16,683
WA6PEV*	CA	50	100	—	—
N6ZE	CA	49	75	—	—
N6RZ	CA	50	68	—	—
K6JZK	CA	50	66	—	—
KB6NAN	CA	50	57	552	12,763
KH6/K6MIO	HI	45	53	313	19,360
W6TOD	CA	50	51	—	—
W7RV	AZ	50	105	828	16,165
W7HAH *	MT	50	61	650	—
N7EIJ	ID	50	61	500	16,106
W7KNT	MT	50	50	512	—
WZ8D	OH	50	120	422	15,262
N8XA	OH	50	92	100	—
W8UV	OH	50	83	165	14,378
N8KOL	OH	50	78	515	13,163
WB8XX	OH	50	70	508	15,224
WA8RCN	OH	50	70	354	—
K8MD	MI	50	58	433	13,199
W8TN	WV	50	51	295	12,436
W9GA	WI	50	89	450	—
K9LCR	IL	50	85	515	15,872
W9JUV	IL	50	83	362	15,865
K9APW	WI	50	81	575	—
W0UC/9	WI	50	65	566	—
KA9UZW	WI	50	51	453	13,850
W9RPM	WI	50	41	309	14,092
N0LL	KS	50	96	754	14,901
K0FF *	MO	50	95	632	16,246
K0SQ	MN	50	95	315	16,106
K0AZ	MO	50	75	421	14,416
W0JRP	MO	50	72	556	14,310
N0KE	CO	50	66	565	16,700
K0CJ	MN	50	56	—	13,328
WA0KBZ	MO	50	51	478	8687
Canada					
VE1YX	NB	50	151	847	—
VE9AA	NB	49	101	500	14,060
VE3DSS	ON	50	79	—	15,230
VE3CTT*	ON	49	76	504	13,148
International					
SV1DH	SV	13	199	670	16,600
ON4ANT	ON	38	189	934	16,727
EH7KW	EA	38	181	848	19,910
G0JHC	G	32	173	840	15,395
SM7FJE	SM	32	170	865	15,930
SV1EN	SV	—	168	504	16,558
IK2GSO	I	25	156	697	—
F5LNU	F	32	155	688	15,944
ZS6WB	ZS	8	130	550	19,288
YU7FU	YU	3	123	618	15,407
ZS6AXT	ZS	—	122	—	—
LU3DCA	LU	45	118	—	—
VK3OT	VK	25	110	400	16,928
VK2QF	VK	20	105	—	19,251
TI5KD	TI	49	102	605	18,129
YV4DDK	YV	—	78	—	—
ZP5ZR	ZP	2	69	—	—

†Terrestrial
*Includes EME contacts
–Not given

hooked up with several stations on 144 through 432 MHz. These were over the same part of the country as those for K0MQS, at least as far eastward as VE3AX (FN03), the longest contacts for both stations. Dan Prusk, KA3SDP (FN00), was closer to the center of the opening. He worked west to N0AGE and WD0HSP (both EN21) on 144 MHz while running 125 W to a 13-element Yagi at 35 feet, as well as numerous strong stations to his east, most within normal tropo range. His best on 222 and 432 MHz was K2DRH/9 (EN41).

Over the next few days, many others from Midwest to the East Coast hooked up on 144 through 1296 MHz, but the opening did not expand much south of the Ohio River. Russ Holshouser, K4QI (FM06), found that signals were exceptionally strong on the evening of September 5-6, when he worked W7XU/0 and N0QJM (both EN13) on 144, 222 and 432 MHz over a 1650-km path. Bill Davis, K0AWU (EN37) in northern Minnesota, made a string of 2-meter contacts across the Great Lakes as far eastward as W2DRZ (FN02) over the same evening.

Contest Tropo

Tropospheric propagation was unusually favorable during the September 8-10 VHF Contest along both coasts. From the first hour of the contest to the last, East Coast stations from Nova Scotia to Georgia east of the Appalachians enjoyed enhanced conditions on all bands. Ducting even extended down to 50 MHz, which is rarely ever observed. Multi-operator mountaintop stations, including W2SZ (FN32), K8GP (FM08), AA4ZZ (EM96) and W4NH (EM85), were especially strong all along the East Coast and racked up huge scores as a result. Many single-operators reported all-time personal bests.

There were few very long contacts, but signals were strong and consistent for hours on end. VE3AX (FN02) hooked up with W4NH on 50 through 432 MHz for his best DX of about 850 km, for example. From Connecticut, it was most interesting to work north to VE1UT in Nova Scotia and south to W4NH in Georgia on 6-meters via tropospheric ducting. Multi-op K1WHS (FN43) in Maine ran W3IY/R (FM17 and FM28) in Virginia on all bands from 50 MHz through 10 GHz, and finished up with more than 20 grids each on 1296 MHz through 5.7 GHz.

Conditions on the West Coast were enlivened by ducting to Hawaii and the fortuitous presence of W1LP/mm in nearby waters. KH6HME went up to his Mauna Loa station on Sunday of contest weekend and worked from Oregon to Baja California on 144 MHz and made at least some 432-MHz contacts into California. XE2EED added KH6HME to his log at 2142 on Sunday afternoon. Roger Wagner, K6LMN/R (DM03), worked KH6HME on 2 meters around 2330 with just 40 W and his four-element portable antenna 10 feet off the ground.

N6TEB/R found KH6HME on both 144 and 432 MHz, and worked W1LP/mm on 144 MHz. For his part, Clint Walker, W1LP/mm rover, reported great success as he steamed through DM03, CM93, 83, 84 and 85. He made 248 contest contacts on 50, 144, 432 and 1296 MHz, as well as 10 GHz. He was surprised to find KH6HME on 144 and 432 MHz, but did not notice any other unusual conditions.

10 GHz

Participation levels during the August 18-19 and September 15-16 weekends of the ARRL 10 and 24 GHz Contest were encouraging in several regions of the country. Operators in New England, where as many as 40 stations can get on 10 GHz, were enthusiastic, even though propagation was just average. Typical stations running 1 W to 1-meter dishes worked in the 300 to 400 km from favorable sites.

Mark Korroch, WB8TGY, who maintains a microwave Web site at **www.geocities.com/**

wb8tgy/index.html, K2YAZ, WA8VPD and WB9SPT were active from the Great Lakes area, especially from hilltops overlooking Lake Michigan. Bad weather actually enlivened activities in South Carolina over the first weekend, enabling W4DEX and KD4RLD to make a rain-scatter contact over a 170-km path using 100-mW rigs.

Other centers of activity include western New York and adjacent Ontario, the Philadelphia-Washington metropolitan corridor, the Chicago area and Southern California. A Web-based directory of 10-GHz stations and clubs that promote microwave building and operating might be quite a useful service for encouraging further activity, especially among newcomers. Is anyone willing to compile and publish such a directory?

The excellent tropo conditions during early September provided opportunities for 10-GHz operators to make some unusual contacts. Mark Hoffman, K2AXX (FN12), had a 696-km QSO with K2YAZ (EN74) on September 3, his longest to date. Mark was also amazed to hear the 20-dB-over-S9 signals of W2SZ/1 (FN32), 375 km distant, during the VHF contest. The multi-op group at K1WHS (FN43), who made 29 contacts on 10 GHz in 17 grids during the contest, were delighted to work K8GP (FM08) over an 800-km-plus path.

10-GHz Record

Finally, a new North American 10-GHz distance record was claimed during the month. W1LP/mm (DL34) completed a CW contact with WB6CWN (DM04) over a 1283 km path on September 20. This sets an initial mark for 10-GHz tropospheric contacts across the Pacific and eclipses the existing North American continental distance record of 1124 km made in August 1994, also held by WB6CWN with XE2/N6CA. W1LP/mm ran 1 W to a 20-dB horn aboard ship, while WB6CWN used 10 W into a 1.25-meter dish. Congratulations to both operators for their novel achievement.

WSJT Meteor Scatter

The *WSJT* digital meteor-scatter program continues to inspire activity, especially on 144 MHz. W1LP/mm was busy running several dozen contacts with 14 different stations across the southern half of the US as he steamed through 30 grids in fields DL, EJ, EK, EL, FK and FL in early September. Among Clint's most successful partners was K9KNW (worked from 16 grids) and W4WHN (from 14 grids).

Joe Taylor, K1JT, used his creation to good advantage during the September contest. He logged 11 meteor-scatter contacts on 144 MHz and six QSOs on 50 MHz, netting him 17 additional grid multipliers. Most were made using half-hour schedules. Joe reports that the median time to complete a 6-meter QSO was 5 minutes and 13 minutes for a 2-meter contact. See Joe's *WSJT* article elsewhere in this issue.

EME Expeditions

During the past decade, VHF expeditions to rare countries that include EME operating have become increasingly popular. W6JKV and K6MYC, for example, have managed to take complete stations for both 6 meters and 2-meter EME during their annual outings to many out-of-the-way places in the world. Antennas, masts and frameworks can be shipped in surprisingly small packages, especially if the pieces can be telescoped inside each other. Modern rigs (like the IC-706) are small and kilowatt amplifiers can be designed to be transported with relative ease.

J45M

Two recent expeditions illustrate what is possible with relatively modest EME stations. Chris Ploeger, PA2CHR, and Jurgen Glind, PE1LWT, made an EME expedition to Bosnia-Herzegovina (T9) in 1999 and were eager to make another trip. After some inquiries, the pair of Dutch VHFers were able to secure an invitation to operate 2-meter EME from the SV5RDS club station on the island of Rhodes during two weeks in late May and early June, using the special call J45M. They shipped antennas, rotators, cable and amplifiers in a 375-pound box and carried more than 200 pounds of equipment in their luggage, not exactly a lightweight expedition, but a practical one.

The four 20-element cross-polarized Yagis on 3λ booms and 800-W amplifier made an effective EME station. J45M logged 119 unique contacts (88 without schedules). Chris was delighted to work several single-Yagi stations, including F/G8MBI, F9HS and SM5BSZ. When the Moon was below the horizon, the operators turned to meteor scatter and even caught a sporadic-E opening to France, Italy and Slovenia.

C31TLT

A group of Andorran, Spanish and Italian operators operated a portable 2-meter EME station in the principality of Andorra using the call C31TLT in August. They put up an array of four 24-element Yagis, but their generator limited the power output to 800 W. Their wooded site was exceptionally quiet, so the operators were able to hear nearly every station that called them. By the end of their five-day operating period, C31TLT had made QSOs with 110 different stations, the vast majority without prior schedules. QST

NEW PRODUCTS

HIGH-ACCURACY RF SIGNAL GENERATOR FROM NOVATECH

◊ With 1-µHz resolution and l-ppm accuracy, Novatech's new Model 2908A 100-MHz signal generator is said to be suitable for amateur and professional test and development applications. The unit features quadrature direct digital synthesis (DDS), simultaneous cosine/sine (quadrature) and ACMOS/TTL outputs, RS-232 and parallel-port control, an external clock input and a master clock output.

Based on the Analog Devices AD9854, the 2908A has programmed frequency sweep, FSK, BPSK, chirp and single-tone modes. An external clock input is provided for users who want to drive the 2908A from their own source. Menu-based *Windows* control software is included. The 2908A operates from 120/240 V ac and consumes less than 15 VA.

Price: $895. For more information, contact Novatech Instruments, PO Box 55997, Seattle, WA 98155-0997; tel 206-301-8986, fax 206-363-4367, **www.novatech-instr.com**. QST

Previous • Next New Products

STRAY

MORSE CODE TO BE FEATURED ON UPCOMING *THE X-FILES* EPISODE

◊ Rob Ginkowski, WA6CW, of Hollywood, California (who also works as an actor) served as a technical adviser to *The X-Files* star Robert Patrick for an upcoming episode. Patrick's character, John Doggett, was in a hospital bed, paralyzed, and was required to send a Morse code message by tapping his index finger. WA6CW taught Patrick how to tap out the message at about 5 WPM. "He was a fast learner," Ginkowski commented. The episode, entitled "4-D," is scheduled to air Sunday, December 9, 2001 on the Fox TV Network.

Previous Strays

Actor Robert Patrick (right) and actor Rob Ginkowski, WA6CW, on the Hollywood film set of *The X-Files*. Rob used the MFJ Morse Code Tutor and the ARRL publication *Morse Code: The Essential Language* to help teach Morse code to Patrick for a scene in an upcoming episode. Rob also works as an actor but will not appear on camera in this episode.

How Amateurs Are Affected by Non-Part 97 Rules

When most US amateurs think of the rules affecting Amateur Radio, they think of Part 97. That's just a small part of Title 47, which deals with Telecommunications, however. Title 47 itself is a small part of the *Code of Federal Regulations*. Other regulations apply to the Amateur Service as well as to other services.

Some of these are referenced in Part 97 and others are not. For the purpose of this article, we'll discuss the various non-Part 97 rules and their implications for amateurs. These include sections of Congressional acts and parts of the various sections of Title 47 of the Code of Federal Regulations. Additionally, typical questions asked of ARRL regarding non-amateur rules will be addressed. Special thanks to ARRL Field and Regulatory Correspondent Brennan Price, N4QX, for lending his expertise to this Washington Mailbox column.

Congressional Acts Affecting the Amateur Service:

Where does the FCC get authority to regulate the Amateur Service?

The Communications Act of 1934, as amended, is the chief tool by which the US carries out its telecommunications obligations. Through the authority delegated to the FCC by Congress, by the Communications Act, the FCC adopted a body of rules to deal with communications. Part 97 is officially cited as 47 CFR Part 97. You can find the Communications Act of 1934 on-line at **www.fcc.gov/Reports/1934new.pdf** and selected portions appear in *The ARRL's FCC Rule Book*.

What does the Electronic Communications Privacy Act of 1986 mean for amateurs?

It does not mean a great deal for amateurs because amateur communications are not protected; that is, amateur communications are exempt. Anyone can listen to amateur communications and amateurs are afforded no privacy. Cellular and cordless telephones are protected communications and people who intercept and divulge these can face stiff penalties. Section 705(a) of the Communications Act documents the prohibition on intercepting and divulging contents of protected communications. For the FCC's fact sheet, see **www.fcc.gov/Bureaus/Common_Carrier/Factsheets/investigation.html**. The ECPA goes further. There need only be interception to be a violation. Disclosure is not necessary to prosecute as a criminal violation. For further information on the ECPA, see **www.digitalcentury.com/encyclo/update/ecpa.html**.

How are amateurs affected by the Telecommunications Act of 1996?

The Telecommunications Act of 1996 is far-reaching telecommunications legislation that can be found at **thomas.loc.gov/cgi-bin/query/z?c104:s.652.enr:**.

It has little direct impact on the Amateur Service other than eliminating the "conflict of interest" rules for Amateur Radio publishers. ARRL often receives questions on preemption for DBS satellite dishes and TV receive antennas, but, unfortunately, this does not apply to amateur antennas. The Telecommunications Act of 1996 allowed this preemption for Over the Air Reception Devices and it has been codified in Title 47 of the Code of Federal Regulations in Section 1.4000.

What is the Administrative Procedure Act?

The Administrative Procedure Act and certain sections of FCC rules set forth specific procedures that all administrative agencies must follow in adopting and amending their rules. The Act also sets forth the procedures to be followed in filing formal pleadings with the FCC, such as submitting a Petition for Rulemaking and filing Comments.

Amateurs may also file pleadings with the FCC electronically. The Electronic Comment Filing System is designed to give access to FCC rulemakings and docketed proceedings via the World Wide Web. The ECFS allows individuals to research, retrieve, view, and print any document in the system including previous non-electronic FCC documents that have been scanned into the system. ECFS includes data and images from the year 1992 onward. ECFS serves as the repository for official records in the FCC's docketed proceedings and rulemakings. See **www.fcc.gov/e-file/ecfs.html**.

While some view the procedures of the Administrative Procedure Act as being slow and cumbersome, every US citizen has a voice.

What does the Volunteer Protection Act mean for amateurs and is our ARES group protected for liability concerns?

The Volunteer Protection Act of 1997 provides federal protection from "frivolous, arbitrary, or capricious" lawsuits filed against individuals affiliated with nonprofit organizations and government entities and acting in volunteer capacities under the auspices of an IRS Section 501(c)(3) charitable, scientific or educational organization. The Act provides a defense to Amateur Radio *volunteers*—not groups, but *volunteers*—if the following conditions apply:

- The volunteer was acting within the scope of his or her responsibilities at the time, and was properly licensed or otherwise authorized to conduct the volunteer activities in the State in which the harm occurred.
- The harm was not caused by willful or criminal misconduct, gross negligence, reckless misconduct, or a conscious, flagrant indifference to the rights or safety of the individual harmed.
- The harm was not caused by the volunteer operating a motor vehicle, vessel, aircraft, or other vehicle for which the State requires the operator or owner to possess an operator's license or maintain insurance.

The Volunteer Protection Act provides a defense to a claim as long as the volunteer was prudently, reasonably, and legally acting within his or her responsibilities, and as long as the claim is not due to a motor vehicle accident. *It does not stop you from being sued; in fact, nothing can stop you from being sued. The Act is merely a defense if you are sued.*

This act would protect ARES members because ARES is an ARRL program. RACES members would *not* be protected under the VPA nor are amateurs acting in a disaster on their own. Those volunteering on behalf of any Section 501(c)(3) organization are similarly protected.

What kind of forfeitures can the FCC assess?

The criteria for forfeitures are set forth

John C. Hennessee, N1KB ♦ Regulatory Information Specialist

in Section 1.80 of the Commission's Rules. Base forfeiture amounts are nothing to sneeze at. Consider these examples:

Construction and/or operation without [a license]:	$10,000
Failure to comply with prescribed lighting and/or marking:	$10,000
False distress communications:	$8,000
Transmission of indecent/obscene materials:	$7,000
Failure to respond to Commission communications:	$4,000
Using unauthorized frequency:	$4,000
Failure to provide station ID:	$1,000

These base forfeiture amounts are adjustable upward or downward based on certain criteria.

Forfeitures in the Amateur Service are rare, because obtaining them requires a great deal of procedural resources on the part of the FCC, and individual amateurs generally do not have the same ability to pay that common carriers and broadcasters do. Forfeitures assessed to amateurs are not unheard of, however.

An irate neighbor has physically damaged my station. What regulation or Congressional Act prohibits damage to a federally licensed Amateur Radio station?

Unfortunately, the mere possession of an FCC amateur license affords you no protection against those who may vandalize your amateur installation. If trespassing and vandalism to your amateur equipment has taken place, contact local law enforcement.

FCC preemption for certain amateur station uses:

How does PRB-1, the amateur partial preemption of local zoning ordinances, help amateurs? What about covenants?

PRB-1 is helpful to amateurs faced with overly restrictive local zoning ordinances, but it does not solve all of amateurs' antenna restrictions. PRB-1 applies only to local government zoning ordinances and not to covenant restrictions). ARRL is well aware that covenants are a major restriction for amateurs and that it is not possible to find housing in many parts of the US without such restrictions which is why ARRL is encouraging amateurs to contact their Congressmen to introduce legislation protecting amateurs from covenants. See October 2001 *QST*, page 15, and **www.arrl.org/govrelations/** for a sample letter.

Returning to the subject of local government zoning restrictions, PRB-1 only says local governments must "reasonably" accommodate amateurs. A short four-line synopsis of PRB-1 (a 12-page document) appears in Section 97.15(b).

The PRB-1 document specifies that local governments can zone for their legitimate purpose; that is, for height, safety and aesthetics issues, but they can't be overly restrictive. This means that local governments may not restrict amateurs with a fee so high, which, by itself, prohibits erection of an amateur antenna. This issue can be quite involved, but amateurs restricted by local zoning ordinances should see PRB-1 which appears at **www.arrl.org/FandES/field/regulations/PRB-1_Pkg/index.html**, in *The ARRL's FCC Rule Book*, and in the ARRL's book and CD, *Antenna Zoning for the Radio Amateur*.

My amateur transceiver receives outside of the amateur bands, but it only transmits in the amateur bands. Is that legal and isn't there an amateur preemption for that?

Yes. PR Docket 91-36 is the federal preemption of state and local laws concerning amateur use of transceivers capable of reception beyond amateur allocations. This preemption allows amateurs to possess a transceiver capable of reception (but not transmission) on frequencies adjoining the amateur VHF/UHF bands. It does not apply to scanners, which are separate from an amateur transceiver. This only applies to amateur transceivers which, unmodified, will receive outside the amateur bands. For example, some two meter transceivers will receive in the 130-170 MHz segment. This is sometimes helpful to amateurs in providing public service communications. This document appears in *The ARRL's FCC Rule Book* and on *ARRLWeb* at **www.arrl.org/announce/regulatory/pr91-36/pr91-36.html**.

Other Telecommunications Parts:

Additional parts of Title 47 of the Code of Federal Regulations also impact Amateur Radio, sometimes directly and sometimes indirectly. These regulations can be found in *The ARRL's FCC Rule Book* and in *The ARRL RFI Book*. They can also be found on-line at **www.fcc.gov/wtb/rules.html**. They include:

Part	Title
1	Practice and procedure
2	Frequency allocation and radio treaty matters; general rules and regulations
15	Radio frequency devices (low power, unlicensed devices)
17	Construction, marking and lighting of antenna structures
18	Industrial, scientific and medical equipment
76	Cable Television Service
95	Personal radio services
97	Amateur Radio Service

Both the NCVEC Form 605 and the FCC Form 605 require that I sign a statement that I'm in compliance with some Part 1 regulation that it will not have a significant "environmental impact" and that my station is in compliance with the RF exposure rules. What's that?

When amateurs complete either form, they must understand and certify by their signature the following statement: "Amateur…Applicant certifies that the construction of the station would NOT be an action that is likely to have a significant environmental effect (see the Commission's Rules 47 CFR Sections 1.1301-1.1319 and Section 97.13(a))." Almost all amateurs agree with that statement. The only ones who will not are those whose stations will be located in an officially designated wildlife area, significant in American history, architecture, archeology, engineering or culture, that are listed, or are eligible for listing, in the National Register of Historic Places, in a wetlands area, those which require tower lighting and for stations which exceed the maximum permitted RF exposure limits. If you fall into that category, you will probably need to file an Environmental Assessment along with your application and should read these rules in detail. They can be found in *The ARRL's FCC Rule Book* and on-line at **http://wireless.fcc.gov/rules.html**.

By completing an NCVEC Form 605 or an FCC Form 605, applicants must also certify that they are in compliance with this statement: "Amateur Applicant certifies that they have READ and WILL COMPLY WITH Section 97.13(c) of the Commission's Rules regarding RADIOFREQUENCY (RF) RADIATION SAFETY and the amateur service section of OST/OET Bulletin Number 65." Section 97.13(c) makes reference to the Part 1 sections mentioned above. In addition to *The FCC Rule Book*, the ARRL book *RF Exposure and You* goes into great detail. Amateurs can find excellent information on the RF exposure guidelines on the ARRL Technical Information Service Web page at **www.arrl.org/tis/info/rfexpose.html**.

[Note: The preceding material was not prepared by lawyers and does not represent legal advice or aid. It was reviewed by ARRL General Counsel Chris Imlay, W3KD, for accuracy.]

Hamfests, 1925 Style

I enjoy hamfests for the social aspects as well as the flea markets. I often wondered what they were like, way back. This spring I had the good fortune to acquire the remnants from an old ham station.

Bill Gould, K2NP, became a SK back in 1983. His station was sold then, but his cellar was never cleaned out. It was a wonderful find, full of old papers and some equipment. Later while organizing the papers I found the program, his ticket and his badge, all shown here, in three different boxes. Let's see why he went and what the convention was like.

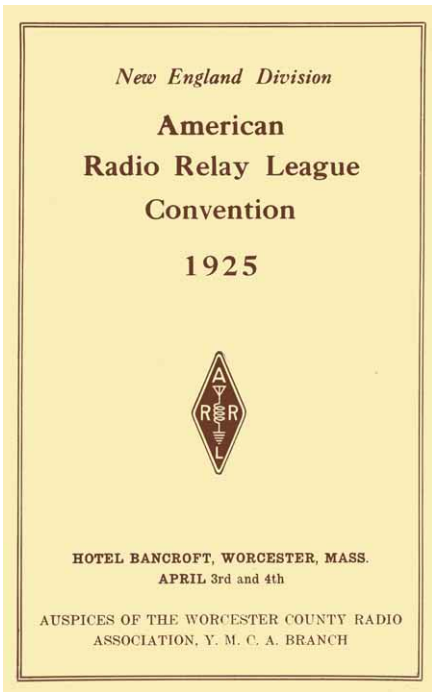
Seventy-six years ago last April, hundreds of hams gathered at the Hotel Bancroft in Worcester, Massachusetts, for the "New England Division ARRL Convention." Announcements preceded the event in *QST* and the New England clubs all notified their members. Everyone who could, showed up.

At a cost of $5, it was a two-day event loaded with talks and activities. Friday April 3 was a fun day. The first events were trips to three of the local "Super-stations", 1XZ, 1YK and 1BKQ. Hams were told to bring their "Wavemeters" for calibration at 1YK. Many other Worcester stations were also available for inspection by visitors.

New England Division Convention

APRIL 3rd and 4th, Friday and Saturday, are the dates of the New England Division A.R.R.L. Convention in Worcester, Mass. Headquarters will be at the Bancroft Hotel. There will be many worthwhile events and among these we might mention: Technical Meetings on Friday afternoon and Saturday morning;

A portion of the New England Division Convention announcement that appeared in the March 1925 issue of *QST*.



That evening they had a "Code Contest," and entertainment such as "Stunts by Radio Clubs," Movies by RCA, a "Liars Contest," a "Cracker Eating Contest" and a "Wire Untangling Contest."

Activities on Saturday, April 4 started at 10 AM with more ham station trips and one to WCTS, a local commercial station. At 2 PM the ham sessions started given by the following well-known speakers: R. S. Kruse, Technical Editor, *QST*; John Reinartz, 1XAM; Dartmouth Prof Elliot White, also the ARRL New England Division director; and Hobart Newell, Prof in Radio at Worcester Polytechnic Institute.

At 6 PM the banquet started with the following speakers: Toastmaster Dr H. Eugene Watkins; A. A. Herbert, ARRL Treasurer; a representative from RCA; Radio Inspector E. H. White; R. S. Kruse; and Irving Vermilya, the NE Divsion Manager. Lee Bates and his radio band, the High Frequency Syncopators, provided music during dinner.

At 10:30 PM, as reported in the June 1925 issue of *QST*, "The closing event of the convention, and one which made a very strong impression, was the holding of a conclave to confer the degree of the Royal Order of the Wouff Hong on about 150 members of the League. The Worcester boys, who did so well last year in Springfield, again showed their histrionic talent. It would be hard to equal their performance."

There was no mention of any swap area. If you think about it, in 1925 there were no major highways, and many hams did not have cars so they traveled by train. This would have limited what they could carry. But knowing hams, I'll bet there was some swapping going on. If any readers happen to have this information, please contact me.

INFORMATION WANTED

I am looking for additional information on Bill Gould. He was a very early ham, first licensed as 1NP. He attended Worcester Polytechnic Institute and was the chief operator of the college ham station, 1YK. He participated in the Transatlantic tests from there, and later as W1NP worked in the Boston area. Around 1940 he moved to New Jersey and worked for the government at Fort Monmouth and Camp Evans. His New Jersey call became K2NP. He had many ham friends and was a great friend to ham radio. I am also looking for information and 1920s photos of station 1YK, the Worcester Polytechnic ham station.

I am putting Bill's biography together for a later column. If you have any photos or information, please contact me at my US mail or e-mail addresses below.

Check my Web page for more information about this column: **www.eht.com/oldradio/arrl/index.html**—*K2TQN* QST

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USTTI Class of 2001 Learns About Amateur Radio

Students from five African nations and an observer from Canada recently attended the United States Telecommunications Training Institute/International Amateur Radio Union course on Amateur Radio administration at ARRL Headquarters. The course was held September 26-28. Coordinated by USTTI and presented jointly by IARU and ARRL staffers, the program covers—among other topics—the International Telecommunication Union and ITU regulations, the IARU, spectrum management, emergency communication, digital communication, satellites, electromagnetic interference, international licensing, and Amateur Radio testing and licensing.

The trainees also constructed a simple 40-meter receiver in the ARRL Lab.

Attending this year's session were Samson Nyatia of Uganda, Davie Mulambia of Zambia, Mohamed Ouhamou of Morocco, Aron Kilangwa of Tanzania, Adeyinka Odunsi of Nigeria, and Daniel Lamoureux, VE2KA, of Montreal, Canada. Lamoureux, an international member of ARRL, monitored the course and plans to teach it in French at a later date. All of the students are in occupations in their home countries that involve the use of telecommunications.

The students with their certificates and their teachers and hosts pose for a photo at the graduation lunch. L-R back row: Mike Tracy, KC1SX; Dave Patton, NT1N; and Ed Hare, W1RFI. L-R front row: Jon Siverling, WB3ERA; Davie Mulambia; Adeyinka Odunsi; Mohamed Ouhamou; Lisa Kustosik, KA1UFZ; Samson Nyatia; and Aron Kilangwa.

Teaching the majority of the Amateur Radio Administration Course were ARRL Technical Relations Manager Paul Rinaldo, W4RI, and Technical Relations Specialist Jon Siverling, WB3ERA, of the ARRL's Washington, DC, office, and ARRL Volunteer Examiner Coordinator Manager Bart Jahnke, W9JJ, of ARRL Headquarters.

Assisting from the ARRL Laboratory staff were Lab Supervisor Ed Hare, W1RFI; RFI Engineer John Phillips, K2QAI, and Test Engineer Mike Tracy, KC1SX.

Assistant to the Executive Vice President Lisa Kustosik, KA1UFZ, served as USTTI coordinator this year.

For more information on USTTI, visit the USTTI Web site, **www.ustti.org/**.

BRIEFS

♦ The International Telecommunication Union has adopted a recommendation that outlines basic qualifications for Amateur Radio operators worldwide. Recommendation ITU-R M.1544, Minimum qualifications of radio amateurs, states that minimal operational and technical qualifications are necessary for proper operation of an amateur or amateur-satellite station. It recommends that any person seeking an amateur license at least be able to demonstrate specific theoretical knowledge of radio regulations, radiocommunication methods, radio systems, radio emission safety, electromagnetic compatibility, and RF interference avoidance and resolution. At the IARU's just-concluded Region 2 meeting in Guatemala, the IARU Administrative Council approved a resolution urging administrations to adopt M.1544.

"The international Radio Regulations have long required that administrations take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate an amateur station," observed International Amateur Radio Union Secretary David Sumner, K1ZZ. "In anticipation of changes that are likely to be made in the amateur and amateur-satellite service regulations at the next World Radiocommunication Conference, the new recommendation provides additional definition to these qualifications without reducing the prerogative of an administration to set its own standards."

Recommendation M.1544 came about as part of the IARU's multi-year effort to prepare for the 2003 World Radiocommunication Conference, where delegates will consider possible revision of Article S25 of the international Radio Regulations.

IARU President Larry E. Price, W4RA, said that establishing uniform minimum qualifications for Amateur Radio operators should help in the area of mutual recognition of amateur licenses for international roaming "and particularly for cross-border movement of amateur operators for disaster communications." Having the recommendation in place, he explained, makes it possible to maintain an ITU document on Amateur Radio operator qualifications within oversight of the ITU-R Study Group and avoids the cumbersome process of modifying Article S25 of the Radio Regulations.

ITU Recommendations are available from the ITU electronic bookshop: **ecs.itu.ch/cgi-bin/ebookshop**—*IARU news release*

♦ *QST* editor addresses South African hams: *QST* Editor Steve Ford, WB8IMY, recently engaged in a question-and-answer session with hams in South Africa. Ford says the two-hour live, telephone interview was featured on the South African Radio League's "Intechnet" for August 19 at 1800 UTC. The interactive show, hosted by Hans van de Groenendaal, ZS5AKV, is retransmitted on 75 meters and on a number of FM repeaters throughout South Africa. "The topic of the show was the technological future of Amateur Radio, with a particular focus on the latest technical innovations in the amateur community," Ford explained. "During the program I fielded about 20 questions—most requiring detailed answers—concerning PSK31, MFSK16, Internet repeater linking, the new WSJT digital software for meteor scatter, the innovative WOLF software for LF and much more."

♦ The Radio Amateurs of Canada Board of Directors has elected Glenn McLeod, VE3GLN, of Ottawa, as the Canadian Radio Amateur of the Year for 2000. An ARRL Life Member, McLeod is a retired Canadian Armed Forces officer. He currently serves as logistics officer at the Communications Research Centre. Licensed in 1978 as VO1DV and later as VE3MPR, McLeod is active on all bands and modes from 160 meters through to 70 cm with 270 DXCC entities confirmed. The RAC Board recognized McLeod for conceiving of and organizing the record-breaking 35A 2000 Field Day entry in the Ottawa-Hull region, which focused public attention on Amateur Radio's public service role. An engraved silver tray will be presented to Glenn McLeod by RAC Ontario North Regional Director Doug Leach, VE3XK.—*RAC*

In the Beginning of Amateur Radio in Space

By Dr Tony Curtis, K3RXK

This month we celebrate the 40th anniversary of the launching of OSCAR-1, the first Amateur Radio satellite.

In early October, we celebrated the 44th anniversary of the launching of Sputnik-1, the first artificial Earth satellite, on October 4, 1957. We look back at Sputnik as an important milestone in human history that marked the start of the Space Age.

Just four short years after Sputnik, the first Amateur Radio satellite, OSCAR-1, was launched into orbit on December 12, 1961.

A California group of Amateur Radio operators—called Project OSCAR for Orbital Satellite Carrying Amateur Radio—built that first Amateur Radio satellite. Since then, most have been referred to as OSCAR, not to be confused with the US Navy series of Oscar navigation satellites.

A Pioneering Satellite

The 11-pound OSCAR-1 was launched as ballast on a Thor-Agena rocket, which carried the military satellite Discoverer-36. The rocket left our satellite in an elliptical orbit ranging from 152 to 295 miles above Earth's surface.

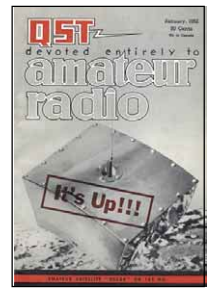
Measuring 9 × 12 × 6 inches, it had cost about $18,000 and incorporated pieces of equipment donated by hams across the country. OSCAR-1 did not offer two-way communications. Its radio transmitted the letters HI in Morse code. The output power was 140 mW on 144.983 MHz. Our 140 mW was 14 times greater than the power of the 10-mW FM radio in Explorer-1, America's first satellite, launched in 1958.

There was a bit of scientific value in OSCAR's DIH-DIH-DIH-DIH DIH-DIH greeting. The temperature inside the satellite controlled the speed of the message. The first reception was at the South Pole and the second at Kodiak, Alaska.

All good things come to an end, and OSCAR's mercury battery was not rechargeable. It had only enough strength to power the transmitter for 22 days. During that time, hundreds of amateurs, in 28 nations around the globe, picked up OSCAR's call from space and mailed in reception reports. OSCAR's low altitude let it stay in orbit only 50 days. It slipped down into the atmosphere and burned January 31, 1962.

Following OSCAR-1, private groups of Amateur Radio operators around the globe have built and sent dozens of Amateur Radio communications and science satellites into orbit. The Radio Amateur Satellite Corporation (AMSAT) was formed in 1969.

Along with OSCAR, hamsats have borne names such as Radio-sputnik, Fuji, UoSAT, and DOVE, among others.



The cover of the January 1962 *QST* trumpets the successful launch of OSCAR-1.

Who gave the time, hardware and cash to build all of our technology-advancing spacecraft? The answer is hams around the world: Argentina, Australia, Belgium, Brazil, Canada, Finland, France, Germany, Great Britain, Israel, Italy, Japan, Mexico, Russia, South Africa, South Korea, the United States, and others.

How Many are There?

The number of Amateur Radio satellites has mushroomed with some 40 launched since 1961:

- only four were lofted in all of the 1960s.
- six went into space in the 1970s.
- 17 Amateur Radio and amateur-related satellites were launched in the 1980s.
- 24 Amateur Radio and amateur-related satellites were launched in the 1990s.
- four have been launched so far in this decade.

The record launch years were 1981 and 1990. There were eight launches in each of those years. I refer to some as amateur-related if we built them, or somehow were involved in their use.

Hamsats used to enjoy free rides into orbit as ballast on rockets launching commercial and government satellites. Today, with rockets over-booked by paying customers, free tickets are few and far between.

Most hamsats have been what we call Phase-1 and Phase-2. They fly low in polar or equatorial orbits from 200 to 1000 miles altitude. Such a low-flying hamsat comes within range of a station on the ground every hour or so. It stays overhead 15 to 30 minutes. Polar satellites appear over a ground station about the same time each day.

A few amateur satellites—known as Phase-3—are in long elliptical orbits. That keeps them in view of ground stations for hours at a time. They range out 20,000 to 30,000 miles, then loop back, coming within 1500 to 2500 miles of the surface. Their long elliptical tracks are known as Molniya orbits after a class of Russian communications satellites.

What do our Satellites Do?

Early amateur satellites carried only one-way radio beacons, which sent down telemetry information about conditions of the onboard equipment and the space environment.

Today, hamsats still transmit beacon signals. Mostly they are used as sky-high communication repeaters. Their transponders relay voice, CW and digital signals. Most carry digital message systems. Sometimes they have television cameras, transmitters for radio propagation tests, ionospheric research and meteor sounding, and receivers for radio astronomy, radiolocation or other science research.

Some serve the general public by training satellite trackers, relaying medical data, teaching school students and science groups, and providing emergency communications for disaster relief.

There are lots of satellite operating interests including DXing, rag chewing, operating achievement awards—Worked All States, Satellite DXCC—technical achievement awards, nets, contests and satellite fox hunts.

What would a future Phase-4 or even Phase-5 hamsat be? It could be an OSCAR in stationary orbit above Earth. Or, maybe, an amateur spacecraft at the Moon or Mars.

Forty years later, we're still enjoying the benefits from OSCAR-1's launch of Amateur Radio into space. QST

W1AW Celebrates the First OSCAR Satellite Launch

In commemoration of the 40th anniversary of the first Amateur Radio satellite—OSCAR-1—launched into orbit on December 12, 1961, W1AW will be on the air as W1AW/40 from December 10 to 14, 2001 on as many of the active satellites as possible. A special QSL will be available for contacts or SWL reports. Please send QSL requests to W1AW/40, 225 Main St, Newington, CT 06111. Include an SASE (or appropriate number of IRCs) with your QSL request.

Steve Ford, WB8IMY ♦ *QST* Editor

Strategic Thinking Needed Like Never Before

By James W. Nash, K4HMS
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Not long after the tragedy of September 11, a US senator made a proposal which, even if obviously flawed, should certainly constitute a wakeup call for Amateur Radio. The senator proposed a "Technology National Guard," in which he would enlist information-technology professionals and equipment in some kind of militarized national service corps. Further, a press announcement from the senator's office, which mentioned communications difficulties after the disaster, described a need for "new ways to set up emergency information systems." I would bet this particular politician knows very little about Amateur Radio and ARES.

But—and this point is vastly important—what Amateur Radio has here is more than a public relations problem. We must deal with a somewhat new view of the basic conceptual problems. Otherwise, in a few years some "national emergency corps" may be getting our frequencies. But, perhaps even worse, we could miss a great opportunity to creatively re-think our purpose under pressure.

The recent catastrophic terrorism striking America will not only restructure our national agenda for the next few years. It will also challenge the Amateur Radio community to undergo another agonizing reappraisal of its role. This crisis may present a challenge to Amateur Radio like nothing seen before. True, we were forced off the air by the two world wars, and in fact faced extinction after World War I. But the September 11 attacks are perhaps even more closely related to actual issues of homeland defense. This time, the homeland has been attacked.

I am aware that the ARRL and some of its constituent organizations have previously engaged in some serious thinking about the future. This is essential because of rapid changes in technology and various cultural factors. Now we must focus on this process again. All our prior assumptions must now be reevaluated. This time the very concept of Amateur Radio may have to be reformulated.

Obviously, we must here and now deal intelligently with the future, of both our avocation and of the country. But this is a slippery process. A few years ago, I heard a management consultant say that there are only two things we really know about the future: first, it won't be like the past; second, it won't be what we expect.

During the last 20 years, because of service on the boards of a number of non-profit organizations, I have become familiar with something known as "long range planning." The lessons learned in these activities apply directly to this situation.

Take, for example, the nomenclature used in the planning process. Many organizations and businesses no longer refer to this activity as "long range planning." The term "strategic planning" is preferred since people learn quickly that few plans actually work out over the long term. This is, after all, a speeded-up, frenetic world of future shock where premises are constantly shifting. Many of you know the old aphorism: "If you want to make God laugh, tell him your plans." In fact, such activities are often not even being called "planning," but are now referred to as "strategic thinking."

What Amateur Radio must do now is some more strong and immediate strategic thinking. We may not be able to predict the future, but through strategic thinking we can at least learn to deal with the present in the context of possible futures. It is the best way to prepare to go forcefully to the table when national decisions are to be made about some technology anti-disaster corps.

So let us focus on this suggestion of the Senator's. Even if this particular proposal is not adopted (it would no doubt face serious legislative hurdles), some other means of harnessing national volunteer resources in this area must be found. We do after all have a pool of hundreds of thousands of trained radio communicators, although, remember, the government no longer needs a giant pool of CW operators for its next war. So we must think about what it does need.

Using the strategic thinking approach, after reevaluating our own objectives, the next question is, what is the problem? In this regard we must consider not only our own community problems, goals and objectives, but also the challenge facing the nation. That will bring about some interesting insights.

What are our weaknesses as related to the issue? What are our strengths? Having reevaluated our objectives, what options do we have to accomplish them? More emphasis on digital modes? Networks of emergency-ready base stations? Some of the answers may be different now than they were before September 11.

Brainstorming about actions will perhaps come up with some important new potentialities. After all, we have the resources—we just need to decide how to use them in this new environment.

Another aphorism about planning is that "the real purpose of the process is the process." Let us then go forward with this process. The future is already here, so we no longer have to wait on it. When Congress and the White House want to talk about a "technology corps," we'll be ready. And, who knows, we might just be able to take the initiative on this issue ourselves.

QST Op-Ed Policy

The purpose of Op-Ed is to air member viewpoints that may or may not be consistent with current ARRL policy.

1) Contributions may be up to two-thirds of a *QST* page in length (approximately 900 words).

2) No payment will be made to contributors.

3) Any factual assertions must be supported by references, which do not necessarily have to be included in the body of the article to be published.

4) Articles containing statements that could be construed as libel or slander will not be accepted.

5) The subject matter chosen must be of general interest to radio amateurs, and must be discussed in a way that will be understandable to a significant portion of the membership.

6) With the exception that the article need not be consistent with League policy, the article will be subject to the usual editorial review prior to acceptance.

7) No guarantee can be made that an accepted article will be published by a certain date, or indeed, that it will be published at all; however, only articles that we intend to publish will be accepted, and any article we have decided against publishing will be returned promptly.

8) Send your contributions to ARRL Op-Ed, 225 Main St, Newington, CT 06111.

Mission Impossible?

My gaze alternated between the Heil Sound ad for their Goldline microphone and the balance register of my checkbook. This is when the realization hit me that, although I wanted a microphone for my Elecraft K2, it wasn't going to be a Goldline. Obviously, I was going to have to get creative and solve my microphone problem without taking out a second mortgage.

Several QRP Power readers had e-mailed me with the suggestion that I explore the world of QRP phone operation. As a dedicated CW op, and not owning a microphone for my K2, I decided this would be a worthwhile endeavor. As long as I was going to procure a mike, why not make it a studio-type with an articulated boom arm, just like a "real" radio station.

CW Rules? Not Hardly!

All too often QRPers (myself included) abandon phone operation in favor of CW. Without a doubt, CW is more efficient than single sideband,[1] but that's not to say that QRP SSB operation is not possible or practical. The problem with successful QRP phone operation is one of perception and acceptance. Many times QRPers speak in irreverent terms regarding SSB. It seems to some that QRP and phone operations are mutually exclusive terms. Not so, *mon ami.*

This gravitation toward CW is directly related to our comfort level. QRPers like CW because we are confident that we will be successful using it. The narrow bandwidth of the CW signal coupled with competent operator skills equals success. QRP phone operation is an altogether different ballgame. Voice intelligence of the phone signal can become lost in the band noise. When we play in the QRP arena, we give up at least 13 dB of power advantage. By examining our stations and applying some simple audio engineering, we can "equalize" some of this power disparity.

Some Audio Basics

Human speech is a complex waveform covering several thousand hertz of the audio spectrum. Speech *power* is highest between 200 and 600 Hz for the male voice. The greatest speech *intelligibility* occurs around 2 kHz. Approximately 33% of speech intelligence is within an octave centered on 2 kHz (between 1.414 to 2.828 kHz) in a normal speech pattern.[2] These are called "mid-range frequencies."

What's an *octave*? An octave is a term that defines a specific frequency change within the audio spectrum. The range of 500 Hz to 1 kHz is one octave. From 1 kHz to 2 kHz is another octave. In other words, an octave increase doubles the frequency while an octave decrease halves the frequency. Octaves are handy measurements when we talk about filters.

In the audio world, we deal with voltage gains/losses expressed in dB. The dB formula used with voltage is 20 log (E_1/E_2). With audio every *6 dB* yields a doubling or halving of the signal. Therefore, if an audio filter has a low-frequency roll-off of 6 dB per octave beginning at 1 kHz, at 500 Hz we should see one half the input signal voltage and at 250 Hz only one-quarter of the input signal. By placing several filters in series (cascade) we can achieve rather sharp roll-off at various frequencies. By making these filter bandwidths variable and adding some amplification we now have an audio *equalizer* that we can tune for specific peak and roll-off across the audio spectrum.

Audio equalization is the key to successful QRP phone operation. Using equalization, we can tailor the microphone's output to the desired communications audio response curve. This equalized audio, when applied to the transmitter, will yield a much more intelligible SSB signal with a lot more audio "punch" because the signal voltage in the maximum intelligence portion of the communications audio range makes up a larger proportion of the transmitted signal.

MacGuyver to the Rescue!

How we go about manipulating the microphone audio is, in some cases, amazingly simple. My local RadioShack had a general purpose dynamic, omnidirectional mike (RS 33-3030) on sale for under $20! I bought it and headed back to the shack. Looking over the documentation, I noticed that it had a fairly flat frequency response from 100 to 12,000 Hz. This is fine for use on a PA system but not what I needed for the K2.

An article by Bob Heil, K9EID,[3] offered some tips on how to enhance microphone characteristics. I decided to try them on my new mike just to see what

Figure 1—Installed on an articulated lamp arm, the modified RadioShack mike provides me with a professional looking (and great-sounding) means of making QRP phone contacts.

[1]Notes appear on page 93.

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ k7sz@arrl.org

Figure 2—My RadioShack mike ($19.95) and Amp/EQ unit—a simple and inexpensive means of enhancing transmitted audio on QRP phone.

Figure 3—Close-up photo of the inexpensive yet perfectly adequate RadioShack mike.

would happen. An on-air test with Fran Slavinski, KA3WTF, proved most enlightening. He listened to the stock mike and commented that the low frequency end was very pronounced yielding a "bassy" quality to the audio. I tried Bob's trick of wrapping the sides of the mike head with a layer of tape and had Fran listen again. This time the results were much improved. Fran said that the "bassyness" was gone and the mid-range frequencies were coming through nicely. After cutting a 3 inch piece of light card stock, 1 1/2 inches in width, and placing it around the *inside* of the mike head, I removed the tape from around the outside. This greatly improved the cosmetic appearance of the mike and the cardstock sealed off the side slots, effectively closing off the air chamber inside the head.

With the air flow behind the mike element restricted, the low frequency response is attenuated, which allows the mid-range frequencies to become more dominant. Instant equalization! As I said earlier, some things are *real* simple. One other simple fix is to place a 0.01-µF disc capacitor in series with the hot mike lead. This capacitor, in combination with the impedance of the mike element, creates a high-pass filter that further rolls off the low end response at or below 300 Hz.

Equalizers, Anyone?

Since I chase my share of DX, I wanted to further alter the microphone characteristics to enhance those elusive mid-range frequencies from 1.5 to 2.5 kHz. I obtained a small RadioShack five band mike amp and EQ unit for some additional experiments. This unit was simple to set up and I was able to adjust the transmit audio on both the high and low end to achieve a good peak in mid-range performance around 2 kHz. While RadioShack no longer makes their little EQ unit, you can occasionally find them at hamfests for a few dollars. Additional sources of used mike amp/EQ units include music stores (bands break up and sell off their gear at a fraction of the cost of new gear) and the Internet.

Another proponent of good audio engineering in the ham shack is George Baker, W5YR, who shared his thoughts on audio equalization with me via several e-mails. George uses a Behringer MX602A microphone mixer/equalizer to improve his station's audio. Bob Heil, K9EID, confirms that the MX602A is an ideal unit for our purpose. Bob further states that large EQ units are unnecessary and difficult to set up properly. A 3 to 5 band EQ unit is perfect for obtaining outstanding audio for amateur use. Check the Behringer Web site: **www.behringer.com**.

The final part of this project was the construction of an articulated boom arm to hold the mike. Figure 1 shows the modified bench lamp I purchased from K-Mart ($9.99). I removed the ac line cord, lamp and socket assembly from the arm. Next, I epoxied a 1/4×3 inch stove bolt in the mike clamp and secured that assembly in the head of the articulated arm. The mike cord runs inside the upper channel of the arm assembly just like the original ac line cord on the lamp. The entire unit sits in the clamp holder on the top shelf of my shack operating bench. The arm and mike are adjustable on three axes. Swinging the arm down places the microphone right in front of my face for ease of use. There is no PTT on the mike so I added a foot switch to the K2 mike connector. This extremely handy configuration is a joy to use on-air and doesn't waste any precious desktop space.

Accepting the challenge to work more QRP phone contacts, I started out with my new mike and promptly worked the following DX: VK3CR, TG9MX, ES4RC, LA1UFA, JT1Y, IK3SWB, ON7YB, LZ2KV, EA6MQ, OD5NH, OM5MZ and 9Y4SF. All these stations were worked at 5 watts or less on a *very* erratic operating schedule.

What was the total cost of my "studio" microphone project? $35! Not too shabby, if I do say so myself.

Your Assignment, Mr. Phelps...

Instead of concentrating on just the CW portions of the major contests, try entering *both* the CW and Phone segments. Keep track of your success rate and your DXCC entity totals, especially when using phone. Cruise around on the phone bands and make an effort to work some phone contacts. Let's try to get out of the "CW rut" by taking the time to develop and perfect our phone operating skills.

Notes

[1]Jacobs, George, W3ASK; Theodore Cohen, N4XX, and Robert Rose, K6GKU, *The New Shortwave Propagation Handbook*," Hicksville, NY: CQ Communications, Inc, 1995, pp 1-16.

[2]Ballou, Glen M, Ed., *Handbook for Sound Engineers: The New Audio Cyclopedia*, 2nd Ed, Indianapolis: Howard W. Sams & Co, 1991, pp 1279.

[3]Heil, Bob, K9EID, "Equalize Your Microphone and be Heard," *QST*, July 1982, pp 11-13.

"I Knew We Had to do Something"

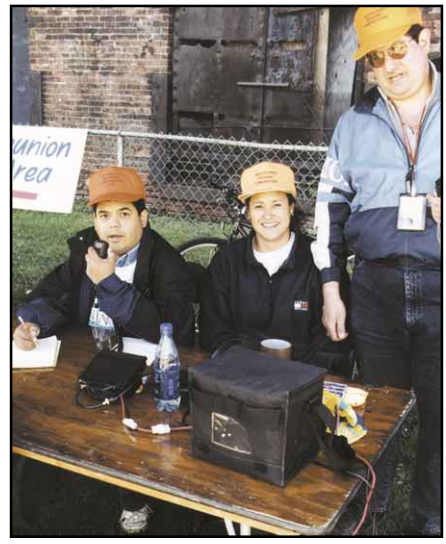
Lucy Rodriguez, KC2HZQ, Simone Lambert, KA1YVF, and Karen Hargrove, N2ZYF, have never met, but they share more than being YLs and Amateur Radio operators. They enjoy helping people and feel strongly about public service. None realized how their dedication and inner strength would be tested by the horrific events of September 11, 2001.

One of the first public service activities that Lucy and her husband Ivan, KC2CHE, of Brooklyn, New York participated in was the "Bike New York" ride last May. Over 30,000 bicyclists rode around the five boroughs of New York City in a steady stream from morning until evening. Ivan had attended a one-day Technician Class course a few months before and Lucy recently passed the Technician test and was waiting for her call sign. One of the first things they did together in Amateur Radio was join ARES (the Amateur Radio Emergency Service) and they were looking forward to participating in local ham radio activities. "Lucy is often away in her job as a flight attendant for American Airlines," her husband Ivan said. "We thought Amateur Radio was a great way to be together and help the community at the same time." For the Bike New York event they were stationed at a "pit stop" under the Brooklyn Bridge and thoroughly enjoyed the experience.

In the small city of Woonsocket, Rhode Island, Simone, KA1YVF, was working hard in her job as an office manager. "I enjoy ham radio and never really had enough time to spend on it," she said. Her husband Armand, K1FLD, is the ARRL Rhode Island Section Manager and they are both active in ham radio and in their community. Over the Labor Day weekend the company she was working for had to lay her off. "It was meant to be," she told me later.

Karen, N2ZYF, has participated for many years in various public service events around her home in Staten Island, one of the boroughs of New York City. Around this time last year she was part of "Operation Santa," where over 2500 disabled children in the New York City area received the news that Mayor Giuliani and Santa had arrived from the North Pole. She received her Technician license in 1994 and her husband Charlie is the ARRL District Emergency Coordinator for New York City. "Karen is always there and works hard for ham radio," Charlie said. "She's very dedicated." Not these women, nor the rest of us, expected what happened on September 11. No one thought this type of disaster could ever happen here, in our own backyard.

KB2ZDZ PHOTO



From left, Ivan Rodriguez, KC2CHE, Lucy Rodriguez, KC2HZQ, and Salvatore Baglieri, KC2BGT, assist at the "Bike New York" ride through New York City.

K2DO PHOTO

Tom Carrubba, KA2D, ARRL NYC/LI Section Emergency Coordinator, discusses the situation with Simone Lambert, KA1YUF, at Red Cross Headquarters in Brooklyn, NY. In the background is Jay Ferron, N4GAA.

"When I first heard the news I knew we had to do something," Lucy, KC2HZQ, said. After the second World Trade Center tower collapsed, she and Ivan immediately checked into an emergency 2 meter net and rushed to provide communications in a local shelter being set up at Westinghouse High School in Brooklyn. Along with another local ham they brought down equipment and quickly set up a station. Many people were starting to make their way into Brooklyn from lower Manhattan. "They were exhausted from the long walk and we were able to communicate their needs to the appropriate people," Ivan said. The local telephone lines and cell sites were jammed with relatives and friends trying to contact their loved ones in New York but the Amateur Radio operators had no trouble getting information into and out of Manhattan. Even the local firemen and police came by to rest and get supplies. "They lost many of their brethren and all of us hoped for news of survivors."

Simone, KA1YVF, was convinced that it was God's hand that made her available. "I told my husband I was going to New York City because they needed me," she said. Her husband was not able to travel with her so Simone said a quick goodbye and went to the Amateur Radio Command station at Red Cross Headquarters, Cadman Plaza, Brooklyn. With her computer skills, she was soon in charge of the Amateur Radio Database that had been set up to coordinate the volunteers. In Staten Island, Karen, N2ZYF was at a local hospital setting up Amateur Radio communications. "We were expecting thousands of people at area hospitals," she said.

All three women, Technician class operators with different experience levels and skills, found a way to help and make ham radio proud.

On September 11, 2001 the world changed and Amateur Radio operators around the globe realized that it would never be the same again. These women are three of the many courageous Amateur Radio volunteers who answered the call for help in the aftermath of the terrorist attacks in New York, Pennsylvania and Washington, DC. We salute you. QST

Diane P. Ortiz, K2DO ♦ PO Box 296, Bellport, NY 11713 ♦ k2do@arrl.org

SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

W1ADD, Ellsworth H. Gibson, Lynn, MA
*W1AP, William R. Marks, St. Augustine, FL
WB1ASD, Frank Fonseca, New Bedford, MA
W1CUI, David S. Wheaton, Yarmouth, ME
W1DNJ, Frank H. Mitchell, Southington, CT
W1EGJ, Lawrence H. Wright, Peabody, MA
KX1H, Thomas M. Burton, Wellesley Hills, MA
KA1HUU, Jorgen P. Christensen, East Haven, CT
KA1KUM, Arthur E. Nichols, Detroit, ME
K1LPX, Neal A. Wiggin, Raymond, NH
W1QFO, Clifford A. Wilkins, West Yarmouth, MA
KD1XK, Kenneth E. MacDonald, Lisbon Falls, ME
KB2ANL, Lloyd E. Curtis, Vestal, NY
W2BKG, Carl King, Brooksville, FL
KS2B, Roy E. Jacques, Hazlet, NJ
N2CII, Victor Jurkovic, Westwood, NJ
W2DGM, Edgar S. Johnson, Harrington Park, NJ
W2EFJ, William G. Klehm, Farmington Hills, MI
KB2EN, Stanley F. Feldmann, Deltona, FL
W2EYY, William A. Robinson, Lighthouse Point, FL
KG2FH, Kenneth E. Sanchez, Albrightsville, PA
N2FQV, Martin Greenberg, Sharon, MA
WA2IOH, Charles R. Cunningham, Ripley, NY
W2IQ, Henry D. Clark, Dandridge, TN
KG2LC, Philanzo G. Edick, Corinth, NY
N2UKD, Mark E. Franklin, Branchburg, NJ
K2WW, Charles M. Brelsford, Tempe, AZ
WP2Y, Alden C. Schewe, New Port Richey, FL
KA3CVC, Alphonsus J. Stankus, Warrington, PA
K3FEC, Seymour E. Fellerman, Richmond, VA
KB3FMS, Thomas L. Olchefske, Annapolis, MD
K3HBN, John W. Wagaman, York, PA
N3IRP, Willis H. McElroy, Peckville, PA,
AA3K, Alfred E. Popodi, Salzburg, Austria, Europe
K3LZS, Loren M. Dunham, Millerton, PA
N3VQE, Mary J. Pohlmann, Parsonburg, MD
*K3YE, James D. Amos, Philadelphia, PA
W3ZJZ, John F. Schmidt, Venetia, PA
KG4ADN, Harold E. Walters Sr., Monroe, NC
WB4AXO, Wesley H. Bacon, Tavares, FL
WD4AZG, Richard E. Miller, Manassas, VA
N4BJZ, Gene Heath, Box Springs, GA
N4CAK, Steven D. Linn, Camp Hill, PA
K4DSO, Lillian O. Bankston, Birmingham, AL
WB4DYY, Warren H. Glasscock, Deatsville, AL
KC4ENQ, John C. Leitch, Waynesboro, VA
KF4ENV, Carol E. Minton, Moneta, VA
W4ESJ, Richard L. Root, Titusville, FL
*WB4GCK, Henry Lathrop, Lakeland, FL
WA4HEH, Ettie S. Wells, Montrose, MO
KD4HUF, Joe E. Chamberlin, Montgomery, AL
WA4JPB, Hugh E. Robertson, Chattanooga, TN
AE4MQ, Samuel G. L. Hitch, Midlothian, VA
KJ4R, Edward F. Salter, Inverness, FL
*KF4RL, Fred Dellinger, Kingsport, TN
KC4RMY, Sandy Ketcham, Ozark, AL
N4RMY, Robert E. Eyes, Elon, NC
K4RT, William G. Hall, Venice, FL
W4RYJ, Howard B. Nichols, Shelbyville, TN
KB4SHL, Carolyn L. Bushel, Live Oak, FL
WB4TRP, Daniel B. Nolan, Mobile, AL
W4USN, Homer J. Cumm, Orange Park, FL
W4UVT, Clifford Wilson, Middlesboro, KY
KF4VEG, Donald Christmas, Alma, GA
W4WOH, William S. Loeb, Huntsville, AL
WB4ZTM, Robert J. Robinson, Macon, GA
N5AEI, Odie V. Collard, Albuquerque, NM
N5DGG, R. W. Mayo, Orange, TX
K5DX, Clarence E. Sharp, Highlands, TX
WJ5E, Preston G. Whatley, Wichita Falls, TX
KD5KVY, Wesley R. Bobbitt, Albuquerque, NM
KD5MS, Michael J. Andrisek, Anahuac, TX
W5PIZ, John R. Halliday, Albuquerque, NM
WB5QVY, Kermit L. Smith, Alba, TX
N5SNV, David A. Beckman, Farmington, NM
W5UHG, Paul Clark, Orange, TX
WR5U, James W. Brusaw, Deming, NM
KB5VSS, Ola E. Laird, Olney, TX
N5YFV, Winifred H. Coonrod, Albuquerque, NM
W6ABN, Stanly Savage, Anaheim, CA
W6EFR, William E. Gotwalt, Leon Gto, Mexico
W6GBL, Glen H. Chapin, S Ogden, UT
W6IFC, Lyman A. Treaster, Visalia, CA
*W6IZR, Clarence M. Griffith, Petaluma, CA
K6JG, John P. Billon, Arroyo Grande, CA
WA6LVZ, Fay R. Bell, Walla Walla, WA
KN6N, Oliver J. Mills, Felton, CA
W6RQQ, William H. Kirk, Lakeside, CA
KC6VNA, Henry N. Wood, San Diego, CA
W6VVI, Kenneth D. Droullard, Sacramento, CA
KG6VY, Louis V. Tristao, Visalia, CA
WA6ZXF, George A. Beale, Lancaster, CA
K7BC, Robert W. Zens, Olympia, WA
WB7DWE, Louis P. Smithmeyer, Burien, WA
WA7ESU, Leonard R. Wilson, Boise, ID,
W7FYZ, Robert C. Carlisle, Portland, OR
KC7ICP, Martin E. McClay, Pahrump, NV
W7KDB, Edwin L. Hamlin, Nampa, ID
KC7LYT, Samuel C. Fleming, Spokane, WA
W7ME, Floyd C. Colyar, Glendale, AZ
W7QWC, Lee T. McCormick, Portland, OR
KB7VA, Donald F. Lawson, Rathdrum, ID
KF8CW, Bernard K. Ackerman, Traverse City, MI
*KE8DI, William A. Moss, Petoskey, MI
W8DMW, Donna B. Wild, Grand Rapids, MI
WD8JPS, Lester R. Staley, Versailles, OH
W8LOY, Edward T. Clegg, Lancaster, OH
N8PLL, Floyd E. Kirk, Salem, OH
N8PTI, Robert A. Jerome, Saginaw, MI
W8SPL, Leslie L. Diehl, Columbus, OH
K8UV, William N. Craiger, Bristolville, OH
W8WSE, Mike Hoychuk, Garfield Heights, OH
AA8XY, Dale J. Boocher, Dayton, OH
W9AMC, Fred C. Clarke, Saint Paul, MN
*ex-KA9DVY, Nellie Myers, Dixon, IL
WA9EZP, Irene E. Kennedy, Fort Wayne, IN
K9MEL, Melvin C. Cox, Farmersburg, IN
KB9OSB, Michael J. Plichta, Milwaukee, WI
ex-W9RBV, Lowell A. Goodson, Evansville, IN
KB9TLJ, Colin K. Weston, Penfield, IL
W9UG, Richard W. Blohm, Fox River Grove, IL
W9ZY, Bruce B. Woodward, Indianapolis, IN
W0DFC, Orrie E. Thompson, Elma, IA
W0DOZ, Ansel M. Dickinson, Coldwater, KS
KB0HKW, Arthur L. Jenkins, Saint Clair, MO
N0KAE, Judith E. Stoakes, Sioux Falls, SD
*WA0KUH, Lyndell C. Miller, Kansas City, MO
KB0QI, Locita F. Herren, Colorado Springs, CO
K0ZRC, Ralph D. Carlson, El Paso, TX
CT1YTP, Genoveva Costa, Aveiro, Portugal
T32O, Phil Wilder, Christmas Island

*Life Member, ARRL
‡Call sign has been re-issued through the vanity call sign program.

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

Kathy Capodicasa, N1GZO ♦ Silent Key Administrator

NEW PRODUCTS

LOG WINDOWS UPGRADE ADDS SUPPORT FOR WINDOWS NT/2000/XP

◊ *Log Windows* 3.07.34.01 adds, among other goodies, support for voice packet spots, 11-meter operation and parallel port devices under *Windows* NT/2000XP. The newest version of this popular logging package also includes fixes for the M^2 antenna rotator, 1.2-GHz support for Kenwood's new TS-2000 transceiver, frequency support for MARS, and more.

Price: $69.95 (full package); $40 (upgrade for users of version 3.06.15 or earlier). Users of version 3.06.50 or later can get the upgrade for free. For more information, contact CSC/Log Windows at **www.logwindows.com**.

W9OKA CENTER-FED PASSBAND DIPOLES

◊ Designed by Tom Clemens, W9OKA, and Jerry Truax, N3SEI, and based on series-resonant circuitry, Passband Antennas provide wide single-band or conventional multi-band coverage with a single center feed section. With elements that are mutually coupled and resonated, and a design that's *not* based on traditional electrical wavelength theory, height above ground has little effect on the feed point impedance of these innovative antennas.

Because of the antenna's patent-pending matching method, the single-element antennas provide more than 20 dB of common-mode noise rejection without undesired signal loss. All Passband Antennas are rated for at least 1500 W. Single-band models provide an SWR of less than 1.5:1 across the band of operation. Multi-band models cover all design frequencies with an SWR of less than 2:1, eliminating the need for antenna tuners and the associated losses and additional expense.

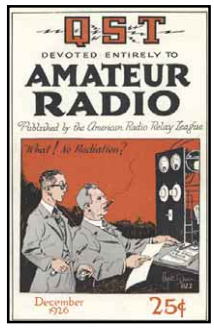
The antennas are available in kit form for 80, 75, 40, 20 and 15 meters (single band models), and 20-17-15 meters and 12-10 meters (multi-band models). 160-meter kits will be available.

Prices: Complete and partial kits range from $99.95 to $169.95, plus $15 shipping and handling per antenna. For more information, contact Tom Clemens, W9OKA, PO Box 265 Miller Rd, Canadensis, PA 18325; tel 570-595-0647, **www.e-info4u.com/w9oka.htm**.

Previous New Products QST

75, 50 AND 25 YEARS AGO

December 1926



◊ The cover, by Clyde Darr, 8ZZ, shows what appears to be a wealthy father and son combination with their newly built radio transmitter, with the caption, "What! No Radiation?" The editorial discusses the advantages of ARRL membership, and also speculates that, at the coming year's international radio conference, commercial and government interests will want our amateur frequencies.

Robert Kruse presents the first part of "How Our Tube Circuits Work," describing the Hartley circuit. J. K. Clapp tells about "Checking the Tone and Wavelength of Transmitters." William Harper discusses "The Relative Importance of Losses in Radio Receiving Systems." McMurdo Silver and Kendall Clough tell about "Devising a Shielded Receiver Kit," and F. J. Marco writes about "A Shielded Short-Wave Receiver"—obviously receiver shielding is starting to get the proper attention. "KFHW and the Trans-Pacific Yacht Race" tells how the 106-foot yawl *Poinsettia* reported its progress while in the race, via 37-meter radio. P. C. Oscanyan reports on "dg1XL, University of Michigan Greenland Expedition." He tells of the many hams contacted in England, Brazil, and the United States, and also reports that the expedition worked WNP on the schooner *Bowdoin*, another Arctic expedition.

December 1951

◊ The cover photo shows a homebrew transmitter in the layout stage, using a *QST* article as the guide. The editorial discusses the 40-meter band, pointing out that the international broadcast stations are legally there, and also discusses the possibility of the ARRL recommending that the FCC open part of the band to 'phone operation.

Myron Hexter, W9FKC, tells about "A Complete Portable 40-Meter C.W. Station," built into a case reminiscent of the Zenith Trans-Oceanic. The new Novice class licensees are urged to get on the air for the first Novice Round-up, to be held January 12-27, 1952. Frank Speight, W3MNR, and C. L. Buchanan, W3DZZ, report on "Some Novel Ideas for Bandswitching Mobile Converters" that are built into their compact, five-band unit. George Mouridian, W1GAC, tells about "Mighty Mo," his "midget mobile for 75, 20, and 10." "Compact Automatic Key Design," by F. A. Bartlett, W6OWP, describes his "electronic bug" that uses two 50B5 tubes and two relays to produce automatic dots and dashes.

December 1976

◊ The uncredited cover cartoon shows Santa gifting some wanna-be ham with a copy of the League's "Tune in the World with Ham Radio"—with other electronic goodies on the fireplace's mantelpiece. The editorial discusses the pros and cons of the recent FCC ruling that mobile and portable identifiers are no longer required, noting that hams can still use the identifiers if they wish, and that ARRL contests will continue to require the use of the portable/mobile identifiers.

Aegidius Pluees, HB9ABH, tells about "A Fast QSK System Using Reed Relays." John Stanley, K4ERO/HC1, presents the facts on "Optimum Ground Systems for Vertical Antennas," while Roger Hoestenbach, W5EGS, considers "Improving Earth-Ground Characteristics." P. D. Rhodes, K4EWG, and J. R. Painter, W4BBP, cross a Yagi with a log-periodic dipole array to produce "The Log-Yag Array." Don Harris, W9GUM, describes "Adapting the KWM-2 for Radioteletype Operation." Charles Pendl, W9JA, tells how he worked "5-Band WAS, the Hard Way," making his contacts only with stations with 1×2 call signs. Tim Cotton, K4DBZ, relates the tale of how he and W4OZF worked the ARRL 160-Meter Contest from a Florida key (a little piece of land, not a Morse-sender) in "W4OZF/4 on No-Name Key…Field Day in December." A vertical antenna supported by a balloon or a kite, a blustery nor'easter, torrential rain, a case of "Montezuma's Revenge,"…you get the picture. Read the article for all the gory details. QST

Al Brogdon, W1AB ♦ Contributing Editor

W1AW Schedule

PACIFIC	MTN	CENT	EAST	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	VISITING OPERATOR TIME (12 PM - 1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	TELEPRINTER BULLETIN				
4 PM	5 PM	6 PM	7 PM	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	TELEPRINTER BULLETIN				
6:45 PM	7:45 PM	8:45 PM	9:45 PM	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

♦ **Morse code transmissions:**

Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 1992 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by K6YR. See "Contest Corral" in this issue. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Send a 9×12-inch SASE for a certificate, or a business-size SASE for an endorsement.

♦ **Teleprinter transmissions:**

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

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

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

♦ **Voice transmissions:**

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

♦ **Miscellanea:**

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

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

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

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

SPECIAL EVENTS

Camden, NJ: Victor Amateur Radio Association (VARA), W2VTM. 0000Z **Oct 23** to 2400Z **Dec 23**. Celebrating the 100th Anniversary of RCA-Victor in Camden, NJ. 28.250 21.350 14.300 7.250. Certificate. Victor Amateur Radio Association, c/o L-3 Communications, 1 Federal St, Camden, NJ 08103. See **www.qsl.net/w2vtm** for details.

Upton, NY: National Weather Service/ARRL, K2U. 0000Z to 2400Z **Dec 1**. SKYWARN Recognition Day (OKX). 28.420 21.320 14.240 7.240. QSL. SKYWARN Recognition Day—K2U, PO Box 1356, West Babylon, NY 11704.

Bismarck, ND: Central Dakota Amateur Radio Club, W0A. 0000Z **Dec 1** to 0000Z **Dec 2**. SKYWARN Recognition Day celebrating Amateur Radio operators. 440.200 146.940 28.440 14.330. QSL. NSW Bismarck, Attn: B. Selzler, PO Box 1016, Bismarck, ND 58502-1016.

New York, NY: NYC METRO, Inc and Floyd Bennett Senior Squadron, N2C. 0000Z **Dec 1** to 2400Z **Dec 2**. 60th Anniversary of Civil Air Patrol. 28.660 21.360 14.260 7.260. Certificate. NYC METRO, Inc (KN2MET), Attn: B. Schwartz, 72-222 153rd St, 2H, Flushing, NY 11367-2642.

Disneyland, CA: Disney Emergency Amateur Radio Service, WD6MM. 1800Z **Dec 5** to 0600 **Dec 6**. Celebrating 100 Years of Magic—Walt Disney's 100th Birthday. 28.475 21.375 14.275 146.940.Certificate. Disney Emergency Amateur Radio Service, Attn: Will Michael, Crisis Mgmt, 800 Sonora Ave, Glendale, CA 91201.

Baton Rouge, LA: USS *Kidd* Amateur Radio Club/Baton Rouge ARC, W5KID. 1500Z to 2300Z **Dec 7**. Pearl Harbor Day—the anniversary of the death of Rear Admiral Isaac Campbell Kidd, Sr. 28.440 21.340 14.240 10.060. QSL. W5KID, 305 River Rd, Baton Rouge, LA 70803.

Massillon, OH: Massillon Amateur Radio Club, W8NP. 1400 to 2000Z **Dec 7** and 1400 to 2000Z **Dec 8**. Celebrating the Quinseptuacennial (175th) Birthday of the City of Massillon. 28.350 21.350 14.250 7.250 3.850. Certificate. MARC, W8NP, PO Box 73, Massillon, OH 44648.

Wheeling, WV: Northern Panhandle Amateur Radio Club, W8ZQ. 2200Z **Dec 7** to 2200Z **Dec 8**. Operating from Oglebay Park during the Festival of Lights. General phone bands. QSL. Joe McCready, WB8CTC, PO Box 192, Blaine, OH 43909.

Joplin, MO: Four State Amateur Radio Club, NI0W. 1400 to 0200Z **Dec 7-8** and 1400 to 0200Z **Dec 8-9**. Operating from the Camp Crowder College Museum to commemorate the bombing of Pearl Harbor and the Camp Crowder Signal Corps. Camp Crowder schooled servicemen in CW and radio for WWII and the Korean War. 28.350 21.335 14.275 7.290 3.990. Certificate. RSARC, PO Box 4483, Joplin, MO 64803-4483.

Tempe, AZ: SHARC, K7A. 1400Z **Dec 7** to 2359Z **Dec 9**. Commemorating the USS *Arizona* Memorial 60th Anniversary. 28.470 21.370 14.270 7.270. Certificate. SHARC, 1104 East Campus Dr, Tempe, AZ 85282.

Wilmington, NC: Shelby Amateur Radio Club, N4C. 0400Z **Dec 7** to 1600Z **Dec 9**. From the USS *North Carolina*, in honor of the 60th anniversary of Pearl Harbor. 28.420 14.260 7.260 . QSL. Mark Beaver, KA4TFP, 2007 Taylor Rd, Shelby, NC 28152.

Marion, IN: Grant County ARC, W9EBN. 1500Z to 2400Z **Dec 8**. Celebrating the Christmas City Walkway of Lights. 146.79 28.410 14.255 7.255. Certificate. L. B. Nickerson, 517 N Hendricks Ave, Marion, IN 46952.

Oxnard, CA: Channel Islands Club, K6CIC. 0001Z to 2400Z **Dec 8**. Channel Islands Club Fifth Anniversary. 28.700 28.410 28.340 28.330. Certificate. Channel Islands Club, 4404 Anchorage St, Oxnard, CA 93033.

St Johnsbury, VT: St Johnsbury Academy Wireless Club, W1SJA. 1300Z to 1800Z **Dec 8**. Celebrating Amateur Radio in schools. 28.400 14.230 7.250 0. Certificate. Bruce Burk, St Johnsbury Academy, 1000 Main St, St Johnsbury, VT 05819.

Baltimore, MD: Historical Electronics Museum Amateur Radio Club, W2W. 1400Z **Dec 8** to 2200Z **Dec 9**. Commemorating the Pearl Harbor attack, December 7, 1941. 14.245 14.045 7.245 7.115. Certificate. HEMARC W2W, PO Box 746, MS 4015, Baltimore, MD 21203.

Vandenberg AFB, CA: Satellite Amateur Radio Club, W6AB. 1600Z **Dec 8** to 0400Z **Dec 10**. Celebrating the 40th Anniversary of the OSCAR-1 launch (Dec 12, 1961). 29.550 21.440 14.250 7.250. QSL. Satellite ARC, PO Box 5117, Vandenberg AFB, CA 93437.

Martinsburg, WV: W8M. 1200Z **Dec 9** to 2400Z **Dec 15**. Honoring the 100th Anniversary of Marconi's Achievement. 28.350 21.350 14.280. QSL. Ron Westberg, WR0N, 101 Fulks Terr, Martinsburg, WV 25401.

Green Bay, WI: Live-Wire Group, N9ZRT. 0000Z to 2400Z **Dec 12**. Celebrating Marconi's 100th Anniversary transatlantic contact with a kite antenna. 28.355 18.155 14.285 7.245. QSL. David H. Hatch, 887 St Charles Dr, Green Bay, WI 54311.

Bethlehem, IN: Clark County ARC, W9WWI. 1500Z **Dec 14** to 2200Z **Dec 15**. Celebrating the Christmas Season. General Class portion of 75, 40 and 20 meters. Certificate. CCARC, W9WWI, 1805 E 8th St, Jefferson, IN 47130.

Baltimore, MD: Historical Electronics Museum Amateur Radio Club, N1S. 1400Z **Dec 15** to 2200Z **Dec 16**. Celebrating the 100th anniversary of the Marconi transatlantic message. 28.348 21.115 14.245 7.115. Certificate. HEMARC N1S, PO Box 746, MS 4015, Baltimore, MD 21203.

Hermann, MO: Hermann Bearcat ARC, K0M. 1400Z **Dec 14** to 2400Z **Dec 17**. Commemorating the beginning of Hermann Bearcat ARC at Hermann Junior High School. 28.335 14.256 14.250 7.120. Certificate. Hermann Bearcat ARC, KC0JYV, 164 State Hwy 100 W, Hermann, MO 65041.

Belen, NM: Valencia County ARA, KC5OUR. 1300Z **Dec 22** to 2400Z **Dec 24**. Celebrating Christmas from Belen (Bethlehem), NM. 28.462 21.362 14.262. QSL. KC5OUR, PO Box 268, Peralta, NM 87042.

Merchantville, NJ: Amateur Radio Lighthouse Society (Member 001), K2JXW. 0001Z **Dec 22** to 2359Z **Jan 2**. Lighthouse Christmas Lights 2001. 28.373 21.373 14.273 7.273. QSL. Jim Weidner, K2JXW, 114 Woodbine Ave, Merchantville, NJ 08109. Visit **ARLHS.com** for details.

Riverton, NJ: Amateur Radio Lighthouse Society (Member 100), KC2HOU. 0001Z **Dec 22** to 2359Z **Jan 2**. Lighthouse Christmas Lights 2001. 28.368 21.368 14.268 7.268. Certificate. ARLHS, Box 2178, Riverton, NJ 08077. Visit **ARLHS.com**.

Hickory Creek, TX: N1CC. 0000Z **Dec 24** to 2359Z **Dec 25**. Number One Christmas Carol 22nd Annual Operation. 28.475 21.390 14.280 7.240. QSL. Jim LaPorta, 147 Shasta Dr, Hickory Creek, TX 75065. Updates at **members.aol.com/n1cc**.

Trenton, NJ: Delaware Valley Radio Association, K2GW. 1400Z to 2000Z **Dec 26**. 225th Anniversary Washington Crossing the Delaware. 14.270 7.270. QSL. Gary Wilson, K2GW, 587 Flock Rd, Hamilton Square, NJ 08690.

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9×12 inch self-addressed, stamped envelope to the address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

Special Events Announcements: For items to be listed in this column, you must be an Amateur Radio club, and use the ARRL Special Events Listing Form. Copies of this form are available via Internet (**info@arrl.org**), or for an SASE (send to Special requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Events Form" in the lower left-hand corner). You can also submit your special event information on-line at **www.arrl.org/contests/spevform.html**. Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; that is, a special event listing for **Feb** *QST* would have to be received by **Dec 1**. Submissions may be mailed (Attn: Maty Weinberg), faxed (860-594-0259) or e-mailed (**events@arrl.org**) to ARRL HQ. QST

Maty Weinberg, KB1EIB ♦ Special Events

MOVED & SECONDED

[continued from page 72]

Charles T. Neill, K4XG; Joseph Nieves, N2TEE; Jeff L. Norris, KA6UIX; Mark E. Osborne, K4LB; Peter D. Oss, WD9DZU; Glenn M. Oubre, KC5HXL; Scott Y. Park, N1PW; Charles F. Perry, KF4OHZ; Robert E. Pierce, K1FE; Claudia M. Pitchford, N9HHE; Donald D. Pitchford, W9EBK; Jeffrey A. Poltanis, KA3ZHA; Mark Leonard Powley, ZL4HT; Charles M. Proffitt, W0BCF; Ronald D. Purinton, N1PYY; Keith B. Raihala, N0VJ; Cynthia M. Raihala, AB0IL; Kenneth G. Ransom, N5VHO; Mark J. Redlinger, W4QP; James J. Rejent, WA8ZHW; James C. Rice, N0OA; Rick Rinehimer, K3TOW; Shirley S. Roberts, N8LX; Barbara E. Roberts, KF4SLZ; Joseph H. Roof, W4JHR; Thomas F. Rose, KC7QGQ; Bernhard A. Rothlisberger, KD4KGY; Roger L. Rowe, W6RLR; William F. Ryan, W0WFR; James D. Saler, NK9D; Daryl Edward Sampson, W4OH; Yukio Sato, JR7AUP; Robert C. Schneebeli, WA3NVZ; Foster Schucker, K3FXS; Shelia Arlene Schwartz, KE6GFI; Fletcher W. Seagroves, N1MEO; Thomas W. Shaffer, N0HWY; Leigh M. Shears, W6DWC; Lloye J. Shears, W6DWD; J. Edward Sibel, W1NCO; Robert J. Simcik, WX1MAN; David A. Smith, KE4UEI; Robert R. Smith, W6GRV; Mary A. Smith, N1FSP; Richard Smith, KK7OX; Samuel B. Somers, WB4FGS; Steve D. Spaniol, N5HS; David A. Splitt, KE3VV; John A. Standorf, N3JAS; William P. Starkgraf, KD6UQB; Stewart H. Stone, KG6BOV; Robert C. Strattan, WR0M; Helen E. Straughn, WC4FSU; Dirk Suerig, DL2DCR; Paul G. Tabatschkow, WE3NUD; Bonnie W. Taylor, WB4FSF; Glenn Thomas, WB6W; Robert W. Thompson, N9SF; Mark J. Thompson, N4TIR; Jay E .Thompson, W6JAY; Michael Tracy, KC1SX; David T. Troike, WD8CXB; Donald M. Tsusaki, WW6Z; Evhen Tupis, W2EV; Stephen E. Turner, N2KEJ; L. Owen Utter, KE4OPB; Jan M. Uzlik, KB0QEP; Thomas Valenzuela, WB6VIR; John T. Van Loon, NP2HZ; Debra A. Varian, KA5HQY; Frederick R. Varian, WD5ERD; Barbara E. Varian, KD5MDZ; John A. Vega; Scott Verity, KC2FBV; Robert A. Wachtel, W6RPT; Rob B. Walker, KG6IAQ; Karl F. Witter, WB1FNK; Jeffrey A. Wittich, AC4ZO; Stephan M. Woytowicz, KI6PB; Craig L. Wright, KB5BOB; Willie L. Wright, KL0OI; John R. Wronski, KC8RUP; Brian F. Wruble, W3BW; Linda R. Zipper, KE4YRK; David A. Ziskind, KE4QLH. QST

CONTEST CORRAL

Feedback

In the **2001 ARRL International DX CW Contest**, **KR1B** was listed in the ME section but should have been listed in the EMA section. The operator of **W2ZQ** was **K2QM**. A log file problem resulted in the **7K4XNN** entry being improperly scored. His score should be 110,376 on 657 QSOs and 56 multipliers.

Because of file formatting differences, the winners of two combined score plaques from the 2001 International DX Contest were incorrect. The winner of the World Single Operator Combined plaque is **KH7Z** (KH6ND, op@KH7R) and the winner of the W/VE Low Power Combined Score plaque should be **K1VUT**. The log of **JH7LRS** was receipted but not delivered by the postal service. His score of 195,624 on 1144 QSOs and 57 multipliers places him in 8th place overall in the Single Operator Single Band 15 Meters category for DX stations. **W8FR** has continued sponsorship Single Band 160-Meter DX plaques for both CW and Phone. The CW winner is **S50U** and is in memory of DL1FF. The Phone plaque, in memory of ZL2BT was won by **S57M**.

In the **2001 International DX Phone Contest**, **KE1Y** entry had marked his entry as Single Operator All Band, but was a Single Band 80 Meter. His score of 72,192 makes him the overall winner in the W/VE Single Band 80 Meter entries. The line score in *QST* was correct, but was not noted in the Top Ten Box or the Plaque Box. The call sign of **N2JNZ** was misreported as N2NJZ. **SP2FAX** marked his log as All Band when in fact it was Single Band 40.

In the **2000 ARRL Ten Meter Contest**, the ops at **WB2JSM** were AB2GG, W2LJM, N2CKK, N2TZX, KC2CBB, KC2WD, WB2KDG, N2EOI, WB2HQO, WB2TYJ, and KA2JSV. The letter Q was omitted from the call of **WA2VZQ**.

W1AW Qualifying Runs are 10 PM EST Friday, December 7, and 9 AM EST Wednesday, December 26. The K6YR West Coast Qualifying Run will be at 9 PM PST Wednesday, December 5 (10-40 WPM). Check the W1AW schedule for details.

Abbreviations
Cont—Continent
SO—Single-Op
MO—Multi-Op
AB—All Band
SB—Single Band
SPC—State/Province/DXCC Entity
HP—High Power
LP—Low Power

1-3

Tennessee QSO Party, CW/Phone/Digital, sponsored by the Tennessee Contest Group, 1800Z Dec 2 through 0100Z Dec 3 (rescheduled this year only). Frequencies: CW—1815, 3540, 7040, 14040, 21040, 28040, SSB—1855, 3900, 7240, 14280, 21390, 28390, Novice/Tech—3700, 7130, 21140, 28140, 28390, VHF/UHF—50.195, 144.195, 146.55, 223.5, 446.0 MHz. SOAB, MOAB, Mobile, and VHF/UHF categories for TN and non-TN entries. For team entries see the contest Web site. Work stations once per band and mode; no time limit. Exchange RS(T) and TN county or SPC, mobiles can be contacted again in each new county; no QSOs on repeaters or repeater frequencies. QSO Points: HF phone—2 pts, CW or digital—3 pts, VHF/UHF phone—4 pts, CW or digital—6 pts. Multipliers are TN counties plus SPC (TN stns add one multiplier for every 5 additional QSOs with same county). Score is QSO points × total multipliers+Bonus Points (100 pts/QSO with K4TCG or 500 points per TN county activated with at least 10 QSOs from the county). For information, **www.k4ro.net/tcg/tqp/tqp01rules.html**. Logs must be e-mailed or postmarked by Jan 18 to TN QSO Party, c/o Doug Smith, W9WI, 1385 Old Clarksville Pike, Pleasant View, TN 37146-8098 or **w9wi@bellsouth.net**.

TARA RTTY Sprint, sponsored by the Troy Amateur Radio Assn, 1800Z Dec 1 through 0200Z Dec 2. SOAB—HP, SOAB-LP, MOAB categories. Work stations once per band (3.5-30 MHz, no WARC bands); no time limit. Exchange RS and State/Province or serial number for DX. Count 1 pt per QSO, multipliers are SPC from each band (US and VE don't count as country multipliers). Score is QSO points × total multipliers. For information, **www.n2ty.org**. Logs must be e-mailed or postmarked by Dec 31 to William J. Eddy, NY2U, 2404—22nd St, Troy, NY 12180-1901, or **rtty@n2ty.org**.

Holiday Spirits Homebrew CW Sprint, sponsored by the QRP ARCI, 2000Z through 2400Z Dec 2. Frequencies—1810, 3560, 3710, 7040, 7110, 14060, 21060, 21110, 28060, 28110 kHz. Categories: SOAB, SOSB, SO20-10, SO160-40, MOAB, DX stations are SOAB only. Work stations once per band; there is no time limit. Exchange RST, SPC (count once per band), and Pwr or QRP ARCI number. QSO Points: member stations 5 pts, non-members/different continent 4 pts, non-members/same continent 2 pts. Score is QSO points×total SPC×power mult (<250 mW ×15, 250 mW-1 W ×10, 1-5 W ×7, >5 W ×1) + Bonus Points—2000 for homebrew (HB) xmtr, 3000 HB rcvr, 5000 HB xcvr. For information, **personal.palouse.net/rfoltz/arci/holispr.htm**. Logs must be e-mailed or postmarked within 30 days after the contest to Randy Foltz, K7TQ, Att: Holiday Spirits Sprint, 809 Leith St, Moscow, ID 83843 or **rfoltz@turbonet.com**.

TOPS Activity Contest 3.5 MHz, CW, sponsored by TOPS, 1800Z Dec 1 through 1800Z Dec 2 on 3515-3560 kHz. SO, MO and SO-QRP categories; no time limit. Exchange RST and serial number (plus TOPS number if a member). QSO Points: 1 pt same country (JA, PY, U, VE, VK and W call areas count as separate countries), 2 pts same continent, 6 pts different cont or /mm; add 2 pts for TOPS, TOPS-TOPS QSOs +6 pts, GB6AQ +10 pts. Multipliers are WPX prefixes, counted only once. Score is QSO points × total multipliers. For information—Chris Hammett, G3AWR, 48 Hadrian Rd, Newcastle Upon Tyne, NE4 9QH, England. Logs must be e-mailed or postmarked by Jan 31 to Helmut Klein, OE1TKW, Nauseagasse 24/26,A-1160 Wien, Austria or **helmut.klein@siemens.at**.

5

Top Band Sprint, 160-meter CW/SSB, sponsored by QRP ARCI; 2000 local time through 2400 local Dec 5 (note local time, not Z). SO-CW, SO-SSB, SO Mixed-Mode categories; no time limit. Exchange RST, SPC and Pwr or QRP ARCI number; work stations once per mode. QSO Points: member stations 5 pts; non-members/different continent 4 pts; non-members/same continent 2 pts. Score is QSO points × total SPC × power mult (<250 mW ×15, 250 mW-1 W ×10, 1-5 W ×7, >5 W ×1). Logs must be emailed or postmarked within 30 days after the contest to Randy Foltz, K7TQ, Att: Top Band Sprint, 809 Leith St, Moscow, ID 83843 or **rfoltz@turbonet.com**.

7-9

ARRL 160-Meter Contest—see November *QST*, page 105, or **www.arrl.org/contests/announcements/rules-160m.html**.

15-16

ARRL 10-Meter Contest—see November 2001 *QST*, page 104, or **www.arrl.org/contests/announcements/rules-10m.html**.

21-22

OK DX RTTY Contest, sponsored by the Czech Radio Club, 0000Z through 2400Z Dec 22. SOAB, SOSB, MOAB, SWL categories. Work stations once per band (3.5-30 MHz according to IARU band plan); no time limit. Exchange RS and CQ Zone. QSO Points: 80 and 40—3 pts on same cont, 6 pts different cont, 20-10—1 pt same cont, 2 pts different cont. Score is QSO points × DXCC entities plus OK stations (count each once per band). For information, **www.crk.cz/eng/DXCONTE.HTM**. Logs must be e-mailed or postmarked by 15 January to Czech Radio Club, OK DX RTTY Contest, PO Box 69, 113 27 Praha 1, Czech Republic or **MILOS@TESTCOM.CZ**.

AGB Activity Party, CW/phone, sponsored by Activity Group Belarus, 2100Z-2300Z Dec 21. SO-QRP and HP-CW, -SSB, -Mixed, MS Mixed Mode, SWL categories. Frequencies: CW 3510-3555, SSB 3700-3750; calling frequencies: CW 3540; SSB 3720 kHz. There are no time limits and a station may be worked once per 15-minute segment starting at 2100Z. AGB members exchange RST, serial number and AGB number; non-members RST + serial number. QSO Points: same continent 1 pt; different cont 3 pts; AGB members count 5 pts. Score is QSO points × AGB members + DXCC entities. For information—**www.qsl.net/eu1eu/**. Logs must be e-mailed or postmarked by Jan 11 to Igor Getmann, EU1EU, PO Box 143, Minsk 220005, Belarus, or **eu1eu@qsl.net**.

29-30

RAC Winter Contest, CW/Phone, sponsored by the Radio Amateurs of Canada, 0000Z-2359Z Dec 29. Frequencies: CW—25 kHz up from the band edge (check on the half hour); Phone—1850, 3775, 7075, 7225, 14175, 21250, 28500, 50 and 144 MHz for both modes. SOAB-LP, SOAB-HP, SOAB-QRP, SOSB, MO categories. There is no time limit. VE stations exchange RST and Province, VE0 and non-VE stations exchange RST and serial number. QSO Points: Outside Canada—2 pts, VE/VE0 stations count 10 pts, RAC stations 20 pts (work stations once per band and mode). Score is QSO points × VE provinces and territories (count each once per band and mode). For information, **www.rac.ca/CANWIN.htm**. Logs must be e-mailed or postmarked by Jan 31 to Radio Amateurs of Canada, 720 Belfast Rd, Suite 217, Ottawa, ON K1G 0Z5, Canada, or **VE7CFD@rac.ca**.

Stew Perry Top Band Distance Challenge, CW, sponsored by the Boring Amateur Radio Club, 1500Z Dec 29 to 1500Z Dec 30. SO and MO categories with a power multiplier. Operate for a maximum of 14 hours. Exchange grid square only. QSO Points: 1 pt + 1 pt for every 500 km distance calculated between grid square centers (see Web page for calculation information), QSOs with QRP stations that submit a log count double QSO points. Score is QSO points × Power multiplier (<5 W ×4, 5-100 W ×2, >100 W ×1). For information, **www.jzap.com/k7rat/stew.html**. Logs must be e-mailed or postmarked by Jan 31 to Boring Amateur Radio Club, 15125 SE Bartell Rd, Boring, OR 97009, or **TBDC@CONTESTING.COM**.

Original QRP Contest, CW, sponsored by the QRP Contest Community, 1500Z Dec 29 to 1500Z Dec 30. SOAB -VLP (<1 W), -QRP (<5 W), or -MP (<20 W) categories. Operate for a maximum of 15 hours with up to 2 off periods on the 3.5, 7 and 14 MHz bands. Exchange RST, serial number and category. QSO Points: 4 pts if log is submitted; 1 pt otherwise. Multipliers: 2 pts for DXCC entities from submitted logs; 1 pt otherwise. Score is computed by the log checkers. Logs must be postmarked by Jan 31 to Dr Hartmut Weber, DJ7ST, Schlesierweg 13, D-38228, Salzgitter, Germany.

Dec 31-Jan 1

ARRL Straight Key Night—see the announcement in this month's *QST* or **www.arrl.org/contests/announcements/skn.html**. QST

H. Ward Silver, N0AX ♦ 22916 107th Ave SW, Vashon, WA 98070 ♦ n0ax@arrl.org

Results, 2001 ARRL Field Day

By Dan Henderson, N1ND
Contest Branch Manager

'Twas the morning of Field Day in 2001,
With lots of ambitious work to be done.
The hams were all gathered 'cross many a field,
Discussing the numerous QSOs they would yield.

In cities and towns across the US and Canada, hams continue to make ARRL Field Day the number one on-the-air operating event. The ARRL Contest Branch received a total of 2,062 Field Day entry reports representing a total of 31,486 participants — an increase of about 4.3% over the 2000 participation numbers. The total number of entries also placed Field Day 2001 among the top-five all time in terms of number of participation reports received.

Equipment was ready. Generators were gassed;
Antennas assembled and coax amassed.
For 24 hours, they'd give up their bed,
And many hard workers would need to be fed.

The key component of Field Day is to test the individual or group's ability to set up and operate their station in temporary or emergency situations. A total of 1874 of the entries (91%) reported operating away from their home QTH or operating with emergency power. Whether gathering in open pastures on hilltops, parking lots of shopping malls or on recreation grounds at local schools, Field Day is the best opportunity we have to "put our best foot forward." This is our opportunity to show community and civic leaders, and the general public, the vast resource that is our hobby. Field Day allows us the chance to demonstrate how we supplement, not supplant, existing communication networks in times of crisis.

Field Day is a cooperative effort that allows each individual participant the chance to use their personal skills and interests to help the common good. Those tending the generator or who coordinate the covered dish suppers are as important to the success of a good Field Day as are those who assemble beams and antennas or spend hours completing QSOs overnight.

When the confusion had settled, and with rigs all aglow,
These hams, they put on a spectacular show.
2 Alpha! 1 Delta! Oh, the sounds they proclaimed,
As many tried hard to stay out of the rain.

Groups reported putting from 1 to 26 stations on the air simultaneously. As usual, most groups pool their resources and operate a small number of transmitters. The most popular category continues to be 2A, followed by 3A then 1A. In fact, over 80% of the entries received came from groups running 3 transmitters or less.

While designed to promote portable operation, a large contingent of participants (17.2%) operated from home, either on commercial power or testing the emergency power systems they employ at home. The flexibility to participate in this manner is what makes Field Day unique, and emphasizes that to be active doesn't mean you have to pack up and go portable. Home stations play an important role in Field Day, just as they would in any real emergency.

As dark turned to light on that hot Sunday morn,
The exhaustion they turned away with great scorn.
With the final Q logged, and the generator run dry,
Clubs looked at their totals and shouted "Oh My!"

The total number of QSOs reported made during FD2001 was almost identical to FD2000—1,416,970 (a slight decrease of .04% from last year). While there was a decrease in the number of phone QSOs (down 4%), we witnessed good increases in the number of CW (up 5.1%) and digital (up 37.9%). The popularity of such digital modes as PSK31, and the ability to do more digital communications through laptop computers seems to indicate that amateur radio's digital communication evolution is continuing.

The rest of the Field Day 2001 story is best told through the photos of the participants themselves. A sampling of them is included with this article. Field Day is always the fourth full weekend in June—which means you have until June 22-23, 2002 to have visions of sugarplums, um, coax connectors dancing in your head. Good luck in your planning and see you on the air in Field Day 2002.

It had ended almost as fast as begun.
Bottom line, all exclaimed "Field Day is great fun!"

Field Day Entries By Class

1A	202	14A	2	1D	167
2A	498	15A	1	2D	15
3A	350	16A	1	3D	5
4A	171	18A	1	7D	1
5A	103	23A	1	1E	121
6A	49	26A	1	2E	24
7A	22	1B1	139	3E	12
8A	14	2B1	2	4E	4
9A	3	1B2	62	5E	1
10A	1	2B2	26	6E	3
11A	1	1C	54	11E	1
12A	2	2C	2		

Jes, KD5EUL, operated her very first Field Day as the second op of her dad's NZ5A 2B2B station in South Texas.

Top 10 Score Claims

Call Sign	*Score*	*Class*
W3AO	31,760	26A
W4IY	22,056	15A
W0CQC	20,360	3A Battery
K8UO	19,015	16A Battery
W2GD	17,590	4A
N6ME	17,362	8A
NC7X	16,050	2A Battery
N1FD	15,740	23A
N4IR	15,100	2A Battery
W6PIY	14,576	18A

Scores

Class A stations are clubs or groups operating with more than two operators. Score listings are grouped according to the number of transmitters in simultaneous operation. The listings show club or group name, call sign(s) used, total number of QSOs, number indicating power output used (5 is less than 5 W, 2 is less than 150 W; 1 is more than 150 W), number of participants and total score, including bonus points, and ARRL section. Scores are listed from highest to lowest in each class. Class B stations are portables manned by one or two operators. When there are two operators, the second operator's call is listed in parentheses, if it is known. Class C stations are mobiles. Class D stations are home stations using commercial power. Class E stations are home stations using emergency power.

1A Battery

Chew's Ridge Gang					
K6MI	1033	5	7	11,055	SCV
Buffalo Lighthouse Group					
W2L	574	5	5	6,540	WNY
Radio Amateur Megacycle Society					
W9DY	601	5	5	6,290	IL
Antrim Extras					
K8AE	458	5	5	5,080	MI
Arrowhead Radio Amateur Club					
W0GKP	510	5	14	4,270	MN
Nashoba Valley ARC					
N1NC	349	5	6	3,990	EMA
Bear Mountain QRP Group					
WA6Y	317	5	11	3,670	NM
North Augusta Belvedere RC					
K4NAB	379	5	12	3,505	SC
Polar Fab ARC					
N0KR	327	5	5	3,360	MN
BarnStormers Contest Club					
NZ1U	343	5	3	3,130	CT
New England QRP Club					
WQ1RP	300	5	3	3,045	EMA
Hiawatha/Falls City AREC					
WD0Y	359	5	18	3,010	NE
SCAN - Red Ant Annihilators					
WA6P	1075	2	5	2,744	LAX
Da Bear and look Cubs					
KE8NK	718	2	6	2,650	WV
Southwest Mississippi ARC					
WB5ASP	1045	2	8	2,490	MS
Soper Hill ARC					
NN7N	296	5	12	2,470	EWA
Tickbit Trio					
K4RET	382	5	3	2,225	VA
Gallinas Mtn Crew					
WB5LYJ	682	2	3	2,150	NM
WN0G	963	2	3	2,126	IA
Kamloops DX Group					
VE7PR	695	2	4	1,918	BC
The Austin QRP Club					
KQ5RP	176	5	5	1,905	STX
U.S. Department of State ARC					
W3DOS	139	5	3	1,685	MDC
HI QRP Club & HILO ARC					
KH6IN	108	5	20	1,575	PAC
Lodi ARC					
N6SJV	208	5	9	1,470	SJV
Fishing Party					
KD8CP	484	2	9	1,468	MI
CBARC					
KO6CW	633	2	4	1,466	SV
Nanaimo ARA					
VE7NA	383	2	21	1,332	BC
ISS Amateur Radio Station					
NA1SS	202	5	1	1,310	
ARES of Jackson Cty N. Carolina					
NC4ES	271	2	20	1,292	NC
KA2BEO	306	2	12	1,248	SNJ
VE6NQ	291	2	7	1,220	AB
Smoky Mountains Amateur Radio Team					
N4GSM	261	2	7	1,122	NC
Venturer Crew 73 (BSA)					
K5BSA	329	2	12	1,060	NTX
Uniontown ARC					
W3PIE	269	2	4	1,052	WPA
Tideland ARS					
K5BS	70	5	20	1,025	STX
SE NM Red Cross					
K5Z	178	2	3	998	NM
Flying Cheetahs					
KD7GKN	88	5	3	980	UT
Socoro ARA					
KC5OLJ	337	2	6	974	NM
New Cuyama Quad Hoppers					
N6PC	144	5	3	920	SJV
Chisholm Trail ARC					
WD5IYF	108	2	19	916	OK
Arch Cape ARC					
N7WC	301	2	4	802	OR
Brandon Bunch					
KC8UR	168	2	3	784	OH
Callaway ARL					
KS0B	192	2	7	746	MO
Eastern Washington Contesters					
NE7WA	292	2	3	684	EWA
Mobridge Area ARC					
K0ERM	120	2	5	638	SD
Atchison Cty ARS/Jackson ARC					
K0HK	167	2	8	600	KS
Old Timers Club					
W3SF	144	2	5	578	EPA
Brookings Radio Research Club					
W0BXO	121	2	18	542	SD
Watertown ARC					
N9HR	125	2	10	500	WI
Sherburne Cty E-Comm					
W0IRO	38	2	4	498	MN
Calgary QRP Group					
VE6QRP	27	5	6	470	AB
Northcoast Naturists Hams					
KI8JV	94	2	4	388	OH
Snake River ARC					
K7SI	88	2	8	376	ID
Pyro-Prosser Youth Radio Org.					
KC7QHH	86	2	6	372	WWA
Concordia University ARC					
VE2CUA	129	2	7	358	QC
Texas Radiotelegraphers Union					
KC5WNW	5	5	4	350	NTX
Sheridan Radio Amateur League					
W7GUX	62	2	3	324	WY
Peninsula Science Fiction Assn					
AA6DS	2	5	3	315	SCV
2nd Bn., 26th Bde., II Div. USSC					
KE2UK	100	2	4	300	NLI
Kline Bower Memorial Wireless Assn					
W0MV	10	5	3	275	MN

1A

McMinn Cty ARC					
NA4K	1570	2	34	6,708	TN
Metro DX Club					
W9TY	1594	2	11	6,540	IL
Boomer Contest Club					
NN5Z	1243	2	4	5,326	OK
Southern Illinois DX & Contest Club					
W9HUZ	1344	2	5	5,118	IL
Beverly Contest Group					
K1EO	1516	2	5	4,998	EMA
FARO					
K9ZA	1312	2	4	4,970	IL
Central NC DX Chasers					
N4OL	1258	2	12	4,904	NC
Six Sparks and A Gap					
AB0MV	1704	2	6	4,640	CO
Thibodaux ARC, Inc.					
W5YL	1571	2	12	4,568	LAX
Gunnison Valley ARC					
W0FD	1786	2	5	4,372	CO
Busters Beach Bums					
K4IX	892	2	4	4,168	VA
Panama City ARC					
W4RYZ	1175	2	26	4,158	NFL
Owensboro ARC					
K4HY	1034	2	10	4,134	KY
Case ARC					
W8EDU	1038	2	3	4,086	OH
Marshall Cty ARC					
W0GCJ	925	2	8	3,614	KS
RA of Southern New England					
W1AQ	1316	2	13	3,492	RI
Eli Lilly ARC					
W9ELI	759	2	10	3,408	IN
TMC ARC Inc (The Motley Crew)					
W9RA	1068	2	22	3,392	IL
Laurens ARS					
K4LSC	577	2	14	3,374	SC
Dr. Loomis Memorial Jr Mechanics					
W3KDR	1056	2	19	3,346	MDC
Dinosaur Valley DX Society					
K5AB	2366	1	5	3,137	NTX
Albright Family Contest Group					
AA2AD	924	2	5	3,042	WNY
Kentuckiana Radiosport Assn					
KY9IN	895	2	5	2,976	IN
Framingham ARA					
W1FY	995	2	20	2,894	EMA
Crashing Tower Group					
KD2A	919	2	8	2,780	WNY
Sam Houston Amateur Radio Klub					
N5IF	668	2	23	2,706	STX
Athens Cty ARA					
NC8V	687	2	8	2,690	OH
Loudon Cty ARES & Ft. Loudon Ops					
W4FLO	820	2	11	2,680	TN
Gallatin Ham RC					
W7ED	862	2	30	2,606	MT
Stanly Cty ARC					
K4OGB	725	2	15	2,602	NC
Thomson ARC					
W9RCA	1223	2	12	2,552	IN
Looped Group					
K0RK	1062	2	5	2,524	WCF
FVARC					
K7LYY	1099	2	8	2,476	MT
Southern Tier Contest Club					
W6XR	823	2	3	2,430	WNY
Lanark Cty ARES					
VE3LCA	472	2	21	2,394	ON
Woodchuck ARC					
KC8KLU	794	2	15	2,288	OH
The Florida Boys					
AB4ET	500	2	10	2,222	SFL
Durango ARC					
K0EP	577	2	12	2,200	CO
Wireless Assn of South Hills					
WA3SH	454	2	4	2,166	WPA
Nutley ARS					
W2GLQ	740	2	20	2,134	NNJ
ARC University of Arkansas					
W5YM	456	2	29	2,110	AR
West Desert ARC					
W7EO	945	2	7	2,092	UT
Captain Morgan's Crew					
N9AU	1860	1	5	2,060	WI
VE2CWI	479	2	7	2,058	QC
Butte ARC					
W7FO	706	2	15	2,012	MT
Hunter's Ridge Hams					
K4BEH	514	2	7	1,990	GA
West Island ARC					
VE2SEI	788	2	3	1,968	QC
Union Metro des Sans-filistes					
VE2UMS	519	2	75	1,942	QC
Rocky River Radio Rebels					
W4DEX	896	2	4	1,922	NC
Covey Hill ARC					
VE2CYH	467	2	15	1,898	QC
Club de Radioamateur de Beauce					
VE2CRB	363	2	15	1,832	QC
Benson Cty ARC					
K0UD	480	2	26	1,762	ND
Salkehatchie ARS					
K4UDY	531	2	10	1,758	SC
Southern Plains Amateur Radio Klub					
N0RZ	529	2	15	1,752	KS
Raytheon Falls Church ARC					
KU4MH	348	2	10	1,710	VA
AB7YB	591	2	8	1,704	ID
Mayerthorpe Flying Tigers					
VE6FT	743	1	10	1,676	AB
Texas A&M University ARC					
W5AC	767	2	5	1,664	STX
USS JURASSIC (Star Trek Club)					
K8SSJ	196	2	7	1,656	OH
Juneau ARC					
KL7IG	448	2	19	1,626	AK
Marconi ARC					
AF8O	343	2	9	1,586	OH
WB0TRA	401	2	13	1,536	MN
Westside ARC					
W5ABD	360	2	20	1,520	LAX
Neurosa's Gopher Munchers					
AE6C	352	2	3	1,502	SV
Parma RC					
W8PRC	548	2	10	1,496	OH
Sugar Creek ARC					
WZ4SC	532	2	10	1,470	SC
Harrisburg Radio Amateurs Club					
W3UU	323	2	15	1,410	EPA
Imperial Valley RG					
WA6LAW	538	2	9	1,400	SDG
K8IAT	376	2	6	1,392	IN
West Tennessee ARS					
WF4Q	290	2	50	1,380	TN
Canadian Police College ARC					
VE3CPC	399	2	6	1,336	ON
Valley Center ARC					
KK0SS	516	2	21	1,332	KS
W4EFK	208	2	9	1,314	WCF
Lake of the Woods ARS					
VE3JJF	404	2	15	1,308	ON
Bryan ARC					
W5DZ	402	2	22	1,304	STX
Sons of the Beaches ARA					
W6ME	599	2	4	1,298	SJV
Laguna Beach Auxiliary Comm Team					
KE6GFI	254	2	3	1,228	ORG
Picco Party Operators					
WA3RNB	552	2	15	1,226	MDC
NW Georgia VHF Society					
K4NGA	499	2	5	1,184	GA
Grand Mesa Yacht Club					
K0SUM	535	2	3	1,170	CO
Hickory Amateur Radio Team					
N3NOP	264	2	5	1,164	EPA
The K4KAM Gang					
K4KAM	297	2	3	1,124	NFL
Sandusky Radio Experimental League					
W8LBZ	444	2	18	1,088	OH
Rockaway Township RACES/ARES					
W2MW	270	2	17	1,086	NNJ
Bawating ARC					
VE3LSC	286	2	11	1,072	ON
Montcalm Area ARC					
N8MA	334	2	8	1,068	MI
Middle Peninsula ARC					
W4G	351	2	15	1,068	VA
Enterprise ARS					
WD4ROJ	217	2	21	1,034	AL
Pennington Cty ARES					
K0LEW	292	2	6	994	SD
N1PP	284	2	8	970	NH
Edisto ARS					
AD4U	385	2	18	970	SC
Hidden Valleys ARC					
KC9KQ	276	2	23	952	WI
Blossom Point ARC					
AA3RT	402	2	18	946	MDC
Roseland ARC					
K2GQ	246	2	10	896	NNJ
Grouse Ridge Group					
KS6S	295	2	5	892	SV
2 Fat 'N' Ugly ARC					
KA1MM	183	2	3	872	WMA
Halton ARC					
VE3OD	106	2	12	870	ON
MacKenzie ARC					
VA7MAR	143	5	5	865	BC
Independent ARC					
W0CXX	242	2	5	838	IA
Novi ARC					
W8RS	179	2	6	826	MI
Carlton High School ARC					
VE5CCH	201	2	13	802	SK
Finest Kind ARA					
N7JRP	258	2	3	788	AZ
No Name Radio Gang					
KE1C	270	2	6	786	CT
North Island ARS					
VE7ARK	181	2	6	778	BC
Triode ARC					
KB4YSX	194	2	8	760	NC
Reno Cty Kansas ARA					
W0WR	528	1	10	753	KS
Dust Bowl ARC					
KY5C	266	2	5	732	OK
Piqua ARC					
W8SWS	164	2	35	728	OH
Trenton ARC					
VE3YTR	214	2	8	728	ON
Hermiston ARC					
KC7KUG	257	2	30	714	OR
Limestone ARES					
N4SEV	105	2	15	710	AL
The Happy Aardvarks					
KI8IL	206	2	4	672	OH
Lake Cty ARC					
W9EMA	236	2	10	672	IN
The Grand Nelson Clan					
WB9GNC	278	2	14	656	MT
Lucent Wedixie ARC					
WB4MZO	51	2	7	632	GA
Murphy's Match					
K0OJ	517	1	15	617	WY
Western Colorado ARC					
W0RRZ	202	2	8	604	CO
Manalapan, NJ RACES Team					
K2GE	47	2	6	602	NNJ
Tremonton Hams					
AA7TR	157	2	3	598	UT
US Center ARC					
K0IEU	148	2	10	596	KS
Will Cty Amateur Radio League					
W9OFR	204	2	10	508	IL
Northwest ARC					
W9LM	130	2	5	500	IL
Hickory Corners Engineering Society					
W8JGA	98	2	3	498	MI
Elmira RC					
VE3ERC	184	2	10	468	ON
Lamoine Emergency ARC					
WB9TEA	211	2	8	442	IL
Dave's Rangers					
W0YZZ	133	2	3	440	MO
VE2CRO	150	2	10	400	QC
In Memory of KF2TR					
W2AG	145	2	10	390	ENY
King George Amateur Radio					
KA3DWW	83	2	3	366	VA
Metro Atlanta Telephone Pioneer ARC					
W4PME	52	2	10	304	GA
KV7V	99	2	6	302	UT
N0ATH	98	2	17	296	MO
Jackson ARES					
W5JWX	23	2	2	246	MS
Xerox Amateur Radio					
WD6CZH	38	2	4	176	LAX

1A Commercial

Gadsden ARC					
K4JMC	738	2	23	2,940	AL
Big Bear Lake ARG					
K3EQ	517	2	3	1,636	WV
Highrock Lake RG					
N4HRL	368	2	3	1,272	NC
CRA de Contrecoeur					
VE2CKC	196	2	15	1,238	QC
NW St. Louis ARC					
K0AXU	837	1	10	1,098	MO
250 SIG, NJARNG, MRC					
WB2JIU	122	2	2	414	NNJ
Creston Valley ARC					
VE7RCA	41	2	4	282	BC
Behler Family					
KB8TYJ	99	2	3	198	EPA

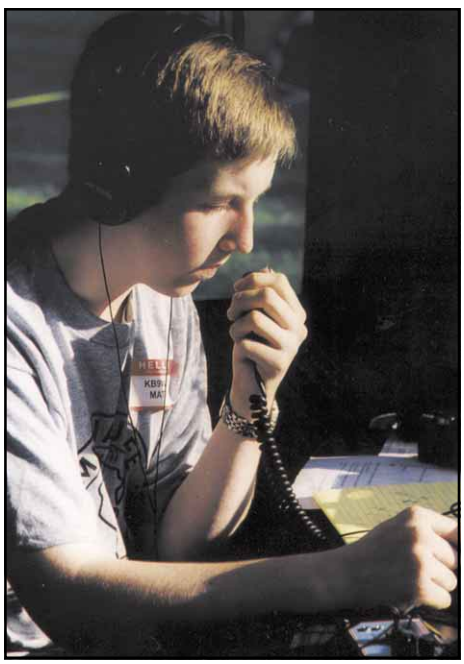
2A Battery

Manti Contest Club					
NC7X	1535	5	4	16,050	UT
East Tennessee Contesters					
N4IR	1439	5	5	15,100	TN
Oregon High Desert Contest Club					
K7AW	1146	5	4	10,910	OR
West Park Radiops					
W8VM	983	5	17	9,515	OH
VPI Alumni RC					
K4VPI	816	5	10	8,580	VA
Minnesota QRP Society					
WQ0RP	826	5	10	8,265	MN
Rockingham Amateur to Talk Society					
N4RS (+K4PAM)	2538	2	15	7,860	NC
BARC/NCAARS/SCARC					
AB5ER (+KD5ATN)	2000	2	10	7,786	AR
New Providence ARC					
K2AL (+KC2FUP)	908	5	37	7,235	NNJ
Fauquier ARA					
W4VA (+N3KTU)	1928	2	44	6,528	VA
Redmond Top Key Contest Club					
N7KE	1868	2	17	6,420	WWA
Sand Hills ARC					
W0MI	809	5	10	5,650	KS
Tamaqua Area ARA					
W3SX	579	5	8	5,430	EPA
Athens RC					
N4ALE (+KG4GKH)	564	5	26	5,165	GA
Walton RA					
W2LZ	480	5	8	5,145	WNY
Greater Lansing DX Group					
N8VYS	478	5	9	5,090	MI
University ARC					
N7UW	1391	2	18	5,048	WY
Schweitzer Eng Labs ARC					
N7CE	1457	2	9	4,850	ID
Bankhead ARC					
N4IDX (+N4KJD)	762	5	10	4,715	AL
Motorola ARC of AZ					
W7MOT (+KC7FWO)	13872	21		4,116	AZ
Williamsburg Area ARC					
K4RC	1394	2	20	4,064	VA
Northwest Mississippi Amateurs					
K5K (+KB5DMT)	1073	2	75	3,996	MS
ARA of the Tonawandas					
W2SEX (+KB2WYI)	465	5	30	3,820	WNY
Clinton Cty ARA					
AA8LF	313	5	11	3,665	MI
Northwest QRP Society					
WQ7RP	346	5	3	3,440	WWA
Dufferin ARES					
VE3EU	1042	2	15	3,438	ON
Choctaw ARC					
K5CAR (+KC5DZJ)	402	5	14	3,285	OK
Open Repeater Group					
W6MW	389	5	30	3,200	LAX
Northern Vermont QRP Society					
N1QS	366	5	10	3,185	VT
Thompson River ARC					
VA7TRS	618	2	12	3,180	BC
Algoma ARC					
VE3SOO	729	2	23	2,960	ON

Historical Electronics Museum ARC					
W3GR	760	2	18	2,950	MDC
Hewlett-Packard Boise ARC					
AB7HP	209	5	19	2,815	ID
Natchaug ARC					
N1EI	232	5	14	2,545	CT
Peninsula Amateur Radio Emerg. Team					
KA7EOC	271	5	24	2,450	WWA
Crisis ARS					
N6IYS	293	5	4	2,430	SV
Verde Valley ARA					
W7EI	840	2	25	2,280	AZ
Holland QRP Group					
W8EL	206	5	4	2,245	MI
Certifiable Radio Maniacs					
AA7IH	165	5	3	2,015	OR
Three Amigos/QRP					
NA5N	224	5	3	2,000	NM
Great River ARC					
N0RWR	560	2	20	1,932	IA
El Jebel RADOPS					
K0FEZ	248	5	12	1,895	CO
Independent RA					
K8KTY	188	5	33	1,795	OH
Arlington Comm League-QRP					
KC9IL	213	5	3	1,770	IL
Southern Oregon ARC					
K7LIX	521	2	33	1,762	OR
1st Chicken Squadron					
N3XRV	399	2	5	1,684	EPA
Eastern Oregon ARS					
W7NYW	292	2	8	1,670	OR
Benzie Amateur Radio Friends					
AA4R	516	2	18	1,664	MI
AA1PL	408	2	7	1,660	RI
Issaquah ARC					
W7EY	438	2	13	1,638	WWA
Albert Lea ARC, Inc.					
NX0C	332	2	20	1,594	MN
Sunset Empire ARC					
W7BU	261	2	23	1,594	OR
Johnson Cty Arkansas Amateurs					
K5OO	178	5	21	1,560	AR
TESARO					
W1IM	417	2	5	1,558	NH
Dallas Cty REACT ARC					
W5DCR	336	2	25	1,502	NTX
Valencia County ARA					
KC5OUR	332	2	31	1,494	NM
Classic Bud Net					
W1PA	375	2	4	1,436	WMA
COOKEN					
W8TNX	111	2	12	1,244	OH
Tech ARA					
KC5ORO	248	2	19	1,228	NM
Lake Erie ARA					
WB8CQR	242	2	14	1,216	OH
South Alabama RC					
KF4YXB	292	2	14	1,196	AL
Sun Country ARS					
W4CW	277	2	3	1,172	NFL
Maple Valley ARC					
KC7KEY	227	2	25	1,146	WWA
Cross Cty ARC					
KD5OTX	111	2	17	1,122	AR
Alameda RC					
KG6HM	62	5	5	1,110	EB
Southern IL University ARC					
W9UIH	403	2	6	1,106	IL
Western Amateur Linking Assn					
WA6LA	372	2	8	1,044	SB
Rhea Cty ARS					
K4DPD	88	5	3	1,040	TN
NBDX Assn					
K5ZP	122	5	5	1,010	STX
Tonto ARA					
W7ETL	201	2	45	1,002	AZ
Transylvania Cty ARC					
K4HXZ	149	2	15	998	NC
Cheboygan Cty ARC					
W8IPQ	187	2	6	858	MI
Catalpa ARS					
W8AG	69	2	9	838	MI
Star Valley ARC					
KD7LVE	142	2	10	784	WY
Wolseley Repeater Group					
VE5WRG	168	2	8	762	SK
Cabarrus ARS					
KT4GG	125	2	13	726	NC
Prince Edward RC					
VA3PEC	199	2	12	698	ON
Int'l Assn for Astronomical Studies					
KB0UAA	150	2	8	602	CO
Northwest AR & Electronics Assn					
N0MS	79	2	28	572	MO
KC7KDZ	87	2	3	474	NE
Bartkowiak Amateur Radio Family					
N2PRS	57	2	5	314	WNY
SNS Radio Club					
W1QWT	3	2	6	6	EMA

2A

Tucson IBM ARC					
W7IBM (+N7OJT)	4077	2	13	11,934	AZ
San Diego DX Club & Point Loma ARC					
W6PT (+N6SBX)	3884	2	10	11,920	SDG
Albuquerque DX Assn					
W5UR (+N5GFR)	3713	2	14	11,808	NM
SERC/FLG					
NJ4M	3921	2	23	11,196	WCF
Texas DX Society					
K5DX	3487	2	11	10,798	STX
Mad River RC					
K8MAD	3312	2	8	10,530	OH
Hoosier DX and Contest Club					
KJ9D	3231	2	17	10,206	IN
Radio Amateurs of Northern Vermont					
W1NVT (+N1ALX)	3304	2	15	10,092	VT
Motorola ARC					
K9MOT (+N9KNS)	3080	2	25	9,348	IL
Mile High DX Assn					
K0AB	2451	2	15	8,918	CO
Raytown ARC					
K0GQ (+KC0DEA)	2528	2	15	8,562	MO
Cape Fear ARS					
N4NG (+KD4DCR)	2411	2	33	8,122	NC
Magnolia DX Assn					
K5MDX	2375	2	20	8,088	MS
Stendec FD Group					
W8LX	2166	2	14	7,998	OH
Tampa ARC					
N4TP (+KG4NVQ)	2451	2	45	7,958	WCF
Mid-MO ARC					
N0SS (+WB0TPN)	2085	2	25	7,814	MO
Falmouth ARA					
K1RK (+N1LTX)	2214	2	70	7,788	EMA
Halifax ARC					
VE1FO (+VE1DOH)	2299	2	10	7,770	MAR
Montrose ARC					
K0SX (+N0XMI)	2448	2	19	7,636	CO
Tanner's Tigers					
KY7M	2329	2	10	7,516	AZ
Koolau ARC					
KH6J	2238	2	33	7,516	PAC
Big Bend ARC					
K5FD (+KC5NPF)	2500	2	19	7,484	WTX
Sakonnet 49'ers					
KD1MW	2276	2	19	7,280	RI
Randallstown ARC					
N3IC	2264	2	12	7,278	MDC
LEFROG					
N9FH (+KA9WXN)	2036	2	15	7,224	WI
Schaumburg ARC					
N9RJV (+KA9ZKR)	1896	2	38	7,202	IL
Explorers RC-AARC 150 Watt Pirates					
NA3DX (+KB3EZL)	2156	2	26	7,124	MDC
MARC/PPRAA					
NX0G (+KB2BZY)	2199	2	90	6,994	CO
Buckhead Contest Club					
W4TE	2314	2	5	6,920	GA
Fond du Lac ARC					
W9EBV	2092	2	20	6,918	WI
ARVARF					
N5A (+KB5PWM)	1811	2	20	6,822	AR
CARC					
N4NC	1850	2	21	6,782	NC
QCWA Chap 17					
W3GS (+WB3BJL)	1972	2	10	6,582	EPA
North Shore ARC					
VE7NSR (+VE7MRQ)	2059	2	51	6,514	BC
East Bay ARC					
W6CUS (+N6VIF)	1477	2	20	6,406	EB
RARC, SVARA, RARA, HCARC					
WD5GSL	1691	2	39	6,400	NTX
SUHFARS/Palatine RACES					
K9IJ (+KB9FAO)	2368	2	25	6,384	IL
Sierra Blanca ARC					
KR5NM	1723	2	17	6,372	NM
Shelby ARC					
AA4S (+KE4QZH)	1987	2	14	6,166	NC
St. Louis ARC, Inc.					
K0LIR	1684	2	18	6,076	MO
Montgomery ARC					
W4AP (+N4WVW)	1485	2	52	6,060	AL
Meriden ARC					
W1NRG (+K1TDO)	1393	2	28	5,970	CT
Hewlett-Packard/Agilent RC					
W1HP	1627	2	16	5,956	EMA
VECTOR					
VE7VCT (+VA7MOS)	1485	2	82	5,930	BC
Fidelity ARC					
W1MB (+N1ULJ)	1681	2	45	5,920	RI
Providence RA					
W1OP	1830	2	10	5,888	RI
Southwest Missouri ARC					
AK0C	1595	2	10	5,844	MO
Runestone ARC					
AA0EV	1535	2	21	5,806	MN
Ocean Monmouth ARC					
N2MO (+KC2GGA)	1603	2	25	5,792	NNJ
Radio Operadores del Este					
KP4FRD (+WP4ELF)	2121	2	10	5,702	PR
Motor City Radio Club, Inc.					
W8MRM	1808	2	55	5,632	MI
Norwood ARC					
N1OP (+W1LKF)	1293	2	25	5,628	EMA
Chicago FM Club					
W9EJ	1646	2	37	5,620	IL
Northern AZ DX Assn & Coconino ARC					
W7TB	1720	2	10	5,592	AZ
Tallahassee ARS					
K4TLH	1552	2	26	5,584	NFL
Radio Free Italy					
W2RA	1510	2	10	5,540	WNY
Southwest Dallas Cty ARC					
W5AUY (+KB5RON)	1533	2	35	5,516	NTX
Benton ARS					
WD5C (+KD5MOW)	1630	2	15	5,502	AR
Heart of America RC					
W0RR	1610	2	14	5,488	KS
Tri County ARC					
W8YEK	2275	2	18	5,456	OH
Northern Ohio DX Assn					
W8DXA	1687	2	17	5,448	OH
Massillon ARC					
W8NP (+KC8EBE)	1416	2	40	5,370	OH
ARCSG					
K3F	1360	2	10	5,366	MDC
Richmond ARC					
VE7RAR	1177	2	20	5,364	BC
Monroe Cty Radio Comm Assn					
W8PI (+KA8EBI)	1446	2	27	5,316	MI
Twin City FM Club					
W0EF	1733	2	50	5,280	MN
West Essex ARC					
W2EF	1435	2	13	5,274	NNJ
Brandon ARS					
K4TN (+KE4SQR)	1183	2	35	5,230	WCF
Horned Toad Acres Wireless Assn					
N7KQ	1506	2	9	5,200	AZ
Lynchburg ARC					
K4CQ (+KD4AZW)	1324	2	50	5,170	VA
Stafford ARA					
N4NW	1391	2	35	5,122	VA
Foothills ARS					
K6YA	1260	2	25	4,988	SCV
Smith Chart ARS					
K4OO	1394	2	10	4,978	VA
Minden ARA					
N5RD	1585	2	48	4,948	LAX
Straits Area ARC					
W8GQN	1349	2	20	4,898	MI
Forsyth ARC					
W4NC (+KB4TKO)	1360	2	47	4,868	NC
CLARA, Boeing and Hughes ARC's					
W6VLD (+KD6FFF)	1574	2	65	4,734	ORG
Eastern ARS					
K2EC	1609	2	13	4,732	NLI
3M ARC & St Paul RC					
W0JH	1247	2	33	4,658	MN
Eastern Michigan ARC					
K8EPV	1131	2	8	4,656	MI
Greater Cincinnati ARA					
W8DZ	1415	2	25	4,642	OH
Candlewood ARA					
W1QI	1562	2	25	4,608	CT
Ottawa ARC					
VE3RC	1110	2	22	4,588	ON
North Franklin ARS					
NF2AR (+KC2HME)	1183	2	6	4,556	NNY
Decatur ARC					
W4ATD (+KB4CAY)	1176	2	15	4,552	AL
Fort Madison ARC					
WF0RT	1133	2	10	4,542	IL
Anderson RC					
N4AW	1168	2	12	4,468	SC
Trojan ARC					
W0WOB (+KB0LGX)	1324	2	26	4,452	KS
Shelby ARES/Honda Lifeline/Alinco					
WK8U (+W8BSW)	1263	2	15	4,446	OH
SVARC					
K0AJW	1401	2	15	4,400	ND
Canton ARC					
W8AL (+KB8NPX)	973	2	43	4,370	OH
Albuquerque ARC					
N5VA	1186	2	10	4,354	NM
Clinton Cty ARC					
W9PC (+WB9UXX)	970	2	25	4,342	IN



Matt, KB9WTI, works a band opening on 6 meters for the Milwaukee (WI) Repeater Club K9IZV Field Day operation.

This wasn't the first step of "policing the bands." The Southwest Dallas County ARC (TX) W5AUY had Joe, KD5IVM, operating while Wayne, KE4SGS, logged before beginning his duty shift Sunday morning.

"In a Class By Herself—Susan Helms, KC7NHZ, and an *Out Of This World* Field Day"

There had been some rumors before Field Day that there might be Field Day activity from the International Space Station, but no one was certain.

But during the weekend of Field Day 2001, a total of 202 clubs, groups and individuals managed to snag a QSO with Susan Helms, KC7NHZ, operating aboard the ISS with the call sign NA1SS. While not the first contacts made with astronauts during an ARRL Field Day operation, it appears to have been the first time a concerted effort had been made to log as many QSOs as possible from space.

Part of the required Field Day exchange is ARRL section, but what do you give when your QTH is hundreds of miles above the Earth's surface? An argument could be made for inclusion in several entry classifications. Home station? Groups (with her cohorts on board)? Aeronautical mobile? In the end, because of the unique nature of this operation, we have chosen to include Susan "in a class by herself."

But what about the log submission deadline? Susan was able to successfully work with AMSAT Vice-President for Manned Space Operations Frank Bauer, KA3HDO, to get the required paperwork submitted to the League. And as a special bonus, working with NASA and astronaut Jim Reilly, a member of the crew of STS-104 that visited the ISS in mid-July, Bauer was able to have Susan presented with one of the collectible FD2001 pins. If you look closely at the photo of Helms, you will notice her proudly sporting it on her lapel.

The ISS may be the ultimate, self-contained Field Day station. It operates renewable, natural, (solar) emergency power 100% of the time. Line-of-site communications on 2 meters is hard to beat when you are several hundred miles above the Earth. And lest we forget, it is an absolute "floating" media publicity of platform. It does suffer from a few drawbacks—it isn't exactly accessible to the general public and it would be kind of hard to set up an Information Booth. But while it misses out on a few bonus point opportunities, it more than makes up for them with the excitement it generates to the ham community during Field Day.

By necessity, Amateur Radio is a secondary function aboard the ISS. However, many of the astronauts either residing on or visiting the ISS see Amateur Radio as an important part of their mission. It gives them the opportunity to share their enthusiasm with a broad segment of the population, and also offers them a brief respite for relaxation when they can find some free time during their missions.

We don't know for certain if the ISS will be active during future ARRL Field Days. But we do know that thanks to the enthusiasm of Susan Helms and several hundred lucky amateur operators on Earth, Field Day 2001 will long be remembered as an "out-of-this-world" experience.

Astronaut Susan Helms, KC7NHZ, proudly sports her Field Day 2001 pin while operating aboard the International Space Station.

Baltimore ARC
W3FT 1232 2 20 4,310 MDC
West Chester ARA
WC8VOA (+KC8FRG)1684 2 20 4,288 OH
San Mateo RC
W6UQ 1337 2 25 4,250 SCV
Muskogee ARC
NV5M (+KD5DWG)1764 2 6 4,242 OK
Cedar Valley ARC
W0GQ 1005 2 12 4,230 IA
Square Dancers
N8NRJ 1069 2 4 4,218 WV
Kilocycle Club of Fort Worth
W5SH 1098 2 10 4,134 NTX
Greensboro ARA
W4GSO (+KG4BHY)1134 2 2 4,130 NC
VADXCC
W4DZ 1206 2 9 4,126 VA
Central Michigan ARC
W8MAA 1109 2 23 4,108 MI
Carbon ARC
W3HA 1260 2 11 4,074 EPA
Johnson Cty Radio Amateurs Club
W0ERH (+KB0ZGU)1034 2 62 4,066 KS
Hattiesburg ARC
K5PN 1266 2 10 4,008 MS
Bullitt ARS
KY4KY (+KE4AWY)1085 2 32 4,008 KY
Vienna Wireless Society
K4HTA 989 2 8 4,006 VA
San Angelo ARC
W5QX (+KC5QCB)1318 2 25 3,974 WTX
Green Mountain Wireless Society
N1VT 1106 2 25 3,916 VT
TARC
W4AC 874 2 12 3,874 WCF
Oldham Cty ARC
N4LQ 921 2 12 3,862 KY
Osgoode/Rideau ARES Group
VE3XL 859 2 26 3,816 ON
Campbell Cty ARC
W7CW 1012 2 7 3,814 WY
Iowa City ARC
W0JV 981 2 21 3,806 IA
Matagorda Cty ARC
WA5SNL 1243 2 6 3,794 STX
West Virginia Amateur Radio, Inc.
WV8AR 1050 2 36 3,788 WV
PPDXG #1
W0GG 1084 2 5 3,770 CO
BEARONS
W7FLY 916 2 15 3,674 WWA
Lebanon ARC
K0LH 863 2 9 3,664 MO
Hiawatha ARA
K8LOD 843 2 30 3,662 MI
Yellowstone RC
K7EFA (+KB7EVT)1028 2 20 3,662 MT
Tennessee Valley DX Assn
W4FOA 1025 2 8 3,660 GA
Palos Verdes ARC
K6JW 1077 2 20 3,600 LAX
Long Island Mobile ARC
W2VL 828 2 125 3,600 NLI
Peninsula ARC
W4MT 928 2 25 3,582 VA
Fresno ARC
W6TO 974 2 15 3,558 SJV
STARS
W9SRC 999 2 8 3,546 IL
South Lyon Area ARC
N8SL 771 2 11 3,532 MI
Quad Cty ARC
N3QC 973 2 5 3,530 WPA
Hancock ARC
W9ATG 811 2 42 3,528 IN
Raleigh ARS
W4RNC 964 2 17 3,500 NC
Reading Radio Club
W3BN 786 2 33 3,474 EPA
First Colony Distric Seven ARES
KR4MA 863 2 11 3,384 VA
Sportsman's Paradise ARC
KN4Y 933 2 16 3,374 NFL
Charleston ARS
WA4USN (+KG4MQF)1025 2 32 3,324 SC
ARCECS
WB2QBP 1362 2 20 3,288 NLI
Heart O' Texas ARC
W5ZDN 1019 2 20 3,258 NTX
Parkersburg Amateur Radio Klub
N8NBL 838 2 10 3,240 WV
CRES ARC
W8ZPF 1227 2 14 3,230 OH
Augusta ARA
W1TLC 1412 2 22 3,224 ME
First State ARC
K3QBD 927 2 17 3,216 DE
Lakeland ARC
K4LKL 713 2 35 3,208 WCF
Arlington ARC
K5SLD (+KB0DBJ) 752 2 35 3,202 NTX
Emergency Communications Assn
W0ECA 994 2 15 3,198 MO
St. Peters ARC Inc.
KB0SWK (+KA0OFH)838 2 25 3,194 MO
Montreal ARC
VE2ARC 1119 2 15 3,158 QC
Oklahoma City Autopatch Assn
W5MEL (+KD5ORW)787 2 35 3,130 OK
St. Clair ARC
K9GXU 691 2 25 3,074 IL
Maui ARC
KH6RS 955 2 30 3,066 PAC
Narraguagus Bay ARC
KB1CEJ 718 2 19 3,044 ME
Sun City ARC
K5WPH (+KB5KYN)896 2 66 2,992 WTX
Gaston Cty ARS
N4GAS 671 2 38 2,976 NC
Waterbury ARC
W1LAS 871 2 12 2,968 CT
Discreet Components of .955
K3WJV 873 2 5 2,956 DE
Hellgate ARC
W7PX 977 2 21 2,934 MT
Hoosier Lakes RC
N9AR 779 2 20 2,922 IN
Milford ARC
W8SDL (+N8PET) 839 2 24 2,900 OH
Coppell ARC
KD5OEW 601 2 23 2,868 NTX
Mid-Atlantic ARC
W3NWA 663 2 28 2,858 EPA
Machias Ham Club
WB7FJG 887 2 5 2,846 WWA
Westside ARC
WA6RC 751 2 26 2,834 LAX
Gregg Cty Emergency Communications
W5HD (+N5VGS) 1245 2 25 2,790 NTX
Newington ARL
W1OKY 1042 2 24 2,790 CT
Carteret Emer. Management Vol Assn
K2ZV 708 2 8 2,766 NNJ
Wantagh ARC
W2VA 648 2 14 2,762 NLI
Hilltop Transmitting Assn
AD3E 735 2 12 2,760 EPA
Laurel ARC
W5LAR (+KC5QZW)686 2 25 2,750 MS
Dixie ARC
K7SG 772 2 10 2,746 UT
Johnson City ARA
W4ABR 653 2 25 2,742 TN
Wall Ridge
KK7UF 901 2 7 2,740 EWA
Pine State ARC
N1ME 850 2 50 2,724 ME
Mifflin Cty ARC
K3KDK 646 2 15 2,694 WPA
Los Alamos/Northern New Mexico ARCs
W5PDO 667 2 12 2,630 NM
North West Illinois ARC
W9RB 636 2 10 2,612 IL
Santa Fe Trail ARC
KS0KS (+KC0GAP)497 2 29 2,588 KS
Lima Area Field Day Group
W8EQ 730 2 14 2,572 OH
Chaparral ARS
W6MV 925 2 16 2,572 SB
Boulder ARC
W0DK 602 2 18 2,556 CO
Area 51 Contest Club
WW7Q 763 2 3 2,540 NV
Chain O'Lakes ARC
W8COL 690 2 32 2,520 MI
Polk Ham Club
W4TJM (+KA1MDI)515 2 22 2,518 WCF
Alameda Cty Sheriff's Comm Team
W6VOM 537 2 20 2,508 EB
MIT Radio Society
W1MX 860 2 14 2,506 EMA
Rockwall ARC
K5RN 693 2 20 2,506 NTX
Oconee Cty ARS
W4EEE 578 2 12 2,486 GA
Radio Central ARC/Suffolk Cty ARC
W2RC (+KC2DBU) 699 2 30 2,478 NLI
Downey ARC
W6TOI 644 2 45 2,470 LAX
Bishop ARC
N6OV 737 2 9 2,460 ORG
Hocking Valley ARC
K8LGN 667 2 20 2,438 OH
Base Amateur Radio Service
VE7RCN 751 2 15 2,436 BC
Cross Cty Simplex Group
KG9IY 623 2 17 2,422 IL
Longview East Texas ARC
KI5UA 547 2 25 2,408 NTX
Milpitas ARES/RACES
W6MLP 570 2 11 2,378 SCV
Ramona Outback ARS
KF6QGR 423 2 29 2,370 SDG
Mohawk ARC
N1WW 768 2 9 2,356 WMA
Ogdensburg ARC
K2RUK 616 2 20 2,324 NNY
Campbell River ARS
VE7CRC 480 2 10 2,324 BC
Police Amateur Radio Team
KD1D 465 2 18 2,312 EMA
Platinum Coast ARS
W4MLB 778 2 10 2,284 SFL
ARES Half Moon Bay
WR6HMB 585 2 13 2,262 SCV
Sterling Park ARC
K4NVA (+KD4RSL)562 2 10 2,200 VA
Martin Cty ARES-RACES
WX4MC (+KG4AJC)714 2 23 2,190 SFL
Spring ARC
KD5OGX 560 2 20 2,182 STX
OSARG
K1OS 898 2 10 2,180 RI
West Allis Radio Amateur Club
W9FK (+KB9TZB) 875 2 14 2,172 WI
CIRAS/TARS
K0EES 735 2 20 2,132 IA
Jefferson Cty ARC
W5SSV 506 2 16 2,132 STX
Hull Neck ARC
K4AAB 811 2 10 2,130 VA
Bloomington ARC
W9INL (+KB9VTQ) 444 2 23 2,128 IN
Placentia RACES
KN6KJ (+KF6ZEH) 476 2 10 2,122 ORG
Seaway Valley ARC
VE3VSW 474 2 6 2,120 ON
Coast Side ARC
WA6TOW 705 2 12 2,120 SCV
Fayette ARA
N8EMZ 533 2 12 2,116 OH
Champaign Amateur Net
W8IF 806 2 11 2,112 OH
Richardson Wireless Klub
K5RWK 551 2 50 2,106 NTX
Parry Sound ARC
VE3PSH 749 2 15 2,106 ON
BSA Camp Flying Eagle ARC
K4BOY 752 2 10 2,106 WCF
Carbon Cty ARS
KC7OZU 513 2 12 2,094 WY
Heart of Texas DX Society
W5DXS (+KC5BFL)616 2 12 2,084 NTX
Old Post ARS
W9EOC 786 2 14 2,072 IN
Mahaska ARC
N0SJF 562 2 14 2,066 IA
Tipton ARS
KE4ZBI 552 2 7 2,064 TN
ARC of Augusta
W4DV 549 2 38 2,040 GA
Kawartha ARG
VE3KRG 477 2 32 2,032 ON
Joplin ARC
W0IN (+N0KMP) 479 2 9 2,030 MO
Murray State University ARC
K4MSU 499 2 10 2,016 KY
Bell Cty ARES
KM5EW 754 2 15 2,008 NTX
North Kitsap ARC
KC7Z 400 2 15 2,000 WWA
Fall River ARC
W1ACT 394 2 12 1,998 EMA
AE4UK 586 2 10 1,996 KY
Liebert ARC
K8SV 796 2 12 1,992 OH
SONRA
VO1AA 649 2 10 1,992 NL
Winona ARC Inc.
N0WE 630 2 20 1,972 MN
Ashtabula Cty ARC
K8CY 516 2 15 1,968 OH
Adams Cty ARC
W8EKG 397 2 12 1,958 OH
Mountain ARC
W6BW 574 2 41 1,954 SJV
Winchester ARS
WA4RS (+N4TVX) 437 2 33 1,944 VA
The Section 8 Group
NJ1K 560 2 10 1,924 WMA
Escondido ARS
N6WB 408 2 25 1,904 SDG
CERTS
VE3BPQ 460 2 21 1,902 ON
Goddard ARC
WA3NAN (+KA3ZYX)388 2 6 1,894 MDC
Mills Cty Ham Operators
WA5NQR(+KD5NAS)569 2 20 1,888 NTX
K7ZS 1152 1 7 1,862 OR
West Nebraska ARC
W0AFG 401 2 18 1,828 NE
Alamo Area Radio Organization, Inc.
AA5RO (+KD5BVG)320 2 45 1,820 STX
Gulf Coast DX Assn
WC4DX 545 2 10 1,818 AL
Palestine/Anderson Cty ARC
K5PAL 500 2 20 1,800 NTX
FARL/LARC
K8UTT 686 2 15 1,784 MI
AERO ARC
W3PGA 466 2 24 1,778 MDC
Acadiana ARA, Inc.
W5DDL (+KB5NMO)436 2 30 1,774 LAX
Hiawatha Valley ARC
N0DH 663 2 16 1,770 MN
Big Island ARC
KH6EJ (+NH6RW) 859 1 75 1,769 HI
KC4AUF Elmer Hour Group
KC4AUF 683 2 15 1,766 VA
Praire Dog ARC
W0OJY 583 2 6 1,746 SD
Brockville ARC
VA3BRC 331 2 17 1,744 ON
Gulf Coast ARC
WA4GDN 401 2 21 1,742 WCF
Eastern Panhandle ARC
WV8E 976 1 15 1,737 WV
Western Tidewater RA
WT4RA 405 2 10 1,716 VA
Whitley Cty ARC Inc.
WB9DAE 344 2 11 1,710 IN
Mason Cty ARC
K8DXF 282 2 15 1,708 MI
LARA
N6VZF 354 2 30 1,706 ORG
Thomasville ARC
W4UCJ (+KE4MDJ)449 2 40 1,696 GA
Alcona Cty ARG
W8SZ (+KC8NGT) 376 2 22 1,668 MI
Sound of Tacoma ARS
KE7LE (+N7RHV) 436 2 15 1,666 WWA
IBM ARC
W4IBM 309 2 18 1,656 GA
Alhambra High School ARC
K6R 363 2 5 1,640 SB
Amateur Assn of Bloomington
KD0CL 492 2 9 1,638 MN
Filamars of San Diego
AF6P (+KG6CLJ) 564 2 30 1,628 SDG
Muncie Area ARC
WB9USA 397 2 45 1,624 IN
Androscoggin ARC
W1NPP 396 2 15 1,620 ME
Metuchen RC
K2YNT 433 2 7 1,612 NNJ
Collin Cty Community College ARC
K5CCC 377 2 12 1,610 NTX
Land of Lakes ARC
K9HD 484 2 18 1,604 IN
Northland ARC of Ashland Wisconsin
W9BCY 1106 1 21 1,600 WI
Columbia ARS
WB4VFT 297 2 10 1,594 NFL
WASH
N3SH 619 2 10 1,588 WPA
Hamilton Cty ARES
KB9FVJ 357 2 15 1,586 IN
Palouse Hills ARC
W7NGI 517 2 8 1,584 ID
QSO Club Alumni
N6MM 420 2 3 1,580 SJV
Okanogan Cty ARC
W7ORC 425 2 11 1,576 EWA
Moreno Valley ARA
AB6PA (+KC6FJC) 357 2 18 1,548 ORG
Skyview Radio Society
K3MJW (+N3NOS) 531 2 12 1,546 WPA
Lagunatics
K6PD 276 2 3 1,542 SDG
Peekskill/Cortlandt ARA
W2NYW 450 2 16 1,540 ENY
Somerset Cty ARC
K3SMT (+WB3FBC)416 2 10 1,536 WPA
Lake of the Ozarks ARC
W0NA 358 2 17 1,528 MO
Cape Ann ARA
W1RK 353 2 7 1,512 EMA
SARES
N6WKY 287 2 35 1,504 SCV
K7PZ 301 2 3 1,498 WWA
Phillips Cty ARC
AA0HJ (+KC0JOG)342 2 15 1,494 KS
Theodore Roosevelt ARC
K0ND 435 2 42 1,492 ND
Blue Springs AM ARC
N0SAK 313 2 24 1,490 MO
Northern Kentucky ARC
K4CO (+N8JMV) 491 2 13 1,482 KY
North East Iowa Radio Amateur Assn
W0MG 358 2 51 1,466 IA
Lehigh Valley ARC
W3OI 263 2 29 1,464 EPA
Blackford Amateurs
AA9Z 355 2 5 1,454 IN
Orange Cty ARC
KB9OHY (+N9PRZ)527 2 11 1,454 IN
RATS of Nashville
W4PQP 412 2 13 1,452 TN
Brazosport ARC
N5KV 388 2 12 1,426 STX
Pamlico ARC
K4BCH 434 2 20 1,426 NC
Enid ARC
W5HTK 356 2 34 1,418 OK
MITRE Bedford ARC
W1ON 600 2 5 1,400 EMA
Lunenburg Cty ARC
VE1LUN 500 2 10 1,400 MAR
Moose Horn ARC
AL7LE 322 2 10 1,388 AK
Wilderness Wonders
K9VSO 217 2 3 1,378 WI
Saskatoon ARC
VE5AA 347 2 20 1,360 SK
Stockton Delta ARC
W6SF 547 2 7 1,350 SJV
Meridian ARC
W5FQ 324 2 50 1,348 MS
Los Angeles ARC
W6QET 232 2 10 1,340 LAX
Jamestown ARC
W0FX 263 2 10 1,330 ND
Detroit Metropolitan RC
W8OHR 358 2 4 1,318 MI
Cascade Radio Group
W7DHC 536 2 6 1,300 WWA
Park Cty RC
AB0PC 194 2 52 1,300 CO
Greenwood ARC
VE1ARC 192 2 12 1,298 MAR
Manhattan Illinois Project
W9RVP 359 2 3 1,292 IL
Barry Emergency Amateur Radio Serv.
N8DXR 491 2 6 1,282 MI
Charlotte ARC
W4CQ 273 2 21 1,280 NC
Williamson Rescue Squad
WA4JA 236 2 15 1,272 TN
Clark Cty ARC
W9WWI (+N9OKI) 397 2 33 1,258 IN
Brantford ARC
VE3BA 528 2 4 1,256 ON
Bluff City ARC
W5KHB 477 2 19 1,254 MS
Radio Wave Runners
K5GDH 174 2 18 1,248 STX
Yorba Linda RACES
W6YLR 468 2 10 1,236 ORG
Columbia Amateur Radio Project
N7DY 259 2 3 1,218 EWA
Juniata Valley ARC
K3DNA 306 2 10 1,216 WPA
WACKRS
N8PCB 326 2 4 1,210 MI
Manhattan Area ARS
K0UHF 248 2 11 1,192 KS
Georgian Bay ARC
VE3HXX 492 2 20 1,184 ON
Salem Area ARA, Inc.
K8BTP 79 2 20 1,172 OH
SC Baptist Disaster Relief
KT4OO 427 2 3 1,164 SC
Natchaug ARC
WE1Y 475 2 10 1,150 CT
Woodlands Irregulars
W5TOB 251 2 8 1,146 STX
Huron ARC Inc.
W0NOZ 273 2 14 1,146 SD
Pike Cty ARC
W9UL 171 2 24 1,142 IN
ARC of Brown Cty
K9VM 212 2 10 1,136 IN
Shuswap ARC
VE7RAW 264 2 12 1,134 BC
Moose Jaw ARC
VE5MA 213 2 27 1,126 SK
Grayson Cty ARC
K5GCC 249 2 45 1,114 NTX
Westminster RACES
WB6LBY 155 2 16 1,110 ORG
Peninsula Radio Operators Society
WW3I 201 2 9 1,104 MDC
K7CVO 160 2 13 1,088 OR
Huntington Cty ARS
K9HC 289 2 12 1,078 IN
Evergreen Baptist Church ARC
K7EBC 228 2 9 1,064 WWA
Macedonia ARC
N8RPA 196 2 7 1,048 OH
NCCC
N6EM 257 2 3 1,042 SJV

Southern Sierra ARS
K6EO 211 2 10 1,040 SJV
Mason Cty ARC
N7SK 69 2 15 1,038 WWA
Lewis and Clark RC
K9HAM 93 2 12 1,036 IL
Pictou Cty ARC
VE1UW 283 2 14 1,026 MAR
Shy-Wy RC
KC7SNO (+N7JJY) 188 2 15 1,012 WY
Kaw Valley ARC
W0CET 235 2 15 1,002 KS
Tri-State ARC
W4GTA 348 2 21 996 GA
Metro Area Repeater Assn
K0RMR 247 2 9 994 MN
Fair Lawn ARC
W2NPT 146 2 12 992 NNJ
Staten Island ARA
W2CWW 247 2 10 978 NLI
K9OWQ (+K9GBT) 318 2 9 976 WI
Small Town Amateur Radio Service
W5STR 149 2 25 962 AR
Foothills RC Inc.
W3LWW 296 2 15 956 WPA
Houston Cty ARC
KD5EGR 122 2 5 944 STX
Kingsport ARC
W4TRC 218 2 31 936 TN
Portland Amateur Wireless Assn
W1KVI 291 2 26 936 ME
UMR-ARC
W0EEE 226 2 11 932 MO
Tri-State ARG
W5OKT (+KD5MGL) 118 2 8 932 OK
Mine Creek ARC
WA0PPN 243 2 20 928 KS
Red River Valley ARC
WB5RDD 211 2 18 924 NTX
Sooland ARA
K0XU 262 2 19 924 IA
Mountain Top ARA
WB2UYR 159 2 9 918 ENY
North Arkansas ARS
AD5DX 184 2 87 908 AR
Suncoast ARC
WA4T 122 2 14 904 WCF
Athens ARC
KD5HMU 240 2 11 880 NTX
Anoka Cty RC
W0YFZ 152 2 10 872 MN
Piatt Cty Radio Amateurs
K9USA 30 2 12 870 IL
NJIT ARC
K2MFF 184 2 4 868 NNJ
WA0YJE 282 2 4 852 KS
Tri-County ARC
W9MQB 156 2 11 840 WI
Tri-County ARC Inc.
VE9TCA 68 2 28 840 MAR
Okaw Valley ARC
N9JOY 263 2 7 826 IL
Delta Cty ARS
K8ZAS 210 2 6 820 MI
Stephen F. Austin RC
W5SFA 234 2 6 820 STX
Los Banos ARC
AD6AA 95 2 15 790 SJV
U.H.F. Associates
WB6ZOD 186 2 6 772 ORG
Wilderness Road ARC
WD4DZC 124 2 24 750 KY
Chesco ARA
K3BKG 175 2 8 748 EPA
Club Radio Amateur Restigouche
VE9RAR 168 2 39 736 MAR
Wellesley ARS
W1TKZ 90 2 12 712 EMA
Texas Instruments ARC
W5TI 170 2 9 640 STX
San Gorgonio Pass ARC
AD6UI 48 2 10 622 ORG
Motorola ARC-West
W6MOT 201 2 5 606 SDG
Drake ARC
K8UU 181 2 8 596 OH
Valley ARA
N1RA 111 2 12 592 CT
Robbinsdale ARC
K0LTC 66 2 23 532 MN
W9LY 103 2 10 506 IN
Frogmore Stew and Brew Crew
WW4M 78 2 9 506 NC
K6MLA 92 2 3 484 SV
WA7HTJ 72 2 3 450 WWA
Conneaut ARC
W8BHZ 82 2 18 364 OH

2A Commercial

Order of Boiled Owls
KW2O 1894 2 14 6,038 NLI
Mountaineer ARA
W8SP 1046 2 16 3,468 WV
Macon Cty ARC
N0PR 775 2 17 2,524 MO
OC Hospital Disaster Support Comms
K6EW 693 2 25 2,390 ORG
Florida Keys ARC
W4LLO 618 2 15 1,894 SFL
Tyler ARC
K5TYR 544 2 18 1,506 NTX
Tri-Lakes ARC
W2TLR 264 2 12 1,376 NNY
Macon ARC
W4BKM 413 2 25 1,326 GA
Pendleton ARC
W7PL 400 2 10 1,268 OR
Ellis Cty ARC
WD5DDH 250 2 12 1,170 NTX
Western Piedmont ARC
K4VLY 337 2 15 1,096 NC
Susquehanna Valley ARC
W3VPJ 261 2 15 1,026 EPA
GA Radio Engineers and Technicians
N4VU 470 2 6 940 GA
Adams Cty ARS
WB3JKT 204 2 12 794 EPA
L Wilson Mem Amateur Explorer Post
W3BSA 382 2 13 764 DE
Emporia ARS
K0JDB 135 2 8 560 KS
DeSoto ARC, Inc.
W4MIN 4 2 6 408 WCF
Poway ARS
N6PWY 319 1 8 377 SDG
KA3PVM 269 1 5 354 MDC

3A Battery

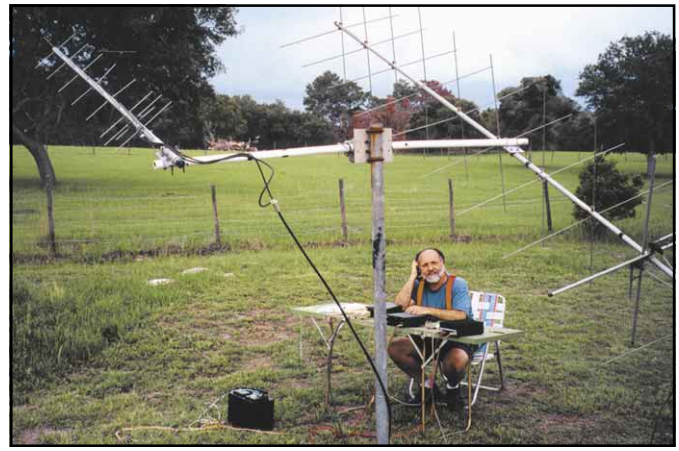
Colorado QRP Club
W0CQC 2310 5 10 20,360 CO
Franklin Cty ARC Inc.
AC1L 761 5 35 8,070 WMA
Lockheed Martin ARC
W5IU (+N5SLX) 827 5 44 7,855 NTX
N5KA Gold Jubilee Group
K5O (+KD5KRB) 743 5 32 7,095 NTX
Paulding Cty ARC
W4TIY (+KG4JSV) 717 5 40 6,985 GA
Austin ARC
W5KA 686 5 116 5,915 STX
GNARC
W6AW 1648 2 11 5,704 SV
Montachusett ARA
W1GZ 544 5 11 5,655 WMA
Barstow ARC
WA6TST (+KC6IIH) 462 5 49 4,780 ORG
Pecos Valley ARC
W5ZU 1323 2 20 4,354 NM
Radio Active Camping & Contesting
K5RAC 526 5 14 4,170 NTX
I. Walton Portable Radio Op. Club
K8JV 459 5 4 4,110 MI
Oregon Tualatin Valley ARC
W7OTV (+KA7HOJ) 1173 2 90 4,048 OR
Knightlites QRP Club
WQ4RP 399 5 7 3,965 NC
Playground ARC
W4ZBB 951 2 49 3,810 NFL
Irving ARC
N5BB 362 5 26 3,400 NTX
Hamilton Wireless Assn
K6BW (+N6OWL) 396 5 8 3,295 SF
Southern Counties Amateur Network
K9VR 713 2 30 3,290 IL
North Penn ARC
W3BTN 295 5 4 2,880 EPA
QCWA 162 WI
K9AKG 273 5 15 2,660 WI
Alamance ARC
K4EG 680 2 8 2,632 NC
Venture Crew 1085
KO0OL (+KC0ALB) 237 5 10 2,500 IA
VE3FAL 212 5 3 2,485 ON
Warrensburg Area ARC
W0AU 213 5 15 2,270 MO
Albany ARC
W4MM 637 2 20 2,206 GA
Metro Amateur Repeater System
W6BIV 565 2 11 2,192 LAX
Fort Venango Mike and Key Club
W3ZIC 278 5 15 2,180 WPA
North Country ARC
W2LCA 532 2 6 1,968 NNY
Genesis ARS
N1ZIZ 356 2 10 1,966 EMA
St. Clair Cty Alabama ARES
K4SCC 631 2 25 1,962 AL
Northern Virginia QRP Club
WA4MM 148 5 15 1,840 VA
River City ARCS
N6NA 458 2 23 1,778 SV
Florence ARC
W4ULH 328 2 11 1,670 SC
Shawnee ARA
W9RNM 377 2 12 1,574 IL
.415 Wireless Radio Society
KQ6AR 333 2 12 1,422 EB
Amador Cty ARC
K6ARC 196 2 27 1,386 SV
Mystic Valley ARG
N1MV 176 2 12 1,316 EMA
Michigan QRP Club
WQ8RP 75 5 3 1,245 MI
Teegarden ARS
N9USN 237 2 4 1,074 IN
Hall of Science ARC
WB2JSM 129 2 22 958 NLI
Liverpool Amateur Repeater Club
W2CM 206 2 12 730 WNY
C^5
KI7EL 68 2 3 588 WWA
KF4ZQA 57 2 23 514 TN

3A

Rochester (NY) DX Assn
W2RDX (+N2TWI) 3983 2 28 12,584 WNY
Cty Line ARA of NW New Jersey
N2ED (+KC2GDT) 2673 2 18 11,166 NNJ
Northwest ARS
W5NC 3342 2 110 10,970 STX
Redwood Empire DX Assn
W6KB 3663 2 22 10,932 SF
Hudson Valley Contesters & DX'ers
W2MU 3641 2 18 10,874 ENY
McHenry Cty Wireless Assn
K9RN (+N9KTL) 3367 2 35 10,180 IL
Fannin Area Contest Team
N5YA 3425 2 10 9,994 NTX
West Jersey DX Group
W2EN 2777 2 10 9,434 NNJ
Massanutten and Valley ARA
N4XU (+KG4EHM) 2561 2 70 9,148 VA
ARC of Parker Cty
W5PC (+N5ONE) 2534 2 30 9,068 NTX
North Florida ARS
W4IZ 3184 2 45 8,636 NFL
OCARS
W8TNO (+K8UMC) 2906 2 40 8,492 MI
McKinney ARC
W5MRC 2433 2 21 8,060 NTX
Old Barney ARC
N2OB 2920 2 40 8,014 SNJ
South Orange ARA
K6SOA 2191 2 37 7,680 ORG
Capeway RC
W1AA 2219 2 15 7,606 EMA
W/K ARC of Greater Milwaukee
N9AW (+N9ARS) 2115 2 15 7,542 WI
Tippecanoe ARA
W9REG (+WA9TGO) 1783 2 30 7,262 IN
Santa Barbara ARC
K6TZ 2165 2 15 7,250 SB
Poughkeepsie ARC
N2YL (+KA2SRC) 2185 2 18 7,240 ENY
Blue Ridge ARC
W4YK 2053 2 23 7,082 NC
Michiana ARC
W9AB (+KB1AGA) 1827 2 30 7,056 IN
Twin Cities Repeater Club
W0BU (+K0ZDA) 2157 2 86 6,906 MN
Tar River ARC
W4DCG 2803 2 8 6,866 NC
Regina ARA
VE5NN 2005 2 17 6,784 SK
OH-KY-IN ARS
K8SCH (+N8HXO) 2263 2 40 6,682 OH
Baton Rouge ARC
W5GIX 1558 2 48 6,586 LAX
Orange Park ARC
K4BT 2037 2 10 6,522 NFL
Columbus (GA) ARC, Inc.
N4WV 1479 2 24 6,484 GA
Springhill ARC
N5II 1811 2 10 6,092 LAX
Garden State ARA
W2GSA 1867 2 41 5,948 NNJ
North Shore RC/Metro Amateur Club
W9RS 1347 2 65 5,946 IL
Antelope Valley ARC
K6OX (+KG6AUR) 1481 2 60 5,744 LAX
Green River Valley ARS
K9WA 1487 2 15 5,730 IL
East Alabama ARC
W4LEE 1468 2 35 5,688 AL
SWLARC
W5BII 2139 2 30 5,644 LAX
Stu Rockafellow ARS
W8NJH 1662 2 20 5,504 MI
Central Missouri RA
K0SI 1381 2 21 5,500 MO
Santa Clarita ARC
W6JW (+KG6ASC) 1496 2 49 5,494 LAX
Two Rivers ARC
W3OC (+WB3ROX) 1582 2 30 5,480 WPA
KT8J (+KC8IET) 2283 2 50 5,466 WV
TARGA
KW4DA 1892 2 10 5,406 NC
Jefferson Cty ARC
W7JCR (+KC7SUF) 1359 2 23 5,378 WWA
Maryland Mobileers ARC
W3CU 1244 2 20 5,232 MDC
Greater Norwalk ARC
N1EV 1662 2 65 5,230 CT
Livingston Amateur Radio Klub
W8MFR 1596 2 65 5,192 MI
Southern VT ARC
WT1B (+N1HSJ) 1613 2 22 4,940 VT
Wichita ARS
N5WF 1105 2 19 4,882 NTX
Delta ARC
W4BS (+KE4BUU) 1393 2 70 4,854 TN
Mt. Baker ARC
K7ZC 1292 2 41 4,814 WWA
Virginia Beach ARC
W4UG 1361 2 50 4,762 VA
Xerox ARC
W2XRX 1238 2 25 4,586 WNY
Fraser Valley FD Group
VE7DB 1270 2 55 4,582 BC
Oak Ridge ARC
W4SKH 1154 2 40 4,558 TN
Temple ARC
W5LM 1155 2 65 4,522 NTX
Six Meter Club of Chicago Inc
K9ONA 1182 2 25 4,496 IL
D-CAT TX
AK5F 1731 2 8 4,462 STX
Cambridge ARA
W8VP 1042 2 23 4,376 OH
Riverside Cty ARA
W6TJ (+KD6UVT) 1361 2 33 4,358 ORG
Vintage Iron RC
N3KR 1491 2 5 4,338 NNJ
Mercer Cty ARC
W3LIF 1115 2 25 4,334 WPA
North Georgia ARC
W4QQ 1135 2 12 4,262 GA
Dial RC
K8PI 2120 1 32 4,194 OH
Boca Raton ARA
K4FAU 1117 2 10 4,156 SFL
Davis County ARC
K1DAV 1378 2 88 4,154 UT
The 440 Group
N9WV 1090 2 22 3,984 IN
M2M
K8FH 1005 2 23 3,980 OH
Lincoln Cty ARC
K1LX 1135 2 16 3,960 ME
Atchafalaya Amateur DX Assn
WA5MC (+KC5RFO) 1182 2 12 3,888 LA
Paducah ARA
W4NJA 1198 2 20 3,884 KY
Larkfield ARC
W2LRC 762 2 32 3,832 NLI
NN7L 1030 2 10 3,806 WWA
Tri-County Repeater Assn
K9OW 1256 2 20 3,800 WI
Mississippi Valley ARC
W9UP 1174 2 13 3,760 WI
Jayhawk ARS
W0LB 925 2 10 3,726 KS
South Baldwin ARC
W4INU (+KF4ZRE) 822 2 27 3,714 AL
Chicago Suburban RA
AA9F 1150 2 23 3,708 IL
Corona Norco ARC
W6PWT 1350 2 11 3,700 ORG
Rip Van Winkle ARS
K2RVW 1129 2 32 3,682 ENY
Valley RC of Oregon DX Sig
N6LF 998 2 10 3,658 OR
MADRAS
W3MAD 1070 2 14 3,654 MDC
South Canadian ARS
W5NOR (+KA5KXW) 999 2 63 3,634 OK
SGARC
WI4F (+KE4CVT) 1000 2 6 3,620 GA
Eastern Pennsylvania ARA
N3IS (+N3ROL) 742 2 20 3,586 EPA
Spider ARC
AF6DX 1481 2 20 3,562 SDG
EFFECT
N8LH 1194 2 11 3,502 MI
Mecklenburg ARS
W4BFB 914 2 19 3,432 NC
Ski Country ARC
K0RV 1467 2 10 3,394 CO
Blossomland ARA
W8MAI 861 2 39 3,378 MI
Amateur Radio For Youth
W0YH 1465 2 17 3,376 CO
MARA
W8USA 913 2 10 3,370 MI
SPARC Inc.
K3IR 830 2 28 3,352 EPA
De Forest ARC
K8GE 725 2 28 3,290 OH
Loyalist City ARC
VE9LC 1015 2 40 3,254 MAR
Central KS ARC
W0CY 777 2 57 3,238 KS
Do Nothing Club
AB6GS 1241 2 8 3,182 SV
Milwaukee Repeater Club
K9IZV (+KB9IIG) 840 2 69 3,154 WI
Kent Cty ARC
W3HZW 845 2 29 3,138 DE
Sonoma Cty Radio Amateurs
W6LFJ (+W6WDM) 790 2 15 3,078 SF
St. Peter Area RC
N0KP 712 2 14 3,048 MN
Englewood ARS
K8ONV 721 2 10 3,044 WCF
Jackson ARC
W5PFC (+KC5KMJ) 685 2 85 3,038 MS
Tamaqua Wireless Assn
W3CMA 744 2 12 3,028 EPA
Pocono Amateur Radio Klub
K3JM 617 2 15 3,024 EPA
Lower Columbia ARA
W7DG (+WA7ROB) 672 2 28 3,022 WWA
Lincoln ARC
K0KKV 1032 2 27 3,008 NE
Sumter ARA
W4GL 1017 2 19 3,002 SC
Chattanooga ARC
W4AM (+KA0YDC) 1151 2 39 3,002 TN
Tri Town Radio Amateur Club
W9VT (+KA9IIT) 724 2 16 3,000 IL
SMCARA/SPARC
K3NAL 778 2 30 2,946 MDC
Sunflower Interlink
K0HAM 1014 2 10 2,940 KS
Peconic ARC
W2AMC 687 2 36 2,932 NLI
Andrew Johnson ARC
W4WC 818 2 13 2,898 TN
David Sarnoff RC
N2RE 632 2 35 2,870 SNJ
Big Thunder ARC
WA9GWM 759 2 8 2,846 IL
Lake Area Radio Klub
W0WTN 621 2 38 2,838 SD
Bloomfield ARC
W1CWA 739 2 30 2,834 CT
Butler Cty VHF Assn
W8CCI 1163 2 48 2,826 OH
Royal Gorge ARC
NC0A 694 2 15 2,816 CO
CARS/PRRA
KK2L 685 2 40 2,792 WCF
Keowee-Toxaway ARC
K4WD 824 2 15 2,754 SC
Surrey ARC
VE7SAR 910 2 9 2,738 BC
Copper Country Radio Amateur Assn
W8CDZ 671 2 13 2,728 MI
Aroostook ARA
K1FS 855 2 25 2,718 ME
Burlington Cty Radio Club
K2TD (+K2KID) 750 2 21 2,700 SNJ
Bristol ARC
W4UD 813 2 53 2,692 TN
N4IQ 798 2 3 2,688 SC
York RC
W9PCS 646 2 16 2,670 IL
Scott Cty ARES
N4CO 906 2 14 2,660 KY
W3BMD (+N3NHN) 613 2 24 2,638 WPA
Kennehoochee ARC
W4BTI 604 2 28 2,616 GA
Neptune ARC
W2NRC 569 2 51 2,598 NNJ
Ramapo Mountain ARC
WA2SNA 809 2 10 2,574 NNJ
Pen Bay ARC
W1PBR 456 2 12 2,542 ME
Dallas ARC
W5FC 653 2 30 2,524 NTX
Rolla Regional ARS
W0GS 788 2 21 2,516 MO
Pasadena RC
W6KA 735 2 60 2,508 LAX
Islip ARES/RACES
WA2LQO 749 2 25 2,480 NLI
Blue Ridge ARS
K4CLT 468 2 35 2,464 SC
Jupiter Tequesta Repeater Group
WY5I 825 2 12 2,458 SFL

Scranton Pocono Amateur Radio Klub					
K3CSG	737	2	46	2,446	EPA
Houston ECHO Society					
W5ECO	739	2	25	2,440	STX
Paul Bunyan ARC					
W0BJI	742	2	10	2,438	MN
Yonkers ARC					
W2YRC (+N2ROD)	603	2	44	2,408	ENY
Nashville ARC					
K4CPO	1185	1	10	2,388	TN
Kings Cty RC					
W2RAK	702	2	20	2,364	NLI
North Shore RA					
NS1RA (+N1FWV)	864	2	25	2,340	EMA
Skyline ARC					
K2IWR	580	2	20	2,316	WNY
Headwaters ARC					
N3PC	633	2	8	2,312	WPA
Bradford Area ARC					
KU4AY (+KG4BAH)	911	2	6	2,310	NFL
Randolph ARC					
NC4ZO	496	2	22	2,304	NC
AEIOU					
K8ROB	489	2	5	2,290	WI
Yankee Clipper Contest Club					
AD1T	577	2	16	2,278	NH
Hastings ARC					
W0WWV	725	2	20	2,250	NE
Columbus ARC					
N9LTT	562	2	7	2,246	IN
Champaign Logan ARC					
W8EBG	445	2	10	2,236	OH
Ole Virginia Hams ARC, Inc.					
W4OVH (+N5RTY)	443	2	30	2,230	VA
ARA of the Southern Tier					
W2ZJ	448	2	25	2,216	WNY
Naval Research Lab ARC					
W3NKF	448	2	14	2,210	MDC
Resevoir ARA					
K8QYL	713	2	31	2,208	OH
Middle Georgia RA					
WR4MG	701	2	30	2,202	GA
Victor Valley ARC					
K6QWR (+KD6JUC)	699	2	15	2,198	ORG
MSTARS					
W7O	1583	1	50	2,183	OR
SARA/NARC					
W3PP	513	2	30	2,172	DE
Dade Cty ARG					
KG0RT	732	2	12	2,164	MO
Sweetwater ARC					
WY7U	377	2	15	2,158	WY
Catalina RC					
W7SA	778	2	21	2,156	AZ
Bellbrook ARC					
W8DGN	533	2	17	2,154	OH
Santa Clara Cty ARA					
W6UW (+KC6SPV)	543	2	25	2,138	SCV
Heritage ARC					
VE3HRC	515	2	12	2,128	ON
IDEC Cirvine Disaster Emerg Comm.					
N6IPD	392	2	12	2,086	ORG
Pilot Knob ARC					
K0LV	638	2	11	2,082	KS
Seneca RC					
W8ID	283	2	17	2,030	OH
Lakes Region Repeater Assn					
W1BST	494	2	7	2,018	NH
Saint Charles ARC					
NF0Q	469	2	34	2,012	MO
Strangers & Pilgrims Amateur Radio					
N3SWH	780	2	25	2,002	EPA
Marin ARC					
W6SG (+KC0JNS)	460	2	36	1,998	SF
South Texas ARC					
AD5CA	446	2	9	1,996	STX
Fountain Valley RACES					
W6WC (+KC6PIR)	580	2	30	1,992	ORG
Purdue University ARC					
W9YB	500	2	10	1,984	IN
Spokane Cty ARES/RACES					
W7GBU	545	2	16	1,962	EWA
London Bridge ARA					
AB7EM	546	2	21	1,936	AZ
Mid State ARC					
KC9AD	466	2	20	1,906	IN
Tazewell Cty ARES					
KU4RK	550	2	4	1,900	VA
Worldradio Staff ARC					
WR6WR	604	2	9	1,886	SV
Quinte and Tri Cty ARCs					
VE3RL	457	2	15	1,872	ON
Ham Operators Group					
K7HOG	849	1	47	1,867	OR
Ionia Cty ARC					
AB8LE	555	2	27	1,858	MI
Wayne ARC					
W8WOO	451	2	11	1,832	OH
Plateau ARC					
W4CV	474	2	23	1,826	TN
Beaver Valley ARA					
W3SGJ	406	2	43	1,812	WPA
South Brevard ARC					
K4SBA (+KD4JRJ)	463	2	10	1,810	SFL
ESDA/ARES/NWSC Boy Scouts of Amer.					
W9BSA	603	2	40	1,806	IL
Drumlin RC					
WA2AAZ	383	2	10	1,798	WNY
Bill Hoehl Memorial Contest Group					
W4UOT (+KG4NTG)	356	2	53	1,782	TN
Olympia ARS					
NT7H	710	1	35	1,767	WWA
Holmesburg ARC					
K3FI	308	2	20	1,744	EPA
SCARA					
K2BR	338	2	30	1,742	SNJ
Elko Chapt Rural ARA					
W7K	322	2	27	1,722	NV
Marshall Cty ARES					
W8CAL (+KA8VAU)	426	2	9	1,718	WV
Cass Cty ARC					
W9VMW	1001	1	20	1,714	IN
McDowell ARA					
W4HOG	657	2	30	1,710	NC
MOSI ARC					
KM0SI	261	2	5	1,702	WCF
El Paso ARC					
W5ES	436	2	54	1,682	WTX
Club Radio Amateur Browsburg					
VE2CWB	590	2	14	1,680	ON
Oakland Radio Communication Assn					
KG6FDP	435	2	36	1,678	EB
Cumberland Valley ARC					
W3ACH	388	2	12	1,676	WPA
Metrocrest ARS					
W5IG	378	2	14	1,656	NTX
Oidar ARC					
KD5MTT	311	2	25	1,654	OK
Rogue Valley ARC					
W7OEK	406	2	10	1,650	OR
Kentucky Moutains ARC					
KF4SJO	408	2	27	1,648	KY
Southern Alberta ARC					
VE6CAM	454	2	46	1,646	AB
Gloucester City ARC					
KC2HZU	359	2	25	1,620	SNJ
Manatee ARC Inc.					
K4GG	250	2	15	1,616	WCF
Willamette RTTY Enthusiasts Club					
W7R (+KD7BCC)	78	2	25	1,612	OR
Mt Diablo ARC					
W6CX	603	2	35	1,606	EB
Quanapowitt Radio Assn					
W1EKT	326	2	10	1,596	EMA
Three River's ARC					
WB0GAH	360	2	9	1,578	ND
Wayne Cty Amateur Assn					
K4CYP	416	2	35	1,554	NC
Branch Cty ARC					
K8CHS	395	2	29	1,530	MI
Burlington ARC					
VE3RAB	414	2	7	1,526	ON
Livermore Amateur Radio Klub					
K6TTM	352	2	23	1,500	EB
New Bern ARC					
W4EWN (+KG4GRS)	293	2	13	1,496	NC
IUA Squared					
W5IUA	536	2	15	1,472	NTX
NEMO ARC					
W0CBL (+KB0QNH)	362	2	10	1,470	MO
Brownwood ARC					
K5BWD (+KC5VSG)	318	2	10	1,466	NTX
Warren Cty ARES/RACES					
KC4CK	280	2	6	1,462	VA
San Patricio Emergency ARS					
W5SPC	279	2	7	1,460	STX
North Shores ARC					
K6HAI	287	2	26	1,452	SDG
Kansas Nebraska RC					
K0KSN	268	2	25	1,438	KS
Hill Country ARC					
N5HR	228	2	21	1,426	STX
Disney Emerg. Amateur Radio Service					
WD4WDW	434	2	9	1,422	NFL
Seattle Auxiliary Comm. Services					
W7ACS	446	1	8	1,420	WWA
CRS Club					
N9AKR	554	2	16	1,408	IL
Carl Hayden Community HS ARC					
KC7KFF	858	1	25	1,405	AZ
SMARTS Carver Cty ARES					
N0EN	401	2	20	1,402	MN
Yucaipa Valley ARC					
KF6LLS	228	2	14	1,390	ORG
Cherokee Capital ARS					
K4WOC	184	2	8	1,384	GA
Victoria ARC					
W5DSC	178	2	17	1,358	STX
Pahrump Amateur Radio Repeater Assn					
K7K	275	2	11	1,342	NV

The Golden Triangle ARC W6GTR (CA) took working with one of their served agencies to new heights, as they utilized the fire department's ladder truck to serve as a temporary tower for their Field Day operation.



The W4CW Sun Country ARS (NFL) entrusted their quest for the satellite bonus to Mario, N4TSV. He secured the 100 bonus points by successfully completing several Qs via the FO-birds.

The Ak-Sar-Ben K0USA tower-raising scene in NE was repeated by hundreds of Field Day operations across the US and Canada.

Ashland Area ARC					
W8OD	249	2	15	1,338	OH
Southeast Missouri ARC					
W0QMF	404	2	8	1,336	MO
DuBois Cty EOC Club					
AA9WD	312	2	38	1,328	IN
Thunder Bay ARC					
K8PA (+N8JVQ)	326	2	14	1,292	MI
Nevada ARC					
K0CB	442	2	9	1,284	MO
W0UK	295	2	10	1,280	KS
McPherson ARC					
W0TWU	486	2	8	1,272	KS
Panoramaland ARC					
K7JAR	328	2	20	1,272	EWA
Upper Valley ARC					
K8FBN	183	2	22	1,266	OH
FCARC					
K9ILS	208	2	22	1,262	IL
Carteret Cty ARS					
W4YMI	321	2	16	1,258	NC
Hualapai ARC					
WB6RER	408	2	8	1,252	AZ
Cupertino ARES					
K6BSA	275	2	12	1,244	SCV
Bean Counter Field Day Society					
N8CPA	263	2	10	1,238	OH
Elgin ARS					
VE3RSE	413	2	10	1,228	ON
Navarro ARC					
N5DDC	350	2	38	1,214	NTX
Conyers ARG					
KR4IP	145	2	16	1,204	GA
Tulare Cty ARC					
WA6BAI	169	2	8	1,196	SJV
Jackson Cty ARC					
W5WA	173	2	19	1,176	MS
Southwest Arkansas ARC					
WA5LTA	137	2	28	1,174	AR
Amateur Radio Public Service Assn					
KC8EO	384	2	10	1,168	MI
Whidby Island ARC					
W7PN	295	2	6	1,168	WWA
Daviess Cty EMA Club					
WA9IN	121	2	20	1,162	IN
Fallbrook ARC					
N6FQ	304	2	18	1,148	SDG
Potomac Valley RC					
WA4JUK	138	2	3	1,146	VA
Mt. ARC					
W3YMW (+KB3CKH)	178	2	10	1,146	MDC
K8ZC	327	2	8	1,144	OH
Pershing Cty ARES/RACES					
N7WVZ	219	2	3	1,138	NV
PHD ARA					
W0TE	281	2	8	1,114	MO
U of M ARC/Arrow Comm. Assn					
W8UM	210	2	20	1,098	MI
Cedar Lake ARG					
KB9NSD	248	2	6	1,096	IN
Yarmouth ARC					
VE1GX	191	2	14	1,080	MAR
Univ of Arkansas Little Rock ARC					
WA5LRU (+KC5NLK)	223	2	10	1,068	AR
Lincoln Trail ARC					
W4BEJ	319	1	10	1,065	KY
Metropolitan ARC					
K8NOW	372	2	8	1,044	MI
Sacramento ARC					
W6SIG	172	2	25	1,044	SV
Ridge ARC					
W4RRC	313	2	22	1,026	SC
San Antonio RC					
W5SC	107	2	18	1,016	STX
NE Kansas City ARC					
KB0SYC	304	2	17	1,008	MO
GEMA/SEMA/WEMA RACES-ARES					
KB1CDL	147	2	14	994	WMA
Flagler Palm Coast ARC					
WY2B	67	2	29	990	NFL
Central Vermont ARC					
W1BD	181	2	12	962	VT
N8IVE (+KB8VRI)	312	2	8	926	OH
Greers Ferry ARC					
W5GFC	123	2	8	922	AR
CVARA					
W2RME	249	2	4	918	WNY
N0STR	154	2	11	908	MO
Valley of the Moon ARC					
W6AJF	278	2	14	882	SF
QUARK					
K7VIT	162	2	12	830	WWA
ADA ARC					
WB5NBA	160	2	19	820	OK
Bluestone ARC					
KC8CNL	140	2	6	780	WV
Disney EARS					
WD6MM	166	2	5	732	LAX
St. Albans ARC					
KD1BL	111	2	9	698	VT
Mountain State Transmitters					
K8VNQ	82	2	12	662	WV
Gary & Steve					
AC6BZ	144	2	3	588	SV
Rural ARA					
N7R	101	2	9	524	NV
3A Commercial					
Splitrock ARA					
K2RF	1231	2	30	4,714	NNJ
W0SRC	819	2	42	3,020	MO
Radio Assn of Western NY					
W2PE	609	2	15	2,156	WNY
Cassel ARC					
W6PB	714	2	5	2,040	SV
Falls ARC					
K9RHH	595	2	7	1,490	WI
Hernando Cty ARA					
WB4NOD (+KC6PIU)	332	2	10	1,404	NFL
High Point ARC					
W4UA	382	2	17	1,320	NC
Zamora Shrine Ham Radio Unit					
W4ZHR	467	2	27	1,294	AL
Timmins ARC Inc.					
VA3RAC	249	2	8	740	ON
Southeast Louisiana ARC					
WB5NET	50	2	19	422	LA
E-Hams					
K9IQ	112	2	17	238	IN
4A Battery					
Portland ARC					
W7LT	1242	5	25	11,510	OR
Summit ARA					
K3ZZ	1312	5	8	10,460	MDC
Dickson Cty ARC					
WC4DC (+KF4ZEO)	1227	5	15	10,035	TN
Indian River ARC					
W4NLX	727	5	57	7,825	SFL
San Andreas Faultline Survivors					
W6SW	2523	2	15	6,824	SJV
North Georgia QRP Club					
NQ4RP	555	5	13	5,685	GA
W8PIG	584	5	14	5,585	OH
Dekalb Cty ARC					
W4GBR	637	5	14	5,160	AL
Anne Arundel RC					
W3VPR	520	5	22	4,955	MDC
ARCA/SCARS					
NC6I	1128	2	20	4,032	SV
Sierra ARC					
KK6PA	412	5	16	3,665	SJV
BARK					
K2BRK	251	5	13	2,345	WNY
Starved Rock RC					
W9MKS	380	2	18	2,196	IL
West Marin ARS					
W6RSI	418	2	44	2,132	SF
Lassen ARC					
K6LRC	582	2	20	2,068	SV
Who?					
K3MC	347	2	18	1,448	SV
Turlock ARC					
W6BXN	253	2	8	1,206	SJV
Bobcat ARC					
KE6RC	294	2	15	1,090	SB

4A

Cherryville Repeater Assn					
W2GD (+KB2ERI)	5745	2	40	17,590	NNJ
PCARC/GBRA					
W1WQM (+KA1WZU)	4411	2	25	13,986	NH
Delaware ARA					
K8ES (+K8ESS)	3867	2	27	13,248	OH
Sussex Cty ARC, Inc.					
W2LV	4164	2	10	11,826	NNJ
Kettle Moraine Radio Amateurs					
N9KS	3329	2	16	10,630	WI
Westchester Emerg. Comm. Assn					
N2SF	2906	2	56	9,920	ENY
Loveland Repeater Assn					
W0DZ (+W0XYZ)	2917	2	20	9,750	CO
Roanoke Valley ARC					
W4CA	3398	2	80	9,296	VA
Contoocook Valley RC					
K1BKE(+KB1GSA)	3178	2	24	9,112	NH
Boeing Employees' ARS					
W0MA	2357	2	20	8,836	MO
Kanawha ARC					
W8GK (+N8VUQ)	2535	2	38	8,484	WV
Franklin Cty ARC					
W4FCR	2110	2	26	8,394	VA
Williamson Cty ARC					
N5TT	2233	2	26	8,070	STX
L'Anse Creuse ARC					
K8AYZ	2225	2	30	7,676	MI
Albany ARA					
K2CT	1998	2	61	7,294	ENY
The Albemarle ARS					
NO4Y	2119	2	27	6,948	NC
Nassau ARC					
K2VN (+KB2MJC)	1789	2	24	6,702	NLI
Peninsula Electronic ARS					
WR4H	2916	2	6	6,532	VA
Chesapeake Bay RA					
K3TKE	1539	2	10	6,444	MDC
Burley ARC					
W7JQ (+W5QQQ)	1887	2	20	6,244	WWA
Kankakee ARS					
W9AZ	1635	2	10	5,938	IL
Rappahannock Valley ARC					
K4TS	1345	2	30	5,762	VA
Twin State RC					
W1FN (+KB1BYP)	2137	2	28	5,648	NH
Hamilton ARC					
VE3DC	1822	2	25	5,584	ON
Garden City (Michigan) ARC					
K8GC (+KA8WXC)	1515	2	35	5,562	MI
Orlando ARC					
W1SE	1539	2	58	5,556	NFL
Golden Triangle ARC					
W6GTR	1526	2	39	5,544	ORG
Greater Vancouver Radio Group					
VE7YAX	2066	2	41	5,388	BC
WIARC/HARC					
W9AWE	1434	2	40	5,290	IL
Twin City Ham Club					
W5EA	1309	2	10	5,106	LAX
Penn Wireless Assn					
W3SK	1295	2	15	5,006	EPA
Orange Cty ARC					
W6ZE	1695	2	27	4,992	ORG
Southern CA Amateur Trans. Soc.					
WB6LRU	1849	2	30	4,906	LAX
Kishwaukee ARC					
WA9CJN (+KB9AGT)	1168	2	18	4,780	IL
Scottsdale ARC					
K7TR	1305	2	23	4,608	AZ
Arizona ARC					
W7IO	1253	2	18	4,528	AZ
Maury ARC					
W4GGM	1263	2	40	4,512	TN
Hamfesters RC					
W9AA	1515	2	20	4,496	IL
Barc Jr.					
K0DE	1473	2	43	4,442	CO
KB8VN Memorial Field Day Group					
K8MZ	1109	2	10	4,398	OH
Alford Memorial RC					
W4BOC (+N9FWG)	1034	2	63	4,324	GA
Van Wert ARC					
W8FY	1211	2	21	4,284	OH
Island Cty ARC					
W7AVM	982	2	34	4,282	WWA
Coos Cty RC					
K7CCH	1206	2	200	4,190	OR
Wilson ARC					
KR4FO	1124	2	10	4,178	TN
Medtronic ARC					
K0ZE (+N0HWQ)	1168	2	11	4,092	MN
Federal Way ARC					
WA7FW	1048	2	45	4,080	WWA
MNARC/DCARA/Mobile 6ers/Delco Dug					
W3JG	985	2	96	4,036	EPA
Madison Oneida ARC					
W2MO	766	2	27	3,960	WNY
Edmond ARS					
N5N	1682	1	45	3,957	OK
North Ottawa ARC					
W8CSO	1092	2	45	3,952	MI
N1SF RC & Central IL RC					
N1SF	927	2	55	3,884	IL
Inland Empire ARC					
W6IER	1064	2	37	3,876	ORG
ARCS/Des Moines RAA					
W0AK	1043	2	40	3,828	IA
Troy ARA					
N2TY	970	2	55	3,740	ENY
Kokomo ARC					
W9GO	701	2	18	3,648	IN
Rochester ARC					
W0MXW	1306	1	50	3,644	MN
Holland ARC					
K8DAA	990	2	10	3,630	MI
Burnaby & New Westminster ARC					
VE7BAR	1344	2	25	3,590	BC
Sioux Empire ARC					
W0ZWY	855	2	20	3,582	SD
Key City ARC					
AE5B (+KC5FFQ)	948	2	25	3,488	WTX
Elkhart Cty Indiana Hams					
K9WJU	769	2	21	3,486	IN
Green Bay Mike & Key Club, Inc.					
K9EAM	836	2	30	3,344	WI
Delaware-Lehigh ARC					
W3OK (+KB3DEC)	1268	2	50	3,326	EPA
Massasoit ARA					
W1MV	763	2	10	3,156	EMA
Four State ARC					
NI0W	859	2	20	3,020	MO
Winnipeg ARC					
VE4BB	715	2	36	2,954	MB
Lowndes/Magnolia ARC's					
AA5MT	785	2	55	2,938	MS

Tim, KI5SQ (with KI5UD as the second op), may not have had the highest score in their category, but few if any had a more dramatic vista at their operating site than this one in NM.

All that was lacking was Casey Jones as the NC8V entry from the Athens County (OH) Amateur Radio Association took to "riding the rails" for Field Day 2001.

Crawford ARS
W3MIE 877 2 35 2,914 WPA
Monongalia Wireless Assn
W8MWA 575 2 21 2,902 WV
Wabash Valley ARA
W9UUU 614 2 49 2,882 IN
Southeast Missouri ARA
AB0JW 639 2 16 2,870 MO
South Berkshires ARC
W1BAA/2 604 2 25 2,866 ENY
San Gabriel Valley RC
W6FU 646 2 18 2,858 LAX
GCARES/ARAY
KF8UI 1004 2 10 2,836 MI
LVSRA & AARG
K3LV 645 2 60 2,796 EPA
Franklin Cty ARC
KQ4MS (+KF4MRX)994 2 12 2,794 NC
Shoreline ARC
W1BCG 655 2 52 2,774 CT
Cyclone ARC/ Story Cty ARC
W0ISU 636 2 12 2,686 IA
Jersey Shore ARS
W2DOR 929 2 26 2,660 SNJ
Palisades ARC
W9BPT 724 2 30 2,618 IL
San Jose RACES
W6IO 459 2 29 2,546 SCV
Pawtuxet Valley ARC
WA1USA (+N1RPV)587 2 26 2,394 RI
3 R.A.T.S.
NO4Q 500 2 12 2,392 TN
Hot Springs ARC
K0HS 435 2 25 2,346 SD
Portsmouth ARC
W4POX 526 2 35 2,342 VA
Foothills ARC
KO4MZ 655 2 7 2,340 SC
LARC
VE3LON 694 2 20 2,336 ON
Yakima ARC
W7AQ 694 2 8 2,334 EWA
Waterhammers
W6EBW (+KE6OFI)476 2 16 2,322 SJV
Saratoga Cty RACES Assn
WA2UMX 660 2 25 2,258 ENY
Northern NV Amateur Radio Services
KE7R 614 2 14 2,254 NV
ARA of Bremerton
W7VE 462 2 28 2,230 WWA
Radio Amateur Club of Knoxville
W4BBB 479 2 46 2,220 TN
Anthracite Repeater Assn
W3SJI 727 2 12 2,220 EPA
Pearland ARC
K5PLD 848 2 36 2,214 STX
Shoreline Aux. Comm. SVC.
K7UW 523 2 8 2,198 WWA
Lincoln Cty Volunteer Communication
NC4LC 441 2 30 2,192 NC
Midland ARC
W5QGG 515 2 15 2,140 WTX
Diamond Bar ARS
K6EOC 502 2 20 2,090 LAX
Fort Wayne RC
W9TE 677 2 52 2,008 IN
Lee DeForest ARC
W6OB 512 2 24 1,996 ORG
McMinnville ARC & Yamhill Cty ARES
AB7ZQ 494 2 21 1,988 OR
Witchita ARC
W0SOE 429 2 16 1,980 KS
Santa Barbara West Cty ARES
W9EC 423 2 9 1,978 SB
Wood Cty Emergency Communications
WC8EC 455 2 17 1,952 WV
TCARES
K6YV 471 2 7 1,948 SJV
South Bay Amateur Radio Service
K6QM (+KA6PSG) 323 2 20 1,944 SDG
Hayward RC
K6EAG 336 2 25 1,938 EB
Bridgerland ARC
W7IVM 449 2 30 1,932 UT
Radio Amateurs of Greater Syracuse
W2AE 305 2 25 1,924 WNY
Grant Cty ARC
W9EBN 509 2 19 1,818 IN
Lancaster ARC
W2SO 447 2 16 1,794 WNY
Tri State ARA
W8VA 454 2 30 1,776 WV
Valley RC of Oregon
W7PXL 327 2 35 1,756 OR
TX Emergency Amateur Communictors
W5SI 444 2 25 1,744 STX
Grays Harbor ARC
W7ZA 367 2 23 1,710 WWA
Orange Cty ARC, Inc.
W2HO 369 2 31 1,704 ENY
Fulton Cty ARC
K8BXQ 447 2 34 1,676 OH
Wexaukee ARC
K8CAD 490 2 25 1,628 MI
Chehalis Valley ARS
WA7UHD 405 2 18 1,624 WWA
St. Croix Valley ARC
VE1IE 350 2 22 1,600 MAR
North Hills RC
K6IS (+KC6PSZ) 445 2 6 1,588 SV
Alamogordo ARC
K5LRW 226 2 25 1,584 NM
Coachella Valley ARC
K6BSC 512 2 17 1,526 ORG
Arlington Communications League
N9MHT 383 2 9 1,480 IL
MECA
K8BF 313 2 10 1,382 MI
Missouri ARC
KC0JXX 291 2 25 1,382 MO
East River ARC
W8MOP 228 2 28 1,380 VA
Portage ARC
KJ3O 277 2 32 1,380 OH
Rockford ARA
W9AXD 334 2 4 1,372 IL
Sunparlor ARC
VE3SPR 427 2 12 1,318 ON
Katy ARS
W5HZ 211 2 10 1,292 STX
Radio Amateurs of the Gorge
KC7KLB 183 2 10 1,282 OR
Washington Amateur Communications
WA3COM 241 2 21 1,202 WPA
Porter Cty ARC
K9PC 73 2 30 1,166 IN
Area Amateur Radio Operators
W9YPS 271 2 15 1,142 IL
Middlesex ARS
W1EOH 262 2 12 1,114 CT
Crow River ARC
KC0KIP 152 2 15 1,104 MN
Nellis ARC
W7W 301 2 15 1,102 NV
SCARE
KB7JAL 297 2 12 1,094 OR
Beloit ARC
W9JSN 234 2 6 1,068 IL
Elkhorn Valley ARC
W0OFK 204 2 10 1,008 NE
Moose ARC
K9SAD 136 2 10 972 IL
Rio Hondo ARC
W6GNS 243 2 22 892 LAX
Gladwin Area ARC
KB8ZML 227 2 20 854 MI
Cascades ARS
W8JXN 254 2 20 852 MI
Saint John ARC
VE9SJA 114 2 6 728 MAR
Calavers ARS
WA6YGA 153 2 13 706 SJV
NASA Glenn ARC
NA8SA 178 2 10 556 OH

4A Commercial

ARA of Southwest Florida
K4YHB 1795 2 54 4,680 SFL
Milwaukee RAC
W9RH 565 2 47 1,972 WI
Radio Ops of South Texas ARC
W5ROS 355 2 8 1,266 STX
ARES of Salt Lake Cty Inc.
K7SLC 307 2 10 814 UT

5A Battery

Zuni Loop Mtn Expeditionary Force
N6GA 1068 5 11 9,620 LAX
TLARC & Explorer Post 30
KC0M 1457 2 20 6,128 MO
Delta ARA
VE7SUN 567 5 9 5,325 BC
NJ QRP Club
WQ2RP 388 5 11 4,525 SNJ
Sisters Repeater Group
KK7TT 393 5 13 2,605 OR
Sheboygan Cty ARC
KB9ZUO 541 2 10 2,026 WI

5A

Huntsville ARC
K4BFT 4366 2 68 13,524 AL
The Udder Club
W1MOO 3598 2 42 11,522 VT
Hoodview ARC
W7Q 3119 2 46 10,210 OR
Loudoun ARG
K4LRG 2810 2 48 10,178 VA
Eastern CT ARA
K1MUJ (+KB1EZU)2967 2 21 9,784 CT
Ozaukee RC
W9LO 2543 2 32 9,526 WI
Palomar ARC
W6NWG (+KC6VDX)
2752 2 30 9,472 SDG
Waterton ARS/Arapahoe Cty ARES
K0A (+KC0GBC) 2383 2 20 8,728 CO
Mt Vernon ARC
K4US 2501 2 32 8,306 VA
Cuyahoga Falls ARC, Inc.
W8VPV 2875 2 27 8,194 OH
Sturdy Memorial Hospital ARC
W1SMH (+N1OFC)
2226 2 31 8,120 EMA
SARA
K2AE 2178 2 10 8,066 ENY
Great South Bay ARC
W2GSB 2459 2 68 8,008 NLI
RF Hill ARC
W3AI 2155 2 21 7,942 EPA
Lake Cty ILL RACES
K9KM (+N9VID) 2104 2 29 7,770 IL
Twin Cty ARC
K9CU 2369 2 25 7,496 IL
Peel ARC
VE3XR 2085 2 50 7,222 ON
Hampden Cty RA
W1NY (+N1INB) 2109 2 35 6,472 WMA
Brazos Valley ARC
W5DPA (+N0JAA)1661 2 20 6,154 STX
Simi Settlers ARC
W6SVS 1669 2 30 6,088 SB
Cuyahoga ARS
NO8A 1730 2 20 5,916 OH
Hazel Park ARC
W8HP (+N8WIQ) 1824 2 36 5,836 MI
South East Texas Amateur Club
NA5TX 1808 2 24 5,756 STX
Boeing Employees ARS-Seattle
K7NWS 1496 2 28 5,710 WWA
Dayton ARA
W8BI 1229 2 43 5,498 OH
RA of Erie
W3GV 1443 2 15 5,440 WPA
Fort Myers ARC
W4LX 1558 2 20 4,858 SFL
BARA
K2BAR 1371 2 21 4,676 NNJ
Smoky Mt. ARC
WHOLE (+KC4PDQ)
1269 2 25 4,652
TN
Butler Cty Amateur Radio Service
K3PSG 1487 2 30 4,530 WPA
York Region ARC
VE3YRA 1241 2 10 4,222 ON
Silvercreek ARA
K8PQ 1253 2 15 3,974 OH
RASON
N1NW 772 2 20 3,922 CT
Cambridge ARC
VE3SWA 1111 2 6 3,880 ON
Highland Cty ARC
K4W 1112 2 18 3,864 WCF
Southboro Rod & Gun ARC
W1SRG 927 2 16 3,764 EMA
Ripley Cty Repeater Assn
KE9DJ (+KB9MGI)1202 2 48 3,700 IN
Las Vegas Field Day 2001
NW7O 812 2 47 3,674 NV
ARES/RACES of Orange Cty Florida
W4MCO 943 2 23 3,582 NFL
Reno Area Metro Simplex Net
NC7RM 906 2 42 3,490 NV
Antietam RA
W3CWC 971 2 8 3,480 MDC
Alliance ARC
W8LKY 914 2 10 3,412 OH
Bluegrass ARS
K4KJQ 823 2 25 3,354 KY
Xenia Weather Amateur Radio Network
WS8B 629 2 45 3,316 OH
Warminster ARC
K3DN 985 2 25 3,070 EPA
Naval Postgraduate School ARC
K6LY 884 2 40 3,062 SCV
Kent ARS
K3ARS 647 2 12 2,972 MDC
Garlic Valley ARC
W6GGF 693 2 7 2,964 SCV
Thin Air Radio Society
KE0MF 837 2 5 2,930 CO
Sojourners
W6SOJ (+KE6MZT)547 2 16 2,920 SV
Egyptian RC
W9PAT 853 2 15 2,906 IL
Midland ARC
W8KEA 742 2 27 2,868 MI
Clear Lake ARC
K5HOU 663 2 84 2,850 STX
Tri County CW ARC
KB3CMW 692 2 31 2,838 WPA
Intercity ARC
W8WE 614 2 30 2,798 OH
Kitchener Waterloo ARC
VE3IC 822 2 12 2,746 ON
Southern Pennsylvania Comm Group
K3AE 696 2 45 2,732 EPA
KE9GM 562 2 10 2,706 IN
South East Metro ARC
W0CGM 639 2 21 2,672 MN
Jacksonville ARS/IL Valley ARC
K9JX 573 2 20 2,658 IL
ICARS
KQ4O 644 2 21 2,630 NC
Broward Cty ARES/RACES
KT4XK 463 2 25 2,574 SFL
Sudbury ARC
VE3ZI 530 2 5 2,494 ON
Bellevue ARC
W0WYV 684 2 20 2,482 NE
Big Rapids Area ARC
N8OE 594 2 30 2,388 MI
Roane Cty ARC
AJ4B 503 2 12 2,228 TN
Russell Cty ARC
KK4MW 639 2 35 2,224 VA
Kamiak Butte Amateur Repeater Assn
KB7ARA 412 2 44 2,164 EWA
Lower Yakima Valley ARC
KK7OE 698 2 12 2,084 EWA
Boeing Employees ARS
KC0AHN 495 2 22 2,076 KS
North Hills ARC
W3EXW 328 2 38 2,068 WPA
Rock River RC
W9TCH 418 2 44 1,990 WI
20/9 ARC
K8TKA 436 2 20 1,928 OH
Eastern Ontario ARC
VE3SAU 533 2 16 1,866 ON
National Trail ARC
K9UXZ 456 2 18 1,816 IL
Satellite ARC
W6AB 490 2 17 1,788 SB
Wisconsin Valley RA
W9SM 302 2 20 1,770 WI
Fort Armstrong Wires Assn
N3VA 497 2 20 1,718 WPA
Waterville Area Wireless Assn
WA1WA 279 2 9 1,708 ME
A.R.E.A. Repeater Club
W9YPC 312 2 6 1,682 IL
Clark Cty ARC
W7AIA 392 2 73 1,622 WWA
DEMARC
KM0D 305 2 23 1,552 MN
Schoharie Cty RA
WA2ZWM 407 2 8 1,514 NNY
Friendly Radio Amateur Team
KI8CY 244 2 17 1,490 OH
White Water Valley ARC
N9JM 242 2 40 1,420 IN
Pine Log Mountain ARA Inc.
W4OE 156 2 27 1,416 GA
Kimberling ARC
K0EI 126 2 25 1,358 MO
Hurst ARC
W5HRC 337 2 19 1,322 NTX
Iron Range ARC
AA9JG 99 2 14 1,156 MI
Radio Amateur Educational Society
VE6RES 148 2 10 1,048 AB

5A Commercial

Illinois Valley RA
K9AVE 2145 2 14 6,782 IL
W4PCF 826 2 25 3,050 GA
LaGrange ARC
AB4GA 722 2 20 2,048 GA
North Coast ARC
N8NC 489 2 23 1,560 OH
Five Flags ARA
W4UC 326 2 20 1,276 NFL
IGLARC
N0SPP 190 2 9 736 IA
Midway ARC
W0KY 237 2 12 610 NE

6A Battery

Orange Cty Radio Amateurs
W4EZ (+KG4NYF) 719 5 42 6,520 NC
Sangamon Valley RC
W9DUA 1074 2 20 4,734 IL
Alexandria RC
W4HFH 800 2 35 2,906 VA
Keuka Lake ARA
N2WEA 515 2 24 2,628 WNY
Stanislaus ARA
W6ERE 350 2 35 2,150 SJV
Durham FM Assn/ARES
N4UBH 356 2 15 2,104 NC

6A

SJRA
K2AA (+N2YAJ) 4252 2 50 14,398 SNJ
United RAC
K6AA 4085 2 28 12,414 LAX
JPL ARC/Caltech ARC
W6VIO (+KC6HUR)3539 2 36 11,816 LAX
Fox River Radio League
W9CEQ 2967 2 54 11,116 IL
Mike and Key Club
K7LED 3541 2 75 10,214 WWA
AK-SAR-BEN ARC
K0USA 2986 2 73 9,316 NE
Larroll Cty ARC
K3PZN 2863 2 15 9,280 MDC
Cherryland ARC
W8TCM 3244 2 33 8,860 MI
Bolingbrook ARS
N9GH 2350 2 50 8,178 IL
DuPage ARC
W9DUP 2319 2 39 7,512 IL
Columbia-Montour ARC
WC3A (+KB3CXP)1906 2 25 7,290 EPA
Gwinnett ARS
W4GR 2050 2 215 6,770 GA
Four Lakes ARC
W9JZ 1591 2 20 6,750 WI
NPARC
VE3VM 1929 2 50 6,338 ON
Gainesville Amateur Radio Operators
K4EAC 1612 2 61 5,654 NFL
Hams Having Fun in Kentucky
AA4NJ 1672 2 24 5,530 KY
Kalamazoo ARC
W8VY 1290 2 26 4,646 MI
Plattsmouth ARC
KB0SMX (+KC0HYD)
1327 2 22 4,616 NE
Southern CA Japanese Ham Club
K6JP (+KC6TQR) 1043 2 20 4,584 ORG
South Bay ARC
W6SBA (+KC6YBJ)953 2 25 4,560 LAX
Northern Berkshire ARC
N1WM 1049 2 35 4,470 WMA
Walla Walla Valley ARC
W7DP 708 2 25 3,774 EWA
West Branch ARA
W3AVK 957 2 12 3,758 EPA
Bay Arenac Tuscola FD Group
N8ZE 814 2 56 3,638 MI
GEARS
W6RHC (+KF6NCX)898 2 54 3,250 SV
Villages ARC
K4VRC 574 2 16 3,246 NFL
Western Carolina ARS
W4MOE 943 2 17 3,192 NC
Big Bear ARC
K6BB 837 2 28 3,130 ORG
SARS
W6CO 569 2 17 3,054 EB
Whitman ARC Inc.
WA1NPO 690 2 20 2,930 EMA
Central Massachusetts ARA
W1BIM 795 2 23 2,892 WMA
Southern Michigan ARS
W8DF 830 2 27 2,834 MI
Kings Cty Repeater Assn ARC
WA2ZWP 620 2 54 2,706 NLI
K8QIK 752 2 20 2,676 OH
Poinsettia ARC
K6NE 583 2 9 2,420 SB
Ventura Cty ARC
K6MEP 470 2 35 2,410 SB
Lakeway ARC
N4PH 509 2 34 1,954 TN
Muskegon Area Amateur Radio Council
W8ZHO 323 2 13 1,946 MI
Skywide ARC
VA3SKY 423 2 18 1,910 ON
The ARL of Lawrence Cty
W3FY 324 2 11 1,846 WPA
Bakersfield ARA Inc.
W6BAR 282 2 20 1,364 SJV

6A Commercial

Plateau ARA/Black Diamond ARC
NM8T 1261 2 90 3,680 WV
Tompkins Cty ARC
AF2A 474 2 23 1,292 WNY

7A Battery

Durham Region QRP Club
VE3QDR 1105 5 10 11,150 ON

7A

Lake Cty ARA					
N8BC (+N8NGU)	3925	2	25	12,150	OH
Wheaton Community Radio Amateurs					
W9CCU	2814	2	55	9,498	IL
Murgas ARC					
K3YTL	2702	2	37	9,160	EPA
Santa Cruz Cty ARC					
K6BJ	2671	2	55	8,210	SCV
Philmont Mobile RC					
W3BM	2195	2	26	7,934	EPA
Lake Monroe ARS					
N4EH (+KE4BEZ)	1916	2	95	6,876	NFL
Birmingham ARC					
W4CUE	2430	2	50	6,570	AL
Butler Cty ARA					
W3UDX	1641	2	36	6,066	WPA
RC of Tacoma					
W7DK	1561	2	55	5,898	WWA
ARC of El Cajon					
WA6BGS	2048	2	40	5,514	SDG
Central NH ARC					
W1JY	1350	2	39	5,132	NH
Rockford Area Hams					
KA9IMX	897	2	25	4,562	IL
Boston ARC					
W1BOS	823	2	20	4,388	EMA
North Fulton ARL					
ND4D	1052	2	25	4,376	GA
NOMADS					
N0TM	1286	2	7	4,142	CO
Everglades ARC					
W4SVI	756	2	25	3,242	SFL
BEARS of Manchester					
W1BRS	787	2	12	3,092	CT
ARS of Savannah and Coastal ARS					
W4S	766	2	45	2,872	GA
Cleveland ARC					
W4GZX	311	2	15	2,128	TN
Yolo ARS					
K6UO	229	2	23	1,902	SV
Laurel Highlands VHF Society					
N3ASE	229	2	17	1,316	WPA

8A Battery

Alameda Cty RC					
N6WG (+KC6LVI)	1110	5	25	10,055	EB
Palmetto ARC					
WE4B	737	2	11	2,740	SFL

8A

Western ARA					
N6ME (+KF6VSW)	5453	2	23	17,362	ORG
Raleigh ARS					
W4DW	3627	2	42	10,828	NC
Mississauga ARC					
VE3MIS	1384	2	33	5,692	ON
Warren ARA					
W8VTD	1350	2	36	5,450	OH
Tulsa ARC					
W5OK	1317	2	110	5,262	OK
Radio Society of Tucson					
K7RST	1710	2	12	4,620	AZ
Mt Tom ARA					
W1TOM	1147	2	37	4,058	WMA
ARA Long Beach					
W6RO	1052	2	92	3,998	LAX
Mahoning Valley ARA					
W8QLY (+KB8GDW)	1047	2	50	3,846	OH
Kendall ARS					
KB5TX	724	2	25	3,352	STX
Clarksville Amateur Transmitting					
KF4L	660	2	53	3,164	TN
Toledo Mobile RA					
W8HHF	410	2	27	2,370	OH

9A

Gloucester Cty ARC					
W2MMD	2218	2	19	8,140	SNJ
Crawford Cty ARC					
W8BAE	1148	2	66	3,778	OH
Triple "A" ARA, Inc.					
AC3J (+KB3BQR)	1012	2	47	3,596	WPA

10A Battery

Ventura Cty ARS					
N6R	908	5	20	6,895	SB

11A

Kern Cty Central Valley ARC					
W6LIE	740	2	50	3,366	SJV

12A

South Pickering ARC					
VE3SPC	2164	2	60	9,292	ON
10-70 Repeater Assn Inc.					
N2SE	1804	2	54	7,832	NNJ

14A Battery

Conejo Valley ARC					
AA6CV	983	5	20	8,930	SB

14A

El Dorado Cty ARC					
AG6AU	1605	2	24	5,854	SV

15A

Woodbridge Wireless					
W4IY (+KC4KOL)	6572	2	68	22,056	VA

16A Battery

Utica Shelby Emerg. Comm. Assn					
K8UO	2111	5	153	19,015	MI

18A

West Valley ARA					
W6PIY	4089	2	110	14,576	SCV

23A

Nashua Area RC					
N1FD (+KB1EFF)	4484	2	80	15,740	NH

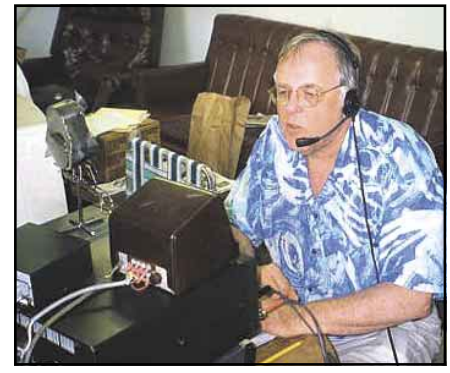
26A

PVRC/CARA					
W3AO (+W3AMY)	10141	2	40	31,760	MDC

1B-1 Op Battery

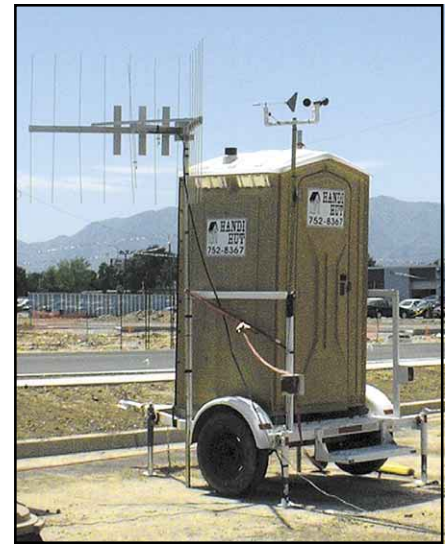
K0MF	830	5	1	8,670	CO
AB4I	569	5	1	5,990	VA
W7QC	535	5	1	5,825	ID
K9AY	535	5	1	5,515	WI
W7EL	517	5	1	5,470	OR
K3ONW	509	5	1	5,190	EPA
AB7E	474	5	1	5,040	AZ
WU0L	412	5	1	4,520	CO
W3TS	407	5	1	4,370	EPA
K7RE	396	5	1	4,160	AZ
K5WNH	395	5	1	4,050	NTX
K0AD	843	2	1	3,540	MN
WS8H	418	5	1	3,430	WV
N7RVD	319	5	1	3,390	WWA
N6VZ	311	5	1	3,285	OR
WA7LNW	321	5	1	3,205	UT
W3CB	225	5	1	2,950	MDC
KW9R	255	5	1	2,750	WI
N4HB	267	5	1	2,650	SC
N9JR	255	5	1	2,650	WI
AC4XO	234	5	1	2,540	VA
WD7Y	219	5	1	2,390	NV
K4RDU	229	5	1	2,390	VA
AE9K	208	5	1	2,380	WI
KD6RDO	195	5	1	2,350	SB
W2UX	224	5	1	2,340	SC
W1EUY	221	5	1	2,310	EMA
N0FPE	331	5	1	1,965	MO
AB2AN	158	5	1	1,880	NNJ
AB0GO	175	5	1	1,850	CO
WA0NLK	175	5	1	1,850	CO
WA6BOJ	266	5	1	1,805	SCV
K7IA	146	5	1	1,760	NM
AA9DH	157	5	1	1,670	IL
N7AC	188	5	1	1,650	SV
KF0T	137	5	1	1,570	MN
K3TW	123	5	1	1,530	MDC
WA8REI	139	5	1	1,490	MI
KI0II	115	5	1	1,380	CO
AE4EC	97	5	1	1,365	NC
K7EN	505	2	1	1,226	UT
W1HUE	102	5	1	1,220	ID
K4JSI	112	5	1	1,220	MDC
VE6TN	104	5	1	1,165	AB
AB2JL	170	5	1	1,150	WNY
WD4IFN	97	5	1	1,070	NC
NF7U	472	2	1	1,044	SJV
W6AQ	82	5	1	1,035	UT
W3WT	71	5	1	1,005	EPA
WB5BEK	76	5	1	960	STX
K1ES	215	2	1	960	SV
KP4/AA3GM	99	5	1	945	PR
WA4CIT	70	5	1	900	NC
W2BVH	70	5	1	900	NNJ
N1IE	111	5	1	895	SV
KB8PMY	69	5	1	890	OH
KE6LBX	57	5	1	835	SDG
KB5ENP	134	2	1	814	OH

Some of the operators at the Historical Electronics Museum ARC (W3GR) in MDC proudly display their Field Day 2001 T-shirts.



Hudson Division Director Frank Fallon, N2FF, took a stint as operator of the Order of Boiled Owls KW2O station that took top honors in the 2A Commercial category.

If the engine conks out, W3ET can rig sails to help navigate in his /MM operation from SNJ.



The dedication of the Bridgerland ARC (UT) W7IVM to maximize operating opportunities is commendable.

WD6DX	69	5	1	790	SCV
N7JI	53	5	1	730	OR
AC7GM	75	5	1	730	MT
N4IY	35	5	1	725	WTX
WA4HLV	42	5	1	720	TN
N4QX	108	2	1	710	CT
W7XT	15	5	1	710	MT
WS2N	117	2	1	614	NLI
WA0CBW	78	5	3	590	KS
WD9EWK	47	5	1	585	AZ
KC0CCR	25	5	1	570	KS
W7BMI	71	5	1	555	MT
KB8HTM	36	5	1	550	MI
WB6FDY	223	2	1	546	UT
W7FH	29	5	1	545	UT
W0SD	205	2	1	524	YU
WD0K	83	5	1	515	MN
KD5JAA	137	2	1	506	NM
WB6VIC	150	2	1	500	LAX
WB2DLA	30	5	1	500	NLI
KD5LX	72	5	1	500	CO
N6ESV	28	5	1	480	SV
W6IU	36	5	1	460	EB
WX7G	84	2	1	436	ID
W0MDS	27	5	1	435	NE
KJ6CA	38	5	1	435	ORG
N8XA	47	5	1	435	OH
W6ESL	45	5	1	425	CO
KB9DVC	161	2	1	422	IL
WA3LGG	22	5	1	410	EPA
KJ7LO	45	5	1	370	AZ
K1VSC	44	5	1	320	CT
W5ACM	43	5	1	315	LAX
NO7UP	48	2	1	292	EWA
AA5SJ	36	5	1	280	STX
W4RL	9	5	1	275	NFL
WU0I	13	5	1	265	SJV
W9KHH	40	2	1	260	MI
W4QDV	28	2	2	258	GA
K6PDQ	27	2	1	254	SB
WA6KHH	72	2	1	244	SDG
VO1DZA	4	5	1	240	NL
W8KNO	63	2	1	226	OH
W2RS	1	5	1	205	NNJ
N0ADF	1	5	1	110	SFL
N1GNV	1	5	1	105	CT

1B-1 Op

N0AT	1024	2	1	4,526	MN
N2MR	631	2	1	2,724	SNJ
W1VR	1148	2	1	2,650	NFL
N7ETC	417	2	1	1,768	WWA
KR5F	327	2	1	1,608	NTX
KU7K	510	2	1	1,590	OR
K6CSL	313	2	1	1,090	SJV
W5ZO	283	2	1	1,056	WTX
WA2DFI/3 (+W3MC)	232	2	1	1,028	MDC
W4AWM	313	2	1	952	VA
AA8PI	125	2	1	900	MI
WA7ZWD	395	2	1	890	WWA
WZ5Q	210	2	1	820	OK
N8KZG	350	2	2	800	MI
AA9UF	179	2	1	780	IL
AB7QG	319	2	1	738	UT
WB8EEJ	170	2	1	620	MI
N4TII	258	2	1	616	GA
W0MQE	131	2	1	490	OK
W0RK	140	2	1	480	MN
KF4MQ	179	2	1	458	NC
K3TJM	161	2	1	422	WPA
AC7JC	99	2	1	398	EWA
WA8JSF	147	2	1	394	MI
WD4NIT	15	2	1	230	GA
W7JAM	76	2	1	152	MT
N3WWN	7	2	1	114	WPA

1B-1 Op Commercial

WE1USA (WA1LNP,op)	1200	2	1	4,800	NH
K0TG	410	2	1	1,512	MN
K1YZ	309	2	1	818	EMA
WB7D	225	2	1	550	KY
N0DLS	139	2	1	378	MN
N2TMT	110	2	1	220	ENY
WE7G	49	2	1	196	UT
KK0DX/4	20	2	1	40	NC

2B-1 Op

KW8N	1575	2	1	6,106	OH

2B-1 Op Commercial

N8IA	700	2	1	2,626	MI

1B-2 Op Battery

W5YA (KT5X,WD9FJL,ops)	910	5	2	9,005	NM
W8DL (+W8HRQ)	811	5	2	8,410	WV
K7QD (+W7ZRC)	770	5	2	8,000	ID
W9HB (+KF9D)	607	5	2	6,370	WI
N7QT (+WA7NCL)	556	5	2	5,760	EWA
N7SR (+KJ7G)	524	5	2	5,640	UT
W8OK (+NI8N)	492	5	2	5,020	OH
AD5AC (+KM50L)	733	5	2	4,565	NTX
N8BL (+ K8RL)	407	5	2	4,460	WV
W4NI (+N4GHU)	310	5	2	3,695	TN
K2WNY (K2SH, K2UD ops)	348	5	2	3,570	WNY
K3SS/7 (+WF4U)	359	5	2	3,260	UT
K6YS (+ W6GKF)	288	5	2	2,980	EB
AB0FX (+N0RU)	281	5	2	2,840	NE
W7TAO (N7CEE,K7ZEN,ops)	240	5	2	2,800	AZ
N2MN	257	5	2	2,780	NNJ
K1DFT (+KA1RM)	230	5	2	2,400	EMA
AK2S (+WB2PKG)	179	5	2	2,290	SNJ
K6SB (AD6VB,W6GL,ops)	667	2	2	2,206	OR
N5GEN (+ W4HBC)	155	5	2	2,150	AL
W0YHE (+W0RC)	208	5	2	2,075	MN
W7POE	442	2	2	2,068	OR
VE3EQP (+ VE3IMG)	305	5	2	1,725	ON
N1XT (+ N1MGB)	239	5	2	1,720	ME
VE3WZ	134	5	2	1,485	ON
VE3ESN (+VA3ESN)	491	2	2	1,482	ON
K3MT (+KF4LGR)	289	2	2	1,276	VA
K7GGG (+AA0P)	446	2	2	1,114	AZ
VE5/N0OND (+VE5/N0PZP)	199	2	2	1,106	SK
WB8TGY (+WB8EET)	97	5	2	1,070	MI
K2QR (+K2OH)	70	5	2	995	WNY
AA3GE (+WC3Z)	78	5	2	800	EPA
KI5SQ (+ KI5UD)	97	5	2	785	NM
N5NSC (+K5HPF)	41	5	2	740	STX
KF6RGW (+ KF6RGV)	45	5	2	725	LAX
WB6ZPB (+ W6DIV)	174	2	2	548	ORG
KF6UVB	20	2	2	540	EB
N7CFO	101	2	2	502	WWA
N4AX (+ KG4LAX)	128	2	2	434	AL
W0PTU (+N0PCV)	155	2	2	410	CO
WB4HUX	29	5	2	410	AL
WA2EZG (+ KC2APD)	14	5	2	270	NNJ

1B-2 Op

W8TK (+K4LT)	1433	2	2	6,332	OH
W2BC (N2DC, K2KIR ops)	1250	2	2	5,500	WNY
NN7S (+N7JKF)	1170	2	2	5,380	MT
K8RYU (+N8NMA)	1245	2	2	5,118	OH
KK9J (+KF9T)	1270	2	2	5,060	WI
VE6KZ (+VE6KC)	722	2	2	3,188	AB
NE9U (+KB9TTO)	649	2	2	2,250	WI
WB6TIK(+WB6AJE)	549	2	2	1,918	LAX
KE0RR (+NR0T)	606	1	2	1,006	MN
K8AO (+KA8WOI)	338	2	2	876	MI
NV7YL (+ K7NHP)	101	2	2	802	NV
AC7GL (+N7JGP)	286	2	2	682	ID
N2WDS (+N2XPG)	161	2	2	522	WNY
WE7H (+ K7CXY)	126	2	2	452	AZ
K0NET (+W5JAK)	171	2	2	442	CO
KC0IUW (+KC0IUY)	148	2	2	396	KS
W7CNN (+N7JAN)	38	2	2	276	WWA

1B-2 Op Commercial

W0LTL (+ KE6HPX)	202	2	2	758	AZ
KA0ZPP(+KA0ZIA)	144	2	2	388	ND
VA2REH (VE2HPS, VE2NTM)	46	2	2	92	QC

2B-2 Op Battery

K4FB (+ N4DL)	623	5	2	6,360	WCF
W0QE (+ W0JZ)	1870	2	2	5,608	CO
W9UR (+K4AT)	430	5	2	3,950	IN
N8EFO (+N8MPF)	320	5	2	2,995	OH
N3GWZ (+WH6CMI)	225	5	2	2,290	MDC
N6MBY(+K6RHB)	226	5	2	2,030	SB
K7EL (+K7RK)	110	5	2	1,340	OR
VE6ZC (+VE6VH)	119	5	2	1,265	AB
KA1DDB (+KC9XJ)	59	5	2	1,090	MI
NT1M (+ WO1G)	55	5	2	1,050	EMA
VE3CG (+VA3MD)	112	5	2	1,050	ON
NZ5A (+KD5EUL)	550	2	2	728	STX

2B-2 Op

K8IJ (+K4FBP)	888	2	2	3,752	WCF
KK7UV (+ KE7NO)	1237	2	2	3,546	MT
K9S(K9OM,KB9SJR,ops)	689	2	2	2,782	IL
K2EI (+K0CCM)	674	2	2	2,420	NM
WR4F (+W4UDX)	882	2	2	2,296	KY
K8CAV (+KF8JW)	372	2	2	1,912	OH
W0ZVY (+KB0MCG)	377	2	2	1,454	IA
KB9XA (+N9EUC)	414	2	2	1,444	IN
WO9K (+KB9CTJ)	353	2	2	1,338	IL
WB4YDL (+KQ4UB)	363	2	2	1,298	TN
K5JCL	251	2	2	1,024	NTX
KG8HZ (+ N8LUK)	308	2	2	982	MI
N7MJW (+KG7NN)	277	2	2	868	MT
KB2CHY (+N2UNV)	67	2	2	434	WNY

Mobile Stations

1C

AA4G/MM	1386	2	8	5,148	WCF
AA6DP	1121	2	5	3,504	LAX
K5ALU	834	2	2	3,336	AR
NX0X	570	2	5	1,886	MN
VE3FGU/MM	508	2	1	1,810	ON
AA0PO	865	2	1	1,730	MO
W3TB	363	2	2	1,448	CT
N8LXR/M	338	2	1	1,262	EPA
N5RP	378	2	1	1,080	SJV
N0HR	304	2	1	896	IA
N9TO	387	2	4	774	IL
N8NA	191	2	1	764	DE
W3CDE	172	2	1	652	GA
N9KO	220	2	1	648	IL
CG2AWR	184	2	1	648	QC
N9YYM/VE1	302	2	2	604	MAR
N5UW	143	2	1	572	OK
K0IO	164	2	1	564	IA
N0IVN	258	2	1	516	CO
K8TL	130	2	2	464	OH
K1DW	160	2	1	458	STX
W7ON	224	2	2	448	AZ
NY0Q	105	2	1	420	CO
N6DW	177	2	1	382	SV
WO8L	99	2	1	382	NC
W3ET/MM	151	2	3	382	SNJ
K5VHH	168	2	1	336	STX
KA5FQA	151	2	1	302	OR
N3KLJ	100	2	2	252	EPA
WL7SG/MM	120	2	1	240	SF
K7CN	60	2	1	230	WWA
N0CQI	111	2	2	222	NE
W0TLS	87	2	1	174	IN
KK7OA	87	2	1	174	AZ
KB0CY	75	2	2	150	MO
N6PA	70	2	1	140	SB
W8AN	66	2	2	132	OH
W8HF	52	2	1	104	OH
WA2IAU	37	2	1	94	SNJ
K7YXZ	43	2	1	86	OR
KA9IVY	40	2	1	80	KS
KF6HKM	36	2	1	72	LAX
W9KJ	34	2	1	68	IA
KE3FL	16	2	1	54	MDC
KM5N	13	2	1	50	NTX
NL7RD	41	1	1	41	AK
N0SCE	20	2	1	40	NE
KC7GNM	40	1	1	40	GA
NX9T	39	1	1	39	NC
KB5EKX	19	2	1	38	AR
W9TQV	16	2	1	32	VA
N9JB/4	16	2	1	32	KY
KB3CSW	14	2	2	28	GA
WD8PYO	9	2	1	18	OH

2C

VE3MB/MM	117	2	4	234	ON
W9KI	19	2	1	38	SC

Home Stations Commercial Power

1D

W0ZP	1505	2	1	4,892	CO
AA2MF	1401	2	5	4,714	NLI
K8CCV	1123	2	2	2,534	OH
K9WWT	582	2	1	2,138	IN
NN0C	551	2	1	2,126	IA
AD4MV	882	2	1	1,764	NFL
VE2JCW	433	2	1	1,732	QC
W7OM	1126	1	1	1,692	WWA
K4PB	411	2	1	1,626	SFL
N2BJ	1593	1	1	1,593	IL
VE2GB	388	2	2	1,552	QC
K9ZO	468	2	1	1,502	IL
WM6J	301	2	1	1,204	ORG
K4FDK	299	2	1	1,196	KY
VE2CQ	356	2	30	1,106	QC
W7BX	319	2	1	1,054	OR
W8UE	254	2	1	1,016	MI
W7ZMD	272	2	1	1,006	AZ
W3IN	248	2	1	992	MDC
N8XP	247	2	1	988	OH
WB8RC	975	1	5	975	SD
VE2FC	243	2	1	972	QC
W6TK	670	1	1	895	SB
KA8YIT	438	2	1	876	OH
W7GAM	182	2	1	728	NFL
KG4MCI	213	2	2	676	SC
K9QVB	160	2	1	640	IL
K1STM	157	2	2	628	CT
K9PPW	165	2	1	628	IL
K3NP	289	2	1	608	NC
N1YS	151	2	1	572	AZ
KS4TD	186	2	1	550	TN
KV6RO	272	2	1	544	SF
K4BXD	131	2	1	524	NFL
WA3AAN	130	2	1	520	EPA
KE6QR	198	2	1	510	EB
K0COP/4	124	2	1	496	SC
K9HS	194	2	1	472	IL
WB1GSO	234	2	1	468	NM
W5USJ	116	2	1	464	NTX
W1HZH	221	2	1	442	NH
WO2N	107	2	1	428	NLI
WR5O	105	2	1	420	WTX
KD4HTX	125	2	1	402	NC
K3ESS	198	2	1	396	NFL
NQ7X	97	2	1	388	AZ
WA2AGE	93	2	1	372	SV
N6YIH	79	2	1	316	ID
KB6HT	156	2	1	312	LAX
VE3BKZ	91	2	2	308	ON
WG7X	284	1	1	307	WWA
K8CPA	92	2	1	292	MI
WB7CFD	146	2	1	292	AZ
KC0BOM	134	2	1	292	IA
N1MHH	142	2	1	284	WMA
KO8S	86	2	1	278	MI
NP2DJ	139	2	1	278	VI
K8JMC	138	2	2	276	MI
W4JZZ	117	2	1	276	NFL
AB8AG	136	2	1	272	OH
VE2DWE	135	2	1	270	QC
W3JM	134	2	1	268	EPA
VE5JZ	67	2	1	268	SK
N3CB	132	2	1	264	EPA
K4SRD	122	2	1	260	VA
W5QHS	126	2	1	252	STX
WA9DBJ	121	2	2	242	IL
KC3T	108	2	2	242	MDC
KG0LD	120	2	1	240	NE
W9BJ	118	2	1	236	IN
N4MM	79	2	1	232	VA
WA5YKS	114	2	1	228	NTX
W9IFR	112	2	1	224	IL
WA2BMH	118	1	1	223	NNJ
K4EZS	92	2	1	222	TN
NA6EE	109	2	1	218	EB
N2LQQ	107	2	1	214	WNY
N2QJN	103	2	1	206	NNJ
AA6EE	51	2	1	204	SDG
KB4XE	101	2	1	202	SFL
N7OOO	63	2	1	196	WWA
N1VOR	93	2	1	192	WMA
WB3FPL	188	1	1	188	EPA
N9XO	47	2	1	188	IN
AC6YC	84	2	1	188	SV
W6PRI	44	2	1	176	SCV
WA1UMA	68	2	1	170	EMA
K3VMS	84	2	1	168	SNJ
N5LUL	48	2	1	164	WTX
N9ESH	54	2	1	162	IL
WD4CBZ	74	2	1	156	NFL
KA6FBB	77	2	1	154	ORG
WK8T	77	2	1	154	OH
W9NWY	76	2	1	152	WCF
K3YZ	75	2	1	150	EPA
WA1JHW	75	2	1	150	EMA
KB3FYL	75	2	1	150	EPA
WA8AEG	37	2	1	148	MI
KB7L	73	2	1	146	WWA
WD6LL	72	2	1	144	SV
NJ6A	142	1	1	142	ORG
KA0ITA	66	2	1	132	KS
AK6DV	60	2	1	120	EB
WA6RND	30	2	1	120	ORG
W2QOB	58	2	1	116	SNJ
K0CIE	29	2	1	116	OK
AA9NF	57	1	1	114	IL
WA0OTV	57	1	1	114	MO
KB9Q/3	56	2	1	112	WPA
N9ZUT	55	2	1	112	IL
N8EXS	54	2	1	108	MI
WP4LNY	52	2	1	106	PR
AB0LJ	52	2	1	104	MO
K0WXF	26	2	1	104	MO
KB9VNO	51	2	1	102	IL
W1DAD	101	1	1	101	NH
N8JO	47	2	1	94	SC
KC5ZJR	43	2	1	86	NTX
N6SR	21	2	1	84	SB
N4DJY	42	2	1	84	TN
CG2GWL	42	2	1	84	QC
KC7FNL	41	2	1	82	AZ
N3SZW	40	2	1	80	MDC
N1MD	20	2	1	80	CT
KD7JGJ	36	2	1	72	AZ
VA3IX	32	2	1	70	ON
KC5OZT	35	2	1	70	NTX
WB2VBN	35	2	1	70	NNJ
KD5AHG	29	2	12	70	MS
N4JN	33	2	1	66	TN
WB2CIC	31	2	1	62	NFL
N4HAI	29	2	1	62	OH
WBZDVU	16	2	1	62	WNY
KT7G	17	2	1	62	WWA
K4IJK	30	2	1	60	RI
W4OGG	54	1	1	54	TN
N0LL	27	2	1	54	KS
K7II	26	2	1	52	WWA
W3SKL	21	2	1	52	NFL
KC0HUJ	25	2	1	50	KS
N9SK	50	1	1	50	IN
AL4K	25	2	7	50	AK
AC7MC	25	2	1	50	AZ
KB6MP	24	2	1	48	EB
WB5CIT	12	2	1	48	STX
WA6KUP	22	2	1	46	SV
KS4GW	19	2	1	44	SFL
WA7BME	22	2	1	44	UT
KA7IEN	19	2	1	38	WWA
AB8IS	19	2	1	38	OH
KB1BRN	17	2	1	34	VT
WA2BKN	16	2	1	32	NNJ
K1EJ	15	2	1	30	EMA
KD5BED	13	2	1	26	MS
AB0OX	13	2	1	26	MO
KD4RKJ	23	1	1	23	TN
WA3GQU	10	2	1	20	WPA
K1MOM	10	2	1	20	NH
WB6YZC	9	2	1	18	ORG
VE7SSJ	8	2	1	16	BC
KA1RWY	6	2	1	12	CT
K9LDW	6	2	1	12	NTX
W7BWI	5	2	1	10	AZ
N9WDV	4	2	1	8	IL
W3QYL	4	2	1	8	MDC
N1ZGY	3	2	1	6	EMA
KC8OIT	1	1	1	1	MI

2D

W6EEN	2559	1	1	2,673	ORG
AF4NP	1020	2	8	2,150	AL
N3BEA	636	2	10	1,924	WPA
K2FA	551	2	5	1,814	WNY
W5DAR	614	2	30	1,586	NM
K2BNL	499	2	10	1,268	NLI
KA5B	403	2	5	852	NM
W5RRR	344	2	3	836	STX
WB8RVK	243	2	12	724	MI
W0XK	265	2	2	636	MO
W5LEX	288	2	12	576	STX
WN3M	179	2	8	514	WPA
NT1N	207	1	1	406	CT
N9ZWY	146	2	2	360	WI
W2EGB	134	2	22	286	ENY

3D

W1CRS	847	2	5	1,820	CT
W1AW	449	2	5	1,362	CT
K7RDG	631	1	24	654	AZ
W1ORS	199	2	6	652	CT
W8BAP	261	2	12	522	OH

7D

NU4A	1873	2	30	4,290	AL

Home Stations Emergency Power

1E

N4BP	1092	5	2	10,920	SFL
W6JTI	626	5	2	6,260	SF
AA3B	1416	2	1	5,664	EPA
W0CP	1435	2	3	5,548	CO
N2WJ	355	5	1	3,550	NNJ
K8CV	339	5	1	3,390	MI
VE1OP	751	2	1	3,004	MAR
N8NS	299	5	1	2,990	WV
K4OAQ	741	2	1	2,964	VA
N5MW	1176	2	4	2,956	WTX
K4YTZ	1063	2	12	2,554	SC
AA1O	249	5	1	2,490	EMA
N5PU	1110	2	2	2,320	MS
WB8RTJ	228	5	1	2,280	OH
N7WS	1040	2	1	2,080	AZ
W9NN	515	2	1	2,060	WI
W7RH	203	5	1	2,030	ID
W7GB	503	2	1	2,012	EWA
VA7DP	1000	2	1	2,000	BC
W4SAA	491	2	1	1,964	SFL
W9DZ	220	5	1	1,935	IN
N5AT	625	2	6	1,914	AR
WO6M	425	2	1	1,678	LAX
AB4EL	185	5	1	1,625	NC
N2CQ	161	5	1	1,610	SNJ
W3DP	154	5	1	1,540	EPA
W4VG	154	5	1	1,460	VA
WF3M	375	2	1	1,436	EPA
K6CEQ	140	5	1	1,400	SDG
W3GN	349	2	1	1,396	MDC
KE8PX	478	2	1	1,372	OH
W6GA	131	5	1	1,310	ORG
W4ZKE	313	2	1	1,252	KY
KI0E	300	2	1	1,200	ND
K2OGT	299	2	1	1,196	EPA
WO2B	117	5	1	1,170	CT

KD7CTF	115	5	1	1,150	OR
WR4I	115	5	1	1,150	VA
K6UF	339	2	3	1,138	SCV
KC8ELY	558	2	7	1,116	MI
KC0BGA	114	5	1	1,105	CO
K5EEE	550	2	1	1,100	SFL
K0GEO	339	2	1	1,094	STX
W1JAA	540	2	1	1,080	SC
N2MTG	515	2	1	1,030	ENY
K3HX	101	5	1	1,010	WPA
K0INT	296	2	7	968	LAX
W8GBH	298	2	1	964	OH
N7NB	127	5	1	950	WWA
K1IF	943	1	2	943	UT
K3IVO	394	2	7	934	MDC
N8CS	247	2	1	892	OH
N8NX	345	2	1	796	MI
NK6A	78	5	1	780	LAX
N3FJP	290	2	3	708	MDC
K7SMW	68	5	1	680	EWA
K4OE	320	2	1	640	AL
WN3C	154	2	1	616	MDC
KE4UKY	150	2	6	600	VA
KS4YX	308	1	1	593	SC
K9FOH	59	5	1	590	IN
KB6TR	229	2	1	578	SCV
W1JN	184	2	1	574	CT
VE3WMB	61	5	1	570	ON
N6TW	196	2	1	554	LAX
KD0ZS	269	2	1	538	WY
W5ORM	133	2	1	532	NTX
KE4YZE	53	5	1	530	NFL
K5NRK	264	2	1	528	MS
W3MWY	52	5	1	520	MDC
KR8L	91	5	2	515	ID
N0FCD	255	2	1	510	IA
W2CVW	54	5	1	505	NNJ
N3OUI	246	2	4	492	EPA
KB8NUF	159	2	1	490	MDC
K6III	58	5	1	475	SCV
KB1EHE	231	2	4	462	CT
N7CVW	230	2	1	460	WWA
AC6TU	45	5	1	450	LAX
N4EK	108	2	1	432	NFL
N2EZY	43	5	1	430	IN
KB9RNM	40	5	2	400	IL
KZ2G	35	5	1	350	NLI
KE9PH	139	2	1	324	IL
W1CZD	80	2	1	320	RI
WA4GNI/7	79	2	1	304	WWA
K9IM	116	2	2	294	IL
K0YG	143	2	1	286	CO
AF4ET	138	2	2	276	SC
KB6CC	131	2	1	262	CO
N5QG	76	2	1	252	NTX
WA0KIU	119	2	1	238	SV
N8EN	115	2	1	230	MI
N5IAC	115	2	1	230	NM
AA6IY	22	5	1	220	SCV
N6SK	107	2	1	214	ID
K6TY	50	2	2	200	LAX
AC7IB	99	2	2	198	OR
KK6IF	191	1	1	191	AZ
W9FL	65	2	1	190	WI
KB9AFW	95	2	1	190	MI
WD5AGO	38	5	1	190	OK
VE6RTL	57	2	1	184	AB
KB2OMM	91	2	1	182	WNY
KD4BRJ	90	2	1	180	NFL
N5JDE	84	2	1	168	LAX
WB6YYZ	70	2	1	146	EPA
KA3AVB	72	2	1	144	WPA
W2DWR	28	5	1	140	NFL
WB2TVB	25	5	1	135	LAX
N9WW	19	5	1	125	ME
KB7HJM	30	2	1	120	EWA
KE4QDM	58	2	1	116	MI
KS6Q	58	2	1	116	EB
KB9WPP	37	2	1	74	IN
AL7EB	10	5	1	70	AK
N9URZ	20	2	1	40	WI
W7CSX	8	5	1	40	WWA
KB9PXB	7	5	1	35	IL
KB9RDS	5	5	1	25	ND
KC7PVD	11	2	1	22	UT

2E

W0AA	768	5	6	6,885	MN
K4CMS	666	5	4	4,765	KY
K8AJR	1758	2	12	4,756	OH
VE6FI	2002	2	4	4,004	AB
K9YHB	427	5	5	3,650	IL
W5ROK	1190	2	6	3,530	NTX
N0AX	507	2	5	1,812	WWA
KQ2F	491	2	3	1,676	NLI
W5CS	789	2	18	1,668	AR
W8DYY	639	2	30	1,648	OH
W3HGT	480	2	5	1,366	NC
VA7CC	895	1	4	1,290	BC
WB2ELW	483	2	18	1,234	WNY
KZ1O	357	2	3	1,228	NH
W6ZO	174	5	1	1,030	EB
W9JOZ	281	2	6	662	IN
N8KCL	281	2	3	598	OH
N4QLX	268	2	9	536	NC
NN9X	158	2	6	390	IN
W6YOB	123	2	2	380	SF
KB5ILY	161	2	2	322	AR
KD5LJS	91	2	6	182	AR
KD4EVB	60	2	5	120	KY
KB9JLF	1	5	2	5	IN

3E

KT0R	4084	1	3	5,282	WI
K5HLA	1753	2	20	5,110	STX
W9DA	407	5	3	3,920	IL
K6SS	875	2	5	3,406	ORG
W8PIF	1036	2	11	3,322	WI
W3KWH	1111	2	20	3,194	WPA
K4RRC	1291	1	4	2,582	NC
VE6RH	695	2	7	2,120	AB
N5BL	461	2	28	1,098	NM
W0SV	441	2	10	1,066	MN
W5SLA	358	2	20	922	LAX
VE3WRC	326	2	5	856	ON

4E

W7GG	5352	1	10	6,583	OR
W4UEA	1248	2	4	2,496	NFL
K8JAC	792	2	5	1,780	WV
W8ZZV	201	1	24	201	OH

5E

K5ER	764	2	6	1,650	LAX

6E

W6YX	4722	2	22	13,902	SCV
W8Q	1899	2	29	4,916	OH
W3MRC	1235	2	17	2,648	STX

11E

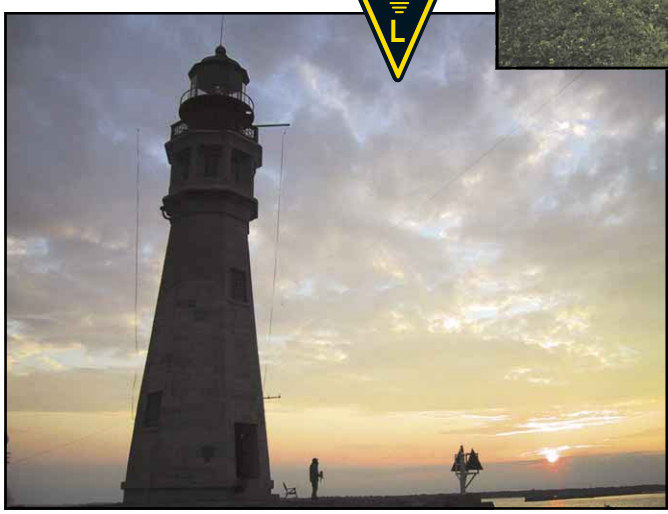
W4WVP	205	2	13	632	VA

Gabriel, KB1GTZ, gains valuable skill while manning the Novice/Tech Plus station at the Fidelity ARC (RI) W1MB 2A operation.

The Dade County (MO) Amateur Radio Group received tremendous support from the local served agencies. Visitors to their site included representatives of the Missouri Highway Patrol, the Cox Air Care medical helicopter services of the local EMS, the Greenfield Fire Department and the Dade County Sheriff's Department complete with K-9 corps.

See you next year!

June 22-23, 2002



The Buffalo Lighthouse Amateur Radio Crew operated as W2L from the Buffalo, New York, Coast Guard Station lighthouse. If you look closely, you can see the transmission lines silhouetted against the sunset.

The Sojourners, W6SOJ, used their Novice/Tech Plus station to good advantage as Jessica, KG6GNR, operated as Siskiyou County EC Nannette, KE6MZT, observes. QST

2002 ARRL January VHF Sweepstakes

1. Object: To work as many amateur stations in as many different 2 degree × 1 degree grids as possible using authorized frequencies above 50 MHz. Foreign stations work W/VE amateurs only.

2. Date and Contest Period: The weekend before the NFL Super Bowl. Begins 1900 UTC Saturday, ends 0400 UTC Monday (**January 19-21, 2002**).

3. Entry Categories:
3.1 Single Operator.
3.1.1 Low Power
3.1.2 High Power
3.2 Single Operator Portable
3.3 Rover
3.4 Multioperator
3.5 Limited Multioperator

4. Exchange: Grid locator (see April 1994 *QST*, p 86).
4.1 Exchange of signal report is optional.

5. Scoring:
5.1 QSO points:
5.1.1 Count one point for each complete 50 or 144-MHz QSO.
5.1.2 Count two points for each 222 or 432-MHz QSO.
5.1.3 Count four points for each 902 or 1296-MHz QSO.
5.1.4 Count eight points for each 2.3 GHz (or higher) QSO.
5.2 Multiplier: The total number of different grids worked per band. Each 2 degree × 1 degree grid counts as one multiplier on each band it is worked.
5.3 Final score: Multiply the total number of QSO points from all bands operated by the total number of multipliers for final score.
5.4 Rovers only: The final score consists of the total number of QSO points from all bands times the sum of unique multipliers (grids) worked per band (regardless of which grid they were made in) plus one additional multiplier for every grid from which they successfully completed a contact.
5.4.1 Rovers are listed in the contest score listings under the Division from which the most QSOs were made.

6. Reporting:
6.1 Electronic submissions may be e-mailed to **JanuaryVHF@arrl.org** and handwritten paper logs or diskettes mailed to January VHF, ARRL, 225 Main St, Newington, CT 06111.
6.2 Entries that have been electronically generated must submit their log file in the Cabrillo file format. Paper printouts of electronic files are not acceptable substitutes.
6.3 Entries must be e-mailed or postmarked no later than February 20, 2002.
6.4 Rovers who submit scores for the club competition must submit a second summary sheet indicating QSOs and score *if they make any contacts from outside of the club territory.* Indicate clearly on the summary sheet and in log if the log is the total entry or that portion to be counted for the club score.

7. Miscellaneous:
7.1 Stations may be worked for credit only once per band from any given grid, regardless of mode. This does not prohibit working a station from more than one grid with the same call sign (such as a Rover).
7.2 Only one signal per band (6, 2, 1¼ etc) at any given time is permitted, regardless of mode.
7.3 Multi-operator stations may not include QSOs with their own operators except on frequencies higher than 2.3 GHz. Even then, a complete, different station (transmitter, receiver and antenna) must exist for each QSO made under these conditions.

8. Awards: Certificates will be awarded in the following categories:
8.1 Single operator.
8.1.1 Top single operator in each ARRL/RAC Section.
8.1.2 Top single operator on each band (50, 144, 222, 432, 902, 1296 and 2304-and-up categories) in each ARRL/RAC Section where significant effort or competition is evident. (Note: Since the highest score per band will be the award winner for that band, an entrant may win a certificate with additional single-band endorsements.) For example, if KA1RWY has the highest single-operator all-band score in the CT Section and her 50 and 222-MHz scores are higher than any other CT single operator's, she will earn a certificate for being the single-operator Section leader and endorsements for 50 and 222 MHz.
8.2 Top single-operator portable in each ARRL/RAC Section where significant effort or competition is evident. (Single operator portable entries are not eligible for single-band awards.)
8.3 Top rover in each ARRL Division and Canada where significant effort or competition is evident. (Rover entries are not eligible for single-band awards.)
8.4 Top multi-operator score in each ARRL/RAC Section where significant effort or competition is evident. (Multioperator entries are not eligible for single-band awards.)
8.5 Top limited multioperator in each ARRL/RAC Section where significant effort or competition is evident. (Limited multioperator entries are not eligible for single-band awards.)

9. Other:
9.1 See "General Rules for All ARRL Contests" and "General Rules for ARRL Contests on bands above 50 MHz (VHF)" in November 2001 *QST*.
9.2 For more information contact **contests@arrl.org** or tel 860-594-0232. QST

A Word about the Schedule

Normally, the January VHF QSO Party is held the weekend before the Super Bowl, since there are usually no playoff games scheduled for that weekend. This helps avoid RFI complaints during the "big game" and gives you a chance to participate in our most popular VHF contest while not missing the nation's number one sporting event.

One small ripple of the September 11 tragedy was the postponement of the Super Bowl by the NFL until February 3, 2002. As a result of NFL schedule changes, there is no off-week in this year's playoffs. We have nevertheless chosen to conduct the 2002 ARRL January VHF Sweepstakes as scheduled on January 19-21. We encourage you to play hard and enjoy both the contest and the playoffs.

COMING CONVENTIONS

December 1-2
Southeastern Division, Palmetto/Tampa*

January 20
New York City/Long Island Section, North Babylon

February 1-2
Mississippi State, Jackson

February 2-3
Southeastern Division, Miami, FL

February 8-10
Northern Florida Section, Orlando

February 10
Virginia State, Richmond

***See November *QST* for details.**

Attention Hamfest and Convention Sponsors: ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262.

Note: Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. QST

Gail Iannone ♦ Convention Program Manager

2002 ARRL RTTY Roundup Rules

1. Object: Amateurs worldwide contact and exchange QSO information with other amateurs using digital modes (Baudot RTTY, ASCII, AMTOR, PSK31, and Packet—attended operation only) on 80, 40, 20, 15 and 10 meter bands. Any station may work any other station.

2. Date and Contest Period: First full weekend of January, but never on January 1. Begins 1800 UTC Saturday, ends 2400 UTC Sunday (**January 5-6, 2002).**

2.1. Operate no more than 24 hours.

The six hours of off time must be taken in no more than two blocks.

3. Entry Categories:

3.1 Single Operator:

3.1.1 Low Power.

3.1.2 High Power.

3.2 Multioperator, Single Transmitter:

3.2.1 Power.

3.2.1.1 Low Power

3.2.1.2 High Power

3.2.2 Stations are allowed only one transmitted signal at any given time.

3.2.3 Includes those single operators that use any form of spotting assistance such as from nets or packet.

3.2.4 Includes those that receive assistance with logging or relief operators, etc.

3.2.5 Limited to 6 band changes (maximum) in any clock hour.

3.2.6 The clock hour is from zero through 59 minutes.

3.2.7 Band changes are defined so that, for example, a change from 20 meters 15 meters and then back to 20 meters constitutes two band changes.

4. Exchange:

4.1 United States: Signal report and State.

4.2 Canada: Signal report and Province.

4.3 DX: Signal report and consecutive serial number, starting with 001.

5. Scoring:

5.1 QSO Points: Count one point for each completed QSO.

Multipliers: Each US state (except KH6 and KL7), each VE province (plus VE8 and VY1) and each DXCC entity. KH6 and KL7 count only as separate DXCC entities.

5.2.1 Count only once (not once per band).

5.2.2 The US and Canada do not count as DXCC entities.

6. Reporting:

6.1 All entries must be postmarked or e-mailed by February 5, 2002.

6.2 Entries in electronic format may be submitted to **RTTYRU@arrl.org** or submitted on 3.5 inch diskette to RTTY Roundup, ARRL, 225 Main St, Newington, CT 06111.

6.3 All logs that are created electronically are required to submit their electronic log file in Cabrillo file format. A printout of an electronically generated log is not an acceptable substitute. A handwritten log that is later entered into a logging or other electronic program is considered an electronically generated log and must meet electronic file requirements.

6.4 The Cabrillo entries include the header and the complete QSO list.

6.5 Hand-logged entries may be submitted to RTTY Roundup, ARRL, 225 Main St, Newington, CT 06111.

7. Miscellaneous:

7.1 Packet radio contacts made through digipeaters or gateways are not permitted.

7.2 All ARRL Contest rules and forms may be downloaded from the ARRL Contest web page at **www.arrl.org/contests/forms** or obtained from the Contest Branch by sending an SASE with 2 units of postage.

7.3. For contest information contact **contests@arrl.org** or tel 860-594-0232.

8. Awards:

8.1 Certificates will be awarded to:

8.1.1. Top high power and low power Single Operator and Multioperator scorers in each ARRL/RAC Section.

8.1.2. Top high power and low power Single Operator and Multioperator scorers in each DXCC entity (other than W/VE).

8.2 Plaques, if sponsored, will be awarded to the top scoring low and high power entrant in each category overall, each ARRL Division, and Canada.

8.2.1. Unsponsored plaques may be purchased from the ARRL.

9. Other: See "General Rules for All ARRL Contests" and "General Rules for ARRL Contests on bands below 30 MHz (HF)" in November 2001 *QST*.

Recommended HF Digital Operating Frequencies (MHz)

North and South America	*Europe/Africa*
3.590 RTTY DX	3.580-3.620
3.605-3.645	
7.040 RTTY DX	7.035-7.045
7.080-7 .100	
14.070-1 4.0995	14.080-14.099
21.070-2 1.100	21.080-21.120
28.050 - 8.150	

Recommended Novice Digital Operating Frequencies (MHz)

10 meters 28.100-28.150

Suggested simplex packet-radio frequencies:

28.102.3

28.104.3

*Authorized power output 200 W maximum for Novices/Tech Plus only in the 10-meter Novice sub-band.

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 **December 1** to be listed in the **February** 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.)

Texas (Houston)—Nov 24. Bill Krampe, KC5GYD, 281-579-7232.

†**Wisconsin (Waukesha)—Jan 5,** 8 AM to 2 PM. *Spr:* West Allis RAC. Waukesha County Expo Center Forum; I-94 W to Exit 294 (Cty J), S to Cty FT, W to Expo Center. Ham Radio, Computer and Electronics Swapfest; VE sessions (AMF Waukesha Lanes, across from Expo; bring your original license with photocopy, CSCEs with 2 photocopies, 2 IDs, 1 must be photo ID); QSO party; refreshments. *Adm:* advance $4, door $5. Tables: advance $12 per 8-ft, door $14 (if available); electrical outlet $14 (advance only). Send business size SASE by Dec 30 to WARAC Swapfest, Box 1072, Milwaukee, WI 53201. Phil Gural, W9NAW, 414-425-3649; **www.warac.org**.

†ARRL Hamfest.

Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as donated ARRL publications, handouts, and other support.

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to **giannone@arrl.org**.

Promoting your event is guaranteed to increase attendance. As an approved event sponsor, you are entitled to advertise your event in *QST* at special rates. Make your hamfest a success by taking advantage of this great opportunity. Call the ARRL Advertising Department at 860-594-0207, or e-mail **jbee@arrl.org**.

Gail Iannone ♦ Convention Program Manager

2002 ARRL International DX Contest Rules

1. Object:

1.1. W/VE amateurs work as many amateur stations in as many DXCC entities as possible on 160, 80, 40, 20, 15, and 10 meter bands.

1.2. Foreign amateurs (also including KH6, KL7, CY9, and CY0) work as many W/VE stations in as many of the 48 contiguous states and provinces as possible.

2. Date and Contest Period:

2.1. CW: Third full weekend in February **(February 16-17, 2002)**.

2.2. Phone: First full weekend in March **(March 2-3, 2002)**.

2.3. Contest Period: 48 hours each mode (separate contests). Starts 0000 UTC Saturday; ends 2400 UTC Sunday.

3. Entry Categories:

3.1. Single Operator:

3.1.1. All Band:

3.1.1.1. QRP.

3.1.1.2. Low Power.

3.1.1.3. High Power.

3.1.2. Single Band.

3.1.2.1. A participant may submit only one single band entry. If contacts are made on other bands, the log file must clearly be marked as Single Band in the header of the Cabrillo file.

3.1.2.2. The same call sign may not be used by a different operator(s) to generate additional single band entries.

3.2. Single Operator Assisted.

3.3. Multioperator:

3.2.1. Single Transmitter.

3.2.2. Two Transmitter.

3.2.3. Multi-transmitter.

4. Contest Exchange:

4.1. W/VE stations in the 48 contiguous United States and Canada (except in the islands of St Paul and Sable) send signal report and state or province.

4.2. DX stations send signal report and power (number indicating approximate transmitter output power).

5. Scoring:

5.1. QSO Points—W/VE stations count three points per DX QSO. DX stations count three points per W/VE QSO.

5.2. Multiplier

5.2.1. W/VE stations: Sum of DXCC entities (except US and Canada) worked per band.

5.2.2. DX stations: Sum of US states (except KH6/KL7), District of Columbia (DC), and Canadian provinces/territories: NB (VE1, 9), NS (VE1), QC (VE2), ON (VE3), MB (VE4), SK (VE5), AB (VE6), BC (VE7), NT (VE8), NF (VO1), LB (VO2), NU (VY0), YT (VY1), PE (VY2) worked per band (maximum of 63 per band).

5.3. Final Score: QSO points× multipliers = final score.

6. Miscellaneous:

6.1. Your call sign must indicate your DXCC station location (KH6XYZ/W1 in Maine, KG4/W1INF at Guantanamo Bay, etc).

6.2. The same station may be worked only once per band: no cross-mode or repeater contacts.

6.3. Aeronautical and maritime mobile stations outside the US and Canada may be worked by W/VE stations for QSO credit only.

6.4. DXpedition scores may be included in the Medium and Unlimited club totals only.

7. Submission:

7.1. Entries for the CW competition must be e-mailed or postmarked by March 19, 2002.

7.2. Entries for the Phone competition must be e-mailed or postmarked by April 2, 2002.

7.3. Electronic entries for the CW competition must be e-mailed to **DXCW @arrl.org.**

7.4. Electronic entries for the Phone competition must be e-mailed to **DXPhone @arrl.org.**

7.5. Submissions that are created electronically must be in the Cabrillo file format and must include the log file.

7.5.1. Paper copies of electronic logs are not an acceptable substitute for the electronic Cabrillo format file. Paper logs that are entered into an electronic medium after the contest are considered electronic logs.

7.6. Handwritten paper entries or diskettes should be marked on the envelope as either DX Phone or DX CW entries and mailed to: ARRL, 225 Main St, Newington, CT 06111.

7.6.1. Entries for the CW and Phone portions of the competition are considered separate contests and must be submitted in separate e-mails or envelopes to the appropriate contest address.

7.7. Forms for all ARRL contests may be downloaded from the Contest Home Page at: **www.arrl.org/contests**.

7.8. Contest forms and rules may be requested from the ARRL by sending an SASE with 2 units of postage.

8. Awards:

8.1. Plaques (if sponsored) will be awarded in the following categories for both the CW and Phone contests.

8.1.1. Top W/VE scorer in each entry category—single operator-all band-QRP, single operator-all band-low power, single operator-all band-high power, single operator-single band (160-10 Meters), single operator assisted, multi-operator-single transmitter, multi-operator-two transmitter, multi-operator-multi-transmitter.

8.1.2. Top scorer in the single operator-all band category worldwide and on each continent. In addition, worldwide leaders in the single operator-all band-QRP, single operator-all band-low power, single operator-single band, single-operator assisted, multioperator-single transmitter, multi-operator-two transmitter and multioperator multi-transmitter categories will receive plaques.

8.1.3. Additional special plaques will be awarded as sponsored.

8.2. Certificates will be awarded to:

8.2.1. Top single operator-all band entries (QRP, low power, and high power) from each DXCC entity and ARRL/RAC Section.

8.2.2. Top single-band entries in each ARRL/RAC section and each DXCC entity.

8.2.3. Top single operator assisted entries in each ARRL/RAC section and each DXCC entity.

8.2.4. Top multi-operator entries (single, two and multi-transmitter) in each DXCC entity, US call area and in Canada.

8.2.5. DX entrants making more than 500 QSOs on either mode will receive certificates.

8.2.6. Additional certificates will be awarded as appropriate.

9. Other:

9.1 See "General Rules for All ARRL Contests" and "General Rules for ARRL Contests on bands below 30 MHz (HF)" in November 2001 *QST*.

9.2. For information, contact **contests@arrl.org** or tel 860-594-0232. QST

2002 ARRL International DX Pins

The ARRL Contest Branch is again offering pins for the 2002 International DX Contest. The sharp four-color design will prominently display the year 2002. To earn the International DX Contest pin, all you need to do is complete 100 QSOs in either the CW or Phone contest weekends. There are not separate pins for each mode. You may contact the same station on different bands. The cost is $5 (US) in the US, its possessions and Canada, and $8 for others (postage included). Your pins will be shipped once all logs for the contest have been processed and verified by the log checking team for publication in *QST*.

To purchase your pin, send a copy of the first page of your Cabrillo log file along with your payment to DX Contest Pins, ARRL, 225 Main St, Newington CT 06111.

VHF/UHF CENTURY CLUB AWARDS

Compiled by Beverly Fernandez, N1NAV
Senior VUCC Technician

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations for contacts with the minimum number of Maidenhead grid-square locators (indicated in *italics*) for each band listing. The numbers preceding call signs indicate total grid locators claimed; after call signs indicate claimed endorsements. The totals shown are for credit given from August 11, 2001 to October 12, 2001.

The VUCC application form, field sheet and complete list of VHF Awards Managers can be found on the Web at **www.arrl.org/awards/vucc/**. Please send an SASE if you cannot download the forms online. If you have questions relating to VUCC, send an e-mail to **vucc@arrl.org**.

NOTE: Due to the heavy workload in the Century Clubs branch, VUCC processing will be held up and will not resume until December 3, 2001. This has been standard each year at this time.

50 MHz
100

1133	W4ZMM
1134	K5UIC
1135	K4YJ
1136	N2AMC
1137	WH6LR
1138	KC2GHT
1139	K9CC
1140	W8UV
1141	N5TIF
1142	WO7GI
1143	KF4ODI
1144	K0KD
1145	KU0A
1146	N5YM
1147	W1TAM
1148	K4SJA
1149	KC6ZWT
1150	VO1GO
1151	KB1DMX
1152	AI9L
1153	W4OZK
1154	WI6Z
1155	NS2P
1156	K0AZ
1157	KM5NU
1158	KA0BAD
1159	W7USB
1160	WB5FDP
1161	K6QG
1162	K7SAM
1163	K1BD
1164	WA7SDI
1165	K6KLY
1166	K2KJ
	VE3SXE 400
	KB0STN 125
	N1NUM 150
	K1TEO 575
	WB1FLD 200
	N1RK 175
	K1SIX 825
	NJ2F 375
	W2GKR 350
	KF4ODI 200
	N4UFP 250
	AF4HX 225
	KF4LVF 200
	W4DR 800
	W4GLV 375
	W5ZN 450
	WD5K 875
	WA5KBH 250
	W6OMF 225
	N6JV 400
	KG6EG 200
	K7ND 300
	WB7QBS 300
	KQ8AZ 300
	WA9PWP 350

144 MHz
100

W5ZN	300
K7ND	125

222 MHz
50

108	K1LPS
W5ZN	70

432 MHz
50

W5ZN	125

902 MHz
25

W5ZN	30

1296 MHz
25

W5ZN	40

2.3 GHz
10

W5ZN	20

5.7 GHz
5

W5ZN	10

10 GHz
5

109	W5ZN
110	AA7VT
111	W7YOZ
112	K1LPS
113	W6HCC/0
K1LPS	10
W5ZN	10

24 GHz
5

12	W6HCC/0

Satellite
100

109	KF6GYM
KK5DO	600
W5BTS	225
N5AFV	300

QST

ARRL Straight Key Night 2002

When I think about my early days in CW, I can't help but fondly remember Dr Mac—WA4VNV (later N4IX and now a Silent Key). I had agreed to take over from him as the editor of the local club newsletter, and he had agreed to keep this neophyte 13-year-old supplied with copy. The only caveat was that he would only send me his material for *Smoketest* (the club newsletter) over the air in CW. It was a sneaky way to force me to increase my code proficiency, but it was effective. And boy, could he make that old straight key sing. Thanks, Dr Mac!

When was the last time you cleared a bit of the rust off your fist and tried some code the good old-fashioned way—via the straight key? In this era of digital communication, keyboarding, FM and electronic keys, once a year many excellent operators bring the past to the present and participate in the annual **ARRL Straight Key Night**. If but for a brief 24-hour period, it is a trip to a nostalgic time, much the same way an old soldier tries on his old uniform. For others, it is an excellent opportunity to try their hand much as their Elmers did in the past.

The object of this friendly event is to enjoy some good, old-fashioned QSO fun, using straight keys. The emphasis is on rag-chewing rather than on fast contest-type exchanges. SKN 2002 begins at 7 PM EST December 31 and runs for 24 hours through 7 PM EST January 1 (**0000-2400 UTC January 1, 2002**).

When participating in SKN 2002, instead of sending RST before sending the signal report, send the letters SKN, to indicate your participation and to clue in passersby who may be listening that SKN is going strong. Following SKN, send the Contest Branch a list of stations worked, plus your vote for the best fist you heard (it doesn't have to be one you worked). Also, include your vote for the most interesting QSO you had or monitored, as well as any interesting comments you have for the Feedback section of the SKN 2002 write-up. Entries may be e-mailed to the Contest Branch at **StraightKey@arrl.org** or may be sent via regular mail to SKN, ARRL, 225 Main St, Newington, CT 06111.

Entries for SKN 2002 must be received by January 31, 2002. Votes for "Best Fist" and "Most Interesting QSO" will be tabulated and included in the April 2002 issue of *QST*. If you have questions about SKN, please visit the Contest Branch Web Page at **www.arrl.org/contests** or contact **contests@arrl.org**. QST

Season's Greetings and Peace on Earth

From the ARRL Staff and Contributing Editors

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Ed Hare, W1RFI
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John Hennessee, N1KB
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Mark Wilson, K1RO
Dan Wolfgang
Jean Wolfgang, WB3IOS
Larry Wolfgang, WR1B
Janice Wytas QST

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Compiled by Joe Bottiglieri, AA1GW
Assistant Technical Editor

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SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, WB0JJX—We can all be proud of the way Amateur Radio has responded in the face of the New York/Washington,DC/Pennsylvania tragedies. I know several of you from this area volunteered to help, and for that I thank you. Even if you were not called your willingness to step up and help out when others were in need is indeed commendable. These events point out that we must always be ready to respond when we are called upon. In the event of an emergency, please monitor your local repeater for announcements or requests for assistance. These will most likely come from the District Emergency Coordinator for your county. New Castle County - WA3PHT, Kent County - N3KRX and Sussex County-K3PFW. N3FRO and K3IKY often assist me at the state EOC as well. Also keep in mind that the Delaware Traffic Net meets at 18:30 local time on 3905 kHz Monday through Friday. The Delaware Emergency Phone Net meets Saturday at 18:00 local time on 3905 kHz. Traffic (Sept) DTN QNI 139 QTC 11 in 20 sessions, DEPN QNI 33 QTC 1 in 5 sess. K3JL 27 N3HMQ 6. 73, Randall.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL—SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. BM: Fred Serota, K3BHX. OOC: Alan Maslin, N3EA. PIC: Bob Josuweit, WA3PZO. STM: Paul Craig, N3YSI. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Bob Josuweit, WA3PZO, Pete DeVolpi, K3PD; Dave Heller, K3TX, George Law, N3KYZ; and Harry Thomas, W3KOD. One unofficial vacancy exists that I am highly interested in filling. We need someone to establish and maintain a Section Web Site. If anyone is interested in helping with those duties please contact me ASAP. I would like to welcome Tim Davidson, W3PLC, back as an Official Emergency Station. Tim is a long time acquaintance and had previously held the OES position but had to cut back due to other responsibilities. Tim will be a great asset to the Lancaster County group. While we are on the subject of volunteers, I must add my voice to thanking all of the Hams in E. Pa. who were so quick to add their names to assist in New York. Some of the volunteers already had schedules that were filled. Everyone's heart felt interest in helping out is very gratifying. Special mention is needed for those who went to NLI and assisted in the effort. Several members of the Delaware Lehigh Amateur Radio Club who assisted in New York were; Don Jennings, K6QDT, Jeff Kelly N3MFT, Chris Kelly, N3RPV, Barry Vogt, N3NVA, Bruce Bobo Jr., KB3FIH, Mike Stanton, N3OUC, Bob Puharic, WF3H, Dick Dech KA3MOU and Cliff Wagoner, W3ZL. Speaking from experience as someone who was involved in the Public Safety field for over thirty years, knowing that so many people cared and were willing to lend a hand means quite a lot. A special thank you also goes to all of the operators who responded to the call of their county EMA Directors who activated the staff of their EOC's. Unfortunately a list of the hams that responded to the call is not available, but I wish to thank all of you for responding at such a difficult time. Congratulations to Jeff Kelly, N3MFT, who has volunteered to taken over the EC position in Lehigh County. We are in the process of handling the paper work for Jeff's position. Jeff volunteered shortly after returning from New York. Jeff will be a very valuable addition to the staff. Last, but not least the EPA Traffic Nets did their usual outstanding job. Tfc: K2BCL 407, N3YSI 334, W3HK 261, N3EFW 190, W3IPX 173, N3SW 109, W3UAQ 96, W3NNL 87, N3JKX 49, W3TWV 24, KB3CEZ 21, K3TX 16, KB3DCT 16, KB3BBR 14, KB3CVO 13, KA3LVP 13 AD3X 8, N8JSO 6, KB3DDL 6, N3AO 4, W3ZQN 4, N3KYZ 4, KB3CKD 3, N3HR 3, N3ZXE 3, N3AS 3, N3IRN 2, W3BNR 1.Net Reports: EPAEPTN 200, EPA 153, PTTN 81, D3ARES 16, SEPPTN 14, PFN 10, LCARES 9, CATN 7, MARCTN 1.

MARYLAND/DC: SM, Tom Abernethy, W3TOM, 301-292-6263-w3tom@arrl.org—MDC Section Webpage: *http://www.qsl.net/w3tom/*. The warmest of Season's Greetings! MDC ARES support of VA ARES Pentagon Salvation Army communication operations began on Sept 12 with a request from ARRL President Haynie, W5JBP via Atl. Dir. Fuller, N3EFN, to the MDC SEC, WA1QAA. After alerting PRGE AEC K3HDM & MONT EC W3CQH, SEC WA1QAA contacted VA SM W4CAC & SEC N4NW to coordinate the MDC ARES response. It was agreed that MDC would provide operator assignments for the first daily shift scheduled through the MDC SEC and second shift VA assignments through the VA SEC or his designee. On 14 Sept MDC jurisdictions of CALV and ANAR were added to the alert. CALV EC N3QHC provided excellent response. Operations were suspended on 19 Sept. SEC, WA1QAA reports MDC operators providing communications: On Sept 13: KB3DVC, WA3YUV, W3LZX, N3SFY, KA3ZPA; Sept 14: KB3DVC, K3OH, N3ODK, N3TEK, KF3AK, KB3BWR; Sept 15: KB3BWR, KD4DSX, KC3WD, K3OH; Sept 16: N3YOY; On Sept 17: N3ZUR, K3OH; Sept 18: KF3AK, N3ZIZ, KR3A, N3IDX; Sept 19: KF3AK, KB3BWR; and throughout the week's activities administrative support was provided by our Section Leadership: K3HDM, W3CQH, AA3RT, and N3QHC. In addition, there were many Amateurs who volunteered to assist if needed after operations were concluded on Sept 19, and to each and every one who assisted, or stood by with support and encouragement in a time of our country's need, our sincere thanks. MDC has learned a great deal from this activation, and will aggressively use these lessons learned to better train and hone our response in the future. The outstanding leadership efforts of MDC SEC WA1QAA, over the week of SA Pentagon support operations, are most appreciated. Sincere thanks to those who supported the MDC response effort. 73, Tom. With the Net - NET/NET MGR/QND/QTC/QNI: MSN/KC3Y/30/47/308, MEPN/N3WKE/no report/, MDD/WJ3K/59/131/551, MDD Top Brass: AA3SB 170, K3JL 156, AA3GV 132, BTN/AA3LN/30/35/357. Tfc: KK3F 794, W3YVQ 112, AA3SB 67, AA3GV 65, N3WK 59, W3CB 49, KC3Y 49, N3DE 38, K3CSX 32, N3KGM 22, N3WKE 21, N3ZKP 4, WA3GYW 2, KE3FL 0. PSHR: KK3F 208, W3YVQ 148, N3WK 126, AA3SB 122, W3CB 113, N3ZKP 108, KE3FL 107, AA3GV 99, KC3Y 94, K3CSX 82, N3WKE 80.

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. It has been a very busy last couple of months here in NNY. We have had amateurs go to the NYC ground zero Tom N2ZLT and Paul-KC2HGL. It was like nothing you have ever experienced before that is what everyone I have talked to here has expressed to me. Many volunteers have gone to help in the rescue and recovery efforts in NYC. We all feel very close to our fellow hams in this area and know they have done a great service to those who were affected by this horrible attack. Our thoughts and prayers are with all the families and friends of lost love ones. It's important that efforts continue well beyond the next few months. We need to foster good will in our communications and find a way to work through these difficult times ahead together. I appreciate all the good will that many members and the ARRL have given over the weeks and months gone by. We "Love NY" and support all the efforts to help them get back to a vibrant NYC. Thanks again! Website: www.geocities.com/nnyara.

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. As our nation and world come together, we are now amateurs with a common goal, to help where needed. A big "well done" to all who went to New York. Now we move on holding our flags high. We must never again allow history to be repeated. We have a "new" normal. Battleship New Jersey is open and I encourage all to visit and to especially check out the results of hundreds of hours of work on the radio rooms by 80 or more hams working long hours. Listen for BB62 calling CQ. Also why not join up with BNJARS radio club. Traffic rpt: Sept. (combined with NNJ) QNI rpts, NJM 112 WA2OPY NJN (E) AG2R 211 NJN (L) 156 AG2R NJPN 213 W2CC NJSN 180 K2PR (Local) JSARS 383 K2ATQ SJTN 70 KB2RTZ SJVN 278 WB2UVB. Tfc: WA2YL 209, K2UL 130, WA2CUW 125, AA2SV 57, KB2RTZ 57, K2BR 55, N2VQA 37, WB2UVB 34, K2UL-4 30, WJ2F 24, KA2CQX 8, KA2VYZ 7, W2AZ 6, W2MC 4, N2WFN 3. PSHR: KB2RTZ 225, K2UL 192, WA2YL 190, WB2UVB 164, AA2SV 120, KA2CQX 106, N2VAQ 102, WA2CUW 100, N2HQL 68, KA2YKN 60, KB2YJD 25, N2WFN 24, W2MC 20.

WESTERN NEW YORK: SM, Scott Bauer, W2LC— Hamfests: Skyline ARC Winter Hamfest, Jan 21,2002 at Marathon Civil Center, 147.78/18 talk-in; ARA of the Southern Tier Winterfest, Feb 23, 2002 at National Guard Armory in Horseheads NY, 146.10/70 talk-in. And you thought all the hamfests were over! In Onondaga County, AI, N2CCN, organized the communications for the Senior Drum Corps World Championship at Syracuse's P&C stadium. Thanks to all that helped. Seems that Jay Clark, KF2JY, has two smart boys. I reported that James, AB2MQ, had passed his Extra this summer, now I hear that 9 year old younger brother Alex, KC2GVO, received his General and is working on his Extra as well. I'm impressed! The Rochester Amateur Radio Association "radio coaches" teaches sixth graders about math, science, electronics and of course radio, even Morse code too. Keith, N2BEL, is heading up the effort. Thank you, Keith, and RARA for being there! Starting in January, 2002, net reports and traffic reports will be summarized quarterly. With a new format, maybe I can get in some PSHR info as well. That's public service honor roll, earned by those who are active in public service and the traffic nets. Want more info? Send me an e-mail. My goal is to open up more space in the few lines that I get, for more section news. Of course, that means that all of you have to write-up reports on your events and activities and send the info to me. Merry Christmas, everyone. I hope you get at least one radio goodie this year! September Net Summaries:

Net	*NM*	*Sess*	*QNI*	*QSP*	*Net*	*NM*	*Sess*	*QNI*	*QSP*
BRVSN	N2OYQ	30	152	2	CNYTN	WA2PUU	30	352	49
EBN	WB2IJZ	20	397	0	ESS	WI2G	30	398	83
NYPHONE	N2LTC	30	220	349	NYPON	N2YJZ	30	344	87
NYS/E	WB2QIX	30	315	173	NYS/L	W2YGW	30	265	206
NYS/M	KA2GJV	30	168	54	NYSCN	W2MTA	4	22	3
NYSPTEN	WB3CUF	30	368	41	OARC	N2KPR	5	40	5
OCTEN/E	KA2ZNZ	30	1382	238	OCTEN/L	KA2ZNZ	30	664	210
OMEN	N2UC	2	35	0	STAR	N2NCB	29	251	17
TIGARDS	W2MTA	5	41	4	WDN/L	W2GUT	30	484	86
WDN/M	KA2IWK	10	130	12					

Traffic (September 2001), * indicates PSHR, #indicates BPL: N2LTC#* 1167, KA2ZNZ* 402, W2MTA* 497, WB2IJH* 323, NN2H* 259, KA2GJV* 445, KB2KOJ* 221, WI2G* 202, W2FR* 138, N2KPR* 112, KC2EOT* 68, W2LC* 98, WB2QIX* 127, KG2HA* 52, KG2D* 63, W2PII* 44, KA2DBD* 52, W2GUT* 58, N2CCN* 45, N2JRS* 32, AF2K* 25, N2WDS* 36, KA2BCE* 25, KB2ETO* 23, K2DN* 22, WA2GUP* 19, W2RH 12, KB2WII* 6. Digital; Stn Rx/Tx: KA2GJV 14/0, N2LTC 203/194.

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: N3YEA. DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: N3BZW. DEC-Rapid Response: N3HJY. DEC-OES: K3TB. We are all painfully aware of the tragic events that took place in our nation on September 11, 2001. When the unimaginable actions and destruction hit this country everyone was shocked and dismayed. During this time when people were trying to get all the information that they could about the events, Amateur Radio operators throughout the nation and in a great part in Western Pennsylvania turned to their radios to offer assistance. A short time after the first plane hit, nets were active in many counties and a state wide net was started. Informal nets were active on the bands handling any traffic they could. Here in our own section a plane was forced down by the efforts of heroes on board that flight. This plane crashed in Somerset County. ARES and RACES operators quickly set up communications in the affected area to help in any way possible. Many served agencies joined together to provide assistance. We often take this hobby of ours for granted as a pleasurable endeavor, however on that day when tragic history was being made amateur radio once again showed it's spirit and merit. To the hundreds of amateurs who participated in the nets and to the untold of others who monitored in case they were needed, a very special thank you. I am sure that all of you share my pride in being an Amateur Radio operator. 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: Williamson Co ARES EC, WA9APQ, was contacted by WSIL TV (Channel 3) in October to speak to the public on TV about the possible use of Amateur Radio in the future and as a result of the 9/11 event. He continued that the Shawnee Amateur Radio Association monthly meeting was to be held at the Carterville Fire Station since the Marion VA Hospital (their regular meeting place) was under lockdown. Bruce thought it most appropriate to do the interview at the meeting. He enlisted W9RGA to assist, freeing him to concentrate on getting "ham" gear to the site. Bruce said, "I removed gear from my camping trailer, installed an HF antenna at the Fire Station, demonstrated voice, cw, vhf, and psk31 within 40 minutes to the press. I also enlisted WB9OHN for the 'visible' operator on voice and K9TJL for the CW operator. Interviews were taken with others in the room as well. All went well."KB9AIL. The Hamfesters RC reports their August hamfest in Peotone was successful. The group has decided to discontinue their info-line due to declining use. The Western Illinois ARC plans to purchase a used controller and make repairs to their 147.03 repeater. The Fox River Radio League was making plans to assist with the horse trials in Pratt Wayne Woods forest preserve. The Sangamon Valley RC was making plans to help with the Springfield Bicycle Club's annual Capital City Century. The Kankakee ARS in working on a DX cluster which may be operational on 145.53 before year's end. August traffic: WD9F 60, N9GZ 8. Sept. traffic: NC9T-77, W9HLX-47, KD9YV-46, WD9F 45, KA9IMX 43, NN9M-39, WB9TVD 34, W9FIF-12, WA9RUM 7, N9GZ 4, WA9APQ 2. Ninth region report for Sept C4 traffic 229, sessions 60, time 395 min, average 3.81, rate .579, percent rep 97% by K9CNP, NS9F, KF9ME, WD9F. From KF4UBX 9RN cycle 1 & 2 report, Sessions-60, Traffic handled-243, Average/session-4.5, Rate-3.3, 93% of Illinois traffic handled by W9HLX, N9PLM, NN9M, NS9F, KD9YV, WA9OZK, and K9IM. ISN de WB9TVD QNI-227, QTC-106, sess-30. W9VEY Memorial Net report de K9AXS 7 with 198 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 : 7/14, John L. Hartzler, K9DGW, Elkhart; 8/11, Arthur G. Bauernfeind, W9MCJ, South Bend; 9/11, Clarence Eley, Sr., K9HTJ, Auburn; 9/13, Edward J. Joy, K9SUB, Jonesboro; and 10/4, James F. Allman, WD9EOI, Marion. They will be missed. Amanda Rudicel, W9JOY in her 8th grade spanish class at Jones Middle School, Marion, amazed and excited her teacher and classmates via 2 meter patch on their local repeater with WD9FVM and Willie, KP4EEB in his native lauguage. It was a wonderful experience for all. I wonder how many new hams will generate out of that class? Owen Co. ARES provided parade communications for the Annual Spencer Applebutter Festival. Seven amateurs provided 158 hours of public service. If you are an ARRL member why not join the ranks of Official Bulletin Station (OBS) contact KA9QWC or Official Relay Station (ORS) contact WA9JWL.EC's reporting were N9IOD, N9GDR, KG9LX, N9ADS, N9XRA, N9MOX, N9MUS, KB9BBI, K9GPS, N9YNF, WB9NCE, WD9BKA, KB9SOE and KB9OLZ. This year has gone by so fast. Wishing all a very Merry Christmas and a Happy New Year. 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	2208	147	1446	79
QIN	3656	1430/0000	149	36	538	44
ICN	3705	2315	35	12	177	17
Hoosier VHF nets(10 nets)			525	7	934	38

D9RN in 60 sessions total QTC 243 IN represented by KB9NPU, K9GBR, WB9QPA, WA9JWL, N9KNJ and KT9G. 9RN in 60 sessions total QTC 229 IN represented by KO9D, K9PUI, WB9OFG, KJ9J, N9HZ, WB9UYU and W9FC. Tfc: W9FC 243, N9KNJ 107, WA9JWL 95, KJ9J 92, KB9NPU 40, W9JUJ 32, KO9D 32, K9PUI 29, WD9HII 28, K9GBR 28, KA9EIV 24, K9RPZ 22, W9UEM 18, W9EHY 17, WB9QPA 16, K8LEN 12, AB9AA 9, K9ZBM 7, K9DIY 4, K9CUN 4, WB9NCE 3, N9HZ 1.

WISCONSIN: SM, Don Michalski, W9IXG—BWN 3985 0600 W9RCW. BEN 3985 1200 KE9VU. WSBN 3985 1730 K9FHI. WNN 3723 1800 KB9ROB . WSSN 3645 1830 N9BDL. WIN-E 3662 1900 WB9ICH. WIN-L 3662 2200 W9UW. My deep appreciation to the many amateurs that supported the emergency services for the September 11 disaster. Harry Herres, WA9DYL, 80, is an S.K. Harry was an active member of Army MARS. Herman Toussaint, N9XJB, 80 and Michael Plichta, KB9OSB, 61, are Silent Keys. Central Division Director, Dick Isely, W9GIG, has appointed Nels Harvey, WA9JOB, Daniel Gomez-Ibanez, W9DGI, and myself as his Assistant Directors from Wisconsin. We are honored to help Dick represent Wisconsin at this level in the ARRL organization. Our thanks to the Watertown ARC for donating $50 to the ARRL Foundation in honor of former club secretary, Terry Ludwig, N9JUU, S.K. Claude Held, WA9KCU, is the new club secretary. Rich Nesbitt, N9WPH, upgraded to Extra!! Effective September 26th, Stan Kaplan, SEC, has appointed Ray Meyer, N9PBY, as the new ARES Packet Coordinator and Len Kreyer, N9QIP, is now

Continued on page 130.

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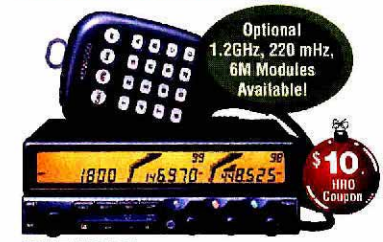

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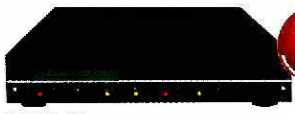

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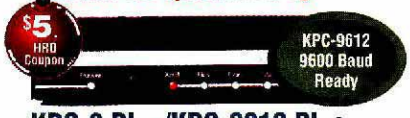

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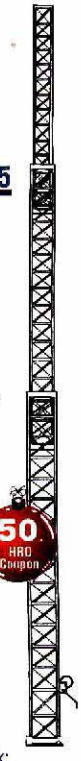

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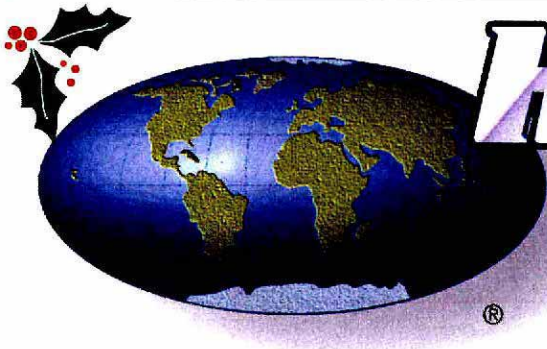

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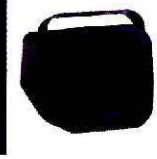

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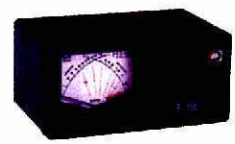

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responsible for ARES Packet Technical Operations. KB9VLG, Dan Williams, Waupaca EC, and other ARES members participated in the Trucker's Pride event. The September technician license class in Madison graduated 9 out of 10 with licenses! Next weekend class is February. Registration: www.sal.wisc.edu/spaceplace/sparc or contact W9IXG! Tfc: K9JPS 1063, W9IHW 504, W9YPY 454, N9VE 417, N9TVT 405, K9GU 401, K9FHI 139, N9BDL 126, AG9G 70, K9LGU 65, KG9B 49, KE9VU 48, W9CBE 44, W9YCV 41, KB9ROB 35, W9UW 32, WA7UVX 30, AA9BB 30, W9BHL 30, K9HDF 25, N9KHD 24, WD9FLJ 24, WB9ICH 17, N9JIY 16, W9RSX 12, K9UTQ 6, WA9ZTY 3.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, KM0D—On Sat Oct 6 the MN Simulated Emergency Test was conducted at 9 AM. Due to the state strike the MN DEM was unable to participate. A last minute change geared the SET to be a simple contact exercise. The goal...to send a simple message originating from my station via HF and sent to statewide HF relay stations who, in turn, relayed locally to their respective areas via VHF/UHF. A simple plan, a practical goal. The result, 46 counties contacted. This was a great chance to involve ARES groups, MARS, radio clubs, and individual hams and other groups with a particular interest in emergency communications at this level. I would like all of you to consider how you could play a role in the future of similar comm exercises, and more so, in a more realistic event. It's easy to be impressed with the results, but this was just a planned exercise. What would our results be if this had been a sudden activation? How fast could we get the word out at a moments notice? I also would like more consideration given to using digital modes. Some may say packet radio has no purpose or useful place in Amateur Radio today. Think again. Imagine how useful strategically placed packet nodes would work. Sure, people still "play" with packet but many have removed their TNC's off the air. But, we still have a good reason to keep them on the air! HF digital modes also play a valuable role. Try this test: originate a test message in, lets say Bemidji. Send it to a station in Mankato, and ask for a reply back...all via Amateur Radio. How would you do it? It's a simple test. I invite you to consider how you would apply the simple concept of communicating statewide using all our available radio capabilities today, and make it work. We can talk around the world, but can we really talk to our neighbors? Let's challenge ourselves. Our served agencies await us. Let's not disappoint them, or ourselves. This may be our hobby, but to them, we represent a valuable service and resource. All 10,000 of us in Minnesota.

Net	*Freq*	*Time*	*QNI/QTC/Sess*	*Mgr*
MSPN/E	3860	5:30 P	693/108/30	W0WVO
MSPN/N	3860	12 P	363/87/30	WA0TFC
MSSN	3710	6 P	N/A	VACANT
MSN/1	3605	6:30 P	226/67/30	K0WPK
MSN/2	3605	9:50 P	128/30/30	K0PIZ
PAW	3925	9A-5P	2167/76/71	KA0IZA

Tfc: KB0OHI, WA0TFC, K0PIZ, K0WPK, W0GRW, KB0AII, W3FAF, KC0HAW, W0HPD, KA0IZA, KN9U, WD0GUF, WA0YSL, KB0AIJ, N0JP, K0IKO.

NORTH DAKOTA: SM, Kent Olson, KA0LDG —Merry Christmas to all and best of wishes for the New Year. With the September 11th terrorist events still fresh in my mind, it's time once again for me to encourage you to get involved. This can take many directions such as joining your local ARES group to volunteering in your community. The other thing to emphasize is to start looking at things around you from a different perspective. If something doesn't look quite right, maybe it isn't and you could be the one who breaks the link in a chain of events unfolding. Don't think that just because you live in ND that nothing will happen to you. Just remember just what is "planted" all over the state that could be a terrorist target. Many thanks to these Section Appointees who after years of hard work have resigned their posts: N0ELA-MN, K0QQ-SGL, and WD0DAJ-TS. Dale Stanford, N0KGE, is now a Silent Key. He was mainly interested in VHF & repeaters and maintained the Valley City Repeater. Section Web site at: http://home.earthlink.net/~qtipf16/. September Tfc: HF NM KE0XT reports Goose River Net, 5/47/1; WX Net 25/615/16; Data Net 30/612/26.

SOUTH DAKOTA: SM, R. L. Cory, W0YMB—Sioux Empire ARC Field Day this year resulted in 9 QSOs on VHF 70 on digital, 260 on phone, and 560 on CW for 1441 contacts. They also had great success with their Memorial Special Event Station on July 7 for the ship USS South Dakota held in conjunction with a reunion of former crew members. About 250 contacts were made in 5 hours of operation. They also report a SK, club member N0KAE, Judy Stoakes, who died on Sept 2, 2001. At the Hot Springs Club meeting, the chief asked for backup communications if their repeater goes down. The club is working with him on that with a call-up plan, etc. At the Black Hills ARC annual picnic, officers elected were Gary Peterson, K0CX, Pres; VP is Chuck Palmer, N0UKO; Treas Catherine Halgerson, KC0GWN, and Sec Randy Bagvy, AB0QY. Lew Rohrer, K0LEW, ARRL EC, has a call-up list set up and a 2-meter packet system installed at the Pennington Co EOC Red Cross office and is making sure portable computers and equipment are ready to deploy to emergency shelters or anywhere needed. They plan to have a digi repeater at the club house.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH—Merry Christmas & hope you find some new "toys" under the tree with your name on them! I'm sure you will. The last few months of this yr. have gone fast and hope you were able to participate in the AR QSO party & attend the Jonesboro Hamfest. Hamfests for '02 will soon be known & published here & on our Web site (all-arkansas-hams.org) so check for updates & new items that will be published. Thanks to everyone for what you've done this yr. to help our section. Hope you'll even be able to take more interest next year. Our clubs need our attendance & participation so pse. try to attend one in your area regularly. Keep up the good work on helping with the club activities they will plan for the new year and hope you will volunteer to take an active role in their success. Let's continue our "back to the basics" theme for 2002 as we are starting to see good efforts by everyone to keep the ball rolling toward everything you've done. The section leadership will work diligently to have programs of interest and will need your participation to be effective recruiters and helpers to anyone in our section. Call on them for club programs and new ideas you have wanted to see done. We really need your input & effort. This is your section. The success accom-

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plished will be in proportion to what we ALL contribute. Net activities for Sept include: K5BOC 74, K7ZQR 41, W5RXU 16, W5HDN 12, N5SAN 8, AD5AM 7, WA5KQU 7, W9YCE 6, AB5AU 4 & AD5BV 2. Tnx for your individual efforts of getting traffic passed.

LOUISIANA: SM, Mickey Cox, K5MC - I'm sure all of us will remember for the rest of our lives where we were and what we were doing when we first learned of the dastardly attacks on our country on September 11. Many hams responded quickly to provide assistance in the stricken areas. Some are still providing help as I write this report. In the coming days, weeks, and months, there may be other terrorist attacks and we should be ready to serve if needed. Our state has its share of landmarks and facilities that could be inviting targets. ECs should be certain that no ARES volunteers are turned away by public officials or served agencies during emergencies because of improper identification. This may mean photo IDs as well as call sign badges. Some agencies may even require their own special means of identification. Thus, ECs should check with their local agencies now to find out if any new ID requirements are needed. Speaking of ECs, less than half of our parishes currently have an EC. If you live in one of these parishes, please consider volunteering for this very important leadership position. Congratulations to the following amateurs for completing one or more levels of the League's emergency communications course: KM5IX (levels I and II), N5IX (level I), K5DPG (levels I and II), K5ER (level I), and AC5VN (level I). Tfc: W5CDX 152, K5IQZ 112, K5MC 89, KM5YL 31, KG5GE 16, K5DPG 16, W5PY 6, N5JU 4. PSHR: K5DPG 128, W5CDX 124, K5IQZ 123, KM5YL 123, K5MC 104, KG5GE 101, W5PY 77, N5JU 37. Net Reports: sessions/QNI/QTC. LTN: 30/425/74.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Section Web Site: www.arrlmiss.org. Web Master: K5IBM at k5ibm@arrl.net. DEC: KD5CKP, K5IMT, WB5OCD, AB5WF, N5ZNT. EC: NN5AF, W0CIR, KD5CKP, KB5CQX, W5DJW, KB5DZJ, KD5EWB, KD5FUO, WD5IMP, KD5KXJ, N5MZ, N5NQ, WB5OCD, W5PES, KB5RQK, WA5TEF, KC5TYL, KM5WX, K5XC, KB5ZEA, N5ZNT. Over 300 Mississippi hams participated in another successful SET. The coordination between the HF and VHF nets was great and the high volume of formal traffic passed was exceptional. In addition to the statewide scenario, several activities were conducted at the county level by the DEC/ECs including bringing up local emergency nets, executing county-wide emergency scenarios, and conducting operations from the local EOC, Red Cross, or other emergency management agencies. These operations were conducted from the following counties: Attala, Clay, DeSoto, Hinds-Madison-Rankin, Jackson, Jones, Lamar, Lauderdale, Lowndes, Oktibbeha, Pike-Lincoln, and Warren. Thanks to all who contributed to the success of this major effort. The annual ARRL Day in the Park was held in Starkville and hosted by MFJ to kick off its celebration of 30 years of providing amateur radio products. Some 250 plus hams and their families from nine states enjoyed tours of the MFJ plants, tailgating, fellowship, and good food. Thanks to Martin, K5JLU, Richard, KC5NCZ, and the entire MFJ Staff for their hospitality and their efforts in attending to all the details necessary for conducting such a successful event. Congratulations to Team Mississippi (WQ5L, W5UE, KB5IXI, AC5SU, and W5XX) for being 20th out of 47 Teams in the January CW North American QSO Party. Also congratulations to KD5FUO and KD5HVF, who exchanged vows on September 22 in Columbus. PIO Rpt: W5KWB. DEC/EC Rpt: KD5CKP, KD5CQX, KD5FUO, N5NQ, WB5OCD, AB5RS, KC5TYL, AB5WF, KB5ZEA, N5ZNT. Net Reports: sessions/QNI/QTC. MSPN 30/3340/50, MTN 30/100/45, MSN 30/1329/11, PBRA 30/694/25, West Coast MS ARES 12/120/3, MBHN 5/43/0, MLEN 5/86/0, MAEN 5/78/11, Attala Co ARES 4/35/4, JARCEN 4/105/0, MCARA 4/38/0, LARC and Jones Co ARES 4/72/1, LoCo QSO Net 4/30/0, NW MS Skywarn 4/27/0, Central MS Skywarn Linking Net 1/48/0. PSHR: WB5ZED 208, KB5W 148, K5VV 124, W5XX 104, KJ5YY 90. Traffic: WB5ZED 852 (BPL), KB5W 379, K5VV 88, W5LEW 24, KJ5YY 14, W5XX 9.

TENNESSEE: SM, O. D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU. TC: KB4LJV. Henry Leggette, WD4Q, Vice Director of the Delta Division was guest speaker at the RATS club in Nashville on Aug 20. Everyone enjoyed Henry's presentation on ARRL on-going programs. Special event station W4B was a success again this year, even if the solar flare took out most of one day. I saw a new face on the front page of MARC News this month. I found out that it is the new president, Dale, KA4ZDR. The other club officers are: VP Greg, KF4ZKV, Sec/Treas Dan, N7DLS, Sgt at Arms Dolly, K4DOL, EC Tom KM4ES, VE Testing Randy, WD4OMP, Program Dir Bob, KS4TD, Editor Bill K4BX. Anyone in the West TN area who needs help, contact W4BS Elmer Shack at 385-0995 or aa4gx@aol.com. There, you'll find an expert in almost every phase of ham radio. The following NARC members are practicing to support the MS Bike ride in Oct. K4WME, KA4AIJ, N4VHM, KC4ZOA, KE4TQO, KC4TMV, K4ANH, KC4TCR, K3OI, KG4HAF. WA4WMN, KB4WQZ, KE4RKJ of BSFARC provided communications for Ride the Rim on Sept 8 & 9. DRN-5 rpt 60 sess, 607 mess, TN rep 88% by N4FSK, KE4GYR & W4OGG. Net sess/QTC/QNI: TMPN 30/38/3019; TCWN 22/24/183; TEMPN 20/48/663; TEPN 24/38/2185; TSN 25/7/130. Tfc: N4PU 58, WA4HKU 38, KE4GYR 20, WB4DYJ 15, WA4GLS 11, W4SYE 10, KI4V 8.

GREAT LAKES DIVISION

KENTUCKY: SM, John D. Meyers, NB4K—Merry Christmas to one and all. Please remember our men and woman in our Military Service during the holiday season. Pick out one locally and send a gift basket. The Silent Keys this month known at the time of this article were Clifford Wilson, W4UVT of Middlesboro, Ky and Donald Sloane, KF4JJB of Steele, Ky. The SET for Kentucky was canceled this year as a precaution not to disrupt the general public anymore than needed with hearing of any emergencies even if it being a TEST or simulated emergency. With the precept of war hanging over our head and the thought of any other attacks on the United States the Section Emergency Coordinator Ron Dodson, KA4MAP, made a wise decision not to have the SET. Although continuing education is going on weekly on the new emergency frequency for Kentucky 3.888 MHz at 0100. A wonderful job was done by the Maysville Amateur Radio Club during the Rosemary Clooney Festival. Their professionalism and good radio spirit is a credit to the Section. I was also wined and dined by the Murray State University ARC and was very pleased to see 16 of the 18 attending the meeting being ARRL members, nice job. They also have a very impressive club radio station. Tfc: K4AVX 46, KF4GQN 40, KO4OL 34, WD8JAW 17, NB4K 16, KE4JFS 4. PSHR: NB4K 123, KF4GQN 108, KO4OL 102, KE4JFS 78.

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

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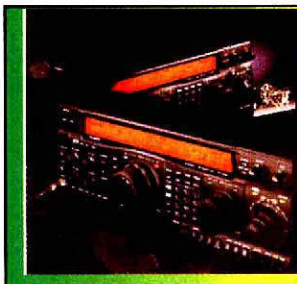

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(ab8cb@arrl.net). SEC: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). STM: James Wades, WB8SIW (wb8siw@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (kb8rji@arrl.net). SGL: Ed Hude, WA8QJE (edhude@juno.com). TC: Dave Smith, W8YZ (w8yz@arrl.net). Youth Activities: Steve Lendzion, N8GQ (n8gq@arrl.net). BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net). I would like to pass along our thanks from the entire Michigan Section to our SM Richard "Dick" Mondro W8FQT for staying on for an additional term. Dick has devoted many hours to our section and the entire Section Staff would like to thank him for his time and devotion to us. We would also like to thank his wife Sandy KG8HM for her valued efforts as well. We all know that Sandy is there for every event Dick attends and spends many hours as our ACC in addition to working with Dick as Section Manger. I'd like to thank all participants of SET. I am very pleased with the results. SET is not only a test but allows us to find our weaknesses and correct them. I was very pleased to see operators helping others and training taking place. The manner in which the help was delivered was spectacular, and those that took the time to help our new hams are to be commended for their efforts. I hope that each one of you will take the time to partake in any training opportunities offered. Trained operators are an asset, untrained a liability. Please consider contacting our Section staff and offering your time as an instructor. Instructors are badly needed. My thanks to the operators at the SEOC for staffing the station, sending traffic, and allowing me to do the evaluation from a distance. I would also like to thank our Section Traffic Manager, Jim Wades, WB8SIW, for preparing the nets, and giving his time to do NTS training prior to SET. Our many net controls deserve a round of applause for a job extremely well done! Nets were very professional and I applaud all of you. My thanks to the NTS liaisons, ECs DECs Net Managers Net Control Operators and most importantly our ARES members. With out you our system will fail. Congratulations the Grand Rapids Amateur Radio Association's new officers. President N8ITY Phil, VP N8LRF Ray, KC8NVX Marion, Treas. KB8SEW Graham, Red Cross Liaison KB8QAQ Jim, Trustee K8EX Mike, Dir. N8DGD Tom, Dir. KF8QL Dave, Dir. N8UXN Ed, At Large KC8PKN Jack. Happy Holidays—Debbie Kirkbride, KA8YKK, Section Emergency Coordinator Michigan Section, State RACES Officer. Traffic reports for September 2001: AA8PI 526, K8GA 300, K8KV 235, KB8ZYY 201, K8LJG 181, WB8SIW 167, N8EIZ 139, N8FPN 126, W8RTN 122, WX8Y 82, KI8GR 77, K8AE 72, WI8K 58, AA8SN 52, W8RNQ 51, WR8F 44, K3UWO 35, N8JAT 32, N8UN 31, K8UPE 28, W8YIQ 28, WA8DHB 24, K8AI 23, KA8DDQ 20, K8ZJU 17, N8EXV 15, K8YB 14, K8JN 14, K8AMR 9, KB8GOY 5, KA8LAR 4, W8NGO 1, NX8S 1. Deadline 5th of the month. Please support the following SECTION NETS:

Net	*QNI*	*QTC*	*Sess*	*Net Mgr*	*Freq*	*Time*	*Day*
QMN	572	289	29	WB8SIW	3.663	6:30&10 PM	Daily
MACS	225	61	29	W8RNQ	3.953	11 PM	Daily (1 PM Sun.)
MITN	490	330	30	N8FPN	3.952	7 PM	Daily
UPN	974	27	35	AA8SN	3.921	5 PM	Daily (Noon Sun.)
GLETN	724	78	30	WB8ICN	3.932	8:30 PM	Daily
SEMTN	270	115	30	WI8K	145.330	10:15 PM	Daily
WSSBN	798	38	30	K8CPW	3.935	7 PM	Daily
MI-ARPSC	71	5	5	W8FQT	3.932	5 PM	Sunday (Alt. 7.232)
VHF	583	18	36	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 ....Happy holidays to everyone. Before we start this column, I must call attention to the Ohio ARRL Cabinet members all listed above. This is the leadership of the Ohio Section - a solid rock group which makes possible all the success we have running ARRL programs here. The Ohio Section Journal, annual Section Conference, Newsletter contest, emergency services, and all the rest. They do it and all I get to do is thank them for you...The events of Sept. 11 keeps reminding us of ham radio's everlasting commitment to emergency services. That made the 2001 Simulated Emergency Test in October so much more special. Ohio responded well. SEC Larry Rain, WD8IHP, reported "That we had about 60% of the counties participating - some with small drills and some over 24 hours in duration. The Ohio Single Side Band Net (OSSBN) was running for 36 continuous hours passing large amounts of ARES messages both test priority and routine traffic. I personally received 37 radio grams from ECs and counties participating." Larry continues to encourage Ohio ECs and DECs to utilize, when possible, the National Traffic System for emergency traffic. On that subject, may I suggest everyone with ARES cards, EMA identification cards, Red Cross cards and/or city police/sheriff's cards; please make sure these are updated. In today's climate, any outdated identification cards could be a problem no one needs...OHIO SECT CONGRATS TO (A) Jim Matthews, KC8BAA, (Toledo Mobile Radio Assn) and Ernie Hudson, KI8O, (Dayton ARA) for being Ham of 2001 for your respective cities; (B) New officers for TMRA: PRES, Brian Harrington, WD8MXR,; VEEP, Tom Swartz, KB8PAI; TREAS, Chuck Ferguson, N8NIR, and SEC, Sally Collins, KA8NNM; (C) New officers for the Alliance ARC: PRES,Robert Steel, K8RLS; VEEP Larry Ashburn, KE8VE, SEC, David Glass, W8UKQ; and TREAS, Mary Ann Royer, KB8IVS; (D) TO Ronnie West, N8OD; Mike Mettler, WW8MM; John Lehman, K8PJ and Connie Hamilton, N8IO, for winning the NTS certificate of merit at the OSSBN fall conference in Findlay (where Connie is NM) for their part in clearing out the over abundance of DX QSL cards from the 8th Area QSL Bureau. ; and (E) To Ohio STM Jack Wagoner, WB8FSV, for his two page article about China in the November QST...THERE ARE NO DEC OHIO HAMFESTS...de K8QOE. Now for the September traffic reports.

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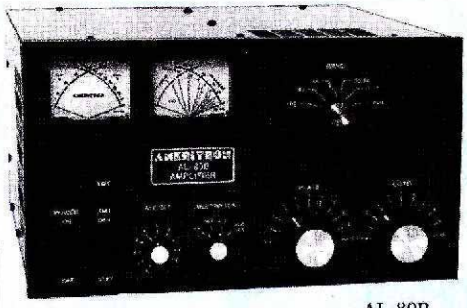

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Suggested Retail

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

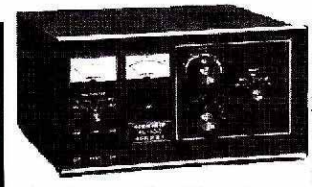
You get a full kilowatt PEP output from a whisper quiet desktop linear. It's a compact 8½Hx14Dx15½ inches and plugs into your nearest 120 VAC outlet. Covers 160 to 15 Meters, including WARC and MARS (user modified for 10/12 Meters with license).

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

AMERITRON offers the best selection of legal limit amplifiers

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

Ameritron's most powerful Linear



AL-1500
$2945
Suggested Retail

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

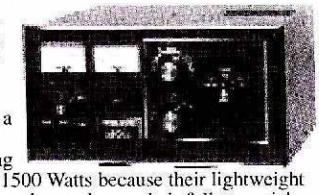
Ameritron's 3CX1200A7 linear Amp

AL-1200
$2495
Suggested Retail

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

Ameritron's dual 3-500 linear

AL-82
$2395
Suggested Retail



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

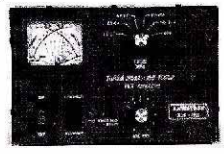
AMERITRON no tune Solid State Amplifiers

ALS-500M 500 Watt Mobile Amp

AL-500M
$799
Suggested Retail

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

ALS-600 Base 600 Watt Amp



AL-600
$1299
Suggested Retail

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

AMERITRON brings you the finest high power accessories!

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

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

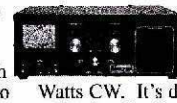
ADL-1500 Dummy Load with oil . . . $59.95

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

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

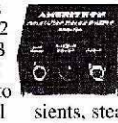
Stops power-up inrush current and absorbs momentary high voltage spikes to your amplifier. ICP-120 for 110 to 120V, ICP-240 for 220-240 V.

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



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

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



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

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

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

ATP-100 Tuning Pulser lets you safely tune your amplifier . . . $49.95

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

ADL-2500 Fan cooled 2500W dry dummy load ...$199.95

Whisper quiet fan. Handles any legal limit amplifier -- 2500 Watts average power for 1 minute on, ten off. 300 Watts continuous. SWR below 1.25 to 30 MHz and SWR below 1.4 to 60 MHz.

Call your dealer for your best price! • Free Catalog: 800-713-3550

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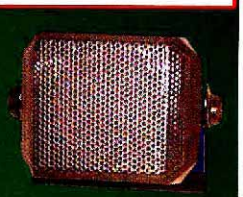

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VR-500 All Mode
FT-2600M
FT-7100
ROTORS
FT-920
FT-1000mpMKV
FRG-100
FT-100D New Features
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VR-5000
FT-840
FT-847

New Product
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200W 50MHz Transverter
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TS-870
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TM-261A
Compact 2 Meter Mobile
TS-2000
TS-570D & TS-570S W/6m HF Transceiver with DSP
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TH-79AAKSS

Prices, products and policies may vary between dealer locations. Not all dealers have all product lines. All prices and products subject to change. Not responsible for typographical errors.

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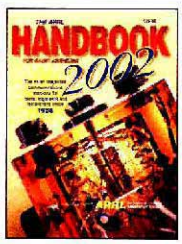

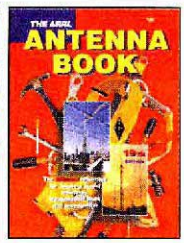

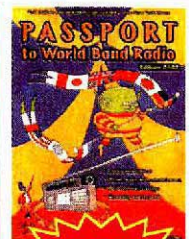

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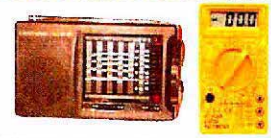

YB205 Grundig (above left)
DT-830B Meter (above right)
KA818 Digital SW
KA989 SW
DP976—4 way power SW

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God Bless America

Scanners/Receivers

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IC-T7A/HP
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IC-746-PRO

IC-910H
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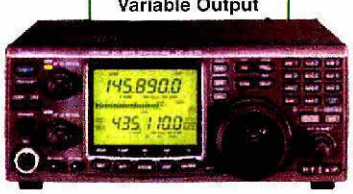
Variable Output



Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	104	54	200	29	1845	3.577	WD8KFN
BN (L)	202	79	294	30	2200	3.577	NY8V
OSN	99	31	439	29	1810	3.708	WB8KQJ
OSSBN	2080	629	2794	90	1030, 1615, 1845	3.9725	N8IO

Tfc: K8PJ 280, N8IO 267, N8OD 212, WD8KFN 209, W8STX 144, N8BV 138, WB8KVM 134, N7CEU 129, KD8HB 124, N8IXF 120, N8DD 106, W8QIW 93, WA8EYQ 90, KA8VWE 83, N8TNV 72, KA8FCC 71, WA8SSI 68, W8PBX 66, KC8HJL 54, W8RPS 52, KD9K 52, N8IBR 47, WB4HHV 45, KC8DWM 37, NS8C 37, NY8V 37, N8CW 36, KC8HPR 33, N8YWX 33, KI8IM 32, W8RG 28, W8GOB 25, WB8PMG 25, KC8HTP 25, KB8SBK 25, WD8KBW 24, W8BO 23, WB8SIQ 23, KC8DWM 22, K3RC 21, N8WLE 21, N8RRB 20, AB8KB 18, KI8O 17, KB8SIA 14, KC8RXL 13, KC8PDY 12, K8QIP 12, KC8KYP 8, N8RAK 7, KB8ESY 4, WB8IOW 4, K8WC 1.

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. If you are a teacher or Boy Scout troop leader or affiliated with a youth group please contact me in reference to bringing amateur radio to our youth. Be part of the 'Big Project'. May everyone have a glorious holiday season and may we all heal from this year's disaster. 73 de Pete N2YJZ. June - PSHR: N2JBA 149, N2YJZ 148, WA2ZCM 142, W2AKT 133, KC2DAA 130, WA2YBM 125, W2JHO 123, KB2YUR 120, K2SLY 115, KC2HUV 109, N2RTF 109, WB2T 88. Tfc: N2YJZ 78, N2JBA 67, WA2ZCM 43, KC2HUV 32, N2RTF 31, W2JHO 25, KC2DAA 16, WA2YBM 15, WB2T 13, K2YS 9, KB2YUR 8, W2AKT 7, K2SLY 6, WA2WMJ 6, KC2HUT 4. Net Reports: QNI/QTC+QSP AES 30/2 CDN 306/94, CGESN 32/4 ESS 398/166, HVN 667/192, SDN 347/93, NYPHONE 220/707, NYPON 344/181, NYS/E No Report, NYS/M 168/125, NYS/L 265/422, NYSPTEN 368/82.

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 continued to respond to the World Trade Center disaster until the official ARES/RACES net stood down at the end of September. Additional hams continued to support the Salvation Army through its 'SATERN' system well into October. Over 500 hams responded with well over 10,000 hours of volunteer communications support contributed. A "Big Apple" thank you and God Bless to everyone. It has been a difficult time, but it is heartening to see our section, state and country come together. If you were involved in helping out and would like to share your story, please contact NLI Public Information Coordinator Diane Ortiz, K2DO, at k2do@arrl.net. We are compiling these stories for publication on the NLI Web site. Thanks again for all your help! HRU 2002: Ham Radio University 2002 is Sunday, January 20, 2002 in North Babylon. Mark your calendars now! A full program of educational seminars is planned. Contact Phil N2MUN for more information and the date of the next HRU planning meeting at n2mun@arrl.net or 631-226-0698. December events: NWS/ARRL SKYWARN recognition day is December 1. Amateurs will operate from National Weather Service in Upton, NY, from 00:00 to 23:59 UTC signing K2U in the SSB portion of the General bands. KCRC is holding a special VE Session on Tuesday, Dec. 11 at Gateway National Park in Brooklyn. Pre-registration required - contact George Donohue at georged1_us@yahoo .com. 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 Web site (www.arrl.org) and update your profile. Check the box that indicates you want Division / Section bulletins. Previous newsletters are available on the NLI site. Please e-mail me with your club's information and I will get it in the newsletter! 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 489, N2AKZ 231, WA2YOW 108, KB2KLH 68, KA2YDW 26, KE2SX 16, KA2UEC 8, WA2VZK 5, N2TEE 5, AB2IZ 4.

NORTHERN NEW JERSEY: SM, Bill Hudzik, W2UDT—ASM: K2WJ. STM: WB2FTX. ACC: N3RB. SEC: K2SO. OOC: K2ZD. SGL: K1VX. The WTC disaster has affected us all. We will never be the same. This is why it is important for all of us to become active in our local groups. If you have not done so, PLEASE join your local ARES/RACES group. You can help! It was great to see that the NNJ Ham community responded with its usual enthusiasm. SEC K2SO and his group worked with NYC-LI ARES/Red Cross to support their needs. Steve, my thanks! With our appreciation, certificates of merit have been presented to those who gave their support. I was happy to be present at the 10-70 Club meeting to thank those who received recognition from DEC WA2MWT for their efforts in the WTC disaster. Other certificates have been presented to thank those who also contributed. The OMARC newsletter had a great summary of its Field Day activities. WB2AWQ's article in the 10-70 newsletter is a good primer of what we need to have in order to respond to emergencies. In the NJ QSO Party W2CC won as top score. I ask all NNJ members to check their ARRL profiles to make sure they will receive Division/Section mailings. This will be my means of giving you news. The NNJ Web site is up. Please use it. Let webmaster know N2WZB what your club activities are. Mark is doing a fine job please give him your support. This is OUR Web page. Let's use it! 73, Bill Hudzik, W2UDT USA!

Net	NM	Sess	QNI	QTC	QSP
NJM	WA2OPY	30	112	108	98
NJPN	W2CC	35	213	41	40
NJSN	K2PB	30	180	24	22
NJN/E	AG2R	30	211	162	101
NJN/L	AG2R	30	156	75	49
NJVN/E	N2RPI	29	467	89	61
NJVN/L	N2OPJ	30	431	37	37

Tfc: W2MTO 186, WA2MWT 56, N2GJ 54, N2RPI 41, N2OPJ 38, W2JG 32, K2PB 28, K2DBK 27, KC2ANN 24, N2BVM 19, W2CC 13, N3RB 7.

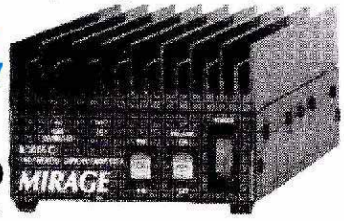
MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD. SEC: NA0R. ACC:

MIRAGE . . . 160 Watts on 2 Meters!

Turn your mobile, base or handheld into 160 Watt powerhouses and talk further, longer, clearer . . . All modes: FM, SSB, CW . . . Superb GaAsFET preamp . . . Overdrive, high SWR, Over-temperature protection . . . Remote controllable . . .

MIRAGE RUGGED!



B-5016-G
$299
Suggested Retail

The MIRAGE B-5016-G gives you 160 Watts of brute power for 50 Watts input on all modes -- FM, SSB, or CW!

Ideal for 20 to 60 Watt 2 Meter mobile or base. *Power Curve* chart shows typical output power.

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. *We know of one that has been in constant use since 1979!*

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's *Therm-O-Guard™*.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive switching with remote external keying.

Draws 17-22 Amps at 13.8 VDC. 12x3x5½ in.

RC-1B, $45. Remote Control. On/Off, preamp On/Off, selects SSB/FM. With 18 foot cable.

Power Curve -- typical B-5016-G output power

Watts Out	130	135	140	145	150	155	160	165
Watts In	20	25	30	35	40	45	50	55

More 160 Watt, 2 Meter Amplifiers . . .

B-2516-G, $299. For 10 to 35 Watt mobile or base stations. 160 Watts out for 25 Watts in.

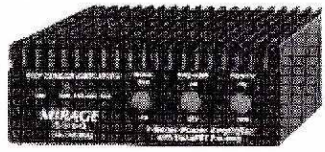
B-1016-G, $379. MIRAGE's most popular *dual purpose* HT or mobile/base amplifier. 160 Watts out for 10 Watts in. For 0.2-15 Watt transceivers.

B-1016-G Great for ICOM IC-706!

B-215-G, $379. MIRAGE's most popular *handheld* amp. 150 Watts out with 2 watts in; 160 watts out with 3½ Watts in. For 0.25 to 5 Watt handhelds radios.

100 Watts for 2 Meter HTs

B-310-G
$199
Suggested Retail
MIRAGE RUGGED!



Power Curve -- typical B-310-G output power

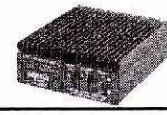
Watts Out	25	50	75	95	100	100	100	100
Watts In	¼	½	1	2	4	6	7	8

- *100 Watts out with all handhelds up to 8 Watts*
- *All modes: FM, SSB, CW*
- *Great for ICOM IC-706*
- *15 dB low noise GaAsFET preamp*
- *Reverse polarity protection*
- *SWR Protection*
- *FREE mobile bracket*
- *Auto T/R Switch*
- *FREE handheld BNC to B-310-G patch cable*
- *Ultra-compact 4¼x1¾x7¾ inches, 2½ pounds*
- *One year MIRAGE warranty*

***Boost** your 2 Meter handheld to 100 Watts!* Ultra-compact all mode B-310-G amp is perfect for all handhelds up to 8 Watts and multimode SSB/CW /FM 2 Meter rigs. *Great for ICOM IC-706!*

35 Watts for 2 Meter HTs

B-34-G
$89.95
Suggested Retail



Power Curve -- typical B-34-G output power

Watts Out	18	30	33	35	35	35	35+
Watts In	1	2	3	4	5	6	8

- *35 Watts Output on 2 Meters*
- *All modes: FM, SSB, CW*
- *18 dB GaAsFET preamp*
- *Reverse polarity protection*
- *Includes mobile bracket*
- *Auto RF sense T/R switch*
- *Custom heatsink, runs cool*
- *Works with handhelds up to 8 Watts*
- *One year MIRAGE warranty*

MIRAGE RUGGED!

35 Watts, FM only . . . $69.95

B-34, $69.95. 35 Watts out for 2 Watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3½x1¾x4¼ inches.

MIRAGE Dual Band 144/440 MHz Amp

BD-35
$159.95
Suggested Retail

Power Curve -- typical BD-35 output power

Watts Out 2 Meters	30	40	45	45	45	45	45+
Watts Out 440 MHz	16	26	32	35	35	35	35+
Watts In	1	2	3	4	5	6	7

- *45 Watts on 2 Meters/35 Watts on 440 MHz*
- *Auto Band Selection*
- *Auto T/R Switch*
- *Full Duplex Operation*
- *5x1¾x5 inches*
- *FREE mobile bracket*
- *"On Air" LEDs*
- *Single Connector for dual band radios and antennas*
- *Reverse polarity protection*
- *Works with all FM handhelds to 7 Watts*
- *One year MIRAGE warranty*

Add this Mirage dual band amp and boost your handheld to a powerful mobile or base -- 45 Watts on 2 Meters or 35 Watts on 440 MHz! Mirage's exclusive *FullDuplexAmp™* lets you talk on one band and listen on the other band at the same time -- just like a telephone conversation. *(Requires compatible HT).*

6 Meter Amplifier

FCC Type Accepted

The A-1015-G, $389, is the *world's most popular* all mode FM/SSB/CW 6 Meter amplifier. 150 Watts out for 10 in. For 1 to 15 Watt transceivers.

70 cm Amplifiers (420-450 MHz)

D-3010-N, $365 -- 100 W out/30 in. For 5 to 45 Watt *mobile/base.* **D-1010-N, $395**, 100 W out/10 in. *Dual purpose* -- for handhelds or mobile/base. **D-26-N, $269**, 60 W out/2 in, for *handhelds.*

Amateur TV Amps

Industry standard ATV amps -- **D-1010-ATVN, $414**, 82 Watts PEP out / 10 in. **D-100-ATVN, $414**, 82 Watts PEP out/2 in. (without sync compression).

Remote Control Head for Amps

RC-1, $45, remote controls most MIRAGE amps. Check with Mirage for compatibility. Power On/Off, preamp On/Off, switch for SSB/FM. 18 foot cable (longer available). Tiny 1¾x3¾x2½ inches.

Repeater Amps

11 models -- continuous duty all mode FM/SSB/CW repeater amps for 6, 2, 1¼ Meters, 70 cm, 450 MHz, ATV.

Low noise GaAsFET preamps

KP-1

KP-2

High gain ultra low noise GaAsFET preamps for receiving weak signals. Selectable gain prevents receiver intermod. 15 to 22 dB gain. Less than 0.8 dB noise figure. Automatic RF switching up to 100 Watts.

Choose *In-Shack* model or *Mast Mount* (includes remote control) model to reduce loss. Rugged die-cast enclosure.

Frequency (MHz)	*In Shack $139*	*Mast Mount $195*
28-30	KP-1/10M	KP-2/10M
50-54	KP-1/6M	KP-2/6M
144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

1¼ Meter Amps (223-225 MHz)

Choose from 10 models -- 20 to 220 Watts out for 2 to 50 Watts in. $129 to $655.

Commercial Amps ($199 to $395)

FCC Type Accepted

Commercial Amps for 150-174, 450-470 MHz and VHF marine bands, 70-130 Watts out.

Accurate SWR/Wattmeters

Read SWR directly and Forward/Reverse, Peak/Average power. Remote coupler. 1.8-30, 50-200, 420-450, 1260-1300 MHz band models.

One Year Mirage Warranty

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N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. STM: KB0RUU. The general theme I am seeing this month is that it is time to plan for elections and the Christmas Party! Dubuque is seeing some new problems with the repeater believed to be temperature related. Well... it is that time of year. DMRAA beat the rush. Officers for the coming year are: pres W0QH, vp KB0ZBL, sec KC0IEB, trs NU0Q. Those elected to the board were KC0FRO, KI0IP, and WD0CZO. For a variety of reasons, Operation Santa Claus has come to an end. For 54 years it provided a service to the DSM community. OARC is look for a new generator to keep things humming. They also organized the Oktoberfest parade. It's work, but it's fun. Hey Steve, how do you like the TS-2000? FMARC had nearly 25 in attendance for the Radio Rodeo. I also have word that W0WMP is a Silent Key. I hear he built his VHF/ UHF gear. Did any of you work 9K2USA? Are you a member of The Royal Order of Thugs? I think its going Nowhere. Did you read KB0RUU's article in the October QST? I have heard from several individuals that are taking the Emergency Comms course. 73 de N0JL. Newsletters were received from DARC, GRARC, DMRAA, CVARC, OARC, FMARC. Traffic: KB0RUU 159, W0SS 164, WB0B 38, N0JL 20. PSHR: KB0RUU 103.

KANSAS: SM, Orlan Cook, W0OYH—ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. STM: Ron Cowan, KB0DTI. PIC: Scott Slocum, KC0DYA. TC: Rick Carver, WA0KS. 2001 SET is behind us. Reports are just now coming in so I will have a full report next month. I will say it seemed to me that there was less activity this year. June, KB0WEQ, EC for Johnson county and her ARES group were extremely active with lots of HF traffic on our nets. Please welcome Joe, KA0NAM, as a new TS to our section and B.J.KC0CBC to our EC ranks in Harper county. On October the 22, the Kaw Valley ARC of Topeka will be celebrating their 75th year of affiliation with ARRL with a banquet/open house KAR, Kansas Amateur Radio Web site is up and running at http://www.ksarrl.net/ please browse to keep up with Ks happenings. Thanks to all of you who hold 129 ARRL Ks appointments and for being there for your communities. Aug. Kansas Nets: sessions/QNI/QTC,KSBN 31/1061/41, KPN 22/271/20 KMWN 31/646/471 KWN 31/853/485 CSTN 27/2036/ 126 QKS 59/264/108 QKS-SS summer bk SEC 72/745/18 QNS KB0AMY KC0AUH N0BTH KC0CFL KC0CIG WD0DVM K0FJ AA0IQ N0LKK KB0WEQ KB0ZWK Joseph WD0DVM SEC. TEN 62/226/??? QNS 76% KB0DTI AA0FO K0PY W0WWR NB0Z WB0ZNY W0SS/Mgr. TRN 60/520/276 Ks 90% with KB0AMY W0FE N0KJ AA0OM W0WWR. Ks tfc W0WWR 368, K0PY 56, KB0ODT 42, KC0JCQ 32, NB0Z 30, W0OYH 22, N0RZ KC0GL 14, N0ZIZ 6, W0FCL 4, K0RY 2. OBS K0RY 25, WA0DTH 18.

MISSOURI: SM, Dale Bagley, K0KY—ASM: John Seals, WR0R. ASM: Bill Coby, KB0MWG. ASM: Larry Ballew, AB0HP. ACC: Keith Haye, WE0OG. BM: Brian Smith, KI0MB. OOC: Mike Musick, N0QBF. STM: Charles Boyd, KE0K. SEC: Patrick Boyle, K0OJPB. The efforts of Patrick Boyle, K0JPB, MO SEC, the many ECs and ARES members that responded to the terrorist attacks in New York and Washington DC, is very much appreciated. Gene Bess, KC0IUO, EC of Pulaski County near Fort Leonard Wood reported that 16 Amateurs operated for nearly 1000 hours. Bill Coby, KB0MWG, St. Louis EC, Mike Bellinger, K0UAA, EC & DEC for the Kansas City area, Don Moore, KM0R, EC Boone County, MO and several other EC's activated ARES groups in response to the attack. Kent Trimble, K9ZTV, the NM for the MTN CW advised that the net could be quickly activated if needed. Janet Stonecipher, KC0IET, of Callao, MO, has worked for several weeks in New York to assist Salvation Army SATERN communications unit with the recovery efforts. The Sikeston, MO based Trico ARC has been reactivated. All affiliated clubs need to determine accuracy of their club information on the ARRL Affiliated Club Web site and prepare to update the officers and contact persons for their clubs for the 2002 club year. The mailing address for many clubs are not valid at this time. Tom Hammond, N0SS, has been active in alerting MO Section Amateurs concerning the FCC Registration Number (FRN) that became mandatory on Dec 3, 2001. If an amateur has registered with the Universal License System (ULS) they were probably pre-registered in CORES & FRN. Getting all Amateurs registered will be an important function of Radio Clubs and Individuals that understand the significance of this effort. Best wishes to all ARRL members, section appointees, and all Affiliated Clubs for a wonderful holiday season and successful 2002. Net/sess/QNI: WAARCI 5/112/ 0; MTN 30/446/37; Audrain Co ARES 4/45/3. Jackson Co ARES 7/75/0. K0UAA. Tenth Region 60/162. Tfc: KE0K 16.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. It is with deep regret to inform you that Tony, K0OAL is a Silent Key. He had served in a variety of ARRL positions. Midlands ARES members were called on Sept. 11th to provide communications for misplaced persons. W8TM, N0UP, KD7GSW, W0ATU, KC0HMI, N0HPP and N0TRK participated. W0AP advises me that the Nebraska CW Net has started back up again. The net operates M-F at 1845 local and the frequency is 3540 kHz. 8 amateurs participated in a pre-disaster drill in Sarpy County on September 8th. Another drill will be held on the 22nd where participants will be graded. 85 members of the Lincoln ARC generated 1,575 hours of public service at the Nebraska State Fair. Net Reports: MIDNE ARES: QNI 338, QTC 5 & 31 sessions. NMPN: QNI 1135, QTC 12 & 30 sessions. Lincoln/Logan ARES: QNI 20, QTC 2 & 3 sessions. NE Storm Net: QNI 885, QTC 9 & 30 sessions. NCHN: QNI 158, QTC 2 & 30 sessions. NE 40 Meter Net: QNI 341, QTC 2 & 30 sessions. MARES: QNI 140, QTC 2 & 4 sessions. Tfc: K0PTK 110, KE0XQ 16, WY0F 6, W0UJI 2, KA0DOC 2, W0DED 2, W0EXK 2, KA0O 2, WA0ZCN 2, KA0DBK 2. PSHR: KB0YTO 30, KC0HOX 40 KA0DBK 113, KB0YTM 28.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—Thank you to the many CT ops who answered the call for help immediately after the tragic events at the World Trade Center. Several reports of your dedication and professionalism came across my desk. Jay, N4GAA, was at the State Ham Fest in Wallingford and at the ARRL Forum, he expressed real pride in being among the ham ops who gave of their time to assist. The task was not an easy one. If you were among the ops in New York, please e-mail me *k1eic@arrl.org*, as I am compiling a list of participants. Thanks. I regret to tell you that Darrow, WA1D, is resigning as SEC as of November 30 and Don, N1HAX, has asked to be relieved of his post as DEC and assistant SEC. Both have work and personal commitments that will impact on their time. Don, N1HAX, wishes to continue to serve in a local capacity; he will be the new EC of East Haven replacing Jim, N1KLB, who can no longer perform that task. The Section sincerely thanks Darrow, Don and Jim for their outstanding service. Darrow has been SEC for about 2.5 years and I have really enjoyed working with him. He and Joe, K1IKE, started the CONNARES reflector which will still operate. Darrow has brought new ideas and creativity to the ARES program in CT. Don, N1HAX, has served as DEC and ASEC since I became SM in 1991 and has continued to be an enthused, energetic leader as you all know. Many, many thanks to both of you! We will miss you as leaders, but know you will continue to be active and ready to help. Jim has done an outstanding job organizing the ARES effort in East Haven. The EC's job is not an easy one—thanks, Jim. Want to upgrade to extra class? Contact Joe, N1KHB, n1khb@juno.com—he is running a class beginning in January which will meet once per week and end in March. This is a fine opportunity—don't miss out! It was good to see so many of you at the State Ham Fest. Thanks and congratulations go to The Meriden ARC for their excellent work. We heard an inspiring talk from Riley Hollingsworth, K4ZDH, who challenged all of us to conduct ourselves as good, intelligent operators on the air so that all can enjoy listening to our frequencies. Net sess/QNI/QTC/NM: ECTN 28/214/84/WA4QXT; WESCON 30/255/33/KA1GWE; NVTN 30/209/49/KB1CTC; CPN 30/233/76/N1DIO; CN 22/70/36/N1AEH; BOMN 23/289/255/NM1K. Tfc: NM1K 2203, KA1VED 433, WA4QXT 124, KA1GWE 94, KB1CTC 36.

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. I'm very proud of the dozens of EMA amateurs who volunteered for, or traveled to New York City to assist our fellow Americans in the wake of last month's terrorist attacks. I applaud SEC W1MPN and his ARES staff for playing an important role in coordinating the deployment of hams to work for the American Red Cross in New York. In these difficult times, let us remember to stay focused and united, and to treat our fellow citizens with respect, regardless of their race or religion. Approximately 20 Sturdy Memorial Hospital ARC members participated in the Rojacks road race. SKYWARN Coordinator KD1CY spoke about severe weather at a recent Acton-Boxboro ARC meeting. Boston ARC coordinated communications for the BAA "Half Marathon" event. Southeast MA ARA held a field trip to the New England Wireless & Steam Museum in E. Greenwich, RI. Mystic Valley ARG handled Boston Fire Dept. Local 718 Road Race communications. Congrats to the Pilgrim ARC of Provincetown, affiliated with ARRL for 25 years strong! Police AR Team members WB1HBE and AA5JO are coordinating Morse code classes. N1XTB to speak about solar power at the Falmouth ARA. Pentucket RA has a new repeater on the air with a PL of 156.7 Hz to alleviate an intermod problem. It's rumored that PRA's Thursday evening net will be resurrected. By all accounts the Hosstraders flea market was a resounding success. KY1B spoke on contesting at a recent Billerica ARS meeting. K1NZQ and crew are planning some upgrades to the 2m and 6m Billerica repeaters. Framingham ARA offered weekend courses for General and Extra. This SM was pleased to co-present with ACC N1DHW a certificate at the Wellesley ARS honoring them for 50 years of ARRL affiliation! Be sure to visit http://www.emaares.com for current information on ARES and EMA emergency communications preparedness. If Amateur Radio is called upon in the event of a local crisis, is your radio club ready? Are you ready? 73 de K9HI. Tfc: W1GMF 1292, N1LKJ 345, NG1A 340, KD1LE 161, NZ1D 143, K1SEC 97, N1AJJ 76, K8SH 67, WA1LPM 60, K1BZD 57, WA1FNM 49, KB1EB 45, N1IST 32, N1LAH 28, N1TPU 26, NC1X 13, N1TD 5.

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. The Christmas holidays are only a few weeks away, and many of you are checking your list to be sure that all of your loved ones open gifts and return your thoughts with big smiles. As for me, my wish list is not very long. The Sept.11th tragedies were a wake up call for all of us to bring ourselves up to a higher state of awareness for future possible terrorist attacks. I would like to see the State Packet Network become again capable of handling traffic into and out of the State, from Ft. Kent to Kittery, from Calais to Kezar Falls, and beyond the State's borders to the rest of the world. Many may say it can't work; it's old technology, but it seems to me, that's what they said about da-dit-da-dit dit-da-da (CW.) Some things will always work, and I believe (in my opinion) that making the Packet Network a reliable means of communications is all the more possible with the Red Cross Stations now equipped with this capability, as well as licensed Red Cross staff (and in some instances, Directors) to make this happen. Ask yourself what you can do to help to ensure that we, as Amateurs, will be ready to provide our services in time of need. Wishing all of you the best of Holiday Seasons, and looking forward to seeing everyone March 29 & 30 for the ARRL Maine State Convention at the Ramada Inn in Lewiston. 73, Bill, N1KAT. Tfc: W1KX 119, W1QU 64, N1JBD 62, W1JTH 42, W1JX 37, KA1RFD 29, KA2ZKM 8.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org)— NH Web site (www.nhradio.org). Thanks to all NH hams who volunteered or responded to needs of NY following the tragedy. Special thanks to Bill Fleming, N1HKO, Assist. SEC who coordinated the NH response with the Red Cross. It has been a yr since returning as your SM and have seen a marketed increase in volunteerism from old and new hams alike. There are still areas that hold great promise with your help. Sept 11th was a wake up call to the U.S. & to the ham community. If you are interested in helping, please contact me. Tell me of your interests, and we will help you help us. Congratulations to the Gable family of New Ipswich. Not only is Dorothy, Timothy and Andrew a three-ham family but they all earned their licenses at the same time in August. Welcome, Dorothy, KB1HEB, Timothy, KB1HED, and Andrew, KB1HEE, into "our" family. Are you ready in the event of a local emergency weather related or otherwise? Contact your local radio club or NH ARES to find out how to be prepared. Happy Holidays, drive and play safe -73, Al. Net/NM/sess/QNI/QTC: GSFM N1RCQ/29/166/25; GSPN WB1GXM/29/92/119; VTNH WA1JVV/30/120/89. Tfc: W1PEX 814, WA1JVV 72, N1NH 67, W1ALE 67, WB1GXM 23, N1CPX 7, K1TSV 2.

RHODE ISLAND: SM, Armand Lambert, K1FLD—It is with great regret that we record the passing of John "Sparky" Palmborg, WA1HAH. He often volunteered the services of his repeater to help out with the RI Diabetes Bike-a-thons. He will surely be missed and his shoes will be difficult to fill.//There was a high caliber of volunteers from the Rhode Island area that took the challenge by coordinating, participating or standing by in the Amateur Radio support for the New York WTC Disaster Relief effort. Our special thanks to Paul Vanasse, W1PEV, for spearheading the project. Also, thanks go out to the following : Dennis Feerick, N2NCL, John Buco, N1EGS, Dan Roy, KA1BNO, Barry Noel, W1BSN, Dick

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to raise havoc with your valuable radio equipment. DANGEROUS static charges measuring 1000s of volts can be developed from local thunderstorms, high wind driven snow or sand; so potent, they can actually puncture the dielectric of unterminated coaxial cable. Solid-state transceivers and other equipment in your hamshack are very vulnerable to these high-voltage charges so you should take every precaution to protect your equipment and shack from possible serious damage... and, ALPHA DELTA has the answer!

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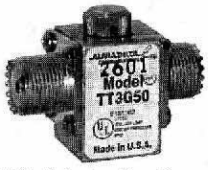

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The heart of this protector is an Arc-Plug™, which consists of two electrodes hermetically sealed in a gas filled ceramic cylinder. Acting like a voltage dependent switch, the Arc-Plug™ can repeatedly carry large currents for brief periods of time. If an excessive voltage appears on the feedline, due to lightning or static charges, the Arc-Plug energizes forming a momentary arc discharge to ground protecting your valuable equipment from damage.

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ATT-3G50 with Type-N females connectors rated up to 3.0 GHz and 200 Watts ..... **$59**[95]

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High quality Center and End Insulators, ideal for all types of wire antennas using either coax or balanced feed line, and up to full legal power. Made from an extremely rugged UV and RF resistant material that is virtually unbreakable. Stainless steel hardware used in the center insulator, and all internal connections are hard soldered. A built-in replaceable Arc-Plug™ provides surge protection for your equipment.

DELTA-C Antenna hardware kit ..... **$29**[95]

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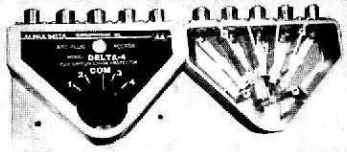

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- √ An extremely High Quality custom design featuring a Cast Aluminum Housing
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DELTA-2/N 2-position, with N-type connectors, rated for operation up to 1.3GHz..... **$64**[95]

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Surge Protected Console Coaxial Switches

- √ Built into a heavy 3/16 inch thick cast aluminum console weighing a hefty 2-3/4 lbs.
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- √ Proven 1/4 -wave sloper DX Performance
- √ Alpha Delta "ISO-RES" inductors replace lossy traps and capacitors √ Full Power operation
- √ Factory assembled using insulated #12 copper wire, stainless hardware and 50 ft. of nylon rope.
- √ Direct 50Ω coaxial feed, no tuner required. See our web site for sloper installation requirements.

DX-A Alpha Delta's Top Performing 1/4-wave Twin Sloper 160, 80 and 40 meter DX antenna. It combines the DX firepower of the 1/4-wave sloper with the wide bandwidth of a 1/2-wave dipole. Installs like an Inverted-V. The legs are only 67 ft. and 55 ft. long ..... **$59**[95]

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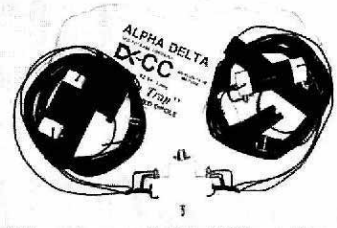

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Full-Size Monoband Dipoles

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DX-80 Covers 75/80 meters, 134 ft. long..... **$49**[95]

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VERMONT: SM, Bob DeVarney, WE1U—The events of September 11th have brought home to me just how woefully unprepared we are in this section. Our ARES organization is in a shambles since Joe Armstrong had to step down due to poor health nearly 2 years ago now. Since that time, I have made repeated requests here in the Section News for a person to step forward to become the new SEC. I am making that appeal once again. Uncle Bob is looking for a few good men (and women) who have the time, energy, and commitment to help rebuild the ARES organization in Vermont. What guarantee can I make? Long hours, and lousy pay...What do you get in return? The satisfaction of knowing that we will indeed be able to help out in time of need. I am looking for an SEC, and a DEC for District 1 (Chittenden County area). I hope that a winter storm or ice storm this winter will not find us unprepared. Lastly, I am reminded by current events of the need to rekindle relationships with family and friends, especially during this holiday season. Take a moment to send a radiogram, or e-mail, or call them on the phone and let them know how much you love and appreciate every person in your life. 73 and Happy Holidays de WE1U. Tfc: KB1DSB 180, KB1EYP 15, W1RFP 9, AA1PR 3, W1KMH 2.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud @arrl.org—ASM: N1MAP. ASM (digital) KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1W. I want to thank all the members of the section that signed my nomination papers. Guess I must be doing something right as I ran unopposed. The bands have been active the past month with the usual DX activity. October and November will have a number of wanted counties activated. If everything works out right, we will have a new country. One of the four islands in the Pitcairn chain may qualify for separate country status. All clubs have their itinerary in place, and it looks like it will be an active winter season. Maintenance has been done on all the repeater sites in preparation for the upcoming winter. I hope you have done the same with your antennas and hardware. Construction is progressing slowly at the Leominster CD building. When completed, there will be a ham shack and meeting and classroom for local amateurs. Dennis, K1VSG, informs me that our emergency drill has been honed to a razor's edge. We can activate at a moment's notice. In any emergency, monitor the call in frequency of 3943 kHz for both WMA and EMA as well as your local repeaters. Tfc: W1ZPB 59, N1WAS 113, KD1SM 159, K1TMA 259, W1UD 238.

NORTHWESTERN DIVISION

ALASKA: SM, Kent Petty, KL5T – All section areas need to re-evaluate effectiveness of ARES interface with local and state government agencies, as well as with emergency relief agencies. HF Pactor stations and amateur PACSAT stations needed throughout the section to interface communications networks between districts....can you help? Contact KL5T or AD4BL. Richard Lampe, KL1DA, of Glennallen, assigned as HAARP Liaison. Contact Richard if interested in participating in any HAARP related activities. HF nets: Sniper's Net 3920 1800 AST, Bush Net 7093 2000 AST, Motley Group 3933 2100 AST, and Alaska Pacific Net 14292 M-F 0830 AST. 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—After the September 11 terrorist events, the WA State Emergency Net was activated on 3.987 MHz. Also city and county officials wanted to ensure ARES ham's availability. As hams we have a versatile and efficient way of communicating, but we must now communicate well. Amateur Radio exists because it is a service and should not be used as a political forum or to speculate or spread rumors, and to be mindful and respectful. Keep your automobile and generator gas tanks topped off, batteries charged up, have extra cash and food and water on hand, and remain vigilent. The Simulated Emergency Test on Oct. 6 involved stations from Spokane, Chelan/Douglas, Stevens, Whitman/Latah and Walla Walla Counties, and 2 stations in WWA including the State EOC. A lot of messages were handled in a professional manner by the participants. Net Activity: WSN: QNI 840, tfc 225; Noontime Net: QNI 8873, tfc 311; WARTS: QNI 3556, tfc 89. Tfc: W7GB 209, KA7EKL 57, K7BFL 49, K7GXZ 47, KK7T 17, PSHR: W7GB 128. In Memoriam: Victims of terrorism! God Bless America, and Season's Greetings. 73 de KA7CSP

IDAHO: SM: M.P. Elliott, K7BOI — OOC: W7ZU. SEC: AA7VR. STM: W7GHT. I want to thank you all for your help in the past 3+ years. Due to my job I must resign as Section Manager. We are fortunate to have very capable hams to take the job. John Cline, K7BDS, has volunteered to take the Section Manager job. Many of you know John from his work in support of the 2000 Tower Bill, his position as Director of the Idaho Bureau of Disaster Services, and his work with Idaho hams. ARRL HQ has approved the transition - John takes over January 1, 2002. I would encourage you to step forward and help John as he begins his new duties. For my part, thanks to all - it has been fun. 73 - Mike, K7BOI. Tfc: W7GHT 416, KB7GZU 63, WB7VYH 46, W6ZOH 17. PSHR: W7GHT 122, WB7VYH 89. Nets: FARM-30/ 2682/32/W7WJH; NWTN 30/2001/78/ KC7VAH; IDCD -20/346/10/WB7VYH; IMN 30/418/ 292/ W6ZOH. http://id_arrl.homestead.com/mainpage.html.

MONTANA: SM, Darrell Thomas, N7KOR—After a quiet August Amateur Activity picked up in the Montana Section during September. Congratulations are in order for the members of the Sacajawea Middle School Ham Radio Club in Bozeman Mt whose members participated in the School Club Roundup earlier this year. This is

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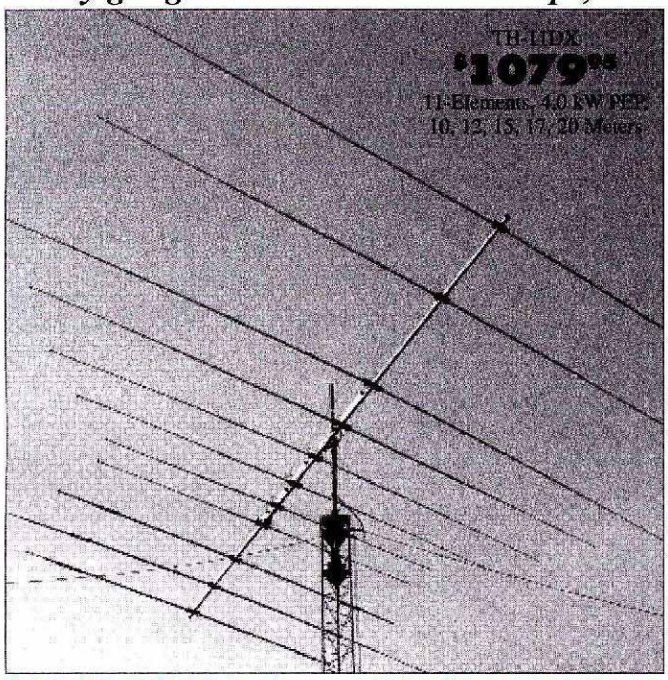
...are stronger, lighter, have less wind surface and last years longer. Why? Hy-Gain uses durable tooled components -- massive boom-to-mast bracket, heavy gauge element-to-boom clamps, thick-wall swaged tubing -- virtually no failures!



TH-11DX, $1079.95. 11-element, 4.0 kW PEP, 10,12,15,17,20M

The choice of top DXers.

With 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!*

Handles 2000 Watts continuous, 4000 Watts PEP.

Every part is selected for durability and ruggedness for years of trouble-free service.

Features a low loss log-periodic driven array on all bands with monoband reflectors, BN-4000 high power balun, corrosion resistant wire boom support, hot dipped galvanized and stainless steel parts.

Stainless steel hardware and clamps are used on all electrical connections.

TH-7DX, $819.95. 7-element, 1.5 kW PEP, 10,15,20 Meters

7-Elements gives you the *highest average gain* of any Hy-Gain tri-bander!

Dual driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands.

Uniquely combining monoband and trapped parasitic elements give you an excellent F/B ratio.

Includes *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

TH-5MK2, $699.95. 5-element, 1.5 kW PEP, 10,15,20 Meters

The broadband *five element* TH5-MK2 gives you outstanding gain.

Separate air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band.

Also standard is *Hy-Gain's* exclusive *BetaMATCH*™, stainless steel hardware and compression clamps and BN-86 balun.

TH-3MK4, $439.95. 3-element, 1.5 kW PEP, 10,15,20 Meters

The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

You get an impressive average gain and a whopping average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival.

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.

Features *Hy-Gain BetaMatch*™ for DC ground, full power *Hy-Q*™ traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

TH-2MK3, $339.95. 2-element, 1.5 kW PEP, 10,15,20 Meters

The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander.

For just $339.95 you can greatly increase your effective radiated power and hear far better!

Ruggedly constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

EXP-14, $549.95. 4-element, 1.5 kW PEP, 10,15,20 Meters

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.

Hy-Gain's *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP.

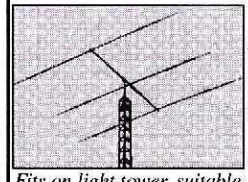
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

***Truly** competitive against giant tri-banders at half the cost!*

QK-710, $169.95. 30/40 Meter option kit for EXP-14.

Compact 3-element 10, 15, 20 Meter Tri-Bander

For limited space . . . Installs anywhere . . . 14.75 ft turning radius . . . weighs 21 lbs . . . Rotate with CD-45II, HAM-IV



Fits on light tower, suitable guyed TV pole, roof tri-pod

TH-3JRS, $329.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

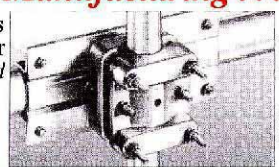
Excellent gain and F/B ratio let *you* compete with the "big guns".

Tooled manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
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 w/40 kit	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

Tooled Manufacturing . . . Highest Quality Materials

1. Hy-Gain's famous super strong *tooled* die cast *Boom-to-Mast Clamp*



2. *Tooled* *Boom-to-Element Clamp*

3. Thick-wall *swaged* aluminum tubing

***Tooled** manufacturing* is the difference between Hy-Gain antennas and the others -- they just don't have it (it's expensive!).

Die-cast aluminum boom-to-mast bracket and element-to-boom compression clamps are made with specially *tooled* machinery.

Hy-Gain antennas feature *tooled* swaged tubing that is easily and securedly clamped in place. All tubing is deburred and cleaned for smooth and easy assembly.

Durable precision injection molded parts.

***Hy-Gain** antennas are stronger, lighter, have less wind surface area, better wind survival, need no adjustments, look professional and last years longer.*

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a very active club and the efforts of 14 operators over 24 hours gained them first place in their division. During the operation they made 415 QSOs with 49 states, 30 countries, 6 clubs and 36 schools. A large thanks to Vivian Linden, K7CUB, Mal Goosey, N7GS, and Don, Godward, N7FLT, of the Gallatin Ham Radio Club who meet each week with the students in support of the school club. During the first week of September, the Great Falls Area Amateur Radio Club ARES group was activated by Disaster and Emergency Service to provide communications support from the command post on the Sun Mountain Fire near Monarch MT. Members worked 4-6 hours shifts over several days providing communications and coordination for the many agencies on the fire lines. They were recognized by all for a job well done. Other activities included public service support by clubs in the section. Net/QNI/QTC/NM MSN 153/1 W7OW, MTN 1716/51 N7AIK, IMN 418/292 W6ZOH. PSHR: N7AIK 115.

OREGON: SM, Bill Sawders, K7ZM—ASM: KK7CW. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. STC: N7LA. ACC: K7SQ. I have been your ARRL Oregon Section Manager for 2 terms. My present term expires in July 2002. I have decided to NOT RUN for a third term. I have taken on added responsibilities as a major Account Supervisor (Honda of America) for my present employer, iSKY, in Bend. I will be working some weekends, and will not be able to travel as freely, as in the past. The official election for my replacement will take place in March or April of next year. See *QST* notices and bulletins for exact dates. These past three and 1/2 years have been very rewarding for me, and my wife, Vicki, K7ZMZ. We have enjoyed meeting hundreds (even thousands) of you. My present "Section Management Team" is truly fantastic. They are the only reason my tenure has been so successful. I thank them. Naturally, my job isn't over yet. I plan to attend as many ARRL functions as possible, as well as local conventions and swapfests, through the end of my term. I just wanted to give early notice, so that YOU may think about the opportunities of leadership and serving Amateur Radio to the fullest, by serving as the next ARRL Oregon Section Manager. Keep in touch. NTS traffic totals for September: W7IZ 211, N7DRP 99, W7VSE 83, N7YSS 78, AC7DD 45, KC7SRL 43, KC7ZZB 32, K7NLM 30, KC7SGM 16, KK1A 8.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—At the turn of the century now 101 years ago the wireless operators were becoming experienced in sending, receiving and relaying messages. Thus was born the American Radio League to formalize the procedural for handling of such message of interest to the public, but not of commercial interest. Eventually was born the present National Traffic System complete with the intricate intertwining of radio networks and the men and lady operators who daily provide such a service. Check the Public Service Roster and monthly you will find their call signs. For the month of September in this Section those making the honor roll were: K7MQF, W7DPW, W7QM, KJ7SI, KA7TTY, W7TVA, N7YSS, W7ZIW. It was the experience of this SM that much of the traffic handled during this period was from ground zero in New York. Here are the traffic handlers and their traffic totals; W7TVA 480, W7QM 152, N7AJ 142, K7MQF 122, W7ZIW 213, W7LG 72, W7DPW 15, N7YSS 78. Of course most of this traffic was via NTS Transcontinental, Region and Section nets. In Washington traffic totals for these nets appear in the Eastern Washington Column where Don, W7GB, is the Section Traffic Manager. In the Western Washington Section Pati, W7ZIW is the STM. These two coordinate traffic flow throughout the Sections. Traffic going out of state is usually handled by Region Net 7 and here George, KD7BDU, is Manager for Cycle 2. He is ably aided by net control stations K7YH, K7NLM, AA7OX, KD7ME, W7QM, KD7MQF, N7DRP and others. These stations also act as liaison to the Pacific Area Network, PAN. Local 2-meter nets such as the Puget Sound Traffic System with KA7TTY and the Clark County Net with K7SUQ feed traffic to the Section Nets. Of course, messages are now also received via Internet such as the EC report from Randy Greely, NU7D. These reports usually go to the SEC who compiles the communication segment for the monthly SM column. Speaking of Randy, do you know that he was recently involved in a hidden transmitter hunt when he was pulled over by a lady deputy thinking his DF antenna was a cross bow? Yes each traffic handler has a story to tell. Some even qualify for the coveted Brass Pounders League a monthly award presented to those who qualify with a specified traffic count. What? You handle traffic? Sure, try it, you'll like it. Check out the WARTS, CBN, NWSSB WSN and the Noontime Nets Frequencies and times are posted on the ARRL Web page. Remember that the Washington State Emergency Net meets Monday evenings at 6:45 PM on 3987 kHz as well as Saturdays at 9 AM. 73.

PACIFIC DIVISION

EAST BAY: SM: Andy Oppel, N6AJO—ASMs: NJ6T, KE6QJV. SEC: KE6NVU. DECs: KE6QJV/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. OOC: KD6FFN. STM: W6DOB. ACC: NJ6T. EB Web Page: http://www.pdarrl.org/ebsec/. Webmaster is KB6MP. It was a pleasure to speak at the Sept MDARC meeting. MDARC welcomed new members KF6QFT and Ron Hillman (call pending). Their excellent VEC program gives them a steady supply of newcomers to the hobby. ROVARC reports a successful trip to the mothball fleet to obtain vintage radios and manuals. HRC mourns the loss of longtime Hayward RACES member KD6SPC. EBARC welcomes KF6HEN as Secretary for the rest of 2001 and announced successful support of the Solano Stroll event. ACSCT support a full Alameda County EOC activation in the wake of the 9/11 tragedy. LARK congratulates KK6ZL on becoming a VE and ARRL emergency communications course instructor. VVRC counted 128 attendees at the 4th annual swap meet, including W6BO who flew his helicopter there. ORCA was honored to have member WB6NER selected as the Communications Officer with the Disaster Medical Assistance Team for a two week tour of duty in New York. September tfc: W6DOB 843, WB6UZX 27, KE6QT 12. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7 PM; NCN2-SLOW SESSION/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Jan Welsh, NK7N—The RARA quarterly meeting in Elko was a real treat. Vice Pres. W7YDX, Jerry, had the welcome mat out for W6OLD-Dick, ASM and KK7AA-Melissa, ACC, my other half KI7EY-Lee and me. President WB6QGH-John Hughes from Fallon presided at the well attended meeting. Wonder how many miles he puts during the year. Problem of a shortage of time. The Elko convention center had an amateur station set up in the science hall manned by W7GK-Dave Hough, N7JEH- Joe Giraudo and others from Elko and Winnemucca with more help from Elko Amateur Radio Club members for the 'FRIENDS IN SERVICE HELPING' public service event. The children had exciting exchanges around the world via HF 3rd party and kept coming back for more. Several of the RARA members attended too and some had questions for me. They are an active group and picked on W7YDX in fun. Hope to make one of the next RARA meetings and have more time to spend. Melissa, NV ACC asks if you'd send copies of your newsletters to her at kk7aa@libelle.com as well as the ones you send to me please. It keeps us aware of what's going on in NV 73. Jan,nk7n@aol.com. Tfc: W7TC 32, W7VPK 14, K7NHP10, N7CPP 9, NV7YL 4, W7YDX 4.

PACIFIC: SM, Ron Phillips, AH6HN—With the events of 11 September, many things that were planned got cancelled. However, our final planning for the upcoming Ham Convention in Honolulu is finished and we look forward to seeing many of you. Dan Spears, KH6UW, and his team finally got to Johnston Island a few days late, but did a terrific job. The number of contacts exceeded about 19,000 which includes contacts on all the bands. The Hawaii DX Association will be handling the QSLs. So far, about 3,000 to 4,000 cards have been received. Keep them coming. We will start responding in a few weeks. Jim, WH6GS reports that it was a great day for HF at Sand Island. Sun shining, seven HF stations, about 40 plus hams and cool drinks. From 8 AM until almost 5 PM, we CQ'd and QSO'd worldwide. First contact was Finland, then Sakhalin Island in Russia, Japan, Australia, and Argentina on QRP (2.5 watts). Not even counting Michigan, Arizona, Illinois, California, etc. We were pleased to have three DXers visit us: Ken, KH7R, Dan, KH6UW, and Bob, W7TSQ, from Seattle. Dan and Bob just returned from the Johnston Island DXpedition this past week. Three students from the current ham class came and one even worked Japan—her first QSO. Kimo, KH7U, fixed a Kenwood TS50 problem and got it on the air. In general, we answered lots of questions and helped many hams try out the rigs. Mahalo to the station control ops, Bev, AH6NF, Walt, Mike, AH7R, Ray, AH6LT, Ron, AH6RH, Tom, NH7EJ, and Jim, KC7OKZ. Special thanks to Kevin, AH6QO, from being a one-man ham promotion booth, and to Lee Wical, KH6BZF, our Asst Dir Pacific Div ARRL. Thanks for the good report, Jim. The stats for the Emergency Amateur Radio Club Net (Diamond Head Rpt 146.88 and 444.5) for September 2001: Number of check-ins: 140; Total net time: 256 minutes. Thanks Dale, AH7D. Dean Manley, KH6B, reports the Hawaii QRP and Hilo ARC total for September is 236. That's an average of almost 8/DAILY at Jack in the Box Restaurant in Hilo. ARRL's Ed Hare W1RFI to be the featured speaker at the Hilo ARC 70th Anniversary Dinner October 12 in Honolulu. Mahalo to all who contributed to this report.

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ—This is really my first opportunity to say "thank you" to all of the amateurs in and around 2 and 3-land that assisted with communications following the horrible terrorist assault on our great nation. You did a superb job and we are all proud of you! While this is the sort of incident that is nearly impossible to prepare for, and which we hope and pray will never happen again. The League's Continuing Education EMCOMM courses (all levels) will help us be as ready as we can be to assist in emergencies, regardless of the type. Seems like more and more often on the HF bands I am coming across stations operating QRP. It is truly amazing what 5 watts or less can do into a decent antenna. During the California QSO Party, I had a JA station call me on 20 SSB claiming to run 1 watt of power. Even into a 6db gain antenna the ERP was only 4 watts! He was an honest 5-5 at my QTH. Lesson? You don't need a "California Kilowatt" to enjoy successful QSOs on HF. Give QRP a try. I have, and it is a lot of fun. As we end another year, I wish to thank all of the appointees in the Section Field Organization, and all that serve in any capacity to promote the health of amateur radio in the Section. May the peace and blessings associated with this holy season be with you. And, the very best to you and yours in 2002. Until next month, 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. The surprise attack in New York City of last month moved all of us here in the section. Several volunteers were ready to go east and help but were not called. Alert status is higher and nets seem to be busy with additional check ins. All counties activated to some degree with San Francisco the highest. Marin and the San Francisco area clubs are still ready for immediate opening of ARES nets and control centers. Thanks to all that have participated. I hope that you can get additional hams to join us in ARES/ACS in the section. Volunteers are needed for DEC and ECs in Mendocino and Lake counties. Please contact me or any of my staff for information. Those further north on the coast are looking at the possibility of a hard winter and are preparing for it now. Change the ready bag and check the radios, AND check into the local nets. K6KSK is an SK.

SAN JOAQUIN VALLEY: SM Donald Costello, W7WN—ASM: Mike Siegel, KI6PR. ASM: John Lee, K6YK. SEC: Kent LeBarts, K6IN. OOC: Victor Magana, N1VM. ACC: Charles McConnell, W6DPD. STM: Fred Silveira, K6RAU. Traffic handling report received October 1 is as follows: K6RAU (STM) Sept. 1 activity report: PSHR = (1)12, (2) 01, (6) 20 TTL=33 KB6QIB activity report sent Sept. 22 Sent 8 did 4 Total 34X (1) 56, (2) 24, (4) 4, (6) 10 Total = 94 Turlock Amateur Radio Club had their Ham Radio Auction on October 13. There was, as usual, lots of great buys including some vintage AM gear. The auctioneer was Grady Williams, K6IXA. People from all over the Section and the Bay Area come to Turlock for this event so, plan to attend next year. Mariposa amateurs are moving forward with establishing an ARES unit to assist local emergency agencies. Dan Sohn, AD6OM, and John Meloy, AJ6LS, are instrumental in the process. Barry Morphew, W6MOR, and Dan Sohn, AD6OM, can be heard Monday through Friday as net control of the National Weather Service, HNX San Joaquin Valley Skywarn Net at 6:45 AM and on weekends. Yours truly, Don Costello, W7WN, operates the net on Saturday and Sunday at 8:00 AM on the TARC repeater 147.030 PL 100. You don't have to be a certified Skywarn member to check in. All amateur operators are welcome, and we hope you will attend one of the Skywarn training sessions given throughout the year. Ask one of the net controls for details. Now is the time to become a member of your local ARES (Amateur Radio Emergency Service). If ever Uncle Sam needed you it is now. Due to terrorist activity our government emergency service agencies could need us more than ever to assist with auxiliary communications. If you don't have an ARES group set up in your area e-mail me for details at w7wn@arrl.org .

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC—SEC: KE4JHJ. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl.org. North Carolina once again shows great enthusiasm for the Simulated Emergency Test. I am glad to see so much interest in the SET in this state. If you are an EC or Net Manager (or otherwise responsible for a SET in your area), please make sure you send in the report forms as soon as possible after the SET. This is our

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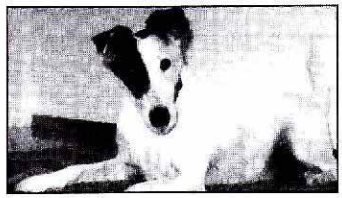

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Sizes: 8ga (40 amps), 10ga (30 amps), & 12ga (20 amps)

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Sorry, No COD's. Illinois residents 8.25% sales tax added. This offer expires December 31, 2001

COAX (50 OHM"LOW LOSS")

	100FT/UP	500FT	1000FT
"FLEXIBLE" 9913 STRD BC CNTR FOIL + 95% BRAID 2.7dB@ 400MHz NC/DB/UV JKT	.60/FT	.58/FT	.56/FT
LMR 400 SOLID CCA CNTR FOIL + BRAID 2.7dB @ 450MHz WP/UV JKT	.64/FT	.62/FT	.60/FT
LMR 400 "ULTRA-FLEX" STRD BC CNTR FOIL + BRAID 3.1dB @ 450 MHz TPE JKT	.89/FT	.87/FT	.85/FT
LMR 600 (OD.590") SOLID CCA CNTR FOIL + BRAID 1.72dB @ 450 MHz WP/UV JKT	1.27/FT	1.25/FT	1.23/FT
LDF4-50A Andrew 1/2" Heliax® 1.51 db/1530 watts @450 MHz 450 MHz	2.38/FT	2.33/FT	2.25/FT

COAX (50 OHM "HF" GROUP)

	100FT/UP	500FT	1000FT
RG213/U STRD BC MIL-SPEC NC/DB/UV JACKET 1.2 dB/2500WATTS @ 30MHz	.40/FT	.38/FT	.36/FT
RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz	.34/FT	.32/FT	.30/FT
RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz	.18/FT	.16/FT	.14/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.19/FT	.17/FT	.15/FT
RG223/U SOLID SC 2 95% BRD NC/DB/UV JKT 2.0 dB/600 WATTS @ 30 MHz	.69/FT	.62/FT	.56/FT
RG214/U STRD SC 2 95% BRD NC/DB/UV JKT 0.925 dB/2500WATTS @ 30MHz	.25FT/UP	1.75/FT.	
RG142/U SOLID SCCS 2-95% SILVER BRAIDS Teflon® JKT 8.2dB/1100WATTS @ 400MHz	.25FT/UP	1.75/FT.	

ROTOR & CONTROL CABLES

	100FT/UP	500FT	1000FT
1618 8/COND (2/16 6/18) BLK UV RES JKT. Recommended up to 200ft	.37/FT	.36/FT	.34/FT
1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300ft	.49/FT	.47/FT	.45/FT
1216 8/COND (2/12 6/16) BLK UV RES JKT. Recommended up to 500ft	.80/FT	.76/FT	.72/FT
1806 18GA STRD 6/COND PVC JACKET Recommended for Yaesu Rotors	.25/FT	.23/FT	.21/FT

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RG213/U strd BC Mil-Spec NC/BD/UV JKT. 1.2dB 2500 watts @ 30MHz. 200' $99.95 150' $77.95 125' $66.95 100' $55.95 75' $44.95 60' $38.95 50' $33.95 25' $22.95 15' $20.95 10' $18.95 6' $13.95 3' $11.95 1' $10.95

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RG8/U strd BC foam 95% braid UV resistant JKT. 0.9dB 1350 watts @ 30MHz. 150' $71.95 125' $60.95 100' $49.95 75' $38.95 50' $27.95 25' $20.95 15' $18.95 10' $15.95 6' $13.95 3' $11.95 1' $10.95

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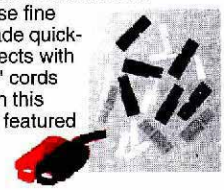

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best method of gauging SET activity and tells us a lot about the kinds of things each group practiced. If you did not get report forms and need them, let me know ASAP. We normally do two large practice deployments each year – Field Day and the Simulated Emergency Test. Each one evaluates different techniques and different types of deployments. We are not limited to practicing twice a year, and if your group wants to practice additional techniques or scenarios, I encourage you to do so. When disaster strikes, we will perform like we have practiced. Dave, ND4MR, reminds me also that we are encouraged to report our activity in public service events to ARRL HQ. The League uses this information to help document how much of a contribution we make to public service communications each year. This information can be brought to the attention of Congress, the FCC and other public officials that can have an impact on our activities. Amateur Radio contributes equipment and volunteer hours to these public service events at no charge to the public. We are glad to do it of course, but these statistics may be helpful when we are defending our frequencies (and antennas). The form FSD 157 (Public Service Activity Report) is available on the ARRL Web site (in fact you can fill the form out online), and there is now a link to it on our site as well. If you coordinate public service events, please submit this information. Sad to report Guy, N4DHO, is a Silent Key. September Traffic: W4EAT 353, AB4E 330, NC4ML 194, K4IWW 118, KI4YV 95, KE4JHJ 92, W3HL 88, KB5WY 73, W4IRE 60, K4RLD 53, AD4XV 52, KE4AHC 34, W4CC 34, N0SU 30, K4WKT 23, WA4SRD 21, N4TAB 19, WA2EDN 12, KB8VCZ 10, KR4OE 8, N4NTO 6, AE4HJ 5, KG4MBQ 4, KE4YMA 3.

SOUTH CAROLINA: SM, Patricia Hensley, N4ROS - Merry Christmas and Holiday greetings to all! Santa has been keeping a list all year long as to who has been naughty or nice or delinquent in checking into nets. Hopefully, Santa's sleigh will hold all of the radio equipment wished for by good hams. Unfortunately, for those who deserve just a lump of coal, Santa may leave you only a "brick" (please specify 2/220/440). Our Presidents' Council was initiated at the Rock Hill hamfest, and new members have been added at both the Sumter hamfest and the Myrtle Beachfest. We now have over 20 groups representing amateurs in SC as part of the Council. It would be desirable to have participation by all groups in the near future. One of the main functions of the Presidents' Council is to keep SC Amateur Radio operators informed of club activities and events throughout the state. Groups are invited to contact me before my Wednesday evening Sideband Net SM report in order that I may announce current happenings. I also encourage individual group officials to make late comments at the end of my SM report. An additional 20 persons have successfully passed the ARRL Emergency Communications Course recently held at the Aiken EOC. We now have approximately 55 individuals in SC who have completed the Level I course in seminar. It is anticipated that the Level II Emergency Communications seminar will be presented after the first of the year. I look forward to seeing everyone at the Union ARC hamfest on December 8th. For those groups who have not been able to attend a Presidents' Council meeting, please make plans to join the Council at the Union hamfest. Tfc: AF4QZ 106, KA4LRM 84, KA4UIV 46, KG4FQG 30, WD4BUH/W4DRF 19, K4BG 15, K4JIF 11, WB4PCS 8. PSHR: KA4UIV 129, AF4QZ 122, KA4LRM 112, KG4FQG 103.

VIRGINIA: SM, Carl Clements, W4CAC—SEC: N4NW. STM: N1SN. PIC: W4PW. ACC: W4IM. OOC: W4NEZ. TC: W4RAH. Web page; www.arrlva.org. As I wrote last month's article for *QST*, I was watching the horrors of the September 11 terrorist attack on the television news. As I write this month's article, I look back at how the country came together in the days after the attack. Amateur Radio operators here in Virginia pulled together to provide support for the Red Cross, the Salvation Army, and Arlington County. The after-action reports are still coming in, but it appears as if we had over 200 Amateur Radio operators from all over VA and MD volunteer their time and equipment to provide communications assistance for these agencies. We had many more that wanted to help, but were unable to because of security. Limitations were imposed on the number of personnel we could have at any one place at a time. I was at the Pentagon site for several days, and I was proud to be an amateur after hearing the professional manner in which the nets were run and the communications were handled. It was an emotionally trying experience for most of us there, and to remain focused and dedicated to the cause indeed shows the commitment of the Amateur Radio community. Tom Gregory (N4NW) and I would like to thank all involved in the operations for their support and assistance. All of the victims and their families are in our thoughts and prayers. I hope everyone is able to take a few minutes to relax during the upcoming holidays and spend some time with their families. And please remember it is you, the ARRL members that make up the ARRL! 73 de Carl, W4CAC. Tfc: W3BBQ 387, WA4DOX 200, N1SN 187, KØIBS 136, KE4PAP 130, K4YVX 102, N4ABM 93, WD4MIS 76, K4MTX 73, WB4ZNB 66, AA4AT 63, W4VLL 57, KV4AN 52, W4CAC 30, W4UQ 27, WB4UHC 26, KU4MF 14, W4YE 10, W4JLS 7, W4MWC 7, N3FDR 4, KB4CAU 3, K4JM 3, N4FNT 2.

WEST VIRGINIA: SM, Hal Turley, KC8FS— SEC: W8XF. STM: KC8CON. SGL: K8BS. OOC: N8OYY. TC: W8DL. PIC: N8TMW. ACC: KC8KVF. Glad to announce WV Section appointees listed above—Let's give them our support and encouragement. The 9-11 attacks and subsequent events show ARES/RACES must be prepared to answer any call. According to WV Zone 3 DEC Ken, WA8LLM, this was the case with Wood Co. (WCEC) ARES members who mobilized on that tragic day and were QRX/QRV to handle emergency traffic, if necessary, from their well-equipped MOBILCOM-1. Reports from NYC and VA/DC ARES activity following 9-11 highlight value of VHF/UHF operation— great case for Technician involvement in ARES and participation in ARES UHF/VHF nets. SEC Mac, W8XF says "TNX" to all who participated in SET in Oct. He is working to fill "gaps" in WV ARES organization, if interested pse contact. WV OO's, WV DNR and FCC join forces to shut down illegal use of Amateur Radio by bear hunters in W.Va.— Great Job! Sounds like ERARC had a good time on Round Mtn. during Sept. VHF contest, FB! Happy Holidays and 73 for 2002 de Hal. Tfc (Sept): W8YS 96, N8NMA 62, KC8CON 49, WW8D 44, K8KFJ 28, WD8DHC 19, N8BP 10, KB8NDS 10. PSHR: W8YS 158, KC8CON 148, WD8DHC 93, N8NMA 88, WW8D 81. WVMDN 663/37/454 WW8D; WVN E 137/47/300 N8NMA; WVN L 131/42/264 N8NMA; WVFN 938/89/686 KC8CON; BDARC (2mtr) 311/5/595.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Jeff Ryan, NØWPA—ASM: Tim Armagost, WBØTUB. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, KØTER. ACC: Ron Deutsch, NKØP. PIC: Erik Dyce, WØERX. OOC: Karen Schultz, KAØCDN & Glenn Schultz, WØIJR. SGL: Mark Baker, KGØPA. TC: Bob Armstrong, AEØB. BM: Jerry Cassidy,

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2. Same as **1**, without speed display -- gives you maximum text display.

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The last 140 characters can be instantly replayed. This lets you re-read or check your copy if you're copying along side the MFJ-461.

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Consistently get solid copy from MFJ's high performance *PLL* (*phase-lock loop*) modem. Digs out weak signals. Even tracks slightly drifting signals.

Of course, nothing can clean up and copy a sloppy fist, especially weak signals with lots of QRM/QRN.

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The MFJ-461's serial port lets you display CW text full screen on a bright computer monitor -- just use your computer serial port and terminal program.

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Learn Morse code anywhere with this tiny *MFJ Pocket-sized Morse Code Tutor*™! Practice copying letters, numbers, prosigns, punctuations or any combination or words or QSOs. Follows ARRL/VEC format. Start at zero code speed and end up as a high speed *CW Pro!* LCD, built-in speaker.

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N0MYY. Like all Americans, the Colorado Amateur Radio community was shocked and saddened by the tragic attacks on our freedom that occurred last September 11th. Our nation will never be the same- and this date will mark a turning point in our collective history. We extend our deepest sympathy to the families and friends of the innocent victims at New York City, the Pentagon and the Pennsylvania countryside. Amateur Radio operators responded as always, to provide needed on-site communications at the World Trade Center location and made us all proud. On a lighter note, a Section cabinet meeting on October 6 th had Tim, WB0TUB handing over the reigns as I begin my tenure as your Section Manager. Tim has been our SM for the past 10 years and served in many other volunteer positions prior to that. I wish to publicly thank Tim for his many years of service to the Amateur Radio community in Colorado. Next time you run into him at a swapfest or meeting, please extend your thanks as well. Tim has agreed to stay on as Assistant Section Manager to keep me honest so, even after retiring, he's sticking around. Congrats to the Pikes Peak Radio Amateur Association in Colorado Springs on their 50th anniversary of being an ARRL affiliated club. That's a half-century of service, folks! (The origins of this club actually date back to the early 30's!) Do you have items for this column? E-mail them to me at n0wpa@arrl.org. 73, de N0WPA. NTS Tfc: AD0A 134, K0TER 94, W0ZZS 15. CAWN: K4ARM 750, W0WPD 682, W0LVI 640, W0NCD 308, WB0VET 294, N0NMP 294, W0GGP 289, AB0PG 286, KI0ND 262, N0FCR 223, AA0ZR 202, WD0CKP 159.

NEW MEXICO Joe T. Knight, W5PDY—ASM: K5BIS, N5ART & KM5FT. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. We are going to try not listing the individual Net Counts, since they were taking half of the Report. Net Counts will still be reported. Plan to devote more space to activities around the Section. Would like to welcome KM5FT as an ASM. Bill is a Retired State Department Communications Engineer. Look forward to working with him. Amateur Radio has served well in our National Crisis. We lost seven Amateurs in the WTC/Pentagon disaster. Our thoughts and prayers are with all. We also lost a friend with the FCC, N4CAK, and his wife Leslie, in a tragic auto accident. They were enroute to the Virginia Beach Hamfest. Son & Daughter survived, and we wish the best for them. Deming ARC has certainly been busy with all their activities! We appreciate the fine efforts of NG5Q and the PVARC. Thanks to KM5EL and his staff with the Caravan Club. Newsletters from Valencia County ARA, Mesilla Valley ARC, Socorro ARA, 0-Beat (Pikes Peak ARA) & W5ES Bulletin. ARES/RACES activities have been in high gear. Tnx to N5LI & crew for a fine job on Albuquerque Marathon. KE5YD & crew vy busy on FEMA Has-Mat Exercise. Sorry to report the passing of N5YFV, N5AEI, WR5U, N5SNV & K5WK.73, W5PDY.

UTAH: SM, Mel Parkes, AC7CP—Happy Holidays! Wow this year has sure gone by fast. By the time you read this, Thanksgiving should be close or over and here come the Christmas Holidays. I hope you have a very enjoyable holiday season and maybe you might find that neat package under the tree that has a little rubber ducky antenna on it. I would like to thank all the officers and leaders of the Amateur Radio Clubs and organizations throughout the state of Utah for the many hours of time you have give to foster and support ham radio in your local areas. Please keep up the great job you have been doing, and let's get more new hams active in our state. We have great potential to set the standard. I look forward to a great new year. 2002 has lots of neat activities in store for all the amateur radio community. 73 de Mel, AC7CP.

WYOMING: SM Bob Williams, N7LKH— This has been a period of significant public service and emergency comm support by the Amateur Radio community. There was the support by UARC for the Bike-A-Thon sponsored by the MS foundation over 11/12 August. It involved riding from Laramie to Riverside/Saratoga via WY 230 the first day and returning over the Snowy Range via WY 130 the second day. Communications along the route was provided by KD7TA, KS7Q, W7SE, AF7E, KD7W, KC7FUP, KB7SGR, KD7NAF, N7KXQ, N7OBS, K7EY, W7MO, WA7SVH, KD7FHE, W7JAL, ND7O, KA7VMA, W7EMA, WL7CMA, KL0TF, N7SPH, and KC7ZRR. Then this past month the hams were called upon by FEMA for communications at the sites of the terrorist strikes in the US. Amateur radio was particularly useful in that case because it significantly expanded the range of frequencies available by adding the ham frequencies to those of the government agencies involved. The FCC should be reminded of this when others seek to acquire our frequencies for commercial use. Tfc: NN7H 296. PSHR: NN7H 177.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ – Happy Holidays! I hope you're enjoying your time with family and friends. Since it is the holidays, and last October we concentrated on Emergency Communications, I would like to turn our attention to a subject more appropriate for the season. After the tragedy of September 11 and the beginning of the War on Terrorism, we must rededicate ourselves to what are important in our lives - Family and Friends! So what does this have to do with Amateur Radio? Plenty... Amateur Radio extends our circle of friends. No longer are our friendships bound to local geography. The electromagnetic waves extend our reach to the whole state of Alabama, the whole United States, and ultimately the world! Just think that a transceiver, like the one on your desk, is an instrument of encouragement for somebody that otherwise would be alone. It is a link between father and a son or daughter who left home. It is a way for spouses to stay connected while one of them travels. Recently our transceivers became a messenger of hope for someone desperate for information about a love one that was affected by a cowardly act of terrorism. An Amateur Radio Station is more than a Transceiver, Feed-Line, and Antenna. It serves a vital part of our civilization - Communication! Communications is a powerful concept. It can be used to build a civilization, and it can also be used to destroy it. Think about that while you travel to your Amateur Radio club meeting, talk to your fellow ham operators, or check into a local net. Think about how important it is for you to support your local ARES group and the National Traffic System. Think about how the power of communications can be used the wrong way and support our President, our Military, and our fellow Americans as we try to destroy the evil network of communications and money that support terrorism. During this holiday season, spend time with your family and friends and don't take for granted the love and respect they show. Let's take a few minutes to remember all our friends who became Silent Keys during 2001. We'll never forget them. God bless & 73, Bill Cleveland KR4TZ. Tfc: W4ZJY 126, WB4GM 101, AC4CS 77, KC4VNO 38, KG4KCC 36, W4CKS 30, W4DGH 26, W4QAT 23, WB4TVY 10.

GEORGIA: SM, Sandy Donahue, W4RU—ASM/South Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. Asst

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MFJ-1275/MFJ-1275M

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Everything you need is included -- software, audio cables and power plug.

The MFJ-1275 provides fully automatic operation with audio and push-to-talk control. It matches sound card audio, eliminates ground loops and provides microphone override.

Works with all transceivers with 8-pin round or modular microphone plugs.

Operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, high speed CW Meteor Scatter and many others. Also use as Contest Voice Keyer and CW Contest Memory Keyer.

Digital Modes or Normal Operation

Choose digital modes or normal transceiver/computer operation with the push of a switch.

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 and relay eliminate ground loops, audio hum, noise and distortion.

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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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Serial port -- lets computer control your radio to override and/or interrupt digital transmissions.

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Level Controls -- for transmitter drive and for receiver-to-sound card drive level. No need to adjust microphone gain or sound card level when you change modes.

Stereo or Mono Audio Input -- A front panel switch selects left, right, or both sound card audio output channels to accommodate various programs.

Off-the-air recording -- for replaying or for use with spectrum analyzer programs.

Speaker on/off switch lets you hear receiver audio when you want it.

Rugged Construction -- All aluminum cabinet and surface-mount construction gives you years of trouble-free service.

Use any Transceiver with 8-pin Mic

Internal jumpers program microphone wiring for any brand or model radio -- no soldering required. Order **MFJ-1275** for 8-pin *round* mic plug. Order **MFJ-1275M** for 8-pin *modular* mic (RJ45) plug.

Everything you need is included

MFJ-1275/MFJ-1275M includes audio cables, power plug and a CD with a collection of the most popular amateur radio software to operate PSK-31, RTTY, SSTV, PACKET, AMTOR, CW, HSCW Meteor Scatter, Contest Voice Keying and other modes. Uses 12 VDC or 110 VAC with optional adapter (**MFJ-1312B, $14.95**).

No Matter What™ Warranty

Protected by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your MFJ-1275/MFJ-1275M *no matter what* for one full year.

Try it for 30 Days

Order from MFJ and try it -- no obligation. If not delighted, return it within 30 days for refund less shipping.

Operate PSK-31 with your MFJ-1278, MFJ/TAPR TNC 2 Clones

MultiCommHost™ for MFJ-1278 Multimode TNCs. **MFJ-1289H, $79.95.** Supports all packet, HF modes. *Adds PSK-31.* 32-bit host mode runs under Windows 95,98,Me,NT,2000,XP™. Syncs with popular logging programs. Toolbar, Hotkeys, user defined macros, quick connects, receiver buffer, more!

MultiCommHost™ for packet only. **MFJ-1284H, $49.95.** 32-bit packet terminal software gives you true multi-tasking in Windows 95,98,Me,NT,2000,XP™. Uses standard Windows commands. *Also adds PSK-31!*

Download free MFJ-1289H/MFJ-1284H demos
http://www.cssincorp.com/multicommhost
Call 800-647-1800 to order activation key.

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MFJ . . . the world leader in ham radio accessories!

SM/IT: Mike Boatright, KO4WX, SEC: Lowry Rouse, KM4Z. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JN. ACC: Susan Swiderski, AF4FO. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. Web site www.qsl.net/arrl-ga, www.w4ru.com. Another holiday season is upon us. My best wishes for a fruitful and highly caloric Thanksgiving. The AMSAT Nat'l Symposium was a critical and artistic success. Over 150 attendees from the U.S. and several foreign countries gathered in Decatur. Chairman Steve, W4EPI, XYL Diane, and the committee ran a well-organized conference. Dozens of hams including myself completed their first AO40 QSO. I regret to report the death of N4BJZ, Box Springs near Columbus. Bill Gremillion ARC in Newnan provided comms for the BRAG cycling event. I want to pay tribute to Scott Haner, KB0Y, Valdosta, who for several years and at great personal expense created the Tall Pine inter-tie of repeaters in south Georgia. It will be a great resource for severe weather alerts and compliments the Storm Spotter network in the northern part of the state. Alford ARC in Stone Mountain re-elected their officers for another year. This Special Service club sponsors the November hamfest at the Gwinnett Fairgrounds which I hope you attended and enjoyed. 73 Sandy. Tfc Sept: WB4GGS 160, AF4NS 119, W4WXA, 96 KG4FXG 75, K4BEH 61, KE4R 50, WB4BIK 39, K1FP 38, K4ZC 21 K4WKT 20, K4JJL 8, K4JNL 2.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—ACC: WA4B. BM: N4GMU. OOC: KD4NLF. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. No words can adequately describe the effects and feelings we are all experiencing from the terrorist attacks on the Word Trade Center in New York and the Pentagon in Washington, D. C. As of this writing, the military started their attacks yesterday. When events like these occur, not only does it leave us mired in disbelief, it creates a sense of unreality and bewilderment. Our thoughts and prayers go out to the victims, their families, and to the emergency services personnel, many of which lost their lives while doing the work of their chosen professions. At least four Amateur Radio operators are among the many still missing in the aftermath of the September 11 attack. As of yesterday, our prayers include the military engaged in the mission of trying to locate the terrorist. May God Bless America. Cristen Radice wins OARC 2001 Scholarship. Congratulations to Cristen. The Jax Poor Mans Tailgate Party went well this past weekend. It was good to see so many friends and discuss the many things of mutual interest. It was good to meet and discuss possibilities with Tom Noland to include the SEDAN operations in the State. It looks good at this time, and the State of Florida should be soon available for SEDAN. The needs exist for towers in various locations and the equipment to operate the system. If you can assist Tom, he will be appreciative. His e-mail tnolan1013@aol.com, and Web page http://beam.to/flsedan. The areas needing coverage are in the W Central District of the Section and a couple in the Panhandle. I have been attending club meetings in the Panhandle, and enjoying seeing so many of the people I hear on the radio. The meetings provide an opportunity to talk about many things as oppose to Hamfest where time does not permit such discussions. It is planned to have more of these and to visit other districts of the Section. So, if you desire a speaker just let me know and I will try and work something out with you. The Gulf has one of those things, and let's hope it does not try and reach the areas in the north Gulf. It's name is Iris if you didn't know. 73 Rudy. Tfc: WX4H 1174, KE4DNO 197, KF4WIJ 119, N9MN 91, AG4DL 87, NR2F 79, K1JPG 59, W5MEN 45, KG4EZQ 40, K4JTD 35, AF4PU 31, WD4GDB 29, KC4FL 26, KB4DCR 19, AB4PG 18, KM4WC 18, W8IM 13, K4DMH 9, W4ZET 9, WA4VOP 9, WD4ILF 9, WX4J 8, W4KIX 7, W4CFH 6, WB9GIU 6, WB2IMO 2, WA4EYU 1.

PUERTO RICO: SM, Víctor Madera, KP4PQ — Ponce estuvo de pláceme este mes. Además de la acostumbrada sesión de exámenes del ARRL/VEC se celebró el tercer taller para Observadores Oficiales y la Asamblea Anual de la Federación de Radioaficionados. La FRA eligió su nueva Junta de Directores. Felicitamos tanto a la Junta saliente como a la entrante por su buen trabajo e interés en mejorar la radioafición. El taller de "OO" fue exitoso. Felicitamos entre otros a KP4V, KP4AL, KP4CY, NP3CV, WP4JAR, KP4COB, WP4LMW y KP3RF por su participación. Todos estudian para obtener su acreditación como "OOs". Los no-socios del ARRL fueron invitados y participaron como oyentes. Ya comenzó un nuevo curso para preparar nuevos radioaficionados en Humacao. Felicitaciones a WP3HM por su esfuerzo en llevar a cabo estas clases. Se están organizando clases en otras partes de la isla, si le interesa participar como instructor comuníquese con su Section Manager. Este mes el team del ARRL/VEC rompió el record de más elementos administrados en un mes, más de 100 exámenes fueron administrados. Felicitamos al equipo de examinadores voluntarios que trabajan en el programa. Los Interesados en los programas para "OOs", Comunicaciones de Emergencia y ARES, comuníquense con el Section Manager por correo regular, la dirección aparece en la página 12 del QST, por 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 ECs for newsletters and activity info. Congratulations to Vice Director Evelyn Gauzens, W4WYR, for being selected Citizens' Ham Mobile and Marine Patrol's "CHAMP" winner of the year by the Citizens' Crime Watch of Miami-Dade County, Miami-Dade Police Department, and SFL FM Association. This prestigious award was presented Oct. 5 at a large reception and dinner. We are proud of you, Evelyn, and know it is well deserved. I am also very proud of four SFL hams who signed up with the NYC rescue team to work at the WTC disaster site. One is Cliff Nichols, K5DA, in Key West. He is a licensed paramedic with extensive disaster rescue experience. A second is Ed Petzolt, K1LNC, in Hobe Sound, who is no stranger to working emergency situations. Another is Alan Kessler, WB2BQK, in West Palm Beach, who set up emergency medical communications NY for 10 years, and worked communications for other major emergencies. Richard Halquist, KG4FZO, Osceola Skywarn Manager and ARES secretary also volunteered to go. He is a licensed paramedic trained in Incident Command (basic and structural collapse). All are extremely well qualified. As of this writing, they are still on standby for a call. Kudos to all four. We are proud of you! AROUND THE SECTION: Brevard and Indian River Skywarn hams and an ARES emergency net successfully shared repeater resources in a cooperative response to tornado activity spawned by TS Gabrielle. Broward County used the new UHF portable repeater as the sole communications for the Foundation for Learning Walkathon held at Plantation Heritage Park. All hams who participated were

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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No Matter What™ Warranty

You get MFJ's famous one year *No Matter What™* limited warranty. We will repair or replace your MFJ-616 (at our option) no matter what for a full year.

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entirely satisfied with the performance. The repeater was constructed by WB4YUC and KD4GR for ARES use and deployment with the CAT's. Indian River hams operating at the Lighthouse Special Event made 84 contacts, and gave a demo to 30 Sea Cadets. Osceola ARES added 3 new members this month. Palm Beach County ARES is gearing up for the Alzheimer's Assoc. memory Walk at Bethesda Hospital in Boynton Beach. The Wellington ARC will run a "Lost Child and Communications Center" to serve the 50 to 80 thousand people per day expected to attend the grand opening of the huge Wellington Green mall. St. Lucie's Skywarn net was activated for a tornado watch with 6 hams donating 9 total hours. September Traffic by STM WA2YL: WA9VND 326, KA4FZI 198, KD4GR 132, K4FQU 108, KC4ZHF 96, KD4HGU 73, AA4BN 49, KG4MLD 49, WB4PAM 42, KB4WBI 38, KG4MLC 36, WA4EIC 35, KE4UOF 30, K4VMD (club) 23, KT4XK 22, KF4OMB16, KG4CHW 14, KN4JN 9, K4OVC 7, W3JI 7, KG4GZL 5. 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. It is early October as this is being written, and contest season is just around the corner. Should be no shortage of stations from the V.I. this year. Jimmy, KP2BH, and Manny, NP2KW, are making a presence on 6 meters and report that band conditions are good. Bill, NP2EF, and wife Yvonne are planning a permanent return to their native Netherlands, will miss you both. Larry, N4FD (part time St. Croix resident) about to put up permanent beam, tower and rotator. What with the heightened security after the WTC disaster, would suggest that if you are carrying an HT, make sure that you have a well charged (or spare) battery and can demonstrate that what you are carrying is a radio and not something else. The U.S. Virgin Islands continues to be a good value for the vacation dollar, but allow extra time at the airport (especially on this end) for the stepped up security measures. Stay safe and 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. The big event for December will be the Tampa Bay Hamfest/SE Div. Convention Dec 1st and 2nd at the Manatee Civic Center. Jim Haynie, W5JBP, ARRL President, and Ed Hare, W1RFI, will be attending. I have started a new Technician Class in Sarasota with 19 students who should all be licensed by the time you read this. I am also working on a new national HomeLand Security Net on 20 m, watch for more information about this net. I have also started a listing of new hams, new league members and Silent Keys on the Section's Web page. New FL law regarding antenna restrictions is also in the works. Silent Keys: Gail Shaffer, N7GAS. SEC KD4E reports an increase of 34 ARES members for a new total of 447. In September there were 44 ARES Nets. 1 public service events, 11 drills and 14 emergencies for a total of 26 ops. The total man hours reported for September is 1,223.5 hours. ECs reporting: KBØEVM, KN4YT, KF4LEB, W4CBS, K4ZVO, AC4MK, AI4ET, KF4B and WD4AHZ. STM AB4XK reports September net report is available on the section's Web page. Sept. PSHR: K4RBR 179, W4AUN 150, K4SCL 139, KF4KSN 125, KT4TD 123, AB4XK 107, WB2LEZ 104, KT4PM 96, KF4OPT 94. Sept. SAR: AB4XK 144, K4SCL 69, KT4TD 50, KT4PM 43, KF4OPT 36, K4RBR 33, W4AUN 14, KF4KSN 14, WB2LEZ 7. 73, Dave, AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—This is the last month for our current Southwestern Director, Fried Heyn, WA6WZO; Fried has elected to not run for another term as our Director. He has served in this position since 1982 and has done an excellent job and supported us here in Arizona. Thank you, Fried, for all the hard work you have done for Amateur Radio and for us here in Arizona. Art Goddard, W6XD, will be our new director. He has been the Division Vice-director for many years and is an excellent choice for this position. He will be at the Superstition Hamfest on 01 December at Mesa Community College. Stop back the ARRL booth and take time to talk with Art. He has some new ideas to help improve Amateur Radio. I am trying to put together a folder on how others have fought the CC&R's throughout the state. We need to band together and see if we can change this restriction on antennas. The ARCA Web site has been changed to www.arca-az.org/arca. Take time to visit their Web site and get to know this organization and the officers. ARCA is an organization that represents many of the clubs here in Arizona. They do a lot more than just put on the Fort Tuthill Hamfest. Don't forget to checkout our 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, throughout the country, and has a listing for all the ARRL volunteer's. 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. Amateur radio TV is starting to take hold here in Arizona. The ATV group has placed a repeater on Mount Lemon. The frequency of operation is input= 434.00 MHz, output= 1253.250 MHz. We have several state and local nets that are used to sharpen our skills so in the event of an emergency we are prepared. Now is the time for the many public service events that take place in this state: 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? Participation in these events will sharpen your radio skills so that when we have an emergency you will be ready. If 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. The Superstition Amateur Radio club will its Fall Hamfest on 01 December at Mesa Community College. Stop by the ARRL booth (normally my truck) and talk with us on your feelings and suggestions to improve amateur radio within the state. 73s, Clifford Hauser, KD6XH. ATEN: 1002 QNI; 20 QTC; 30 Sess. Tfc: W7EP 52, K7POF 24.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF— Our ASM, Al Hart, W6UBM, informs me that he can accept old Radio Equipment for repair and donation. Al lives in the San Fernando Valley and can be reached at the numbers listed in QRZ.com or as listed on our web site: www.qsl.net/arrlsw/lax. Al has an old buddy, K6UU, John, who can repair and distribute this old equipment to schools and needy kids for educational purposes. - We have some very sharp characters on 40 meters (SSB). One of them said that his wife was an angel. The other guy came back with, "Well, you

MFJ 1.8-170 MHz SWR Analyzer™

Reads complex impedance . . . Super easy-to-use

***New** MFJ-259B reads antenna SWR . . . Complex RF Impedance: Resistance(R) and Reactance(X) or Magnitude(Z) and Phase(degrees) . . . Coax cable loss(dB) . . . Coax cable length and Distance to fault . . . Return Loss . . . Reflection Coefficient . . . Inductance . . . Capacitance . . . Battery Voltage. LCD digital readout . . . covers 1.8-170 MHz . . . built-in frequency counter . . . side-by-side meters . . . Ni-Cad charger circuit . . . battery saver . . . low battery warning . . . smooth reduction drive tuning . . . and much more!*

***The** world's most popular SWR analyzer just got incredibly better and gives you more value than ever!*

MFJ-259B gives you a complete picture of your antenna's performance. You can read antenna SWR and Complex Impedance from 1.8 to 170 MHz.

You can read Complex Impedance as series resistance and reactance (R+jX) or as magnitude (Z) and phase (degrees).

You can determine velocity factor, coax cable loss in dB, length of coax and distance to a short or open in feet.

You can read SWR, return loss and reflection coefficient at any frequency simultaneously at a single glance.

You can also read inductance in uH and capacitance in pF at RF frequencies.

Large easy-to-read two line LCD screen and side-by-side meters clearly display your information.

It has built-in frequency counter, Ni-Cad charger circuit, battery saver, low battery warning and smooth reduction drive tuning.

Super easy to use! Just set the bandswitch and tune the dial -- just like your transceiver. SWR and Complex Impedance are displayed instantly!

Here's what you can do

Find your antenna's true resonant frequency. Trim dipoles and verticals.

Adjust your Yagi, quad, loop and other antennas, change antenna spacing and height and watch SWR, resistance and reactance change instantly. You'll know exactly what to do by simply watching the display.

Perfectly tune critical HF mobile antennas in seconds for super DX -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on one band, or analyze multiband performance over the entire spectrum 1.8-170 MHz!

Check SWR outside the ham bands without violating FCC rules.

Take the guesswork out of building and adjusting matching networks and baluns.

Accurately measure distance to a short or open in a failed coax. Measure length of a roll of coax, coax loss, velocity factor and impedance.

Measure inductance and capacitance. Troubleshoot and measure resonant frequency and approximate Q of traps, stubs, transmission lines, RF chokes, tuned circuits and baluns.

Adjust your antenna tuner for a perfect 1:1 match without creating QRM.

And this is only the beginning! The MFJ-259B is a complete ham radio test station including -- frequency counter, RF signal generator, *SWR Analyzer*™, RF Resistance and Reactance Analyzer, Coax Analyzer, Capacitance and Inductance Meter and much more!

Call your favorite dealer for your best price!

MFJ-259B **$259.95**

Call or write for Free Manual

MFJ's comprehensive instruction manual is packed with useful applications -- all explained in simple language you can understand.

Take it anywhere

Fully portable, take it anywhere -- remote sites, up towers, on DX-peditions. It uses 10 AA or Ni-Cad batteries (not included) or 110 VAC with MFJ-1315, $14.95. Its rugged all metal cabinet is a compact 4x2x6¾ inches.

How good is the MFJ-259B?

MFJ *SWR Analyzers*™ work so good, many antenna manufacturers use them in their lab and on the production line -- saving thousands of dollars in instrumentation costs! Used worldwide by professionals everywhere.

More MFJ SWR Analyzers™

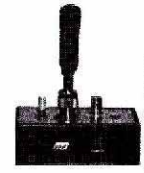
MFJ-249B, $229.95. Like MFJ-259B, but reads SWR, true impedance magnitude and frequency only on LCD. No meters.

MFJ-209, $139.95. Like MFJ-249B but reads SWR only on meter and has no LCD or frequency counter.

MFJ-219B, $99.95. UHF *SWR Analyzer*™ covers 420-450 MHz. Jack for external frequency counter. 7½x2½ x2¼ inches. Use two 9 volt batteries or 110 VAC with MFJ-1312B, $12.95. *Free* "N" to SO-239 adapter.

SWR Analyzer Accessories

Dip Meter Adapter



MFJ-66, $19.95. Plug a dip meter coupling coil into your MFJ *SWR Analyzer*™ and turn it into a sensitive and accurate bandswitched dip meter. Save time and take the guesswork out of winding coils and determining resonant frequency of tuned circuits and Q of coils. Set of two coils cover 1.8-170 MHz depending on your *SWR Analyzer*™.

Genuine MFJ Carrying Case

MFJ-29C, $24.95. Tote your MFJ-259B anywhere with this *genuine* MFJ custom carrying case. Has back pocket with security cover for carrying dip coils, adaptors and accessories.

Made of special foam-filled fabric, the MFJ-29C cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

Has clear protective window for frequency display and cutouts for knobs and connectors so you can use your MFJ *SWR Analyzer*™ without taking it out of your case. *Look for the MFJ logo for genuine authenticity!*

MFJ-99, $54.85. Accessory Package for MFJ-259/B/249/B/209. Includes *genuine* MFJ-29C carrying case, MFJ-66 dip meter adapter, MFJ-1315 110 VAC adapter. ***Save $5!***

New! ***Tunable Measurement Filter***™

MFJ-731, $89.95. *Exclusive* MFJ tunable RF filter allows accurate SWR and impedance measurements 1.8 to 30 MHz in presence of strong RF fields. Has virtually no effect on measurements. Works with all SWR Analyzers.

MFJ *No Matter What*™ warranty

MFJ will repair or replace (at our option) your MFJ *SWR Analyzer*™ for one full year.

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MFJ-224 **$159.95**

MFJ 2 Meter *FM SignalAnalyzer*™

Measure signal strength over 60 dB range, check and set FM deviation, measure antenna gain, beamwidth, front-to-back ratio, sidelobes, feedline loss in dB. Plot field strength patterns, position antennas, measure preamp gain, detect feedline faults, track down hidden transmitters, tune transmitters and filters. Plug in scope to analyze modulation wave forms, measure audio distortion, noise and instantaneous peak deviation. Covers 143.5 to 148.5 MHz. Headphone jack, battery check function. Uses 9V battery. 4x2½x6¾ in.

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More hams use MFJ SWR Analyzers™ than any others in the world!

are lucky, mine is still alive." One other conversation was about stolen credit cards. The ring leader, said, "My wife's credit card was stolen, but I decided not to report it. The thief was charging far less than my wife." Then the discussion changed to automobiles whereupon one man's wife told her husband that the carburetor was full of water. He said, "How do you know that there is water in the carburetor?" She said, "I know because it is in the river." - I met W6IST, Allan, several times at the Northridge Hospital, recently. He told me that the Hospital was helping the San Fernando Club set up an Emergency Radio Station in the Hospital. - The last meeting of Los Angeles Area Council of Amateur Radio Clubs had their last meeting at the Los Angeles Maritime Museum at San Pedro, K6AA. The next meeting is scheduled to be held in Burbank. The LAACARC is going to evaluate a new location for an ARRL Convention.

ORANGE: SM, Joe Brown, W6UBQ, 909-687-8394—ASM: Riv. Co. Brett, N6NLN, 760-346-6291. ASM: Org. Co. Richard, WA6NOL. 714-835-3295. ASM S. B. Co. Jeff W6JJR, 909-886-3453. From REACT Team #4252, When the "balloon" goes up, it's going to be a little late for shopping. Let's learn from this current event and take preparation to heart. A little bit each week hurts on one. And, in the end, you'll be ready when the call comes. Walt, WB6RQT, writes. The numbers game is on in earnest. Effective Dec. 3, 2001, you will have yet another "FCC Number" to deal with. The FCC is requiring every one doing business with the FCC to provide a 10 digit Registration Number (FRN) with any application filings requiring a taxpayer identification number (This TIN is the applicant's Social Security number.) OCRACS sez, if your group is interested in learning more about SSTV or ATV, please contact Robert Stoffel at 714-704-7919. The 2001 USA ARDF Championships were a rousing success! Radio-orienteers from ten states plus Australia, China and Ukraine converged on New Mexico. The youngest (Jay Thompson, W6JAY, who just turned 16 and oldest competitor (Harley Leach, KI7XF, were in categories by them-selves. Each took home Gold Medals. From The SQUELCH. As amateur Radio Operators, we have out-of-the ordinary opportunities to learn about the world and it's people. But as Hams, we also have out-of-the ordinary opportunities, indeed obligations, to learn, to be prepared to serve. Tfc: KC6SKK 120, K6IUI 108, W6QZ 60, W6JPH 45, W6QZ NTS BBS 93. PSHR: W6QZ 144, W6JPH 87, K6IUI 76, K6SKK 74. SCNV NET MGR W6JPH reports 21 Sessions QNI 126, QTC 70.

SAN DIEGO: SM, Tuck Miller, NZ6T, 619-434-4211—Can you believe the Holiday season is once again upon us. It seems as if it was only last week that we celebrated Christmas. Most of you will be actually receiving this issue of *QST* shortly before Thanksgiving. I would like for you to pause for just a few moments, and reflect on all that we have to be thankful for. We are still in shock from the September 11 attacks that were caused from the heartless terrorists, and we can be thankful that our country has pulled together as one people. United we will stand. Would like to thank all those who attended the Ham Radio Roundup on October 20. There was a union picnic also held at the site with 400 attendees. What great exposure for ham radio. December is usually the month where many clubs elect new officers. Please keep me informed of your newly elected officers, especially the club president. I want to be able to keep in contact with all the clubs. With the holidays come the parties, and if the past is any indication, there will be parties galore. Hams sure know how to celebrate with style. I have appointed Kent Tiburski, K6FQ, to be one of my Asst. Section Managers. Kent has done a bang up job, not only as DEC for the Southern District, but he also serves as the Section Technical Coordinator. Del Radant, N6JZE, stepped up to the plate once again, and is our Section Official Observer Coordinator. He has invaluable service in the past, and we thank him for serving once again. San Diego is the home of many fine, active Amateurs, and we are always looking for more. We have been missing many of our past regular attendees for our monthly breakfast, but it is still not too late. 7 AM at Coco's Family Restaurant, 5955 Balboa Ave, San Diego on the 2nd Saturday of each month. Actual meeting starts about 8 AM. For those of you who would like to continue their education in Emergency communications, I would encourage you to periodically check the ARRL Website to see when the next class will be given. Level 3 is scheduled to be released in about a month or so. The League Internet address is www.arrl.org. Check often. Stay tuned in next months edition, I will give you a complete rundown of all our ARRL appointees. Have a great Holiday season folks. See you in the January edition. For traffic totals recently submitted: KD6YJB 55, KC6NXZ 48, K6DAY 32, N6TEP 51.

SANTA BARBARA: SM, Robert Griffin, K6YR, SM (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 now an ARRL-affiliated organization. Thanks again to ACC, Michael, KE6DKU and Asst SM, Don, W6YN. 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). In memory of a fine Radio Amateur & gentleman, Don Parton, K6DC.That's 30.

WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL—SEC: Bill, K5MWC. STM/BM: Carolyn, KC5OZT. ACC/OOC: John, WN5PFI. Here it is the December edition already. The first 2/3rds of the year seem to flyby and then September 11 came and we will never be the same. Even if you didn't know anyone in New York or Washington DC, there has been an impact on us all like most of us have never seen before. What the future holds for us is anyone's guess but it does remind us all to be ready to serve as communicators. And based on some visits to ham clubs, the future is bright indeed for Ham Radio. I just visited the Hamfest in Belton and spoke to the Heart O' Texas ARC in Waco or as they call it the "Home Ham Club of President George Bush." HOTARC has a very good Web site at *www.hotarc.org* and there Webmaster is 18 year old Justin Martin, KC5KQL. Check it out. I have started receiving SET reports from Kenneth Hughes, KK5BE, Charlie Byars, W5GPO, and I have received a

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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.

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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.

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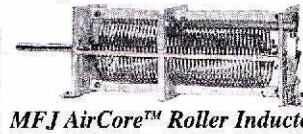
You get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-Needle SWR/Wattmeter, massive transmitting variable capacitors, ceramic antenna switch, built-in dummy load, *TrueCurrent*™ Balun, *scratch-proof* Lexan front panel -- all in a sleek compact cabinet (10¾Wx4½Hx15D in).



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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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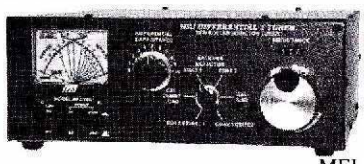

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Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10¾Wx4½Hx15 in.

MFJ-962D *compact* Tuner for Amps

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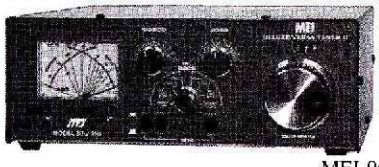
A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10¾x4½x10⅞ in.

MFJ-969 300W *Roller Inductor* Tuner



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Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

MFJ-949E *deluxe* 300 Watt Tuner

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
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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

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Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-931 *artificial* RF Ground

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$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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Public Service Activity Report from David Gaines, N5DHG, for a Table Top exercise in Wichita Falls. Now that the Garland ARC has just completed their SET, and I encourage everyone to get the reports filled out and sent to League HQ, along with a copy to the SEC Bill, K5MWC. I would like to thank my predecessor Don Mathis, KB5YAM, and some of the folks from the Denton County ARC for a presentation that they put on at a Denton school science fair. SAR: K5UPN 536, KC5OZT 246, K5NHJ 93, KD5NZA 77, KB5TCH 7, WA5I 24, AC5Z 24. 73 and Merry Christmas de KA5TXL.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL. The Tulsa Repeater Organization is now meeting at Furr's Cafeteria at 41st and Garnett in Tulsa. TRO also assisted with the Tulsa State Fair Parade September 29. I had the pleasure of speaking at the Tulsa Amateur Radio Club's October meeting and shared with them current activities related to league activity. I operated the first weekend of the EME contest at Tommy Henderson's QTH, WD5AGO. Conditions were not the best but we had fun. Great news to report this month. The Oklahoma DX Association has agreed to sponsor an Oklahoma QSO party. It's been a long time since we have had a state QSO party and I've had several requests to get one together. I'm sure it will be a great success. Thanks to all of those involved in making this decision and volunteering their time to make it happen. I'll try and post more details of the party next month. Hope you all have a very happy holiday season and Merry Christmas. May you get all those goodies you wish for under the tree. To subscribe to the Oklahoma section e-mail 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 1395, WB5NKC 464, N5IKN 444, WA5OUV 314, KK5GY 333, K5KXL 215, KM5VA 126, WA5IMO 105, KI5LQ 54, KE5JE 38, W5VBD 25.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, W5JAM. STM: W5GKH. SEC: W5ZX, ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. PIC: KD5HOP. On September 15, barges hit the South Padre Island bridge taking out 240 feet of roadway to an from the island. Several were killed as cars plunged into the water below. AK5Z was contacted to set up communications between the mainland and the island. The phones, water supply system, power and lights, and yes even the cell phone system went down to the island. The first thing that came to everyone's mind was a terrorist attack. However, it turned out it was just an accident. The hams that furnished communications for about 48 hours were AK5Z, N5SLI, KC5SAM, W8AHU, and KA0ARS. I hope I didn't leave anyone out. For more information, read ARRL Letter, Volume 20, Number 40, in the "In Brief" section. After the bombing of Afghanistan on October 7, several of the EOC activated in South Texas. Something that may seem unimportant to some is the ARRL Radiogram format. While some want to change the format, when the radiogram is brought to the nets, they must be in the ARRL format. In an emergency, we will allow more text. If you have to take time to reformat it, then it just causes confusion and takes valuable time. The reason for this is that you can't always make direct contact with the recipient and must go to a relay station. Or in the case of H/W, it may be stock piled until we can get enough operators into the area to handle H/W. Even MARS uses the ARRL format when they refile a message and bring it to the ham bands. In the emergency course from ARRL, have received several e-mails that state that is not what the course wants you to do. You are to send an ARRL formatted radiogram to your SM. If you can't in anyway get to a net to transmit it, then it still must be in the radiogram format. I talked to W6WF, who is a mentor. He also said unless it was in radiogram format, it's not acceptable. Experience is only gained by doing something correctly, and doing a lot of it helps. All of our clubs need to be sure your members are trained for emergency operation with conditions that now exist. These are trying times in America, but we will survive. As we go into Christmas time and the holiday season, let's remember others that are in need. May God Bless this wonderful Nation of ours. Hope all have a very Merry Christmas. Tfc: KA5KLU 305, N5SIG 168, W5GKH 124, W5KLV 113, W5TUK 89, W5ZX 63, K0YNW 60, N5NAV 55, AC5XK 51, W5ZIN 33, KD5GM 31.

WEST TEXAS: SM, Lee Kitchens, N5YBW—Of the 14 clubs listed as inactive last month, one is now active and on board. Three clubs have been visited so far. Two more are scheduled for visits with more to follow. Several hams in the section working on the ARRL Emergency Preparedness course. Let's have some more. Hams must be trained in the incident command concept in order to maximize their effectiveness when participating with Red Cross, the Salvation Army, Fire, and Law Enforcement groups. Arrangements are underway to put a complete ham station in the Lubbock Science Spectrum. The Executive Director was very impressed with the things the Phoenix, AZ, hams have done at their science spectrum. The hams will shortly join the El Paso, Midland, and Odessa clubs by having their own facility. A 3700square-foot building is being made available which has classrooms and space for antennas and extensive ham shack. Season's greetings from our mike and key to your speaker.

MFJ *Switching* Power Supplies

Power your HF transceiver, 2 meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!

No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

MFJ's new adjustable voltage switching power supplies do it all! Power your HF or 2M/440 MHz radio and accessories.

MFJ's *MightyLites*™ are so light and small you can carry them in the palm of your hand! Take them with you anywhere.

No more picking up and hauling around heavy, bulky supplies that can give you a painful backache, pulled muscle or hernia.

MFJ's 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

No RF hash!

These babies are clean . . . Your buddies won't hear *any* RF hash on your signal! *None* in your receiver either!

Some competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

These super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

Low Ripple . . . Highly Regulated

Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

Fully Protected

You won't burn up our power supplies!

No RF Hash!

MFJ-4225MV
25 Amp
$149.95
plus s&h

MFJ-4245MV
45 Amp
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They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Replaceable fuse.

MightyLites™ . . . Mighty Features

Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Brightly illuminated 3 inch meters let you monitor load voltage and current.

A whisper quiet internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D in.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

NEW! 25 Amp *MightyLite*™

Super light, super compact switching power supply delivers 25 Amps maximum/ 22 Amps continuous at 13.8 Volts DC. Low ripple, highly regulated. ***No RF Hash!*** Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 3.5 lbs. 5½Wx2½Hx10¾D in.

MFJ-4125
25 Amp
$109.95
plus s&h

MFJ 35/30 Amp Adjustable Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

MFJ-4035MV
$149.95
plus s&h

MFJ's heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

MFJ *High Current* Multiple DC Power Outlets

Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

MFJ-1118
$74.95
plus s&h

MFJ-1116
$49.95
plus s&h

MFJ-1112
$34.95
plus s&h

New!
MFJ-1117
$54.95

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.

NEW! MFJ-1117, $54.95. For powering four HF /VHF radios (two at 35 Amps each and two at 35 Amps combined) simultaneously. Tiny 8x2x3 inches.

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ICOM

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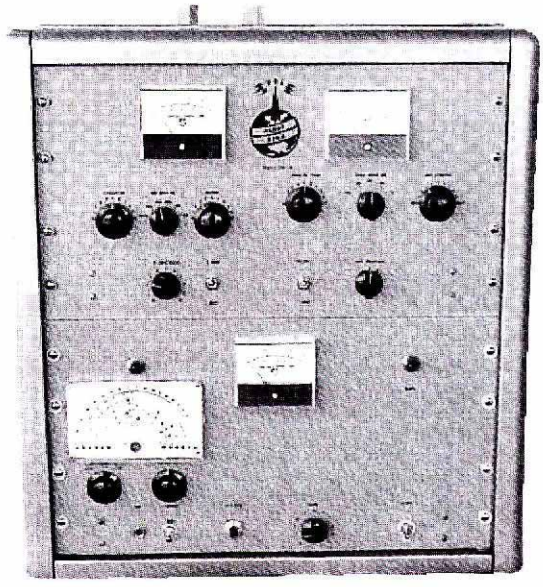

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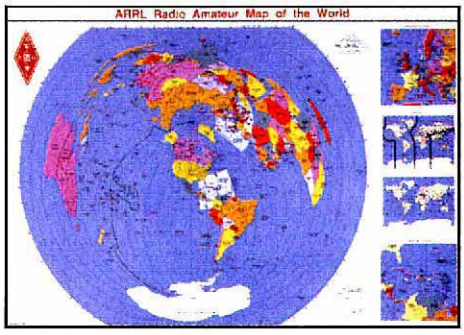

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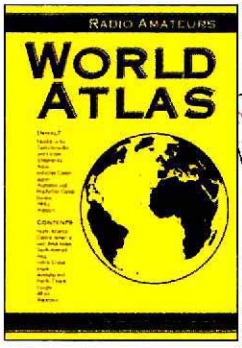

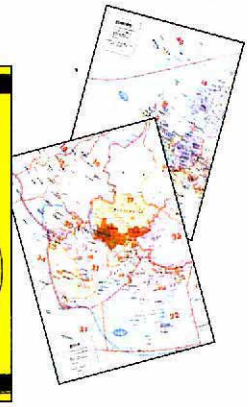

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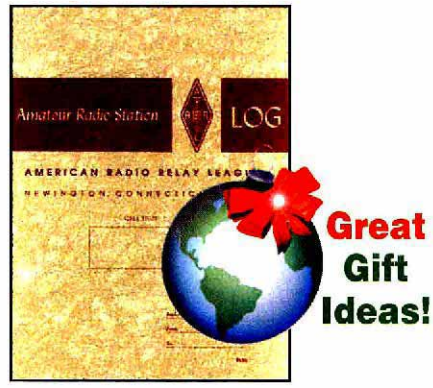

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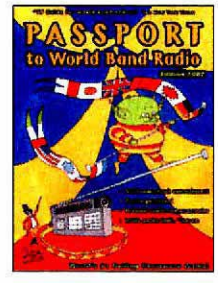

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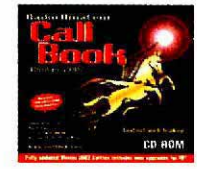

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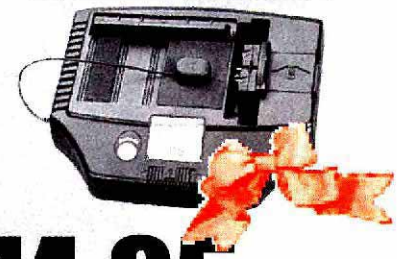

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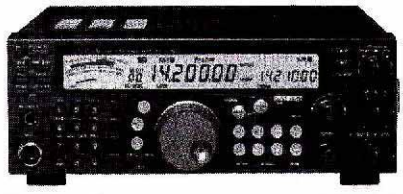

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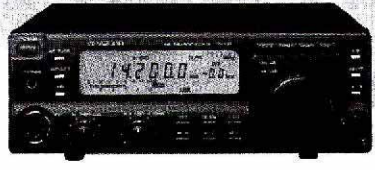

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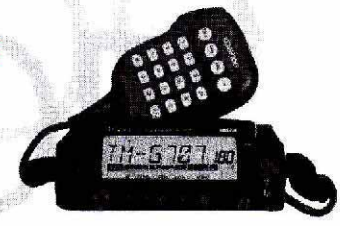

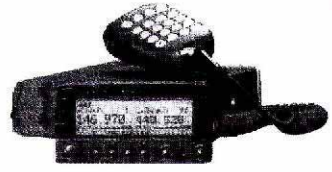

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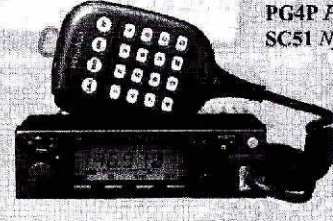

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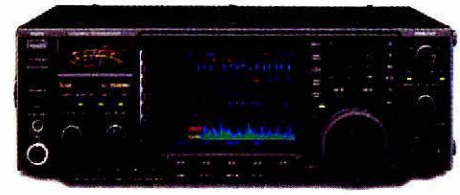

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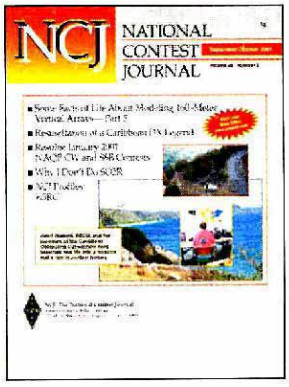

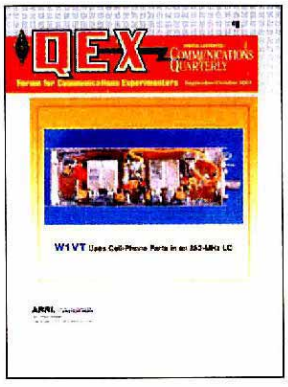

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The new 2002/2003 CQ Radio Classics Calendar features fifteen magnificent photos of some of the memory-jogging, heart-tugging gear that so many of us treasure or aspired to years ago. (Publisher's Note: They're making antiques a lot newer than they used to!) This year's Radio Classics Calendar features some of the great equipment of the '50s and '60s, with a smattering of the 1940s and 1930s.

Here's what's featured this year:

Collins 75S-3 Receiver, 1961; Lakeshore Bandhopper VFO, 1957; Gonset Commander II Mobile HF Transmitter, 1955; Gonset 913A 6 meter amplifier, 1964; Technical Materiel Corporation (TMC) GPR-92 Receiver, 1964; Hammarlund HQ-170 Receiver, 1958; McElroy Model 100 Straight Key, 1941; Sonar XE-10 Modulator, 1947; National NC-300 Receiver, 1955; Hallicrafters S-85 Receiver, 1954; Heathkit SB-500 VHF Transverter, 1969; Sideband Engineers SB-34 Transceiver, 1965; Swan 400 Transceiver, 1964; Drake TR-3 Transceiver, 1963; Utah UAT-1 Transmitter, 1937.

How many do you recognize? How many did you own? How many did you wish you owned?

The 2002/2003 CQ Amateur Radio Calendar brings you fifteen spectacular digital images of some of the biggest, most photogenic Amateur Radio shacks, antennas, scenics, and personalities. These are the people you work, the shacks you admire, the antenna systems you dream about having, all digitally captured by the talented Larry Mulvehill, WB2ZPI, CQ's own roving cover photographer. Larry's travels this year took him to Colorado, Montana, Wyoming, Texas, Florida and New York, capturing some of the greatest Amateur Radio photos of the year especially for this annual favorite calendar. From winter scenes of the frosty northeast to pedestrian mobile in the Rockies, you'll love this traveling Amateur Radio photo show.

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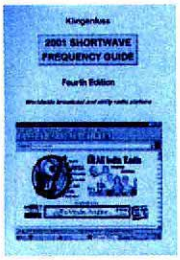

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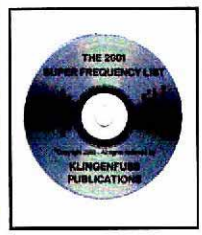

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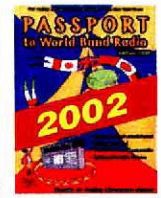

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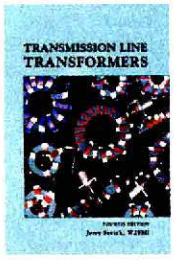

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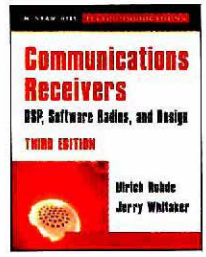

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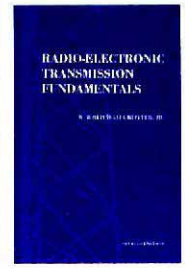

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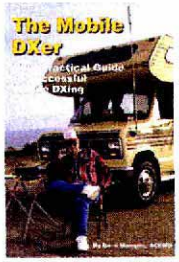

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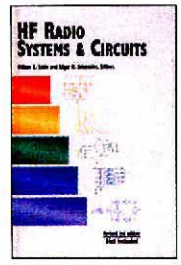

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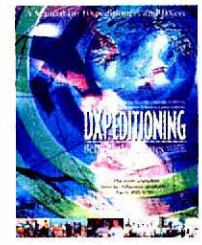

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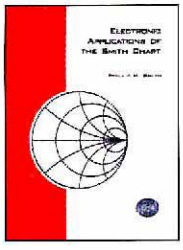

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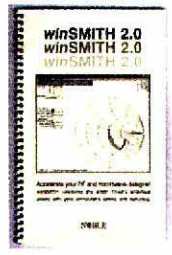

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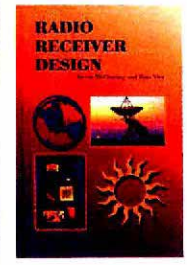

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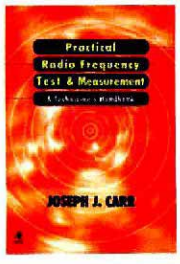

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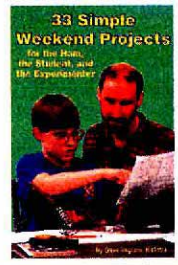

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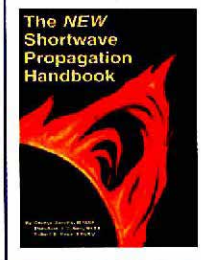

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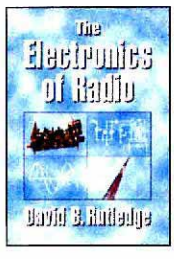

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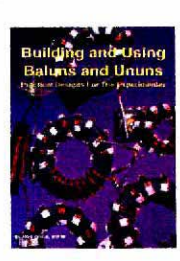

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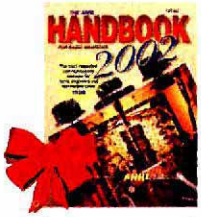

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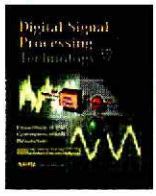

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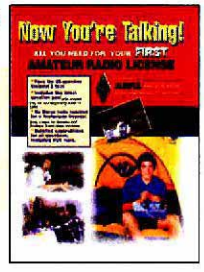

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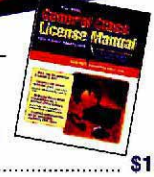

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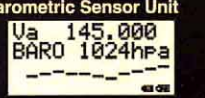

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