



QST

June 1999

Official Journal of
The American Radio
Relay League

devoted entirely to

AMATEUR RADIO

QST *reviews:*

- Yaesu FT-100 HF/VHF/UHF transceiver
- Hamtronics R139 weather satellite receiver

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IC-707

IC-746

ICOM Connect 2000

IC-756 (top), IC-775DSP (center), IC-781 (bottom)



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Most ICOM rigs are PC programmable with select ICOM options



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IC-T22A 2M • Easy to Use • Alpha-numeric Display • Wide Rx*, Air Band* • 5W@13.5VDC* • 3W@9.6VDC Standard

NEW IC-T2H 2M • Super Rugged • 6W@9.6VDC • 500 mW Audio • 8 Front Panel/PC Programmable* Keys • "AA" Ni-Cds & Wall Charger included

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ALL MIL SPEC HTs

IC-Q7A is available with an optional shorter antenna.

Too new! IC-T81A's MIL SPEC test is pending



IC-T2H



IC-T22A



IC-Q7A



IC-T7H



IC-W32A



IC-T8A



IC-T81A

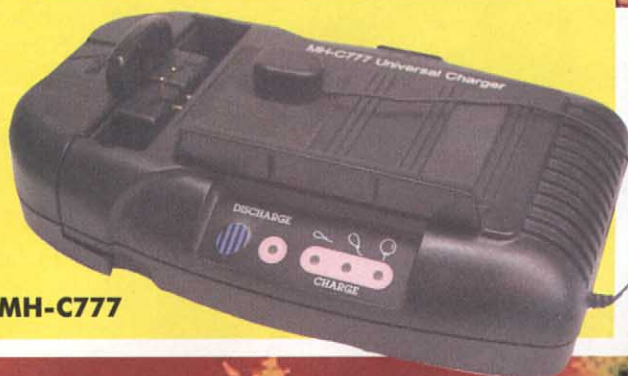
*Optional equipment required. 11Reception guaranteed on US ham bands only. 11MIL STD 810 C/D/E for shock/vibration.

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– *Passport to World Band Radio*, 1998



IC-R10 (left) Advanced performance and features. 0.5 – 1300 MHz*; all mode; alphanumeric backlit display; attenuator; 7 different scan modes; beginner mode; 1000 memory channels; band scope; includes AA Ni-Cds and charger.

IC-R2 (right) Excellent audio, tiny package. 0.5 – 1300 MHz*; AM, FM, WFM; easy band switching; CTCSS decode; 400 memory channels; priority watch; MIL SPEC 810 C/D/E; weather resistant; includes 2 AA Ni-Cds and charger.



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QST (ISSN:0033-4812) is published monthly as its official journal by the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494. ARRL yearly membership dues (including a subscription to QST), are \$34 worldwide. To compensate for additional postage for mailing outside the US please remit \$47. Complete membership information is shown on page 5. Periodicals postage paid at Hartford, CT, and at additional mailing offices. POSTMASTER: Form 3579 requested. Send address changes to: QST, 225 Main St, Newington, CT 06111-1494
Volume 83, Number 6

See [page 10](#) for detailed contact information.
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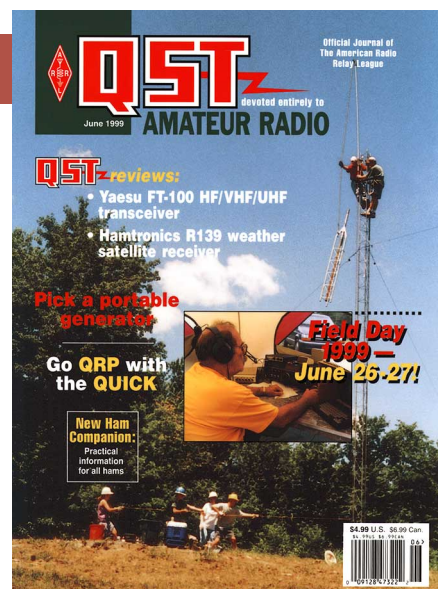
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PHOTOS BY MAUREEN NEEDLES

Our Cover

The crew tops off one of several towers at N1FD, the Nashua (New Hampshire) Area Radio Club Field Day site. In the inset photo Mike, K7CTW, chases contacts at the N1FD 15-meter station. While you're making your 1999 Field Day preparations, read about this mammoth operation in "Please Copy Twenty-Six, Alfa, New Hampshire" in this issue.

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Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No: 21-9421

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battery pack for Kenwood TH-22 and TH-79.
Cost: ~~\$55.90~~ 41.90 each.

PR-FNB27H - 12 Volt, 1000 mAh NiMH
battery pack for Yaesu FT-26, FT-415, FT-416,
and FT-530. **Cost:** ~~\$58.90~~ \$44.90 each.

PR-FNB41H - 9.6 Volt, 1000 mAh NiMH
battery pack for Yaesu FT-50, FT-10, FT-40.
Cost: ~~\$58.90~~ \$44.90 each.

PR-FNBV47H - 7.2 Volt, 1800 mAh NiMH
battery pack for Yaesu FT-50, FT-10, FT-40, and
Vertex VX-10. **Cost:** ~~\$58.90~~ \$44.90 each.

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HT Antennas



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RD-98 / RD-98SMA - 2M / 70CM Extended Thin Duck

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AL-800 - 2M / 70CM Telescoping Antenna

This highly popular antenna is great for hiking, riding, or whenever you end up on the fringes of your favorite repeater. Telescopes to 34" or collapses to 10". When you are back in town, unscrew the telescoping section and replace it with the 9" rat tail section (included). Tuned for amateur band operation (144-148 / 420-450 MHz). **Cost:** \$34.95 each.



Audio Accessories

SPM-400 Series - Mini Boom Microphones



The SPM-400 series headsets include an in-the-ear speaker and a patented rubber-covered earloop design that adjusts to comfortably fit either the right or left ear of any user. The entire headset/speaker assembly is made of durable polyurethane and rubber. The unit features an in-line Push-To-Talk switch that can be clipped to the user's lapel or belt, or the unit can be keyed remotely using an optional remote cord.

Models Available: SPM-400 (for ADI, Alinco, Icom, Standard, Yaesu), SPM-401 (for Kenwood), SPM-402 (for Yaesu FT-50 / VX-1R / VX-5R), SPM-403 (Motorola GP300), and more. **Cost:** as low as \$25.95 each.

SPM-700 Series - Clandestine "Palm" Microphone



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Models Available: SPM-700 (for ADI, Alinco, Icom, Standard, Yaesu), SPM-701 (for Kenwood), SPM-702 (for Yaesu FT-50 / VX-1R / VX-5R), SPM-703 (Motorola GP300), and more. **Cost:** as low as \$39.95 each.

SPM-500 Series - Throat Microphones



The **PRYME Radio Products**™ SPM-500 series throat microphone by PREMIER Communications is a low profile solution for operating in high noise environments. Our SPM-500 rests comfortably against the user's throat, picking up audio directly from vocal cord vibrations. It provides outstanding background noise suppression, surprising clarity, and can be easily concealed inside a shirt or jacket. The microphone has a built-in, in-the-ear speaker and an in-line Push-To-Talk that can be clipped to the lapel or belt. The PTT may also be operated remotely as a "finger tip" PTT by running the included remote cord down the user's sleeve.

Models Available: SPM-500 (for ADI, Alinco, Icom, Standard, Yaesu), SPM-501 (for Kenwood), SPM-502 (for Yaesu FT-50 / VX-1R / VX-5R), SPM-503 (Motorola GP300), and more. **Cost:** as low as \$59.95 each.

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Models Available: SPM-600 (for ADI, Alinco, Icom, Standard, Yaesu), SPM-601 (for Kenwood), SPM-602 (for Yaesu FT-50 / VX-1R / VX-5R), SPM-603 (Motorola GP300), and more. **Cost:** as low as \$39.95 each.

*see our webpage for details

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AT-201HP 2 Meter HT

AT-401HP 440 MHz HT

AT-201: Tx range: 144-148 • Rx range: 130-179 MHz • **AT-401:** TX range: 430-450 MHz • Rx range: 400-470 MHz

- MARS and CAP capable (permits are required) • 5-watts output with supplied battery pack (HP version only)
- 40 memory channels store any offset or tone • CTCSS encode and decode included • programmable band and memory scan modes • DTMF paging included • dual frequency watch
- auto-repeater offset • user selectable frequency or channel display modes
- backlit display and keypad • Size: 4.25" (H) x 2" (W) x 1.3" (D) excluding battery pack



\$40

instant coupon
until 5/31/99

PR-52 6 Meter (50 MHz) HT

PR-222 1.35 Meter (222 MHz) HT

PR-52: Tx range: 50-54 MHz • Rx range: 44-54 MHz

- **PR-222:** Tx range: 222-225 MHz • Rx range: 216-229 MHz • 5-watts output with included NiCd battery pack • MARS and CAP capable (permits are required) • built-in CTCSS encode and decode • 40 memory channels store any tone or offset • direct frequency entry using 16 button keypad
- frequency or channel display modes • PC programmable (with optional software) or cable cloneable • Palm-sized! World's Smallest 6 Meter and 1.35-Meter singleband handhelds! Size: 4.25" (H) x 2" (W) x 0.75" (D) excluding battery pack!



NEW!

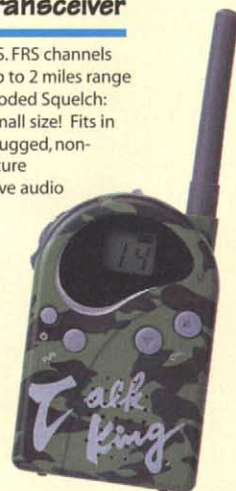
TALK KING* Family Radio Transceiver

Operates on 3 AAA batteries (not included) • All 14 U.S. FRS channels

- External microphone jack • No license required! • Up to 2 miles range
- Backlit display • Adjustable volume control • Tone Coded Squelch: eliminates interference and increases privacy • Very small size! Fits in your shirt pocket! • Simple "menu-style" operation • Rugged, non-removable antenna • Built-in belt clip keeps unit secure
- Available in three great colors • Clear and loud receive audio
- Channel scan for finding busy channels
- Automatic power off • Key lock prevents accidental channel changing
- Available in three colors: blue, yellow, and camouflage
- Size: 3.5" (H) x 2" (W) x 0.8" (D) excluding antenna



NEW!



AR-147* 2M Mobile • AR-247* 222 MHz Mobile • AR-447* 70CM Mobile

The next generation of amateur single band mobile radios has arrived. These amateur mobile radios feature both CTCSS and DCS (Digitally Coded Squelch) encode/decode, and tone scan. DCS adds 106 new tones to the radio, in addition to the 50 standard CTCSS tones, that can be used for selective calling or repeater access.

AR-147: Tx range: 144-148 MHz • Rx range: 118-171 MHz (includes AM air) • Output: 50/15/5 watts • **AR-247:** Tx range: 222-225 MHz • Rx range: 215-229 MHz • Output: 30/15/5 watts • **AR-447:** Tx range: 430-450 MHz • Rx range: 400-470 MHz • Output: 35/15/5 watts • 81 memories • CTCSS (50 tones) and DCS (106 tones) encode, decode, and tone scan • MARS capable (permits required) • 9 DTMF autodialer memories • Built-in redialer for autopatch use • Programmable band and memory scan • Time Out Timer • DTMF paging • Dual frequency watch • Auto Repeater Offset (AR-147 only) • Direct frequency entry using multi-function DTMF microphone • PC programmable (with optional software) • Auto Power Off • Frequency or channel display modes • Four-step display dimmer • Power line over/under voltage protection • Small! Size: 1.5" (H) x 5.5" (W) x 6.25" (D)



Includes both CTCSS
and DCS

NEW!

* These units have not yet been FCC approved. They are not, and may not be, offered for sale until after this approval is granted.

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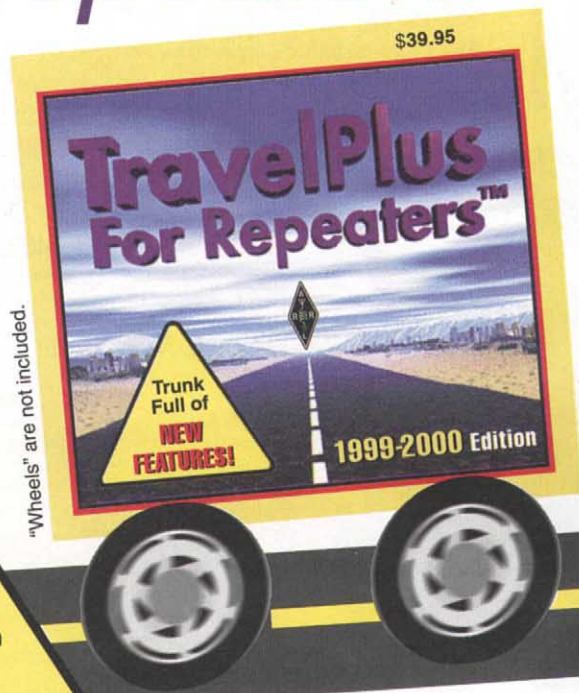
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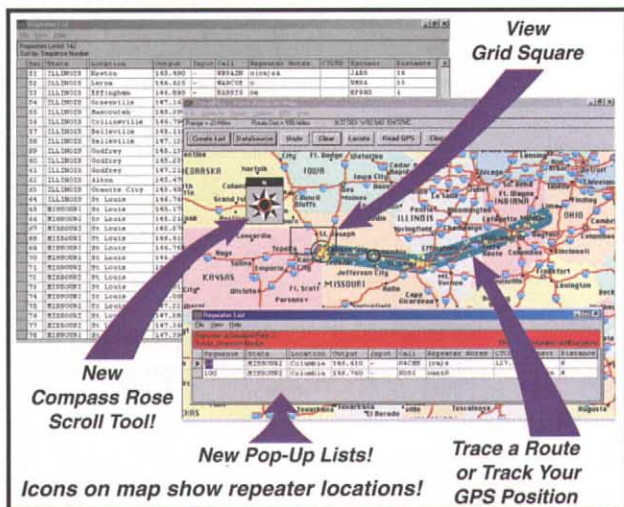
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Wheels are not included.

Take it for a drive!



The ARRL Repeater Directory 1999/2000 Edition

Listings for nearly 21,000 FM voice and ATV repeaters located in North, Central and South America, Europe and the Middle East! Casual VHF operators, public service volunteers, and anyone on-the-go will enjoy the friendly format of the Repeater Directory. Thumb to the section you're looking for—and tune in! You'll never be out of touch.

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*plus \$3 shipping (UPS)



TravelPlus For Repeaters™ CD-ROM

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THE AMERICAN RADIO RELAY LEAGUE INC



The American Radio Relay League Inc is a noncommercial association of radio amateurs, organized for the promotion of interest in Amateur Radio communication and experimentation, for the establishment of networks to provide communication in the event of disasters or other emergencies, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

ARRL is an incorporated association without capital stock chartered under the laws of the State of Connecticut, and is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1986. Its affairs are governed by a Board of Directors, whose voting members are elected every two years by the general membership. The officers are elected or appointed by the directors. The League is noncommercial, and no one who could gain financially from the shaping of its affairs is eligible for membership on its Board.

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

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

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

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"It Seems to Us..."

50,000 Members Can't Be Wrong

On the afternoon of April 27, the ARRL reached a significant milestone: the 50,000th member registered to use the Members Only section of the ARRL Web site. In less than eight months, the number of members using this new service went from zero to 30% of the total membership, making it our second most popular membership service—out-ranked only by *QST* itself.

Every day, thousands of members use the Members Only section to read the latest news, posted as soon as it is available; to read upcoming *QST* Product Reviews and contest results before the magazine arrives; to search for references to articles in all past issues of *QST* and *QEX*; to download from an archive of *QST* Product Reviews published since 1980; and to read exclusive feature articles that are not available anywhere else. Two-thirds of those who have registered have opted to receive *The ARRL Letter* automatically, giving this weekly electronic newsletter a direct circulation of more than 33,000 and a weekly Web readership (which is not restricted to members) of several thousand more. About 30,000 members have elected to receive general-interest W1AW bulletins electronically as they are issued, and the weekly W1AW DX bulletin goes to 18,000 e-mail addresses.

Members Only activity is just a portion of our total Web presence. A wealth of information and news about Amateur Radio and the ARRL is readily accessible to anyone at <http://www.arrrl.org/>, and will remain so. Recognizing the value of the ARRL site to anyone who is curious about Amateur Radio, thousands of members, clubs, and other organizations provide links to the ARRL site. Once there, the newcomer can click on "Learn About Amateur Radio" and be guided through the sights and sounds of our avocation. In the first four months of 1999, this section of the ARRL Web site was visited 53,000 times. Our classified advertising service, Radios On-Line, was visited almost 50,000 times. Popular reference features include our hamfest listing, consulted 44,000 times since January 1, 1999; the volunteer examination site search feature, used 36,000 times; and the local club search feature, used 25,000 times. On an average day the site receives more than 100,000 "hits" (requests to download files) and it's a rare day that less than 1,000 Mbytes is downloaded.

While it is very gratifying to see such heavy use of particular features, one of the beauties of Web publishing is that it lends itself so well to serving specialized audiences. We have barely scratched the surface

of what can be done to promote specific aspects of Amateur Radio in ways that cannot be done economically via a print medium.

Like most popular Web sites, the content of ours is in a state of perpetual evolution and expansion. From its inception, we have followed the philosophy of keeping the site as uncluttered and as easy to navigate as possible; our objective is to inform, not simply to entertain. At the moment there are 3,000 HTML (normal Web page) files and 500 PDF files available, encompassing about 300 Mbytes of data, and these numbers inevitably will grow. As you can imagine, just keeping everything up to date is a formidable task!

Each month, hundreds of members use the site to renew their memberships and about 200 sign up via the Web for the first time. Members and nonmembers alike use the on-line catalog to obtain information on ARRL publications, to find a dealer near them, or to place an order.

The latest ARRL membership benefit is the ARRL E-Mail Forwarding Service. Free of charge, any member or affiliated club can arrange to have e-mail that is addressed to them at an address with the format **<call sign>@arrrl.net** forwarded to their regular e-mail address. No longer will you have to explain a convoluted e-mail address to someone; if they know your call sign and know you're an ARRL member, they can reach you if you want! In the first three months, more than 8,600 members have signed up for the service.

What's in store for the ARRL Web site in the future? That will depend on you, the member. We're monitoring the use of the site to learn which features are popular and, conversely, which features might not be worth the investment of time it takes to bring them on-line. We're listening to your suggestions, and at this moment are working to implement several of them.

While much of the credit for the popularity and success of the ARRL Web site belongs to the Board members who have supported and encouraged it and the staff members who have worked hard to make it happen, much credit also belongs to you, the member. No matter what field they represent, every membership association recognizes that electronic communication with its membership and with the world at large is assuming ever-greater importance. By embracing electronic communication as a logical and desirable extension of your interest in radio, you have put the ARRL in the forefront of this trend.—David Sumner, K1ZZ

We're At Your Service

ARRL Headquarters is open from 8 AM to 5 PM Eastern Time, Monday through Friday, except holidays. Our address is: 225 Main St, Newington, CT 06111-1494. You can call us at 860-594-0200, or fax us at 860-594-0259.

If you have a question, try one of these Headquarters departments . . .

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You can send e-mail to any ARRL Headquarters employee if you know his or her name or call sign. The second half of every Headquarters e-mail address is @arrl.org. To create the first half, simply use the person's call sign. If you don't know their call sign, use the first letter of their first name, followed by their complete last name. For example, to send a message to John Hennessee, N1KB, Regulatory Information Specialist, you could address it to jhennessee@arrl.org or N1KB@arrl.org.

If all else fails, send e-mail to

hq@arrl.org and it will be routed to the right people or departments.

Technical Information Server

If you have Internet e-mail capability, you can tap into the ARRL Technical Information Server, otherwise known as the *Info Server*. To have user instructions and a handy index sent to you automatically, simply address an e-mail message to: info@arrl.org
Subject: **Info Request**
In the body of your message enter:

HELP
SEND INDEX
QUIT

ARRL on the World Wide Web

You'll also find the ARRL on the World Wide Web at:

<http://www.arrl.org/>

At the ARRL Web page you'll find the latest W1AW bulletins, a hamfest calendar, exam schedules, an on-line ARRL Publications Catalog and much more. We're always adding new features to our Web page, so check it often!

Members-Only Web Site

As an ARRL member you enjoy exclusive access to our Members-Only Web site. Just point your browser to <http://www.arrl.org/members/> and you'll open the door to benefits that you won't find anywhere else.

- Our on-line Web magazine, the *ARRLWeb Extra* with colorful news and features you won't see in *QST*.
- *QST* Product Review Archive. Get copies of *QST* product reviews from 1980 to the present.
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- Previews of contest results and product reviews. See them here before they appear in *QST*!
- Access to your information in the ARRL membership database. Enter corrections or updates on line!

Stopping by for a visit?

We offer tours of Headquarters and W1AW at 9, 10 and 11 AM, and at 1, 2 and 3 PM, Monday to Friday (except holidays). Special tour times may be arranged in advance. Bring your license and you can operate W1AW anytime between 10 AM and noon, and 1 to 3:45 PM!

Would you like to write for QST?

We're always looking for new material

of interest to hams. Send a self-addressed, stamped envelope (55¢ postage) and ask for a copy of the *Author's Guide*. (It's also available via the ARRL Info Server, and via the World Wide Web at <http://www.arrl.org/qst/aguide/>.) The guide contains all the information you'll need to craft an article to meet our requirements. Send article ideas or manuscripts to the attention of the *QST* Editor (e-mail qst@arrl.org).

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Send your press releases and new book announcements to the attention of the *QST* Editor (e-mail qst@arrl.org). New product announcements should be sent to the Product Review Editor (e-mail reviews@arrl.org).

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Interested in Becoming a Ham?

Just pick up the telephone and call toll free 1-800-326-3942, or send e-mail to newham@arrl.org. We'll provide helpful advice on obtaining your Amateur Radio license, and we'll be happy to send you our informative Prospective Ham Package.

ARRL Audio News

The best way to keep up with fast-moving events in the ham community is to listen to the ARRL Audio News. It's as close as your telephone at 860-594-0384, or on the Web at <http://www.arrl.org/arrlletter/audio/>.

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- 200 memory channels plus two call channels
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- Up to 6 watts output, 3 output settings
- CTCSS Encode+decode, DTMF squelch and 4 different European Tone Bursts
- Accepts up to 13.8 VDC direct input
- 4 scan modes, 5 programmable scan banks
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- MARS/CAP capability
- Autodial memories
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- SMA antenna connector
- Eight different tuning steps
- Wire cloning capability
- Wide choice of accessories
- Audio output control (high/low)
- Split-band operation capability



These radios have not yet been type accepted by the FCC. They may not be sold or leased until the approval of the FCC has been obtained.

•Cellular blocked.

NEW!

DJ-195T 2 Meter HT

- Alphanumeric display
- 40 memory channels
- 5 watt output with standard battery
- CTCSS encode+decode and DCS
- 13.8 VDC direct input
- Direct frequency input
- S-meter
- Autodialer
- Cable Cloning
- Additional features, including theft alarm!



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Specifications subject to change without notice or obligation. Performance specifications apply only to Amateur bands. Permit required for MARS/CAP use. Products intended for use only by properly licensed Amateur Radio operators..

Get to Know Your Section Manager

The 15 divisions of the League are arranged into 70 administrative *sections*, each headed by an elected *section manager* (SM). Your section manager is the person to contact when you have news about your activities, or those of your club. These news items could find their way into the pages of QST! If you need assistance with a local problem, your section manager is your first point of contact. He or she can put you in touch with various ARRL volunteers who can help (such as technical specialists). Your section manager is also the person to see if you'd like to become a section volunteer. Whatever your license class, your SM has an appointment available.

Atlantic Division

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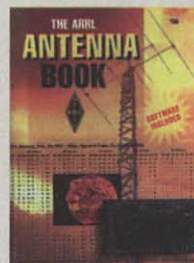
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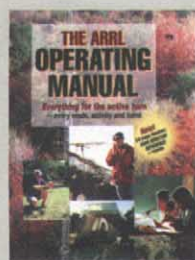
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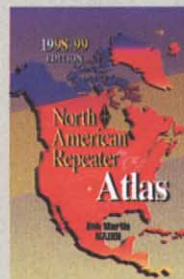
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DC Currents

By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs

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

Congress Looks at the FCC...

 The House Telecommunications Subcommittee launched a review of the Federal Communications Commission this spring in what is likely to be a series of hearings. Just as Congress must pass appropriations bills to fund federal agencies, it must also pass "authorization" bills to provide the legal basis for those agencies.

Lead-off witness Peter Huber, a former FCC employee and now a beltway "think tank" consultant, set the stage by telling the Subcommittee that the new world of telecommunications is likely to see a shift toward digital technology and a blurring of the boundaries between services. He said the nation is moving toward a comprehensive communications network carrying a mix of "point-to-point" and "one-to-many" messaging, a trend often referred to as "convergence."

"We are engaged, here, in a truly fundamental transformation of the whole of the telecom infrastructure," Huber said, noting that FCC's most productive role during the


transition should be to let the system evolve. But Huber cautioned, "the Commission seems quite eager to maintain and extend the old regulatory paradigms."

Echoing the free market mantra that prefaces many discussions in deregulatory Washington these days, FCC Chairman William Kennard told the Subcommittee that the days of the "top down regulatory model of the Industrial Age" are over, and described a five year plan to bring the FCC up to the requirements of the 21st century. Kennard said that his restructured FCC will focus on universal service, consumer protection and information, enforcement and promotion of pro-competition goals domestically and worldwide, and spectrum management. Commissioner Susan Ness echoed the Chairman's views and asserted that the lawyer-heavy commission ought to strengthen its technical resources and revive its engineering training program. Commissioner Harold Furchtgott-Roth focussed on his view that the FCC ought to adhere to the narrowest interpretation of federal telecom-

munications law, and predicted that, over the short term, the cost of the move to the new FCC headquarters would need to be offset either by higher license fees or reduced FCC staff unless Congress increased the commission's budget. Commissioner Michael Powell suggested that the FCC be reorganized along competitive function lines, "for example, formation of a multichannel competition bureau to administer what is now Mass Media, Cable and Direct Broadcast Satellite." He also cited the need for better coordination of functions with other agencies such as the Justice Department and the Federal Trade Commission. Commissioner Gloria Tristani also supported FCC restructuring, with increased emphasis on enforcement and a more accurate reflection of the continued convergence of technologies.

As we went to press, the Subcommittee had launched reauthorization hearings on the National Telecommunications and Information Administration (NTIA). No dates have been set for more FCC reauthorization hearings.

...While the FCC Looks at Spectrum

 Even as the FCC Commissioners were trooping to Capitol Hill, they were summoning guests to their own party. The *en banc* hearing on spectrum management in April featured three panels.

The first was an all-purpose "Spectrum 101," right down to explaining the relationship between frequency and wavelength. Dale Hatfield, FCC's Chief of Engineering and Technology, told the commissioners that enforcement is a critical part of spectrum management. Tom Sugrue, Chief of the Wireless Telecommunications Bureau, suggested that frequency coordinators are like "car jockeys" whose expertise is squeezing more cars into less space than if drivers parked their own cars. Tom Tycz, Chief of FCC's Satellite and Radiocommunications Division explained the complexity of coordinating non-geostationary satellites, and observed that under the World Trade Organization treaty, decisions could no longer be made solely on the basis of domestic considerations.

The second panel featured representatives from the commercial sector speculating about what needs fixing with FCC spectrum management. Lynn Claudy, of the National Association of Broadcasters, said the FCC has to be more critical of claims of ability to share and of the size of the market for proposed services, and needs better rules to ensure compatibility between broadcasting signals and receivers. Mark Crosby of the Industrial Telecommunications Association, emphasized that non-economic factors had to be taken into account in considering the spectrum needs of private wireless users. Mike Kennedy, of Motorola, raised the heretical proposition that auctions aren't the answer for all allocations decisions, and suggested the FCC create a "Spectrum Management Board." Phil Salas, AD5X, of Alcatel USA, said spectrum studies ought to be the first, not last, step when new services are proposed. He cited ARRL as a representative of the types of noneconomic spectrum interests the FCC should consult. Leslie

Taylor, president of Leslie Taylor Associates, painted a picture of a telecommunications future dominated by mobility and new broadband uses.

The third panel discussed new approaches to spectrum management. Thomas W. Hazlett, of the American Enterprise Institute and UC-Davis and one of the early proponents of FCC deregulation, called for a liberal "hands off" policy by the FCC, particularly with regard to emerging wireless services and with the exception of regulating interference. Dewayne Hendricks, WA8DZP, of Com 21, said the future might see an increasingly self-regulatory model, where "smart radios" determine their RF environment and adapt to it. Dr. Charles L. Jackson, of Jackson Associates, observed the paradox that as radios get smaller and cheaper the value of spectrum actually increases. Kalle Kontson, Vice President of IIT Research Institute, predicted that today's emphasis on licensing and spectrum ownership would diminish in favor of emphasis on type acceptance as radios become the

more agile creatures envisioned by Hendricks. Joseph Mitola of the MITRE Corporation followed up with a description of the features and limitations of "software radios" of the future. Dr. Eli Noam, KE2PN,

of Columbia University proposed that the FCC was a prisoner of the analogy of spectrum to real estate when the better analogy was to the high seas. He encouraged the Commissioners to think in terms of opening

more bands to unlicensed use on a not-to-interfere basis.

To read the transcript check out the FCC Web site at <http://www.fcc.gov/enbanc/040699/eb040699.html>.

Slowly but Surely, Amateur Spectrum Protection Act Builds Support

• Thanks to all of the ARRL members who've taken the time to write to their members of Congress, HR.783 is gaining traction in the House of Representatives. As we went to press, the bill had been referred to the Subcommittee on Telecommunications, Trade, and Consumer Protection, and had gained 41 cosponsors with several more waiting in the wings but not yet signed on. The bill protects Amateur Radio spectrum by requiring the FCC to provide equivalent replacement spectrum should reallocation be required. For an analysis, see "DC Currents" in last month's *QST*.

One tip-off that HR.783 has gotten congressional attention is recent efforts on the part of the Congressional Budget Office to "score" the legislation for its impact on the Federal Budget. Scoring is required before legislation thought to have an impact on federal government receipts or expenditures is reported out of committee. The impact of the bill is projected out over at least a five-year period. While ARRL has not yet learned how CBO views the bill, the fact that it is being analyzed means that it is being taken seriously.

The biggest factor in the decision of members of Congress whether to support specialized legislation like HR.783 is whether they've heard from constituents in their own districts. Many offices we've visited on The Hill lately report that they have *not* heard from their districts. So if you're an ARRL member who thinks a spectrum protection bill is a good idea, write to your member of Congress. For a sample letter and mailing addresses, see last month's *QST* or visit the ARRL Web site at <http://www.arrrl.org/govrelations/hr783.html>.

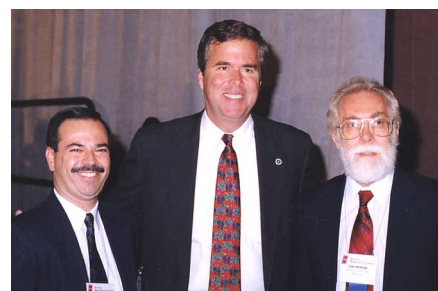
HR 783 Co-Sponsors (In order of sign on)

Frank Pallone, Jr (D-NJ-6th)	Jo Ann Emerson (R-MO-8th)	Rick Boucher (D-VA-9th)
Michael R. McNulty (D-NY-21st)	George R. Nethercutt, Jr (R-WA-5th)	Charles H. Taylor (R-NC-11th)
Ronnie Shows (D-MS-4th)	Robert B. Aderholt (R-AL-4th)	Sanford D. Bishop, Jr (D-GA-2nd)
Nathan Deal (R-GA-9th)	David L. Hobson (R-OH-7th)	Donna Christian-Christensen (D-VI-delegate)
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Robert A. Underwood (D-GU-delegate)	Dan Burton (R-IN-6th)	Thomas H. Allen (D-ME-1st)
John E. Baldacci (D-ME-2nd)	Bernard Sanders (I-VT-At Large)	Bob Schaffer (R-CO-4th)
Sam Farr (D-CA-17th)	Sonny Callahan (R-AL-1st)	Frank R. Wolf (R-VA-10th)
James M. Talent (R-MO-2nd)	Deborah Pryce (R-OH-15th)	George Miller (D-CA-7th)
Stephen E. Buyer (R-IN-5th)	Michael F. Doyle (D-PA-18th)	Dave Weldon (R-FL-15th)
Dale E. Kildee (D-MI-9th)	Steven R. Rothman (D-NJ-9th)	Virgil H. Goode, Jr. (D-VA-5th)
Norman D. Dicks (D-WA-6th)	Ron Klink (D-PA-4th)	Peter A. DeFazio (D-OR-4th)
Owen B. Pickett (D-VA-2nd)	Greg Walden (R-OR-2nd)	Louise M. Slaughter (D-NY-28th)
Barbara Cubin (R-WY-1st)		
Steve C. LaTourette (R-OH-19th)		

National Hurricane Conference Lauds Ham Volunteers

♦ At the National Hurricane Conference in Orlando this spring, Florida Governor Jeb Bush was on hand at the presentation of Outstanding Achievement Awards to the Hurricane Watch Net and the operators of W4EHW (the National Hurricane Center station). The Hurricane Watch Net is a voluntary hurricane tracking net that collects and provides information between hams and the National Hurricane Center whenever a hurricane threatens. The net's primary frequency is 14.325 MHz. W4EHW, staffed by volunteers, acts as the central collection point.

The conference featured a session on Amateur Radio's role in hurricane disasters presented by Jerry Herman, N3BDW; John McHugh, KU4GY; Steve Richbourg, KO4TT; Red Cross disaster services communications coordinator Steve Hailey; Rudy Hubbard, WA4PUP; John Fleming, WD4FFX; and Rick Palm, K1CE. Dr. Mike Carter, N3PDK, moderated.



W4EHW group founder Julio Ripoll, WD4JNS (left), Florida Governor Bush (center) and W4EHW coordinator John McHugh, KU4GY (right) at the National Hurricane Conference awards ceremony.

FCC Issues Strengthened Scanner Rules

• The FCC has amended its rules to strengthen prohibitions on scanning receivers that receive cellular telephone transmissions. The new rules contain exemptions for the Amateur Service but will have ramifications for the manufacture of new Amateur Radio gear that scans frequencies outside the ham bands. The rules broaden the definition of scanning receivers to include receivers that automatically switch frequencies between 30 and 960 MHz and stop to receive a detected signal. Still exempt are receivers designed solely for operation as a part of a licensed station. In response to an ARRL request, the FCC clarified that the rules don't apply to Amateur Service receivers unless they cover frequencies outside the ham bands (as do many VHF and UHF mobiles and handhelds). They also do not include broadcast receivers.

The FCC widened its definition of "test equipment" exempted from the restrictions. In part as suggested by the ARRL, the rules define test equipment by function rather than

by end user, thus permitting sale to the general public.

The rules require that receivers be designed so that tuning, control circuits, and filtering are inaccessible, and that the design is such that any attempted modification would render the receiver inoperative. Modifications for MARS and CAP operation still would be permitted. The rules prohibit modification of scanning receivers as a business or on an ongoing basis regardless of the date of manufacture or number of units modified. Labels will be required on new equipment warning that modifications are illegal.

Kits will be treated the same as assembled equipment. In response to the ARRL's objection related to the availability of frequency converter kits for ham bands, the Commission said that ham radio scanning receivers "already cover frequency ranges needed by amateurs" and a prohibition against scanner kits "will not impact frequency converter kits used to expand the frequencies covered by amateur equipment."

The League plans to look closely at this provision to make sure it won't prevent manufacturers from producing legitimate transverters. The FCC said it was modifying its rules "to clarify that the prohibition on modifying scanning receivers to receive Cellular Service transmissions contained in Section 15.121 overrides the home built device provisions of Section 15.23." The FCC said the clarification was "necessary to prevent individuals from modifying scanning receivers to receive Cellular Service transmissions and claiming the provisions of Section 15.23 as justification for their actions."

The new rules become effective due 30 days after publication in the *Federal Register*. The FCC said it would include a transitional period to allow the acceptance of equipment certification applications for scanning receivers under the current rules for up to 90 days after the publication of the Report and Order. The ruling can be found on the ARRL Web site at <http://www2.arrrl.org/announce/et98-RandO.html>.

QST

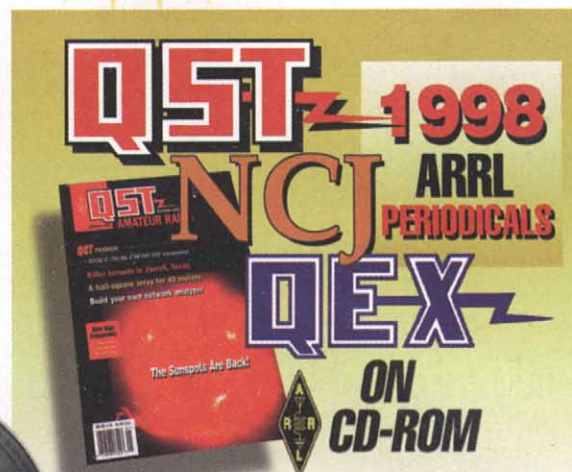
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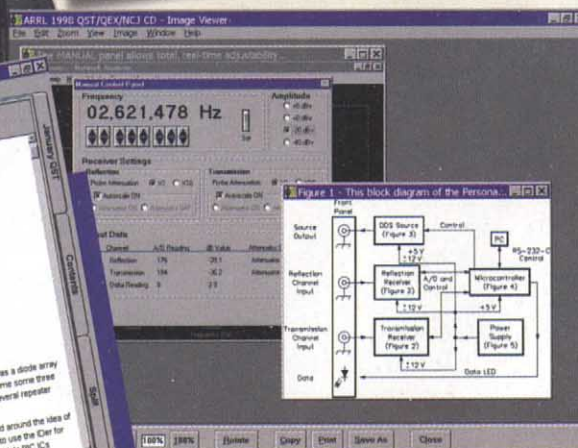
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Antenna as art. Sandra Mershon, AA0TW, snapped this striking photograph from her backyard deck last November. She calls it "Low angle radiation pattern into sunrise."



Don Kirk, WD8DSB, displays what *used* to be the rectangular phasing stub on his Cushcraft Ringo Ranger antenna. It became more-or-less circular after the antenna was subjected to a direct lightning strike! The tip of the antenna (not shown) was completely vaporized.



St Paul's Island (CY9) is a popular DXpedition destination, but the desolate rock (right) is better known as the "graveyard of the Gulf of St Lawrence." One of the last expeditions to St Paul's in 1998 signed WV2B/CY9 from September 10-14. With a 2-element Yagi antenna

planted near the lighthouse (left) Duane Traver managed more than 4,000 contacts during his stay.

ANDRE KESTELOOT, N4ICK

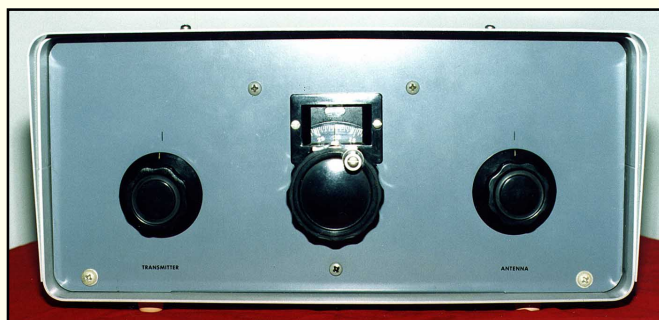


Eight members of AMRAD (the Amateur Radio Research and Development Corporation) journeyed to the wind-swept beach at Nags Head, North Carolina last January to conduct low-frequency listening tests. In the foreground you can see Elton Sanders, WB5MMB and Tracy Wood, K7UO, erecting a low-frequency receiving loop. The small mast in the background supports a remotely tuned e-probe designed by Andre Kesteloot, N4ICK. The AMRAD group used DSP software to monitor signals from Europe (the results were still being analyzed when this was written). During their tests they heard several 1750-meter Lower transmissions from as far away as Pennsylvania. See the AMRAD Web site at <http://www.amrad.org>.

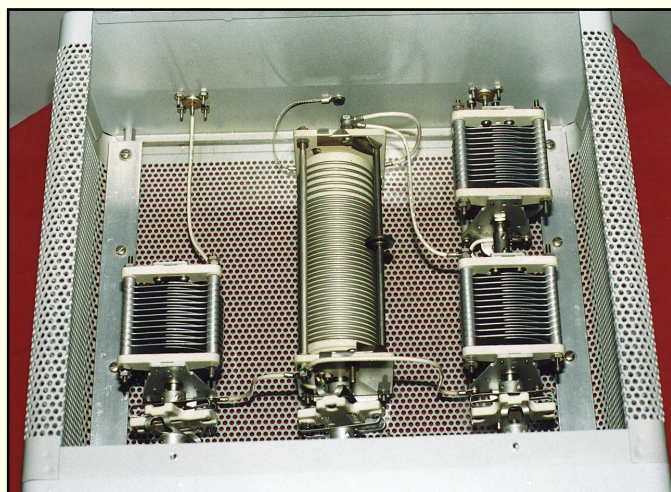




In Charleston, South Carolina they boast of having one of the few all-female ARRL VE teams in the country. From left to right, Liz Martin, AF4HU; Ann Johnson, AF4LN; Dr. Mary Favaro, AE4BX; Sheila Frank, KT4YW; Linda Nesmith, KE4MPY; Susanne Roth, KE4RVF; and Jenny Myers, WA4NGV. In the accompanying photograph (right), Dr. Mary Favaro, AE4BX, assists Ernest Blackwell, KE4YQG.



It will even match the proverbial wet string! Louis D'Antuono, WA2CBZ, began collecting the parts for his "ultimate" antenna tuner years ago. Between work obligations and other tasks, it took a while before Louis could finally translate his design into reality. The result is the heavy-duty roller-inductor tuner you see here. Homebrewing isn't dead; it just takes patience!



On March 13, 1999 AMSAT-NA celebrated 30 years of service to the amateur satellite community with a gathering at the NASA/Goddard Space Flight Center in Greenbelt, Maryland. Frank Bauer, KA3HDO, AMSAT vice president for manned space programs and chief of the Guidance, Navigation and Control Center at NASA/Goddard, presented this colorful plaque to AMSAT-NA president Keith Baker, KB1SF. The plaque honors 30 years of cooperation between NASA/Goddard and AMSAT-NA. See "Amateur Satellites" in this issue.



FORWARD INTO THE PAST

As we prepare for the last Field Day of the 20th century, let's reminisce with a few images of Field Day 1998. Maybe they'll inspire you to gather your friends and take to parks, meadows, hills, mountains ... wherever! We're making the '99 event particularly memorable by offering the commemorative pin shown at right. To earn one for yourself all you have to do is *participate*—even if that means doing nothing more than frying eggs for breakfast. See the details and the Field Day rules in *last month's QST*, or get on the Web and go to ARRL site at <http://www.arrl.org/>.

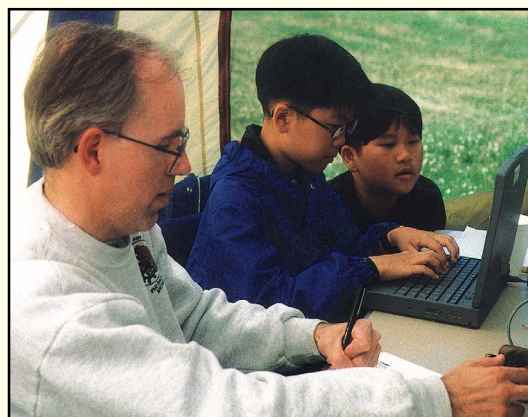


Hey, ho, and up she rises! Members of the Northwest Amateur Radio Society near Houston, Texas haul up a triband beam and a 40-foot tower at the W5NC site.



We love the smell of pancakes in the morning! The W0ZWY Field Day crew answers the breakfast call.

FIELD DAY 1998!



Boy Scouts Gil Kim and Alex Kwon handle the Field Day logging for Phil DeClaire, WB7AEI. Phil was working CW at the Boeing Employees Amateur Radio Society station, K7NWS.



Norm Brown, KC8CLM, stands proudly next to his impressive satellite antenna array at the Cherryland Amateur Radio Club site near Traverse City, Michigan. Norm used the antennas to make contacts on AO-27 and RS-12.



Mike's first Field Day. KC8KAI was licensed in April 1998. Two months later he received his baptism of fire at the KG8HZ operation.



Field Day is about more than radio. In addition to operating the event, the Alamo Area Radio Organization (KC5NTN) in San Antonio, Texas conducted a fundraiser that netted \$850 for the Child Life Development Program at University Hospital.

HF ENTHUSIASM

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Correspondence

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COMPLAINING ABOUT CROWDED BANDS IS FUTILE

◆ This is a response to the letter from Dave Tobin, KC7DYY, in the January 1999 "Correspondence" ("Give the 'Little' Stations a Chance"). Dave suggests that General, Advanced, and Amateur Extra operators should curtail their power output when operating on the Novice/Technician portion of 10 meters. In this letter, Dave states that "enjoying conversations with DX stations is often next to impossible when stations on adjacent frequencies are running a kilowatt or more."

If this is the case, then how do I have 65 countries confirmed (over the last year and a half) and over a 100 worked using less than 200 W? Only a five or six of my DX contacts have been with high power. Dave also states that "Technician Plus operators can't hope to compete when they are limited to 200 W." If that is true, how have I managed to work these countries while operating within a Technician's power limit?

As a recent DX station myself (ZP5/KE9NA), I can attest to the fact that most of the US stations run far less than the legal limit. In fact, most US hams run just 100 W to dipole antennas or something similar. And I had QRP stations beat out the kilowatts trying to work me! I've also worked DX stations on just a couple of watts. Yes, a DX station can easily work the big guns, but the little guys can work them, too.

Start by investing in better antennas and by sharpening your operating techniques. Consider buying a decent DSP filter, or save your money for a rig with a better front end. As we near the peak of the current sunspot cycle, crowded bands will be a fact of life. We need to learn to deal with the problem creatively. Complaining about it is a waste of time.

Consider low power operating a challenge. I love beating the kilowatts with my 100 to 200 W while working rare DX. It gives me a sense of pride and accomplishment. Just remember that anyone can bust a pileup with big power. Busting it with QRP or low power takes skill.—*Jon Ogden, KE9NA, Algonquin, Illinois*

MORE SHOWBIZ SHTICK

◆ The letter from Tom, NU4G, in the February "Correspondence" concerning Morse code from a photographic spy satellite in the movie "Enemy of the People" generated a laugh. Morse code is show-biz-speak for exotic technology. Another incorrect shtick in movies and TV commercials is the depiction

tion of binocular vision through a mask with two openings aligned horizontally. This never occurs with good optics but Hollywood assumes it's the only way to depict a view through a binocular. Any wonder we have so many "mad scientist" pictures?—*Al Goldberg, K1JWX, Stamford, Connecticut*

HATS OFF TO HOLLINGSWORTH!

◆ I'd like to take my hat off to Riley Hollingsworth, K4ZDH. It's about time that the FCC appointed someone to an enforcement post who understands the problems facing Amateur Radio operators on the HF bands, and who has the courage and determination to step in and *do something!*

We are supposed to be a self-policing group, but our hands are tied without the power of law behind us. As an Official Observer, I know first-hand that "gentle reminders" to our fellow bad-apple operators don't accomplish much. In fact, the only notice of violation I have ever sent resulted in a series of threatening messages on my answering machine. I'd rather send "Good Operator" cards all day (and I do!). The good apples do outnumber the bad. So here's to Hollingsworth. Great job! Keep it up!—*Dave Sumner, KD7DS, Bullhead City, Arizona*

WE NEED MORE CONSIDERATE OPERATORS

◆ I am just a regular guy who likes to get on the air once in a while and chew the rag. I really enjoy talking to people and making contacts throughout the world, but mostly I like to talk to my Dad, KB8ZB. We chat mainly on 20 meters and use just about every mode of communication, but RTTY is one of our favorites.

On the weekend of February 20-21 the CW portion of the ARRL International DX Contest was in full swing. When I switched on the rig Sunday afternoon I wasn't surprised to hear a horde of CW signals in the 14.070-14.095 MHz segment of 20 meters where the RTTY operators hang out. It is unfortunate, but it happens and I accept it.

Rather than whine about the contest interference, I spent the afternoon puttering around the shack and listening to the CW. One operator was making a decent string of contacts when, suddenly, a powerful RTTY signal blew the poor guy out of the water. At first I assumed it was an accident, but after the fourth such blast I sat down at my computer and fired up my RTTY software to see what was going on.

I never copied so much filthy print in my

life! This guy, to put it nicely, didn't want any part of those CW <expletives> in "his" RTTY portion of the band. It was particularly disappointing to see this taking place with a mode that, like CW, is respected for its well-behaved operators.

This letter is a plea to all of you to help not only me, but every other person that decides to become an Amateur Radio operator. We *must* become more considerate of each other and understand that occasional interference comes with the ham territory. It is unreasonable to expect clear, interference-free band conditions every weekend. If a contest is making it difficult for you to operate on a particular band, try another (30, 17 and 12 meters come to mind). Indulging in hate-filled diatribes solves nothing and only inches us closer to the day when Amateur Radio is merely a fancy version of CB.—*Jeffrey R. Pender, KC0DNQ, Lake St Louis, Missouri*

CABLE LEAKAGE

◆ I am writing to express concern over the comment of William Stearns, KE4RGH, in the March 1999 "Correspondence" column ("Leaky Customers").

Mr Stearns accurately points out that the vast majority of cable system leakage comes from illegal or unkempt customer-side wiring. However, conditions on the customer side in no way absolve the cable television operator from remedial action or compliance with technical standards.

Mr Stearns indicates that customer-side leakage accounts for 95-99% of all leakage. This may be true if counted by the number of leakage cases, but not by the total amount of RF leaked. You see, cable systems typically deliver around 1000-mV p-p RF at the customer end. Do the math and you'll see that to deliver 1 V of RF to each customer, the cable operator must send the equivalent of hundreds of watts of RF down hundreds or thousands of cable drops via tens or hundreds of "distribution" amplifiers. These amplifiers are a primary source of high-level leakage and it's not uncommon for an amateur to receive interference from one at a distance of several miles. In a large cable system city portions of 75, 10, 6 and 2 meters can be rendered nearly unusable.

The level of RF leakage from the customer end is typically milliwatts while from distribution amplifiers the level can be tens of watts. I come by this information the hard way. While living in North Seattle, Washington, I experienced heavy leakage from the cable system. Their official posi-

tion was that their system was closed and therefore could not leak. After numerous calls and letter to the (now defunct) Seattle FCC Field Office and Chambers Cable of Edmonds, a crew finally came to visit and verified the problem. The cost to the cable operator was very high in this case because an unqualified technician had incorrectly installed connectors on a distribution amplifier which was then buried in concrete under a brand new sidewalk!—*James S. Kaplan, KG7FU, Eugene, Oregon*

STEREO CODE

◆ Reading the excellent “[A Binaural I-Q Receiver](#)” by Rick Campbell, KK7B, in the March *QST* reminded me of the stereo code adapter article by F. Charman, G6CJ, and R. Harris, G3OTK, in the September 1975 issue of *Radio Communication*. Their circuit is elaborate with several networks and amplifiers. Pat Hawker, G3VA, in his book *Amateur Radio Techniques* (7th edition) gives a very much simplified but somewhat less effective version by Stephen Price, G4BWE. One earphone receives a signal through a low-pass R-C network while the other receives it through a high-pass network, whose cut off frequency is a little lower than that of the low-pass network. The operator tunes the receiver so that the beat note of a desired CW signal is in the frequency range passed by both filters. The operator has the impression that, spatially, the source of the signal is straight ahead. The beat notes of interfering signals are higher or lower in frequency and are passed by only one of the filters. This gives the operator the impression that their sources are either to the right or left. Besides the difference in pitch, the spatial effect aids the operator in distinguishing the desired signal from the interfering signals—*Yardley Beers, W0JF, Boulder, Colorado*

W1AW CUTBACKS

◆ I recently discovered that, as a cost-saving measure, one of the W1AW operator positions has been eliminated at ARRL Headquarters. Weekend broadcasts were terminated as of January 1 and bulletins and code practice are now on weekdays only. That’s fine for retired people, but for those who have to work or go to school during the week, weekends are prime code practice time.

Is this the beginning of the end for on-the-air code practice? I heard a rumor that the plan is to replace it with code practice via the Internet. There are two problems with that. One is that not everyone has Internet access. The other is that copying code from a computer is different from copying over the air. One of the biggest complaints about W1AW code practice—that it suffers from interference—is actually a useful training feature!

On-the-air code practice exists for the same reasons as on-the-air QSOs. We can replace W1AW with the Internet when the

Internet replaces ham radio.—*Alan Bloom, N1AL, Santa Rosa, California*
[While it is true that W1AW has curtailed weekend activity, there are no plans to eliminate on-the-air code practice.—Ed]

ONE HAPPY DAD

◆ After being licensed for only 10 years, I’m finding that Amateur Radio has been one of the best and most fulfilling hobbies I’ve ever been a part of. It’s been an enjoyable ride that continues to offer new and exciting avenues to explore and pursue. My main interests are chasing DX and contesting, but since my two little boys have come into the Penick household, a new chapter has opened in the hobby.

Time spent in front of the radio has been somewhat reserved for late nights or early mornings when the boys (and my wife) are asleep. But when the chance came to introduce them to Amateur Radio, I was totally off guard. Last December Trevor, who is almost eight years old, was looking at the article in *QST* about Kid’s Day and asked me to explain the details. Kyle, who is five, also wanted to learn more about what big brother and Dad were talking about.

It was a dream come true! The three of us sat down and I explained Kid’s Day in terms they could understand. Although they had been somewhat interested in radio over the last year, this article seemed to open the door. Suddenly I had an attentive audience as I gave them a tour of my shack. They agreed to participate in Kid’s Day, not knowing what lay in store for them.

The big day arrived and the boys were on the air. Each son was given a chance to sit down in front of the radio with Dad as the control operator. The boys made 22 phone contacts on 20 meters that afternoon and they enjoyed every minute. They exchanged their name, location, age, favorite color and sometimes which Beanie Babies they owned.

Yes, Dad was loving the father-sons time and I was glad that the chance had finally come to expose them to the worldwide fun! I have also given them the chance to help with bulk sorting the bureau QSLs, measuring coax cables and building antennas. Maybe one day they will want to study for their license and, if they do, Dad will do his best to Elmer them. Of course, Amateur Radio is not everything to us. Fishing, playing Legos and other fun things are a must too! They are only little once and I want to look back years from now and be able to enjoy the wonderful memories.

Those of you who have children, young or old, take time out of life’s busy schedule and spend more quality time with them. Since we only go around once in this short lifetime, we should make the most of it with the ones we love.—*Chris Penick, K4PC, Boone, North Carolina*

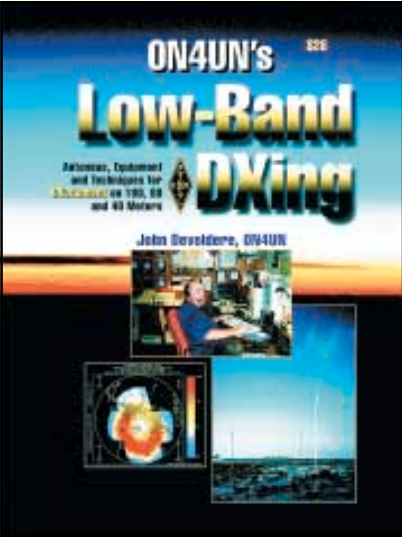
[The second *Kid’s Day of 1999* takes place on June 19. See the announcement in this issue.—Ed]

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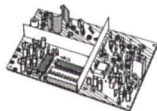
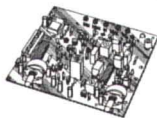
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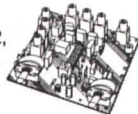
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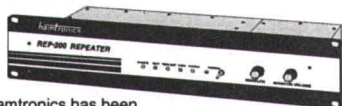
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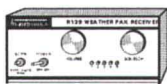
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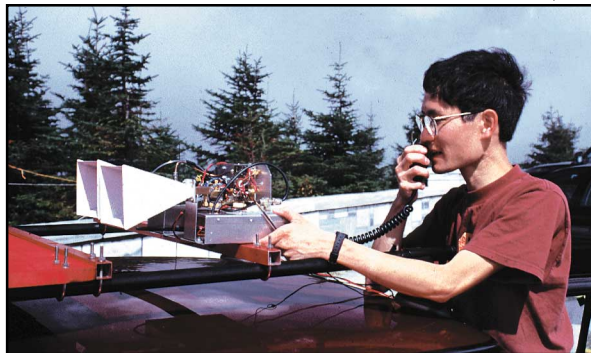
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This Month in Amateur Radio

BRUCE HERRICK, WW1M

What DX prospects await this month above 50 MHz? You're likely to find out June 12-14 during the **ARRL June VHF QSO Party!** Depending on which crystal ball you use, the forecast is calling for sporadic E openings on 6 and 2 meters, with lots of tropo on the higher bands. See the rules in your [May QST](#). And if you still can't get enough VHF action, try the **SMIRK QSO Party**, June 19-20. See "[Contest Corral](#)" in this issue.



Zack Lau, W1VT, prefers to do his microwave contesting from the summit of Vermont's Mt Equinox. There will be a lot of VHF, UHF and microwave RF in the air this month during the ARRL June VHF QSO Party.

When you think of June, think of **Field Day**. On June 26-27 thousands of hams will be operating from parks, back yards, hilltops and just about anywhere else you can imagine. It's all in the name of emergency preparedness, but it's also a heck of a lot of fun! The complete Field Day rules are in your [May QST](#).

June is *the* hot month for hamfests and conventions. On the weekend of June 4-6 you can choose from no less than four conventions around the country! They'll be celebrating in South Sioux City, Nebraska during the **Iowa State Convention**. In Rochester, New York it's the **Atlantic Division/New York State Convention** at the Monroe County Fairgrounds. If you prefer gatherings on the *Left Coast*, check out the **Northwestern Division Convention** in beautiful Seaside, Oregon. Or head south of the Mason Dixon for the **Georgia State Convention** in Atlanta.



Field Day = exhaustion? After a long night hunting contacts, Larry Shirk, AA7UA, catches up on his sleep at the K7NWS site.

At the risk of sounding like a late-night kitchen utensil commercial, we must say, "But wait! There's more!" Stick around in Georgia until the following weekend, June 11-12, and you can take in the **Georgia Section Convention** in Albany. Head to the Dallas/Fort Worth area the same weekend for the **West Gulf Division Convention** at HamCom '99 in Arlington. Or fly up to Bloomsburg, Pennsylvania on June 12 for the **Eastern Pennsylvania Section Convention**. Or zip over to Knoxville for the **Tennessee State Convention** June 13. Whew!

Or you could simply rest at home with your family and work the **Kid's Day** event on June 19. This is one of the best times to gather your children, grandchildren, nieces or nephews and create memories that will last a lifetime—and possibly create some new hams, too! See the [announcement](#) in this issue.



Lauren Ford, daughter of QST Managing Editor Steve Ford, WB8IMY, chats on 10 meters during the Kid's Day event. Gather your young ones around the radio June 19!

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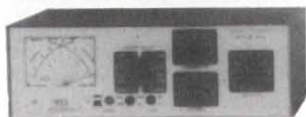
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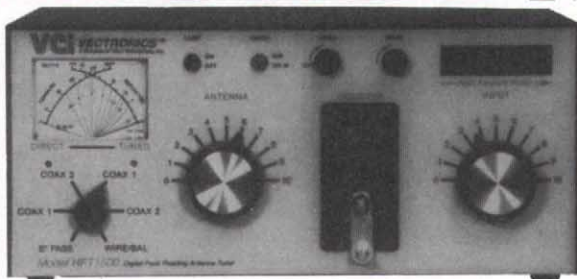
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HPF-2, \$24.95. Installs between VCR/TV and cable TV or antenna lead-in cable. Eliminates or reduces interference caused by nearby HF transmitters.

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ALL PHOTOS BY MAUREN HEEDLES

“Yeah, right. Well, we’re 30 alfa, then,” comes the somewhat unbelieving reply. It’s not the typical Field Day response, but 26 Alfa (the exchange sent by a Field Day operation with 26 transmitters) isn’t a typical Field Day exchange. Most Field Day sites (more than 80% last year) had three transmitters or less. Sites with five transmitters or less total nearly 95%.

If you’re typical, you grab a few of your friends, a couple transceivers, wire, a generator and any necessary beverages and head into the woods for a couple of days of rest and relaxation (sharpening your emergency preparedness skills in the process, perhaps).

What could possibly possess a group of otherwise stable hams to mount an effort that results in two dozen active transmitters covering dc (almost) to daylight (literally)? If you’ve ever worked one of the “double digit” sites and wondered what sort of effort is required, here’s our story.

NARC

The Nashua Area Radio Club (NARC) is a large southern New Hampshire club (150+ members) who are united by a strong desire to eat. Between Thursday night pizza and Saturday morning breakfast, there is rarely a gathering of three or more members where something isn’t consumed to stave off hunger.

In addition to a love of food, at least one member of every family group has an amateur license. These two interests come together during the annual club picnic held, coincidentally, the same weekend as Field Day.

Since 1982 the club has scored in the Field Day Top Ten 16 times. Five of those, including the last four years in a row, we’ve managed the highest score overall. Even when we aren’t high scorer, our total QSO count is frequently far greater than the number one finisher. Since 1985 the club used the call sign of Jim Belanger, N1NH. In 1998, the new club call sign, N1FD, was used. Since 1983 we’ve operated in the double-digit class, and since 1995 we’ve run 20 or more transmitters.

For the last seven years we’ve had access to 25 acres of Buzz Muzzy, KA1OMJ’s, apple orchard, pine forest and swampland in Hollis, New Hampshire. In the allotted 24-

hour setup period prior to the actual start of Field Day ’98, the club brought in and erected a 100-foot tower, two 70-foot towers and a 50-foot Novice tower.

The 70-footers were populated with multiple HF and VHF beams ranging from two elements at 40 meters to 13 elements at 2 meters and 900 MHz. The 100-footer ran stacked beams on 40 and 20 meters. VHF/UHF verticals adorned the tops and sides of the towers as HF dipoles and slopers sprouted from the trees. Tents, pop-up campers and RVs were brought in to house all the equipment.

A power grid ran from the generator area to each of the towers, the satellite station, the ATV station and the kitchen area (of course!). Tower lighting, sanitary facilities and a dining/lounging area (next to the kitchen) completed preparations. By 1800 UTC Saturday, all was ready. The local noise floor jumped as more than 2 kilowatts (total) of RF energy poured skyward.

For the 24 hours after assembly, the setup crews took a well-earned rest as the operators pounded keys and shouted themselves hoarse. The constant drone of the 6500-W generator was always audible. At 2 PM EDT Sunday, the generator finally fell silent as bleary-eyed operators and loggers staggered from their caves into the daylight. The rested (hopefully) setup crews started tearing it all down. Eight hours later, the area was devoid of man-made items. Trampled grass and tire tracks were the only signs of human occupancy.

Why we do it

Why? Why *not*? Here are the high points:

Ever dreamed of running a Ringling Brothers-size Field Day extravaganza?

This group of New Hampshire hams has been perfecting its multiple big-top circus for many years. Here are some thoughts on staging your own “greatest (ham) show on earth!”

Fun—The single biggest reason we do it is fun and exhilaration. It's the biggest club social event of the year, eclipsing even the Christmas party, and it gets more of the membership together than at any other activity. Don, W1GUU, has made the trip from Maryland since 1986 just to be in on the festivities.

Emergency Preparedness—The avowed purpose of Field Day runs a close second. Whether you think Field Day is an emergency preparedness exercise disguised as a contest, or a contest disguised as an emergency preparedness exercise, most participants recognize the invaluable and life-saving services provided by amateurs in times of need. The ability to assemble a massive communications facility in less than 24 hours could help save hundreds or thousands of lives if "the big one" hits New England. A two-tower, six-transmitter station covering HF, VHF and UHF could be on the air within six hours.

Food—As I previously hinted, the Nashua Area Radio Club has often been described as an *eating club* made up of licensed amateurs—and Field Day without "field ranges" would be lightly attended. The fare isn't fancy, but it is good. Hamburgers, hot dogs, chicken, ham, pasta, chili, pancakes, salads and dozens of home-baked goods make up the menu. Three meals are served at the "infrared" station: Saturday lunch, Saturday dinner and Sunday lunch. Friday's dinner is held at a local restaurant (Field Day kitchen and dining facilities aren't set up yet).

Fun—Did we mention that the fun is also open to the public and nonmembers? One year, a ham who's on the road a lot and rarely gets to participate in Field Day was in the area and just had to see our site. He parked his 18-wheeler in the apple orchard and was a guest op through the night.

How we do it

The question most hams ask when they hear about our setup is, "How do you manage that?" The answer is *volume, volume and volume*. A lot of people, a lot of equipment and a lot of effort are required.

People are the most important ingredient. Without a large group of dedicated individuals we wouldn't help in a disaster—we'd be a disaster. More than 100 people—licensed and unlicensed, club members and nonmembers, young and old, friends, family and newcomers—all help make a successful 26 Alfa station. Participants take on as much or as little as they want. A large club membership makes it easier to find people to plan, set up, operate and tear down.

Planning makes the difference between a well-run Field Day operation and a madhouse. Our first planning meeting for Field Day 1998 took place in July of 1997. Lessons learned from Field Day 1997 were written down in an effort to improve things the following year. We then had an eight-month break, which ended when the planning began in earnest in April.

You don't have to be in the Army to realize the importance of having a chain of command. We have our Commander-in-Chief, whom we call the "Incident Commander" out



An aerial view of the site on Saturday morning. With only a few hours to go, nearly every station was ready.

of respect to our emergency preparedness theme! He or she is also referred to as the "Stuckee." The Stuckee is the primary coordinator for planning and execution, and the final authority on any questions that can't be resolved logically. The IC's largest task is delegation. There's too much for one person to handle; only by having reliable support people does the job become manageable.

The "Co-Incident Commander" acts as backup and trains for the moment when the Incident Commander says, "I've had enough!" There are multiple "Station Masters," one for each major band/station. The Station Masters are responsible for making sure that enough stuff—people, equipment, shelter and whatever—is on hand to operate their station for the duration of the event.

Two Station Masters deserve special mention. The Master of the "infrared" station handles all the cooking chores, making sure

we all have enough to eat. The Master of the 5-megameter station also performs a critical function by supplying 60-Hz power to within 50 feet of every station (except the natural power station!). The last 50 feet is the responsibility of the respective Station Master.

And there are still more positions. Lead climbers and ground crew chiefs are needed for each tower. A computer Station Master makes sure that the ops using computer loggers have their machines up and running by 2 PM Saturday. Signs need to be made providing directions to the site. The public information booth needs to be staffed and the guest book maintained. The list goes on!

Safety

Safety is a boring topic perhaps, but human beings break easily. Confusion or carelessness can get someone killed. With four towers to erect, 6 kW of power grid to lay



Ed, K2TE, hunts signals on 80-meter CW.



With an operation this size, you need signage to direct visitors and regular participants, too!

down and numerous vehicles moving around on appointed tasks, the hazards are very real. We have a number of hard and fast rules:

Prohibition—Absolutely no alcohol is consumed on the site during setup and tear-down. No one who has been drinking in the past eight hours is allowed to participate in these tasks.

Hard Hats—Unless you're an actual tower climber, if you're within the circle made by a tower's guy wires you wear a hard hat. If you doubt that a hard hat is necessary, check with Fletch, N1MEO. His hard hat has a bulls-eye painted on the top. It commemorates the time a steel wrench *didn't* bounce off his head.

Crew Rest—No one is allowed to work when they're exhausted. This mainly translates to, "If you operated through the night, you don't tear down," but any task that requires alertness carries the same restriction.

Besides the ground rules, old hands keep an eye on inexperienced members and provide valuable "on the job training" throughout the weekend. Everyone, new and old alike, is also expected to be aware of what's going on around them and to ask questions if something seems amiss.

One of the standard pre-Field Day activities is "Tower School." The first or second weekend in June, Sterling, AK1K, holds a class on how to safely work around towers. This is a must for any inexperienced club member who wants to climb. Sterling covers the basics of climbing, gin pole usage, guy wire handling and more.

Execution

Before the actual work starts, there's food. At noon on Friday people gather at the local pizza and sub shop. The usual lunch crowd is overwhelmed by 40 hams in jeans and fatigues. As folks mill around, the final crew assignments are made. Towers 1 and 3 are erected first. A large klaxon is used to signal important events: Start of Field Day setup, start of on-air activities, end of on-air activities and, of course, meals!

Friday Activities

Once the starting siren sounds, a flurry of activity begins. There is a lot to do in the next 24 hours before we start operating. The goals for Friday include erecting all towers and most antennas; setting up the kitchen and dining area, campers, field ranges and seating; laying down the initial power grid; establishing sanitary facilities and more.

Once towers one and three reach their final heights of 70 and 100 feet, the climbers are relieved. We've found over the years that using one set of climbers to erect the tower, and a second set to install the antennas is the safest, most efficient method. The climbers from Tower 1 rest until one of the gin poles

becomes available. At that point they'll erect Tower 2. The climbers from Tower 3 rest and support the ground crew if they have any strength left (they climbed up and down the tower at the 30, 60, and 90-foot levels).

While the towers are being built, antennas are being assembled on the ground. All antennas are stored partially or fully disassembled. All elements and boom parts are secured with electrical tape (done during last year's teardown) to keep them together. Elements are labeled with indelible markers indicating driven element, reflector, director 1, 2, 3, etc. Booms are marked where each element is secured. Where elements and booms are disassembled, marks are made indicating how far telescoping segments should be inserted. The band segment (CW or SSB) is also marked on the boom to prevent antennas from winding up at the wrong tower.

As the antennas and towers are being raised, the kitchen and dining area is assembled. This includes a camper for food storage, World War II army field ranges, coolers, awnings (it always rains!) and tables and chairs to serve the one hundred or so people who will be eating. The "infrared" station is *critically important*!

Over the years the club has acquired various lengths of number 8 and number 10 wire from local junkyards. We also own a 6.5-kW Honda generator, purchased through fundraising activities, for emergency use. Because we make full use of the 1000-foot Field Day circle, we have some long wire runs from the generator. The 5-megameter station is located as close to the center to the circle as possible. It's also kept away from any other groups of people and equipment. Fire extinguishers are placed within easy reach.

To minimize resistive losses and to balance the load on the generator, 240 V is distributed to towers 1, 2, 3, and the kitchen. Heavy-duty, extreme isolation 5-kW step-down transformers are used at each location to provide the required 120 V. A smaller 1.5-kW transformer is used to power the Novice station.

By the time it gets dark (around 9 PM), people are tired and hungry. Usually, about 30 or 40 of us meet at a local restaurant for a late dinner. Had this been a real emergency this would probably not be an option, but where there's food....

Saturday Activities

Saturday morning is a very busy. The setup crew handles everything planned for Saturday morning, plus anything that didn't get done on Friday. Then there's Murphy. Despite preparation and pre-Field Day check-out, things break and things are forgotten.

Saturday's goals include installing any remaining antennas and feed lines; finishing the power distribution grid (generator start-up is set for 11 AM); putting up signs and the information booth; and setting up stations, computers and accessories.

At this time the circle becomes crowded. The number of people on-site climbs to its peak of 100+ as the operators and Station Masters arrive and begin setting up. The



The cool, shady comfort of the 20/40-meter CW tent at the base of tower #1.



A top-notch Field Day crew must be well fed. Active operators and loggers come first!



Incident Central. Fletcher, N1MEO (left) and the author (right) collect updated scores for posting on the Web.

major HF stations get RF filters (see “Inexpensive Interference Filters” by Alan Bloom, N1AL, June 1994 *QST* pages 32-36). Eleven multiband units were built by the club for Field Day.

Logging computers are distributed to the major stations, both HF and VHF/UHF. K1EA’s *CT* is our logging software of choice. Although the club’s hardcore contesters bring their own computers with *CT* already loaded, most ops do not. Between 11 AM and 2 PM, almost a dozen portables, laptops and desktop units are configured to run a Field Day-only version of *CT*. Except for a few isolated systems (20 and 40 meters, located in the same tent), none of the computers are networked.

At Noon, the two-hour warning siren goes off. This is also known as the “lunch siren”! Folks head to the kitchen area to sit and eat (if things are going well), or to grab a burger and run (otherwise). Finally, always sooner rather than later, the starting klaxon sounds and the noise floor jumps, as more than a dozen transmitters fire up.

All major stations have operators and loggers. Headphones wired in parallel allow the teams to hear the receiver audio. The less-active stations usually have a single operator who performs both functions.

During the 24 operating hours, the “on-duty” operators and loggers are VIPs. Periodically, runners make passes through all stations to check on operator needs. Food, drink and aspirin are brought as requested. If an operator chooses to take a break and wander down to the kitchen, he or she goes to the head of the food line. Scores are collected every few hours and posted at the dining area and on the club’s Web site (<http://www.n1fd.org>).

Sunday Activities

Sunday morning is actually “really, really late Saturday night” for the ops and loggers. A hearty breakfast is served to energize everyone for the remaining hours of the event.

The goals for Sunday afternoon include

making as many contacts as possible; collecting and packing stuff that’s no longer needed; rounding up logs, paper and electronic; tearing everything down and putting it all away (ready for next year or an emergency!).

What takes 24 hours to put up comes down in less than eight—even when adhering to safety protocols. Getting it all cleaned up by dark isn’t a requirement, but experience has shown that what isn’t done on Sunday takes weeks to complete. Anyone who



At the end of a successful Field Day operation, someone has to take down the towers. Jack, WB4MDC, is supervising the teardown of Tower 3.

operated through the night isn’t allowed to climb or participate in any potentially hazardous activity.

Throughout the morning, the cleanup begins. The 160-meter stations are history soon after sunrise. Towers are torn down in reverse order. On those rare occasions when there are excess climbers, a head start can be made on antenna removal and disassembly. Traditionally it’s tough to find enough people to clean it all up. Usually, a dozen or two die-hards stick it out to the end. Fortunately, they all forget their annoyances by the time next year rolls around.

Wrap-Up

As with many things in life, it isn’t over until the paperwork’s done. In the weeks following Field Day the logs are merged, bonus points are collected and the first Field Day meeting for next year is held. This is really a postmortem of the present effort, where lessons learned can be written down and put to good use the following year.

I hope that this article provided some insight into how to manage a major Field Day effort. If you scoff that this sort of effort isn’t in the spirit of emergency preparedness, consider this:

- We actively plan what to do and how to do it for more than a third of the year.
- A large pool of skilled people is available to set up towers, assemble stations, erect antennas, coordinate dining and support facilities and move people around the site.
- We’ve trained in sun, wind and rain.
- All the major equipment and more than half of the antennas are club-owned. They’re stored and available at a moment’s notice.

If this isn’t emergency preparedness, what is?

If the Big One hits New Hampshire (that means 6.1 on the Richter Scale for you folks on the Left Coast), we’ll be ready and able to do our part.

You can contact the author at 6 Birch Dr, Amherst, NH 03031-1807; wwly@arrl.net.

QST

Kid's Day—June 1999!

What does your daughter, son, grandchild, nephew, niece and the kid next door think about ham radio? If they consider it at all, do they think it's something totally foreign to their experience, an "adult" activity forbidden to anyone under the age of 50?

Hams are fond of wringing their hands over the failure to attract young people into our hobby. Your chance to actually *do something* about it is coming up in a matter of weeks. It's easy, doesn't require much time to set up, and you don't have to learn anything new. Just invite a kid to visit your ham shack for 15 minutes or more to talk to other kids who've been invited to do the same thing.

The event that is designed to handle this fun on-the-air kid exchange is called Kid's Day, and it has become tremendously popular. The Boring (Oregon) Amateur Radio Club started the event a few years ago, and members asked the ARRL to assist with sponsorship in 1999.

Participants can make one QSO or as many as possible during the six-hour activity—and some kids report hundreds! Let the youths decide whether they want to make one contact, or continue on; don't push them. The exchange is simple (see the "Kid's Day Rules" sidebar): name, age, location and favorite color. Friendly ragchews rule the day; Kid's Day isn't a contest. Let the kids ask whatever questions pop in their heads. With children you must be patient and willing to overlook what you might consider to be gross operating gaffs. Resist the urge to correct them, or say "ya gotta do it this way." Just be the control op, and make sure you or they ID at the proper time. Follow third-party traffic rules for DX QSOs.

If a youth is already licensed and doesn't need your assistance, that's great. He or she may not have HF privileges, and might be thrilled to operate your station with bigger antennas and power. Again, just be the control op.

A kid's attention may dissipate after

about 20 minutes. If no one answers the kids' CQs, they won't want to call for very long. Don't show your disappointment. Tell them you'll listen for a while longer, and call them again when things pick up. Even if they only make one QSO, they'll remember that they had a nice time with a ham who's interested enough in them to invite them to take part. That's what counts.

Set aside a short period of time on June 19 and invite a kid over to talk on your radio. This is one of the best investments you can make in the future of our hobby. If nothing else, get on the air and talk to the Kid's Day junior ops yourself. Be friendly and ask the kids about familiar things—pets, number of sisters and brothers, favorite sports or the weather. The warmth and interest that you display on June 19 will pay dividends in years to come!

Kid's Day Soapbox

This was our first attempt at Kid's Day after my son Corey completed only a half QSO two years ago. This time was a big hit, with Corey and my daughter Emma taking turns at the mike—21 QSOs (12 states, 2 countries) and lots of fun. We had a big pileup the whole time! Everyone wanted to talk to Emma, age 4, who did quite well—the "repeat after me" mode worked.—*Emma, Corey and Stuart Santelmann, KC1F*

The guys (both age 15) really had a good time, but they wanted to operate at the same time. They are built like football players and there should be no wrestling in the shack, so I'll have to try two radios next time. Got some wonderful video of them operating.—*Justin, Adam and Ralph Bellas, K9ZO*

Only made three contacts, but we had fun! Future plans include: getting QSL cards for the QSOs, getting the certificate, making a



Use your radio skills to plant seeds of curiosity.

Lowell Silver, KD7DQO, works Kid's Day on 10 meters from the station of his father, Ward Silver, N0AX.



Marissa and Andrew Katz, ages 8 and 11, really enjoyed Kid's Day. "We all had lots of fun!" says Dad, Steven Katz, N4KTZ.

poster to show Jennifer's first-grade class, and maybe operating Field Day style from her school so some other kids can participate!—*Jennifer and Jim Walroth, N3AWS*
My grandson and I enjoyed it immensely.—*Ricky Knapp and David Fisher, KA2CYN*

Another great Kid's Day! Natalie remembered last year's contact with Elissa—Natalie just upgraded from Novice to Tech Plus, and maybe next year can be control op for Rebecca. This year Rebecca felt bolder and made some contacts of her own. (We had a couple of wrestling matches over control of the microphone). Alas, the girls craved each other's company more than fame, glory or points, and after an hour they declared that they'd had enough fun on the radio.—*Rebecca, Natalie, KC7FWM, and Linda Reichert, N7LR*

What a delight. What I thought would be a 20-minute, attention-span-limited affair turned into a 3½-hour marathon! We'll be looking forward to the event in June!—*Aaron and Steve Lympany, WA3TMR*

I read about Kid's Day in January '98 *QST*. It seemed like a great way to introduce my kids, Sarah and Anna, to radio. We invited cousins Cyndi, Mike and Josh, and a co-worker and his twin daughters, Sasha and Sonya. In the beginning, I was the only one excited about the contest. My kids were excited about the visit by their cousins, who had decided it was probably going to be boring, and did not plan to stay long. Boy, were they wrong! We all had a great time making QSOs and meeting folks around the country. I had to shut the radio off to get them to break for lunch. Every time we tried to walk away, someone would call us. There was rarely any quiet time. When it was over, the older three voiced interest in getting their licenses, and wanted to know when they could do this again. I am still excited; it was a great experience sharing my shack with the kids!—*the kids and Mark Trevisiol, N7EAT*

Maria, age 9, made 68 contacts and reported that "this is more fun than trick or treat." Look for her in the June contest with her own call.—*Maria and Nick Critelli, K0PCG*

This event produced results at our household. After the January 98 Kid's Day, my then 7-year-old wanted to get her ham license, and in April, earned her Novice (KB3CLQ). Sara is most active on 10-meter SSB and has worked all states and 100+ countries. This Kid's Day was fun to watch because Sara was the control op when 5-year-old brother Mark made QSOs with her call.—*Rick Saeger, K3OO*

Initially my daughters weren't all that interested in the event, but the weather turned nasty and it was easy to convince them to try it. They had a good time, almost against their will. Next June the girls will invite friends over!—*Kim, Becky and Rick Reneau, KB9NDF*

We were snowed in—my youngest daughter, Charlyn, KB9JIZ, with two of her cousins, Dan and Laura. They put her call sign on the air for about an hour. It was the cousins' first exposure to the hobby. After the first two contacts, Laura (8), wanted to do the CQing.—*the kids and Jim Funk, N9JF*

Kid's Day Rules

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

Date: June 19, 1999.

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

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

Suggested Frequencies: 28350 to 28400 kHz and 14270 to 14300 kHz.

Be sure to observe third-party traffic restrictions when making DX QSOs.

Reporting: Logs and comments may be posted via the Internet to kids@contesting.com. You may review these postings at <http://www.contesting.com/kids/>.

Those with photos or without Internet access may forward items to the Boring Amateur Radio Club. A summary of the postings will also be sent with your participation certificate.

Awards: All participants are eligible to receive a colorful certificate. Send a 9x12 SASE to the Boring Amateur Radio Club, PO Box 1357, Boring, OR 97009. More details may be obtained from the Boring Amateur Radio Club at the above address or on the Web at <http://www.jzap.com/k7rat/>.

Lowell just got his license, KD7DQO, on December 23, and this was his first solo flight. He made 40 QSOs and had a good time. You will hear him helping me with a multi-entry in the NAQP SSB contest.—*Ward Silver, N0AX*

By the end of the event, Becky (age 5) and I were fighting over the transmitter's foot switch! Jim (age 13) was just as interested in operating, but a speech impediment related to his Downs Syndrome made it a little difficult. With a little coaching, Jim did have four really nice QSOs. He had an ear-to-ear smile when his turn was done!—*Becky, Jim and Dan Reese, N9XX*

My wife and I have no children, but I wanted to participate, so I set up the radio outside in my motor home. I called a few neighbors, and invited them to bring their children to speak with other kids over my radio. David (age 8) and his dad Richard showed up, and we heard Lorin calling "CQ Kid's Day." I answered his call and handed the mike to David to exchange favorite colors and ages, and tell about the ice storm we were having. Then Jennifer (age 11) and her sister (age 9) showed up, and also spoke with Lorin. Jessie (age 14) came by, and he spoke with Nicki in Indiana. Then I heard W5RRR (the Johnson Space Center ham club call) clearing with another young person, and he returned my call! We spoke to

Kent, who told Jessie about the SAREX program, and how they licensed astronauts at their club. All the kids, young and old alike, sure had a great time!—*the kids and Al Lark, KD4SFF (age: young at heart)*

What a great event! Activity was noticeably up from the last three times. Hope everyone had a good time and see you next time!—*Jason Goldsberry, N5NU (age 15)*

Matthew, age 10, comments: "More Radio!" We were amazed at the number of kid ops and the pileups they generated. Matt likes Nintendo, model rockets, baseball and cartoons. He hopes to get his Technician license soon, and one of those little shirt-pocket 2-meter radios.—*James Kaplan, KG7FU*

Katie was probably one of the oldest ones participating (age 16), but she had fun. It pushed her over the brink; I noticed later that she was reading one of my *ARRL License Manuals*.—*Katie and Bob Wood, W7OAD*

Ken, K5KA, and I left two local boys with a day they'll remember forever. You should have seen their faces when they heard crystal-clear voices from Fairbanks, Japan, Brazil and Australia. One of them, Kyle, is a Tech who left with a keyer on loan. He'll be back. The other, Wes, when asked by an OT about getting his own license, blurted out without any previous discussion, "As soon as possible!" His grandpa was a ham and everyone thinks gramma still has the radios somewhere. We'll find them and put him up a wire. It was enough to bring a tear to the eyes of this OT.—*Mark Beckwith, N5OT*

Kid's Day with my daughter Chelsea, age 9, was very enjoyable. After starting off with a case of mike fright that was quickly overcome, she had a great time. She pointed out that we must upgrade the antennas because we weren't being heard in the pileups with a broken triband beam, 10-meter vertical and 100 W. Yes, there were Kid's Day pileups; a sight to behold! We will not miss the chance to be on again in June! Hats off to the Boring ARC!—*Chelsea and Jon Andrews, K1IMD*

This was the first time on the air for my two oldest daughters, Kelly (16) and Cassie (8). Cassie enjoyed a long QSO with Bridget, AB8CD. Kelly liked calling CQ. I've been inactive for years, but this event was the impetus to get my station back on the air.—*Kelly, Cassie and Stu Benner, WD8EGW*

Heather, age 10, worked the contest from her grandfather's station. Not too many contacts but a lot of fun. Heather wants to become a ham now.—*Joe Smith, K14DG*

Kid's Day was probably the most fun I've had with radio in a long time! Anyone with a kid around age 9 who would like a sked with my daughter, drop us an e-mail (kt4md@gte.net). Emily will be happy to meet you on the air!—*Carl Pitts, KT4MD*

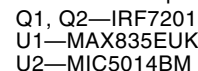
QST



When Hurricane Georges came through in 1998, my friend, Dave, N0LSK, had left his boat at a marina in the Keys. Although he had the boat tied up well, he forgot that his refrigerator shifts to battery power if the ac-line power is lost. When he returned to the boat after the storm, his boat was okay, but its battery was dead. With the switch about to be described, Dave wouldn't have lost his expensive battery.

Figure 12 is a schematic of the switch. When V_{CC} drops below 12 V, and the voltage at U1 pin 4 goes below 1.2 V. That causes the output voltage on pin 5 to drop from about 5 V to 0 V. Pin 2 of U2, an MIC5014, accepts a logic-level signal and uses it to control an on-board charge pump. Q1 and Q2 are N-channel MOSFETs used as a 10 A high-side switch. (See the sidebar “[Selecting a MOSFET for Power Control](#).”) To turn the switch on, the gate must be at least 10 V above the source voltage (5 V for logic-level MOSFETs). That means you need 22 V to turn on the switch. This voltage is supplied by the charge pump in U2. U2 also acts as a buffer for U1, which cannot operate at 12 V. R1 through R4 provide a nominal 5 V power source for U1 and provide the voltage-level input signal to pin 4 of U1. Pull-down resis-

will use a variety of values for R1 to R4. Here's how I selected my values: U1 can operate with voltages of 2.5 to 11 V, so the R1-R4 divider must keep the voltage at pin 3 in this range as V_{CC} changes. The maximum V_{CC} I ever expected to encounter was 15 V, and the least, 11 V. U1 draws 2 μ A,



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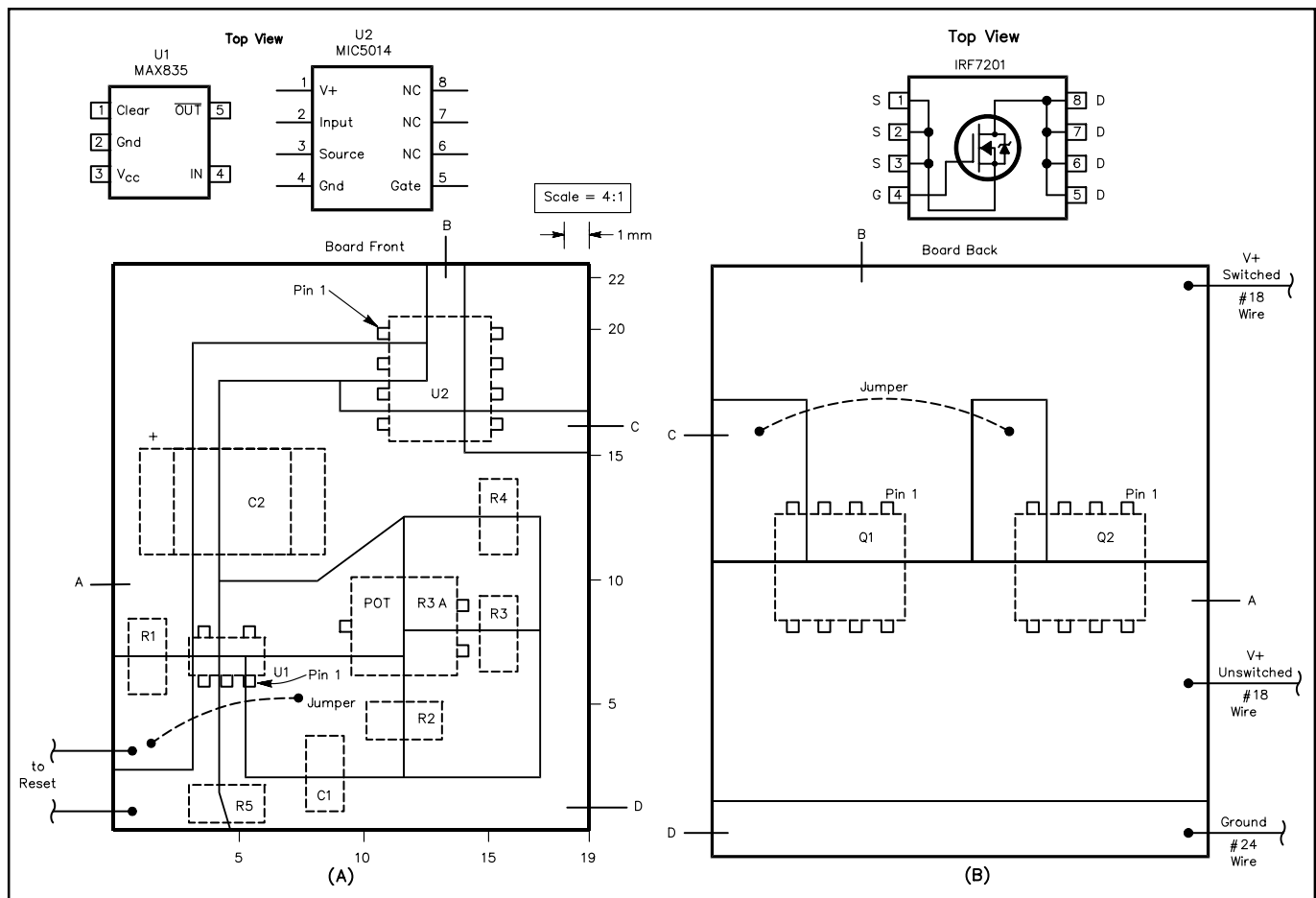


Figure 13—Part placement for the PC-board top (A) and back sides (B), respectively.

so to keep a stiff supply, I wanted the current through the voltage divider to be at least 200 μ A. This calls for a total resistance of not more than 50 k Ω . As current drain is not important, I decided to use a total resistance of about 20 k Ω . Using an Excel spreadsheet, I calculated the values shown. The voltage on pin 3 is 5.3 V for V_{CC} of 15 V, and 3.8 V for V_{CC} of 11 V. I used four fixed-value resistors and a SM potentiometer (R3B) in parallel with R3 to allow better control when setting the trip level at 12.0 V. You can run U1 at a lower voltage, but keep in mind that U2 needs at least 2 V to trigger it.

This basic circuit can be optimized for other uses. To handle more current, you need only replace the MOSFET with a more-robust one. I use an IRFZ46 and a heat sink with my ICOM IC-735. If you want to control a low-voltage NiCd-powered circuit, you could use U1 alone, connecting it directly to a logic level *low-side* N-channel MOSFET. In that case, increase the resistances of R1 to R4 for minimum current drain.

The Technology

There is a lot of new technology in this simple circuit. The entire project—including the 10 A MOSFET switch—is on a PC

board smaller than the MAX8211 project. Because the quiescent current of U1 is only 2 μ A—and it has a wide operating-voltage range (2.7 to 11 V)—it's possible to power it from a resistive divider rather than a 5 V regulator. U2 is a single-chip charge pump that requires no external parts. Like U1, it can operate over a wide voltage range (2.75 to 30 V) and draws only a few microamperes. U2 is designed to let low-level signals control high-voltage and high-current circuits through low resistance *N-channel* MOSFETs used on the *high side*. This arrangement is important for at least two reasons: High-side switches are usually needed with Amateur Radio applications because there is almost always more than one path to ground: the antenna, keyer, computer etc. A low-side switch would force the current to go through one of those connections rather than shutting off the rig. Second, N-channel MOSFETs have much lower resistance than equivalent P-channel MOSFETs (typically, 2.5 times less²⁰). This permits the use of smaller MOSFETs for a given current.

MOSFET technology has advanced dramatically. The circuit shown uses two small SO-8 MOSFETs in parallel to control the power to my Kenwood TM-241, which draws a maximum of 11 A on high power.

The two MOSFETs in parallel have an *on* resistance of only 15 m Ω (milliohms). The voltage drop across the plug connections and fuses is greater than the drop across the MOSFET! Unlike power transistors, no equalization resistors are needed when paralleling MOSFETs. That's because MOSFET *on* resistance increases with temperature, so they tend to be self-equalizing. MOSFETs make better circuit breakers than fuses or relays because they have no moving parts, are resettable, do not arc or bounce, emit less EMI and are much faster than relays or fuses. The latter can be important in an overcurrent situation. Typical MOSFET shut-down time is less than a microsecond (excluding circuit delays). The blow time on a fast-acting fuse is usually longer than 1000 μ s.

U1 and U2 have families. U1 has a push-pull output; the output is internally held at either 0 or V_{CC} . The other version (MAX834) has an open-drain output that requires a pull-up resistor to provide the logic-high output. This is a common family in the SM world. One advantage of the open-drain output is that you can control a circuit with a voltage level different than the V_{CC} of the IC itself. U2's brother is the MIC5015, which operates exactly like the

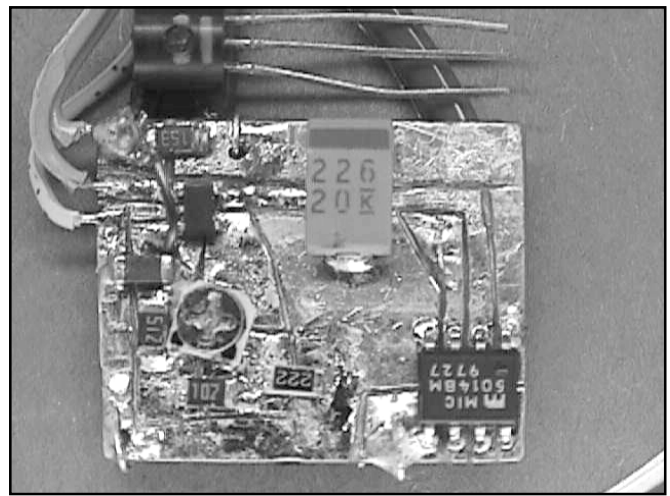
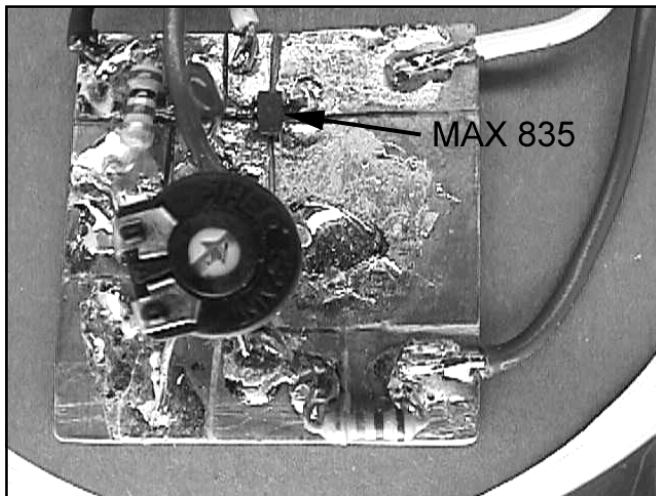


Figure 14—Close-up views of the low-voltage battery-protection switch using a Maxim MAX835 SM IC. At A (left) is a trial board made using the MAX835 and non-SM parts. The MAX835 can be seen above the large pot and to the right of the $\frac{1}{4}$ -W resistor. At B (right) is the top side of a PC board made using the hobby tool and all SM parts. The MAX835 is above the SM pot and to the left of the tantalum capacitor. The board size can be compared to the TO-92 case transistor above it. The MIC5014 is at the bottom right of the board. The SM MOSFETs are on the bottom side of the board and not shown.

'5014, but 0 V at the input turns it on, and a high level turns it off.

Making the PC Board

Figures 13A and B show the part placement for the top and back sides of the PC board for this project.²¹ Before I made the all-SM version (shown in Figure 14B), I built a quick-and-dirty prototype using two PC boards. Except for the ICs, I used all standard-size leaded parts (one side of one of these boards is shown in Figure 14A), so the only critical cutting area was around the IC; all the rest was old-fashioned pad construction such as used in Project 0A. If you want to use an SM-only IC but don't need small size, this is an easy way to do it. You can also add solid wires as leads from the board and plug the entire circuit into a protoboard to use the subcircuit in a larger through-hole circuit. If you realize that SM projects needn't require *only* SM devices, experimentation becomes easier.

Once more, four jumpers (A, B, C and D) make connections between the top and bottom sides of the board where necessary. Because the board has parts on both sides, soldering is a little trickier than dealing with a board with parts mounted only on one side. Once you solder parts to one side of the board and turn the board over to solder the backside parts, it won't lie flat. Here's where a small vise can help by holding the board steady. I place parts on the more-congested side first. It isn't difficult to use the two SO-8 chips because they are so large; soldering SOT-23 packages would be more of a challenge.

Tune In Again

Before we wrap up this series next month, we'll look at a project with a large number of small parts mounted on both sides of the board. This project is one you can use as an appeasement gift to your

Selecting A MOSFET for Power Control

The MIC5014 can drive just about any N-channel MOSFET. Which MOSFET you use depends on your current load. My circuit uses two small SO-8 MOSFETs in parallel. Although the specs show the maximum current for each as 7 A, a check of the I^2R (power) loss and thermal resistance shows that 4 or 5 A is a more reasonable amount when the chip is mounted on a small PC board. Using two MOSFETs in parallel, the circuit has no problem passing 10 A continuously. When selecting a different MOSFET, *calculate its heat loss* and don't be fooled by the maximum-current figure which—for nonsurface-mounted MOSFETs—is achievable only with a perfect heat sink.

The data sheets give the thermal resistance as temperature rise per watt of heat dissipated in the MOSFET ($^{\circ}\text{C}/\text{W}$). For surface-mount MOSFETs, the data sheet gives a single number: junction-to-ambient thermal resistance. For the IRF7201 used in the project, that is $50^{\circ}\text{C}/\text{W}$. At 10 A total, each MOSFET carries 5 A, and the I^2R loss is $25 \times 0.030 = 0.75 \text{ W}$, giving a temperature rise of 37.5°C (100°F) above room temperature.

For nonSMT MOSFETs, the junction-to-ambient figure applies *only* if you are *not* using a heat sink. To gain the most from the MOSFET, you need to use a heat sink. In this case, you can determine the thermal resistance by adding the thermal resistances of the junction to case, the case to sink and the sink to ambient, which depends on the heat sink used. (This is just like electrical circuits: Resistances in series are added.) When in doubt, try a heat sink and see if things get hot. If so, use a larger heat sink, or add another MOSFET in parallel to reduce the current through each one.*—Sam Ulbing, N4UUAU

*If you want to use a junk-box MOSFET, be sure to check its *on* resistance as it will probably be much higher than those of the MOSFETs I am using. The IRF510, a common MOSFET in a TO-220 package, has an *on* resistance of 0.54Ω . Even with a rather large heat sink, the *maximum* current it can pass is about 4 A.

loved ones for spending so much time at the workbench!

Notes

¹⁸Parts 1 and 2 of this series appear in the April and May 1999 issues of QST, pages 33-39 and 48-50, respectively.


¹⁹Donald G. Varner, WB3ECH, "A Battery-Voltage Indicator," QST, October 1998, pp 50-51.

²⁰Micrel Applications Note 5 (Micrel, 1849 Fortune Dr, San Jose, CA 95131; tel 408-944-0800; <http://www.micrel.com>).

²¹If you are interested in learning to make your own boards as described in this series, I have a limited number of parts kits available. Each consists of a 3×6 -inch double-sided, copper-clad board, eight cut-off wheels (two 0.005 inch, four 0.009 inch and two 0.025 inch) and the special mandrel recommended

for use with the ultra-fine cut-off wheels. Order from Sam Ulbing, N4UUAU, 5200 NW 43rd St, Suite 102-177, Gainesville, FL 32606; n4uau@afn.org. Price \$13. (Florida residents must add sales tax). For orders outside the US, please add \$3 for shipping.

A limited number of parts kits for Project 3 are available from me for \$12 without a PC board. If you want a premade PC board, add \$1.50. (Florida residents add sales tax). The kit includes only one IRF7201 MOSFET. If you want to parallel more MOSFETs or try an IRFZ46, Digi-Key, Newark and other suppliers carry those parts.

You can contact Sam Ulbing, N4UUAU, at 5200 NW 43rd St, Suite 102-177, Gainesville, FL 32606; n4uau@afn.org. 

A Doppler Radio-Direction Finder

Part 2—In this installment, I'll discuss the antenna switcher, construction of the PC boards, calibration and checkout.

Construction data is supplied for using the unit on three bands.⁷

Antenna Switcher

Figure 4 is the antenna-switcher schematic. Antenna 1 is selected when +5 V is applied to J1 pin 1. Current flows through RF choke L5, D11, D7 and RF choke L1 to ground. This current forward biases diodes D11 and D7, increasing their junction capacitance. The high junction capacitance (low reactance) allows RF signals present on antenna 1 to pass easily through D7, the 12-

inch-long coaxial line, D11, C49 and on through the line to the FM receiver. C49 is a dc blocking capacitor.

J1 pins 2, 3 and 4 remain at 0 V dc while antenna 1 is selected. Without forward bias, D8, D9 and D10 exhibit very low junction capacitance and effectively isolate antennas 2, 3, and 4 from the circuit. Thus, D7 through D14 function as RF switches. They are considered closed when forward biased and open without forward bias. Emulating a spinning antenna in the pattern of antenna 1, 2, 3,

4, 1 is achieved simply by applying 5 V dc sequentially to pins 1, 2, 3, 4, 1.

It is absolutely essential that all unselected antennas be isolated from the circuit and circuit ground. Grounding unselected antennas has the undesired effect of adding parasitic antenna elements, which could distort the received-signal direction indication.

ECG-555 or MPN3404 PIN diodes are usually recommended for switching diodes D7 through D14. However, they are expensive compared to ordinary 1N4148 switch-

⁷Notes appear on page 40.

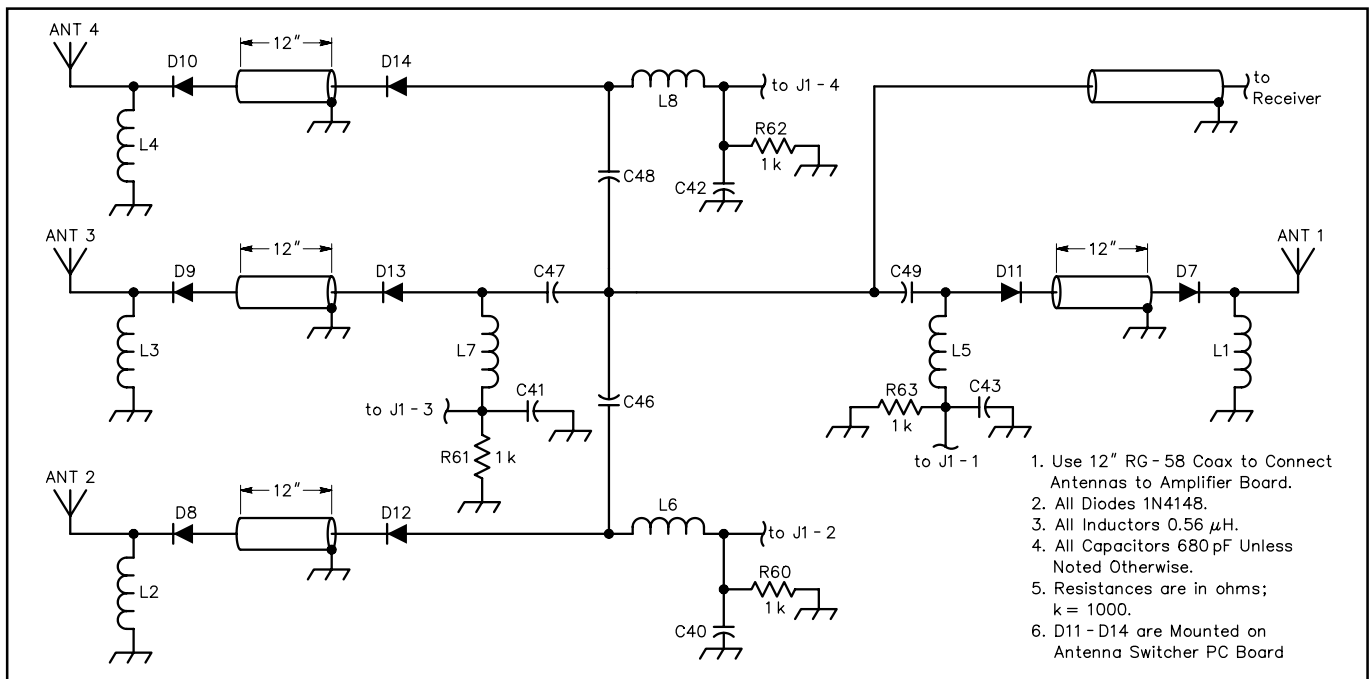


Figure 4—Antenna switcher schematic. Unless otherwise specified, resistors are $\frac{1}{4}$ W, 5% tolerance carbon-composition or film units. Part numbers in parentheses are Mouser (Mouser Electronics, 958 N Main St, Mansfield, TX 76063-4827; tel 800-346-6873, 817-483-4422, fax 817-483-0931; sales@mouser.com; <http://www.mouser.com>). Equivalent parts can be substituted; n.c. indicates no connection. Switcher PC boards only (371-SWITCHERPCB); includes switcher PC board and four mag-mount antenna PC boards.

C40-43, C46-49—680 pF, 25 V chip capacitors (140-CC502B681K)
 D7-D14—1N4148 silicon diode (583-1N4148)
 L1-L8—Surface-mount inductor, 0.56 μ H (434-07-R56K)
 R60-R63—1 k Ω chip resistors (71-CRCW1206-1.0K)

Miscellaneous
 4— $\frac{1}{2}$ inch brass hex spacers (534-1450C)
 1—6-pin DIN plug (171-0276)
 4—#4-40 \times 1 inch flat-head screws
 12—#4-40 star lock washers
 12—#4-40 nuts
 4— $\frac{1}{16}$ diam \times 36-inch-long copper welding

rod (Lincoln R45)
 5—Magnet strips $3\frac{1}{2}\times 3\frac{1}{2}$ inches
 4—Soda bottle caps (pop tops) for antenna bases
 10 feet of RG-58 coax, 95% shield
 10 feet of 6-conductor #24 AWG shielded wire

ing diodes. I decided to compare the difference between expensive PIN diodes costing as much as \$10 each with common 1N4148 switching diodes costing as little as four cents each. I tested a pair of each diode type in the same test circuit using a network analyzer to measure the insertion loss through both diodes and return loss. (Return loss is a measure of how close the input impedance is to the ideal 50 Ω .) A 0 dB return loss corresponds to an infinite SWR (open or short circuit) while a -20 dB return loss corresponds to a good SWR of 1.2:1. The diodes were turned off by not applying any forward bias and turned on with 15 mA of forward current. The test results are presented in [Table 1](#).

Not surprisingly, the most expensive PIN diode performed the best. I was a little surprised, however, to find that the popular ECG-555 has very poor isolation (4.5 dB) at UHF. This makes it totally unacceptable for use on 446 MHz. The ECG-553 is a better choice for VHF and UHF applications, but it costs considerably more than the switching diodes without providing a significant improvement in performance. I chose to use the Rectron 583-1N4148 and obtained excellent results with it.

Construction

Main Board

I used PC board construction for the main Doppler RDF board because of the large number of interconnections. Point-to-point wiring can be used if you have the patience and are a stickler for detail. Part placement is not critical, but use care to isolate digital and analog grounds. The main PC board fits nicely inside a 2 \times 8 \times 6.25-inch (HWD) plastic Pac-Tec enclosure. The **CALIBRATE**, **DAMPING** and **AUDIO LEVEL** controls and the **ON/OFF** and **SCAN STOP** switches are mounted on the front panel for easy access. Dc power input, Doppler tone **PHASE INVERT** switch S3 and the audio inputs and outputs are located on the rear panel. I mounted the external speaker inside the enclosure and drilled speaker holes in the top.

Display Board

A PC board simplifies construction and provides a uniform circular pattern for the LED display. Point-to-point wiring can be used if desired; part placement is not critical. I made my own LED standoffs from #20 wire insulation. Strip the wire, removing a single tube of plastic insulation six inches long. Then cut 16 equal-length pieces, 0.20 inch long. Install the standoff on each LED's anode (longer) lead. The PC-board hole spacing varies to facilitate layout. Keep the anode lead straight at all times, and bend the cathode lead as necessary to reach the wide-spaced mounting holes. The standoffs ensure all display LEDs are the same distance from the board. Repeat the same procedure for LEDs D3, D4 and green **CENTER** LED, D16.

Antenna Switcher

Double-sided PC board construction with plated through holes is used for the antenna

Table 1

On and Off Performance of Various Diode Types

Diode Number And Type		146 MHz		446 MHz		Cost (Each)
		Return Loss (dB)	Insertion Loss (dB)	Return Loss (dB)	Insertion Loss (dB)	
HP3077-745	Off	0.16	66.00	0.03	49.50	\$10
PIN	On	23.00	0.44	15.10	0.79	
NSMP-3820	Off	0.10	47.30	0.10	27.00	\$1
PIN	On	25.20	0.21	18.20	0.44	
ECG-553	Off	0.10	48.00	0.05	27.60	\$2
PIN	On	21.40	0.76	19.10	1.00	
ECG-555	Off	0.10	29.10	2.80	4.50	\$2
PIN	On	25.30	0.23	16.40	0.51	
MPN-3404	Off	0.10	42.70	0.30	20.30	\$1.25
PIN	On	24.20	0.23	14.40	0.57	
1N914A	Off	0.10	56.30	0.20	37.10	\$0.12
Switching	On	16.70	1.82	17.80	2.42	
1N4454	Off	0.06	49.00	0.28	29.50	\$0.05
Switching	On	24.50	0.76	22.90	1.15	
1N4537	Off	0.05	48.00	0.27	30.80	\$0.05
Switching	On	25.50	0.66	22.70	1.24	
333-1N4148	Off	0.10	50.50	0.37	33.40	\$0.04
Switching	On	24.10	0.93	24.40	1.40	
583-1N4148	Off	0.04	47.10	0.27	29.00	\$0.04
Switching	On	26.70	0.62	22.30	1.09	



Antenna switcher close-up

switcher circuit. Microstrip transmission lines are employed to minimize impedance discontinuities and route signals to the summing point. Double-sided PC boards are also used to make each of the four $\frac{1}{4}\lambda$ antennas (see [Figure 5](#)). Each 2.5 \times 2.5-inch antenna PC board contains an antenna-mounting stud, one switching diode and an RF choke connected to a microstrip line. A thin, flexible magnet attached to the bottom surface of each board makes it a mag-mount antenna. Business-card size magnetic material is available from office-supply stores. This material has an adhesive backing. It also helps make an excellent, low-cost mag-mount antenna! To add support to the antenna-mounting stud, I use plastic soda-bottle caps (pop tops). Drill a hole in the center of a cap for the whip-mounting screw and notch one side of the cap to pass the coax, as illustrated in [Figure 5](#). For this reason, I dubbed my homemade mag-mount antenna the Pop Top Mag-Mount. A 12-inch length of RG-58 coax connects each antenna to the antenna switcher PC board. take care to make the lengths of all four coax lines exactly equal: This ensures the accuracy of the RDF bearing indication. Use hot-melt glue or epoxy to secure the RG-58 to the antenna-switcher PC board and each Pop Top Mag-Mount PC board. Larger fruit and sports

drink caps work well to protect the antenna switcher electronics.

Detachable antenna whips are made from 1/6-inch-diameter copper-plated-steel welding rods (Lincoln R45) and available from welding supply stores. The rod is easily soldered halfway into the zinc-plated #4-40 \times 1/2-inch hex standoffs. Install a #4-40 \times 1/2-inch screw in one end of the standoff to prevent solder from flowing more than halfway into the standoff. Insert the antenna whip into the other end and solder it in place. Remove the screw when the solder has cooled. Caution: All plastic pop tops are not created equal. Because their height varies, screw the antenna whip into the pop-top mag-mount base *before* cutting it to length. [Table 2](#) provides the whip lengths for 146, 223 and 446 MHz operation. The whip length is measured from the top surface of the Pop Top Mag-Mount base to the whip tip. You'll notice that the whip lengths are somewhat longer than that calculated using the formula $l = 234/f$. The extra length is required to compensate for the capacitive coupling between the mag-mount base and the car top.

Check Out

Basic Testing

It is wise to review your workmanship, looking for circuit shorts or opens prior to applying power. Use an ohmmeter to measure the resistance between power and ground; the value should be greater than 2 k Ω . Apply 12 V dc to the RDF unit with the power-supply current limited to 150 mA to prevent damage in the event of a problem (normal current drain is 100 mA). Verify the presence of the following supply voltages: +5 V on the output of U10, pin 16 of U8, pin 8 of U4, pin 8 of U6, pin 16 of U7, pin 24 of U11, pin 16 of U5. Verify +2.5 V on pin 14 of U3, verify +12 V on pin 4 of U1 and U2. This completes the basic testing of the Dop-

pler RDF circuit. The following tests are recommended to identify and troubleshoot problems, but don't worry if you don't have all the necessary test equipment. Satisfactory performance can usually be achieved without performing these tests.

Functional Testing

Before connecting the antenna switcher, verify the operation of clock oscillator U4 by connecting an oscilloscope to pin 3. The output should be a square wave with an amplitude of 5 V and a period of 125 μ s (8 kHz). Use a frequency counter to verify the clock frequency is 8 kHz \pm 250 Hz for best performance. If necessary, the values of R27 and

R28 can be changed to adjust the clock frequency. Verify that closing switch S2 disables the clock. Open S2 (**SCAN STOP**) and verify the operation of BCD counter U7 by connecting the oscilloscope sequentially to pins 14, 13, 12 and 11. The signal frequency on these outputs should be approximately 4, 2, 1 and 0.5 kHz, respectively. Verify the presence of a square wave signal on pins 2, 4, 6 and 8 of buffer U12.

Signal-Level Indicators

The following test uses an audio-signal generator to simulate the presence of the Doppler tone. Disconnect the speaker from **AUDIO LEVEL** control potentiometer R50 to

prevent loading the signal generator. Connect an audio-signal generator to the receiver audio-input terminal. Set the generator to apply a 500 Hz sine wave with amplitude 1 V P-P. Rotate R50 until the **AUDIO OVERLOAD** LED D3 illuminates. Then, adjust R50 until **LOW SIGNAL LEVEL** LED D4 lights. Adjust R50 so that LEDs D3 and D4 are off, set **CALIBRATE** control R36 to the center of its range and adjust **DAMPING** control R19 for minimum damping (fully CCW).

Direction Indicator

Adjust the frequency of the audio generator very slowly around 500 Hz while observing the LED display. You should see the direction-indicating LEDs around the green center LED illuminating. The LED illumination should rotate *clockwise* when the frequency of the generator is set slightly *lower* than the antenna rotation frequency. (Only one LED will be on when the frequency of the generator equals the antenna-rotation frequency.) The display should rotate *counterclockwise* when the frequency of the generator is slightly *higher* than the antenna-rotation frequency. Because the digital filter is sharp, the transition between clockwise, stationary and counterclockwise directions is very abrupt. The audio generator must be capable of very fine frequency adjustment in order to observe the transition. All LEDs in the display may appear to be on if the signal generator frequency is just 10 Hz different from that of the antenna-rotation frequency determined by U4. It is interesting to observe the sharpness of the digital filter on pin 1 of U2 on the oscilloscope as the display makes the transition from clockwise to counterclockwise. You can see the simulated Doppler tone of the generator come out of the noise, peak and return into the noise as the transition takes place.

Calibration Control

Verify the function of the **CALIBRATE** control by adjusting the audio generator equal to the antenna rotation frequency. At this point, only a single LED will illuminate. Rotate the **CALIBRATE** control through out its range and observe the direction-indicating LED "move" around the display. The range of movement should be more than 360°. The direction-indicating LED may move slightly if the generator frequency drifts. It is very difficult to keep the generator frequency synchronized exactly, but that's not necessary in this test. Disconnect the signal generator and reconnect the speaker to the receiver audio-input terminal.

Antenna Switcher

Verifying proper operation of the antenna-switcher sequencing circuit requires only a dc voltmeter. Connect the antenna switcher to the Doppler RDF unit and position the four mag-mount antennas on a table. Do *not* install any of the whip antennas for this test.

It is essential that the antennas be turned on in sequence to emulate an antenna spinning in a circular pattern for the Doppler RDF

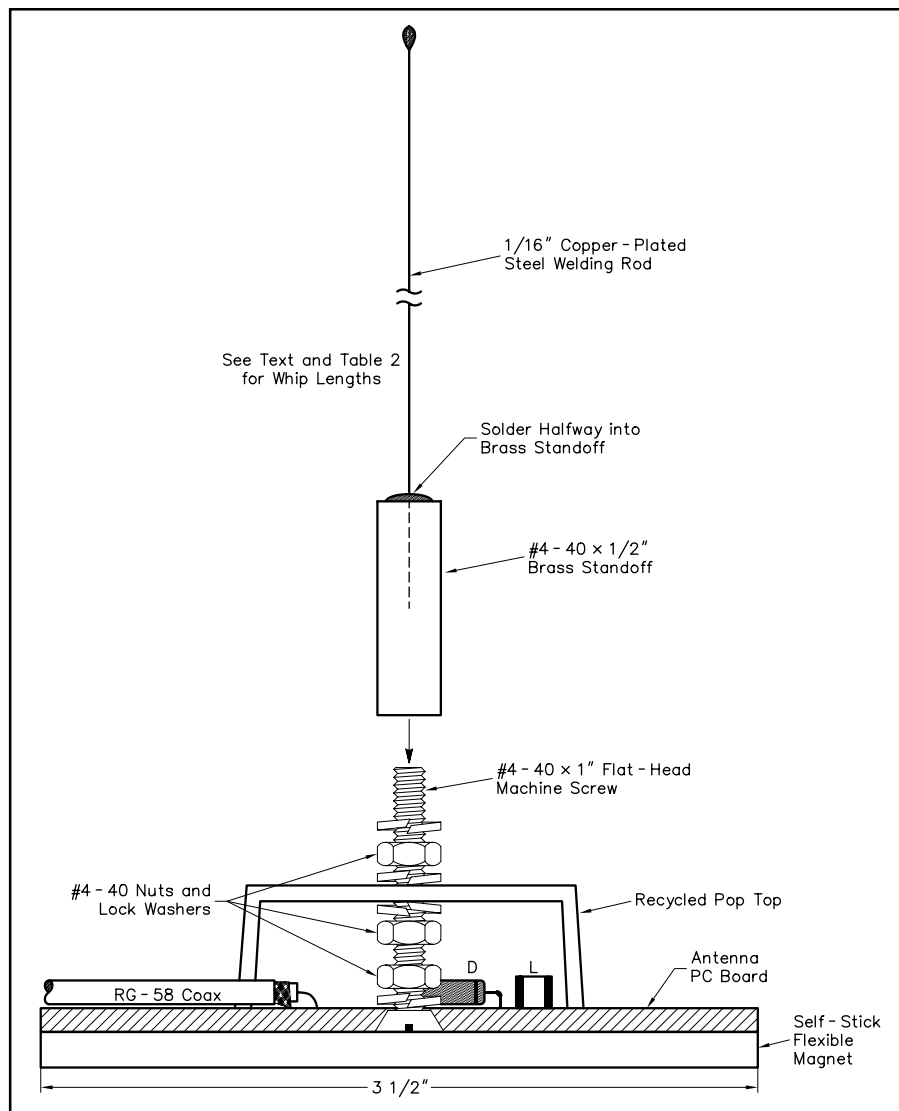


Figure 5—Assembly drawing of one of the four Pop Top Mag-Mount antennas. Dimensions for the whip lengths for three bands are given in Table 2.

Table 2

Antenna Whip Lengths and Antenna Spacings for Use on Three Bands

Frequency (MHz)	Whip Length (inches)	Antenna Spacing per Side (inches)
146	20 ¹ / ₁₆	18.25
223	13	11.5
446	6 ¹¹ / ₁₆	5.75

unit to operate correctly. A single antenna turned on out of sequence is enough to produce a bogus RDF reading. It does not matter if the antenna spins clockwise or counter-clockwise. For this test, we'll assume the antenna spin is clockwise.

SCAN STOP switch S2 stops the antenna from spinning. Close and open S2 until the voltage on terminal J1 pin 1 of Figure 3 reads +5 V. Pins 2, 3, and 4 should all read 0 V. Pin 1 is the antenna-enable signal for antenna 1. Label the corresponding mag-mount antenna on the table as antenna 1. Close and open S2 until the voltage on terminal J1 pin 2 reads +5 V. Pins 1, 3, and 4 should all read 0 V. Pin 2 is the antenna enable signal for antenna 2 and should be positioned to the right of antenna 1 as viewed from the center of the antennas for a clockwise spin. Close and open S2 until the voltage on terminal J1 pin 3 reads +5 V. Pins 1, 2, and 4 should all read 0 V. Pin 3 is the antenna-enable signal for antenna 3 and should be positioned to the right of antenna 2 as viewed from the center of the antennas. Close and open S2 until the voltage on terminal J1 pin 4 reads +5 V. Pins 1, 2, and 3 should all read 0 V. Pin 4 is the antenna enable signal for antenna 4 and should be positioned to the right of antenna 3 as viewed from the center of the antennas.

Testing the RF operation of the antennas is quite simple. Place all four mag-mount antennas around the center of the car roof, placing each antenna at the corner of an 18.25-inch-square pattern for operation on 146 MHz. Do not install any of the whip antennas yet. Connect the RF output of the antenna switcher to an FM receiver or transceiver tuned to a strong NOAA weather broadcast signal. *Caution:* Make sure you disable transmit mode if you are using a transceiver!

Apply power to the RDF unit and open S2 to stop the spinning process. Take one whip antenna and touch it to the mounting screw on each of the mag-mount antennas. Only one antenna should provide a signal strength reading similar to it being connected directly to the FM receiver. Remove the whip from the selected antenna and touch it to each of the other three antennas. The NOAA signal should be weak or nonexistent. Close and open S2 until another antenna is selected and repeat the same test. Continue the process until you have verified each antenna can be turned on while the other three remain off.

Operation

Checking performance of the RDF unit is best done in a large, empty area away from tall buildings; a parking lot will do. Use caution at all times during open-road operation of the RDF unit. Use a minimum of two people for all testing and operation of the RDF unit: one to operate the vehicle and the other to operate the RDF unit. As a safety measure, secure each Pop Top Mag-Mount with 20-pound fishing line when operating the vehicle at highway speeds.

Attach all four whip antennas to the mag-mount antenna bases placed about the center of the car top. Connect the RF output of the



Single antenna base

antenna switcher to a FM receiver or transceiver tuned to a strong NOAA weather broadcast signal. *Caution:* Again, make sure you disable transmit mode if you are using a transceiver!

Adjust the receiver's audio to a comfortable level in the external speaker. Apply 12 V to the RDF unit and spin the antenna by closing switch S2. As soon as S2 is closed, you should hear a 500 Hz tone imposed on the receiver audio. Rotate **AUDIO LEVEL ADJUST** control R50 so that **LOW SIGNAL LEVEL** LED D4 and **AUDIO OVERLOAD** LED D4 are extinguished. *Never trust bearing indications if D3 and/or D4 are illuminated.* The direction-indicating display should be relatively constant with a single LED lit, or one or two adjacent LEDs alternately illuminating. Adjust **CALIBRATE** control R36 so that the direction-indicating LED is consistent with the general direction of the NOAA transmission with respect to your location and the position of the car.

Have the driver slowly circle while you observe the display. You should see the direction-indicating LED move in the opposite direction as the car is turning in a circle. The position changes relative to the changing direction of the car; however, the direction indicated from the center of the circle the car is driving around should remain fixed. If the display turns in the same direction as the car, flip **PHASE INVERT** switch S3 to the opposite position to correct the 180° phasing offset. This completes the rough calibration procedure.

Final Calibration

A more accurate calibration can be achieved while the car is in motion. Position a volunteer with an H-T in a safe spot on the side of a long, straight and vacant roadway about 1/4 to 1/2 mile away. Have them transmit on low power (0.5 W) while traveling towards them. The RDF operator should calibrate the RDF display to indicate 0° as straight ahead. The display should change to 180° indicating the signal is coming from directly behind the car as the vehicle passes the transmitter. The moving calibration procedure functions to average out false reflected signals caused by multipath propagation.

You may notice that the Doppler tone changes as the car moves about. The Doppler tone will sound like a pure, undistorted 500 Hz sine wave in the absence of reflected or multipath interference. Direction indications are most reliable under these conditions. When reflected or multipath signals

are present, the Doppler tone will sound raspy and distorted. These signal components may arrive from different directions causing false bearing indications. The LED display tends to jump around randomly under these conditions. Avoid taking bearing information when the Doppler tone sounds raspy for this reason. You can minimize display jitter by slowing the response time of the digital filter. This is accomplished by increasing **DAMPING** control R19. With a little time, you can master the art of Doppler RDFing.

RDFing on Other Bands

The wide-bandwidth antenna switcher can be used for DFing on other bands, provided the proper antenna whip lengths and antenna spacings are used. Arrange the antennas in a square pattern. Typical antenna spacing is 0.22λ per side. Table 2 provides the whip lengths for use of the DFER on 146, 223 and 446 MHz. Whip lengths are measured from the top surface of the mag-mount PC-board base to the tip of the antenna.

Other band-limiting components associated with the antenna switcher are the inductors L1-L8. The recommended inductor for the antenna switcher in the parts list is a 0.56 μH unit with a self-resonant frequency of 440 MHz. This inductor presents an impedance of more than 500 Ω from 146 MHz to 446 MHz. Part substitution is permissible, providing the inductor has a inductive reactance of at least 500 Ω and a self-resonant frequency greater than the highest frequency at which the antenna switcher will be used.

Summary

This project incorporates several useful features developed over the years into a single, compact design. The wide bandwidth antenna-switcher design introduced here can be built using commonly available components, significantly reducing the overall cost of the project. In constructing this project, you have the opportunity to learn about analog, digital and RF circuits—and have a great deal of fun organizing and participating in “fox hunting.”

Acknowledgments

I want to thank Harry Randel, WD2AID, for capturing the schematic and parts layout of this project, and my brother, Dave, KC2BDL, for assisting with field testing. My thanks also to these members of the Tri-County Radio Club (TCRA): Gerry Miller, AA2ZJ, Bob Grassmann, KB2BBD, Ed Grassman, N2TDM, and Dick Montgomery, N3DV, for providing the opportunity to hone my RDFing skills with many memorable hours of fox-hunting.

⁷Part 1 of this series appears in QST, May 1999, 35-40.

Note: In Part 1, Figure 3, page 38, the input pin of U12A should be shown as pin 9, not pin 4. Also, the author's mailing address is 244 N 17th St, Kenilworth, NJ 07033.

You can contact Mike Kossor, WA2EBY, at 244 N 17th St, Kenilworth, NJ 07033; mkossor@lucent.com. 

See Feedback in July 1999 QST.

A Simple 50- Ω Feed for W8JK Beams

Shifting the antenna's feedpoint makes a classic antenna easier to feed.

W8JK beams have been popular since John D. Kraus, W8JK, first published its concept in 1937.^{1,2,3} The antenna consists of two closely coupled half-wave dipoles fed out of phase. For a two-element antenna, the gain is quite high: 6.0 dBi. However, with the antenna's 0.1 l element spacing, the feedpoint impedance of each dipole element is quite low, approximately 5 Ω . Attempting to match a 50-W feed line to the combined low feedpoint impedance has likely kept many amateurs from building an '8JK. Here, I'll describe a design modification that yields a real 50-W feedpoint impedance. Hopefully, this will make the antenna more appealing to other hams.

Analysis

Figure 1 shows the basic antenna. I used Roy Lewallen's *ELNEC*⁴ to analyze the antenna's feed. With out-of-phase current sources located at the center of each dipole, as shown, the (dual) input impedance is raised to 17.9 Ω by increasing the element spacing to 0.188 l. Doing so decreases the gain by only 0.2 dB.

The element lengths in Figure 1 are shown for two conditions: First for the case where the elements are composed of RG-8/X (0.4688 λ) and second for elements composed of RG-8/X with an exterior vinyl jacket (0.4612 λ). The exterior vinyl jacket adds dielectric loading to the element, so the necessary length is shortened slightly.

If we shift the feedpoint away from the center of each dipole, the input impedance increases smoothly, because the element current is lower farther from the center. This is a convenient means of increasing an antenna's impedance without affecting the standing current lobe on the element. Figure 2 shows the dimensions for dual 25 Ω feedpoints offset from the center of each dipole element.

Of course, it would be even better if we had a single 50 Ω feedpoint. This can be



Caitlin Ferguson, a neighbor, stands next to a 2-meter version of the antenna.

Table 1

Dimensions for 2- and 6-Meter W8JK Beams Using RG-8/X Dipoles Supported by PVC Pipe

	2 Meters (144.2 MHz)	6 Meters (50.1 MHz)
Dipole Length	34 inches (86.5 cm)	104 inches (264 cm)
Dipole Spacing	20 inches (51 cm)	48.43 inches (123 cm)
Stub Length	11.02 inches (28 cm)	33.66 inches (85.5 cm)

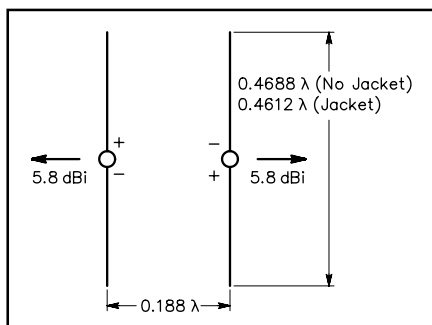


Figure 1—The usual arrangement of the W8JK beam, with sources at the center of each element, yields driving point impedances of 17.9 Ω at the two feedpoints. The directional gain is 5.8 dBi in the two major lobes in the plane of the figure. The dimensions shown are for coax elements with and without its jacket.

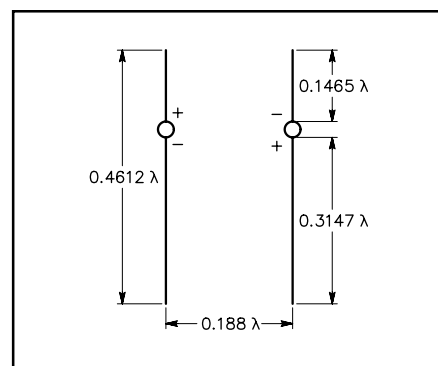


Figure 2—Moving the feedpoints away from the center of each dipole yields a higher feedpoint impedance. This may be easily seen since the element current decreases away from the center. For the dimensions shown, the driving-point impedance is 25 Ω (both elements).

¹Notes appear on page 47.

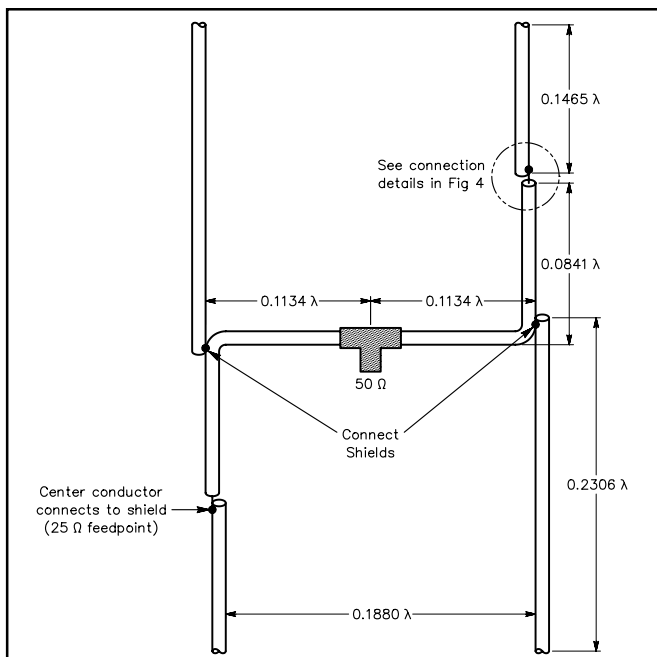


Figure 3—This figure presents a convenient coaxial network for feeding a W8JK beam. The 25-Ω feed points are located on opposite ends of the dipoles. RG-8/X foam-dielectric coax (with a velocity factor of 79%) transforms each 25-Ω feedpoint impedance to 100 Ω at the central T connector. Connected in parallel at the T, the two 100-Ω impedances yield a 50-Ω input impedance, a perfect match for 50-Ω coaxial-cable feed line. This figure shows the shields are soldered together; there is no overlap between the 0.0841 λ and 0.2306 λ sections.

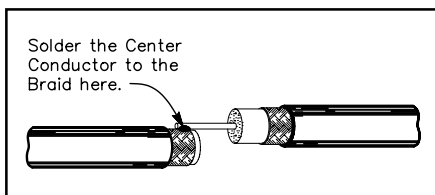


Figure 4—Drawing showing the details of the 25-Ω feed points of Figure 3.

achieved rather easily with the dual coaxial feed shown in Figure 3. The out-of-phase feeding is implemented by feeding the dipoles *on opposite ends*. Using 50 Ω RG-8/X foam dielectric cable with a velocity factor of 79%, it is possible to place two $\frac{1}{4}\lambda$ transforming cables in the beam structure. Each element's 25 Ω feedpoint impedance is thereby increased to 100 Ω at the center T connector. With the two 100 Ω impedances in parallel, the impedance presented to the coaxial feed line is now 50 Ω! A detailed drawing of how to make the 25 Ω feedpoint connection is shown in Figure 4.

Construction

W8JK beams can be used on HF and VHF. On HF, you can hang the antenna between any conveniently available supports. The dimensions in Figure 3 slightly overestimate the actual free-space dimensions so that minor pruning of the dipoles (on the dummy legs) will bring the elements right on frequency.

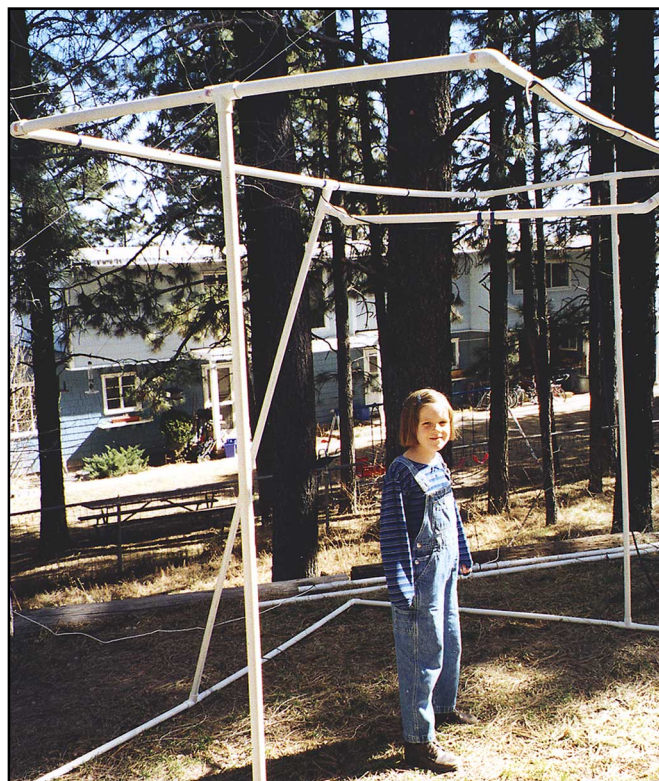


Figure 5—My 6-meter beam in a PVC frame work.

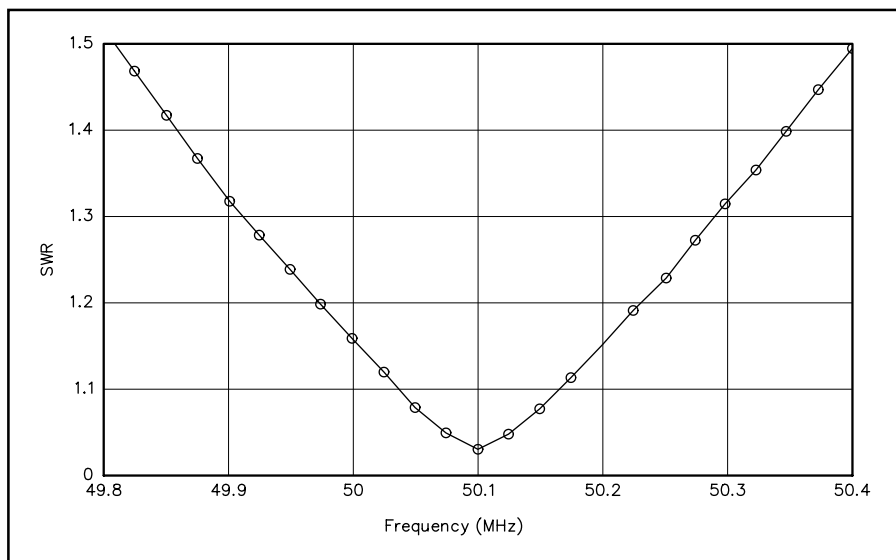


Figure 6—SWR plot of the 6-meter beam.

On VHF, you must pay more attention to dimensional accuracy because of the shorter wavelengths involved. At these frequencies, it is also easy to build a support framework of PVC pipe and tape the dipole elements to the pipe. However, because the PVC pipe acts as a dielectric, the physical lengths of the dipole elements must be shortened by about 3% from the dimensions given in Figure 3. Figure 5 shows my 6-meter beam supported on a PVC framework. A simple 2-meter beam can be seen

in the title photo. The length-adjusted dimensions (to account for the dielectric action of the PVC) for both of these beams are given in Table 1.

An SWR plot of the 6-meter beam is shown in Figure 6. In Figure 7 is a frequency-scaled SWR plot showing the performance one might expect of a 20-meter W8JK beam cut for resonance at 14.1.

(Continued on page 47)

The QUICK: QRP Under Integrated Control from the Keyer

Here's how you can get control of your QRP transceiver using a keyer as the control center.

Over the years, I've done a little microprocessor work, mostly 6502 and 6805 assembly language stuff. Today, however, it seems as if everyone is using Microchip's PICs.¹ So, I set out to learn a little about PIC microcontrollers. When Bob, K3VOT, told me about an article he'd seen that describes a simple PIC programmer,² I had a PIC programmer working before noon the following day. So I could program PIC16F84s—now what?

A Project Grows

I'm a builder, a tinkerer. I learn from examples and from my mistakes. If I were going to learn anything about PICs, I needed a simple project. A keyer seemed like a good place to start. My design goals included low cost (less than \$20), low power requirements (less than 2 mA),

simple controls, some memory, sidetone and iambic operation.

In just a few hours, I had a fairly good keyer working. It had a fixed speed and

fixed sidetone pitch, but it was a usable keyer. Later, I decided to add speed control and variable sidetone pitch. I had already used the PIC's internal timer for creating

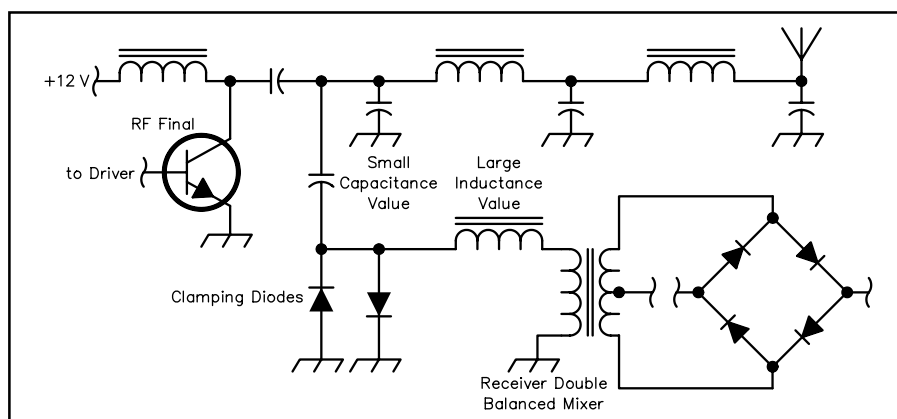


Figure 1—Basic TR diode-limiting scheme used to protect a receiver while transmitting.

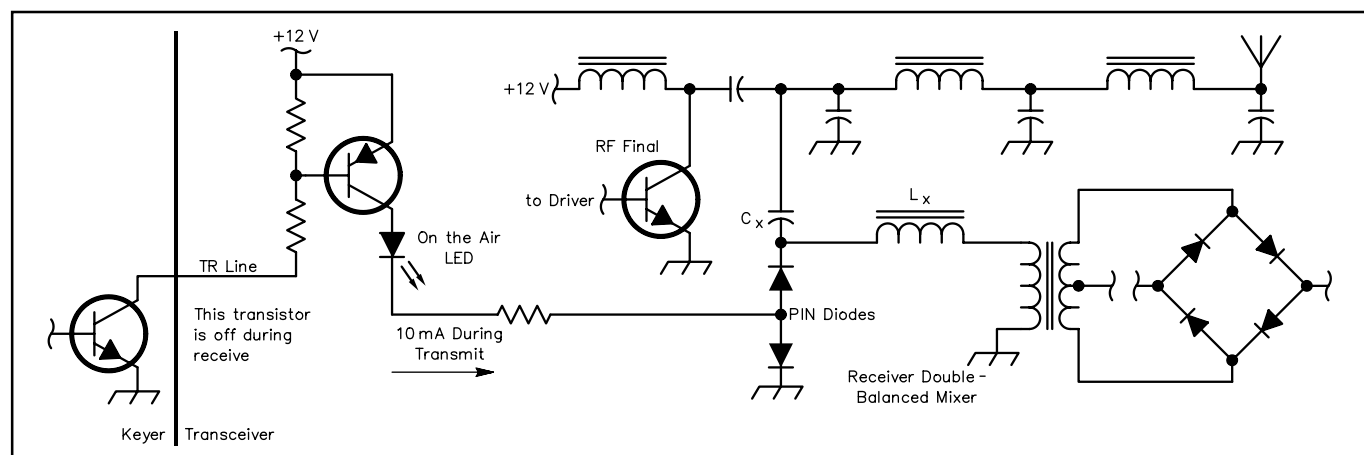


Figure 2—This TR switching approach uses PIN diodes and sports an **ON THE AIR LED**. As a rule of thumb, the reactances of C_x and L_x should be about 400 to 500 Ω . This equates to an approximate capacitance of 100 pF and 19 μ H at 3.5 MHz, 50 pF and 9.5 μ H at 7 MHz, 25 pF and 4.7 μ H at 14 MHz, etc.

dit and dah lengths, so I had to use simple software loops to generate the sidetone. It was challenging, but it worked out better than I expected.

After finishing the speed and sidetone-pitch routines, I had used about 250 bytes of the PIC's 1 kB of program memory and the project was just another PIC keyer. It simply wasn't *different* enough—I needed something else.

A CW Transceiver Controller

I've built a few QRP rigs, mostly direct-conversion (D-C) types. I love full break-in keying and a shaped sine-wave sidetone. With over 700 bytes of memory left, a transceiver controller didn't seem too difficult to devise.

What is a transceiver controller? To answer that, think about the functions a transceiver performs when switching from receive to transmit and vice versa. First, the receiver audio output is muted. If you are using the receiver's audio-output stage to provide your CW sidetone, you can't just turn it off. Rather, you must interrupt the receive audio and allow the sidetone through. Second, the VFO is shifted to the transmit frequency. Third, the antenna is connected to the transmitter and (hopefully!) disconnected from the receiver. Finally, the transmitter is turned on. All of this happens in a few milliseconds—and there is no better circuit to control this sequencing than the keyer itself. So, to my existing keyer I added TR control, RIT, receive-audio muting and, of course, transmitter keying control.

Sequencers

I have built discrete sequencers that do a fair job of sequencing these events. There's one in *The ARRL Handbook* (Chapter 22) that works pretty well.³

In a sequencer, there are two fundamental items that require consideration. The input to the sequencer is the key line, but transmitter keying itself is the last event of the sequence. Therefore, a sequencer must steal some time from the beginning of the first dit (or dah) to switch everything else before transmitting. Consequently, the sequencer must also stretch the end of the keying sequence to make up for the time it stole at the beginning. If it doesn't, the length of the final dit or dah is shortened by the amount of time stolen. Secondly, in the majority of sequencers, the time delays are set up in hardware and don't change when code speed changes.

Sequencer operation could be simplified if the sequencer had prior knowledge that the keying line was about to be asserted. Guess what? A keyer has that information. With a good sequencer, you won't even notice the small time differential occupied by the switching action. As a bonus, the sequence timing adjusts with the keying speed. (Most of the circuits I used are adaptations of others appearing in *QRP*

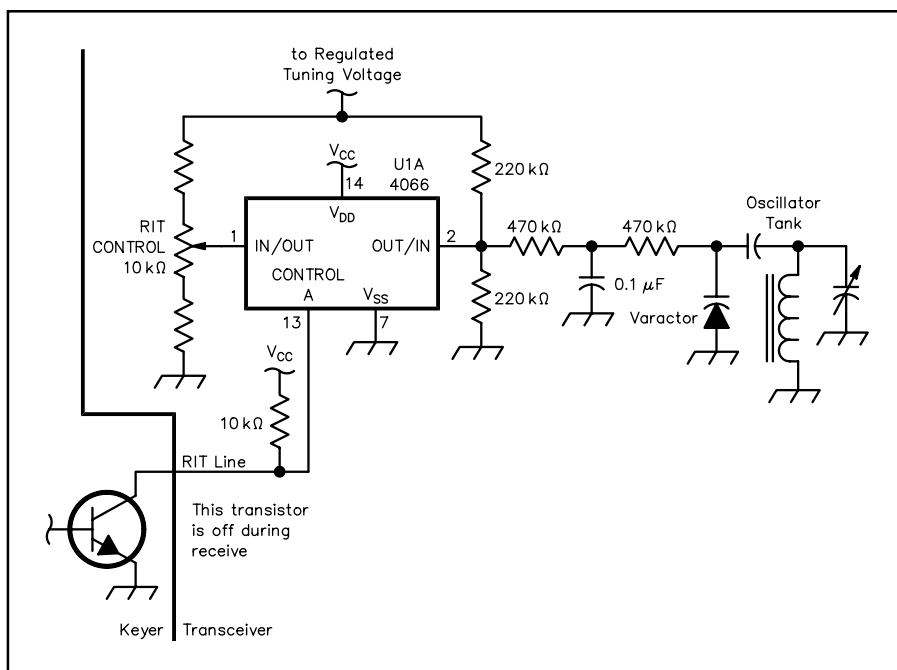


Figure 3—This RIT approach uses a 4066 switch to allow tuning above and below zero beat.

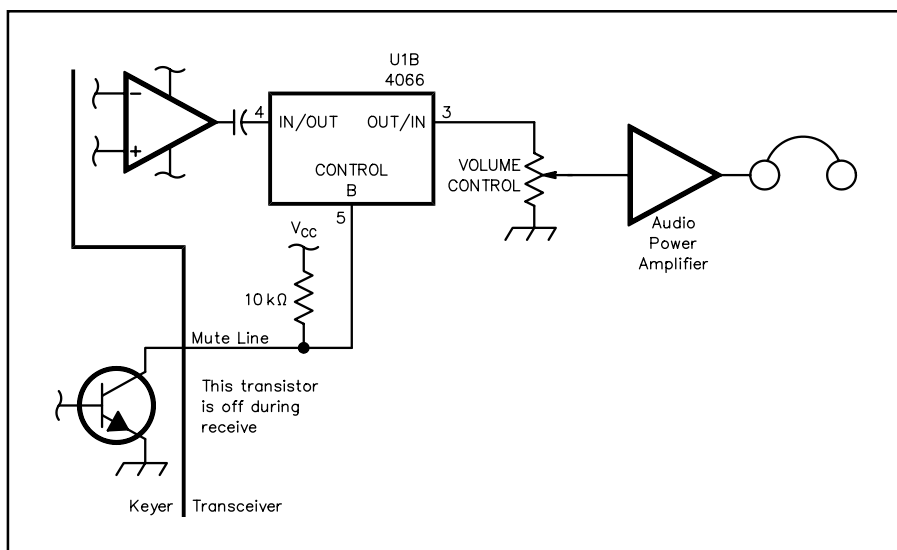


Figure 4—During transmit, the 4066 switch opens to provide receiver audio muting.

Classics and QRP Power.^{4,5}) Knowing how important a catchy name is, I call my creation the QUICK. The PIC source code is available so that someone who *really* knows what they're doing can teach me some PIC'n!⁶

The Antenna Switch

One popular circuit that automatically provides transmitter and receiver isolation is shown in Figure 1. In addition to preventing receiver damage, there is a good reason to isolate the transmitter from the receiver, especially when using a D-C receiver: chirp. If the transmitter output gets back into the VFO via the receiver

mixer, it causes the VFO to change frequency.

AM breakthrough during receive can be a problem, especially on 40 meters. Although the circuit shown in Figure 1 keeps the transmitted signal out of the receiver by limiting, it also makes a pretty good crystal set. When I first used one of these circuits, I was disappointed with what I thought was very poor AM breakthrough performance. It turned out that wasn't the case: The clamping diodes were acting as a crystal detector.

One of my transceiver requirements is a low-power receiver. At one point, my receiver drew about 25 mA from a 12 V supply. Most of the current was consumed

in the VFO buffer. Unfortunately, most of the existing TR switching circuits I found draw at least 10 mA during receive, a bit much.

After much searching and experimenting, I came up with the circuit shown in Figure 2. It uses current only during transmit and since you're dropping from 12 V to 0.8 V anyway, the **ON THE AIR** LED is a nice touch. For good performance, use PIN diodes: 1N4007s work a bit better than 1N4148s, but not as well as MPN3404s. With this circuit, the AM breakthrough is gone.

The RIT Circuit

Many QRP rigs provide an RIT circuit that allows receiver tuning offset in one direction only. You can receive *above* your transmit frequency, but not *below* it. I don't like that. There are times when interference can be minimized by tuning to the other side of zero beat. The simple circuit of Figure 3 allows this. When the 4066 switch is open, the voltage applied to the varactor diode is half that of the regulated supply. When the 4066 switch is closed, the voltage applied to the varactor can be varied above or below that set point.

Receive-Audio Muting

Now I'm committed to using a 4066 CMOS switch. Because there are four switches in a single IC, I use a second section for audio muting; see Figure 4. Hint: Place the receiver-audio muting function late in the audio chain, just before the volume control. If you use an audio band-pass filter, put the mute control before it and use very little (if any) gain in the filter. Also, make sure there's no dc current flowing through the mute switch—that will create a click when the switch changes state.

Keying the Transmitter

You'd think turning a transmitter on and off is pretty straightforward. Well, it is and it isn't. It's easy to simply apply power to the transmitter, but achieving well-shaped rise and fall times for the output waveform takes some thought. The circuit shown in Figure 5 does a good job of providing that shaping. Note that this keying circuit acts on the transmitter's *driver* stage, not the final. Even though most CW rigs use class-C finals, you can still shape the output waveform by controlling the drive to the final amplifier. I shoot for 5 ms rise and fall times and it sounds great.

Although I went to great pains to provide sidetone in the QUICK (see Figure 5), I don't use it in my rigs. It's okay for CW practice and for rigs without sidetone, but I prefer a sine-wave sidetone.

About the Controller/Keyer

The QUICK schematic is shown in Figure 6. Although the QUICK can be used as a simple keyer, its sequencing features make it much more powerful. The timing

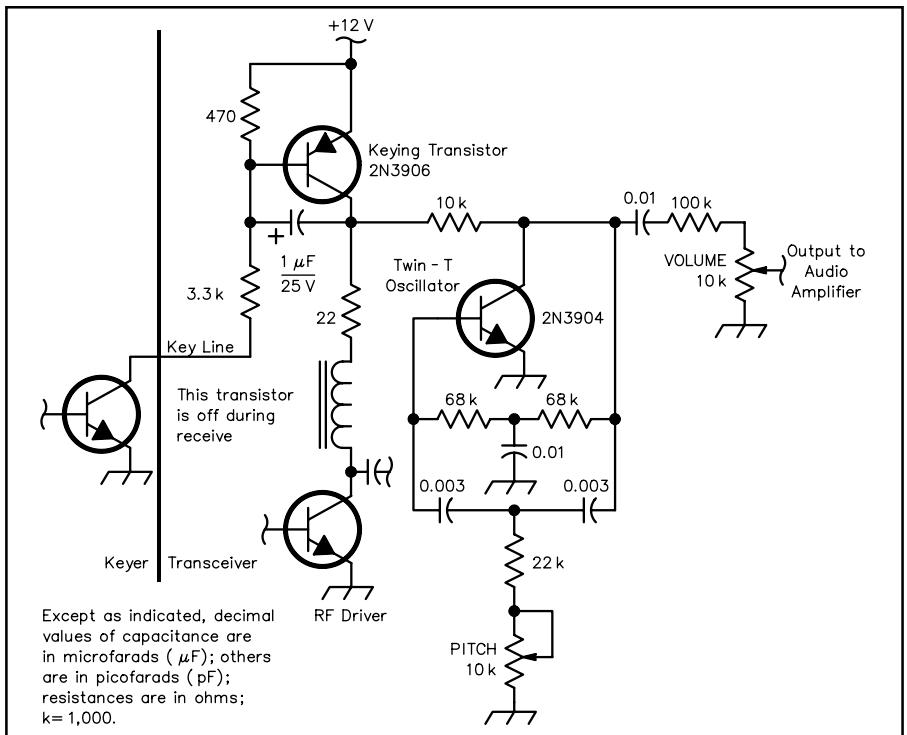


Figure 5—To obtain well-shaped rise and fall times of the CW waveform, a transistor switch is used in the transmitter driver's collector circuit. Also shown here is a twin-T phase-shift oscillator that can be used for sidetone generation.

Table 1

Mode Switch Function	Code	Dit Paddle	Dah Paddle
Speed Adjust	S	Increase	Decrease
Sidetone Frequency	F	Increase	Decrease
Tune	T	Transmit on	Transmit off
Audio Mute	M (LED Blinks)	Sidetone off	Sidetone on
Keyer	K	Normal	Normal
Record/Playback Switch			
Record	R (LED blinks)	Enters a dit	Enters a dah
Play	P	Play message	Go to keyer

diagram (see the Figure 6 inset) gives you some idea of how the circuit operates. As a time reference, the length of a dit at 30 WPM is about 40 ms.

What can I say about a circuit that, for all practical purposes, is really a piece of software? Well, not much, but I'll let you in on some of the design tradeoffs and operation. The keyer uses two pushbutton switches and the paddles to set all parameters: Keyer speed (variable from about 8 to 32 WPM), sidetone frequency, sidetone mute, transmitter **TEST** and **RECORD** and **PLAYBACK** of a message of up to 50 characters long are provided. Each mode sends a prompt, in Morse (of course), as do many recently published keyers.

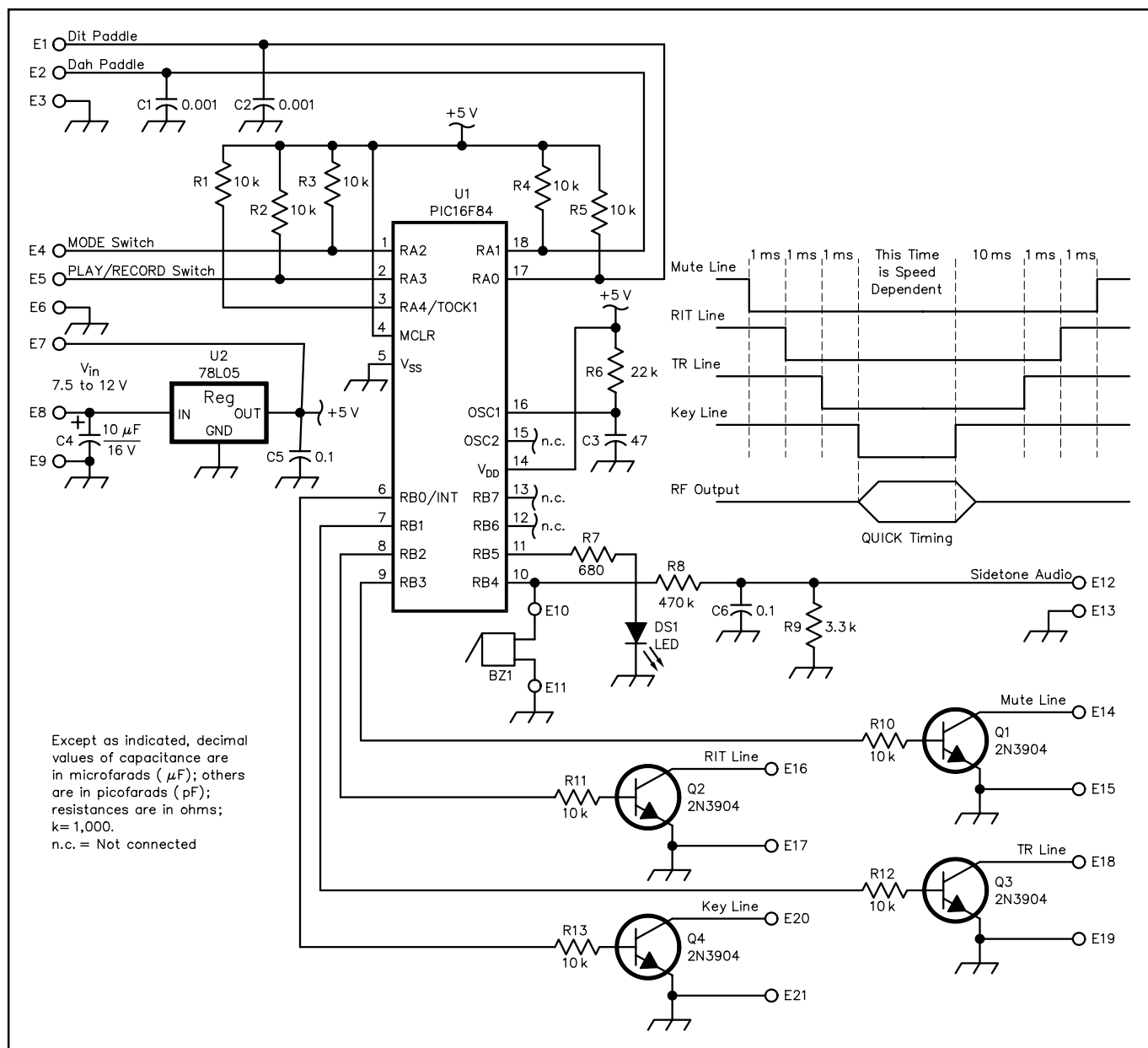
Clock

I use a 500-kHz clock because its frequency is low enough to use the PIC's eight-bit internal counter to time the long-

est dah at 8 WPM (450 ms). It's also a frequency for which ceramic resonators are available at a reasonable cost. My first and second prototypes had a 500-kHz resonator. After looking at the PIC data sheets, I decided to try an RC clock, and it works just fine. I kept the clock frequency at 500 kHz because the code was already written. If you want to change the clock frequency, feel free to do so, but you'll need to change the software timing loops as well.

Power Supply

The PIC16F84 requires a 4- to 6-V supply: Three series-connected AA, AAA or N cells work well. On the PC board, I included a 5-V regulator for those who may want to use it, but the regulator uses about 10 times the current of the PIC! If you already have a 5-V supply available (or want to use three or four series-connected cells), don't install the 78L05, it wastes current. National



specifies the idling current of the 78L05 at 2 to 6 mA.

acts to insert a space if you haven't pressed a paddle in a while. I suggest recording messages at a speed a bit slower than that at which you'd normally send them. You can always increase the transmission speed. By the way, the memory used for the message is nonvolatile. If you don't record over it, Microchip says it will still be there 40 years from now.

The QUICK has three modes: **SETUP** and **TUNE, RECORD/PLAYBACK** and **OPERATE**. I use a simple CW menu system like many of the previously published designs. Basic operation is described in Table 1.

Summary

During testing, the advantages of using a PIC instead of dedicated hardware were reinforced. I had recorded a CQ and tuned around 40 meters. There was a lot of dead air (it was 4:30 AM local time—don't ask). I sent out a CQ and suddenly there was a QSO on frequency. The only thing I could do was to reach up and turn off the radio because I hadn't thought about an abort switch. Ten minutes and four lines of code later, I had added the ability to abort in the middle of sending a prerecorded message by pushing the **PLAY/RECORD** button.

I accomplished what I set out to do:

Learn a little about PIC microcontrollers. If you would like to learn a bit about PICs and have a good controller and keyer, you can download the software and modify it to do just what you desire. I originally had it send my call sign on power-up, but bypassed the code for this article. The code is still in the listing and it's simple to substitute your call sign for mine. I won't apologize for the software, even though I should, since I'm just a hardware bum.

If you want more than a simple keyer and you've been wanting to try out a PIC-controlled project, here's one for you. Have fun—and look for me on 40!

Notes

¹David Benson, *Easy PIC'n: A Beginner's Guide to using PIC 16/17 Microcontrollers* (Kelseyville, California: Square 1 Electronics, 1996) is a popular book for those learning about these devices. Microchip Technology Inc, 2355 W Chandler Blvd, Chandler, AZ 85224-6199; tel 602-786-7200, fax 602-899-9210; <http://www.microchip.com> offers a wealth of good information and free software.—Ed.

²Michael A. Covington, "Burn PIC Microcontrollers with a 'No Parts' PIC Programmer," *Electronics Now*, Sep 1998, pp 35-43.

³R. Dean Straw, N6BV, Ed., "TR Time Delay Generator," *The 1999 ARRL Handbook for Radio Amateurs*, (Newington: ARRL, 76th edition, 1998), pp 22.53 to 22.56.

⁴Bob Schetgen, KU7G, *QRP Classics*, (Newington: ARRL, 1990), first edition.

⁵Joel Kleinman, N1BKE, and Zack Lau, KH6CP/1 (now W1VT), *QRP Power* (Newington: ARRL, 1996), first edition.

⁶PC boards and parts kits are available from Q-Sat, PO Box 110, Boalsburg, PA 16827; rak10@psu.edu. Charge cards are not accepted and a telephone number is not available. Prices: PC board, \$8 plus \$2 shipping; programmed PIC, \$8 plus \$2 shipping; complete kit (not including switches, connectors, or enclosure), \$18 plus \$2 shipping. Pennsylvania residents must add sales tax. Please allow four to five weeks for delivery. The source code and PC board files in bit-map (.BMP) form, are in *QUICK.ZIP* and can be found on the Internet at <http://www.arrrl.org/files/>.

⁷Current flow through the contacts helps to keep them clean.—Ed.

Rod Kreuter got his Technician class license at age 15 and currently holds an Extra class ticket. Rod's interest in Amateur Radio led to a career in electrical engineering. He holds a BSEET from Pennsylvania State University. Rod has worked in the fields of fiber optics, signal processing and satellite communications systems, primarily for defense contractors. He is now Director of Research Instruments for Penn State's Chemistry Department. He enjoys biking, backpacking, tinkering and "ragchewing." You can contact Rod at 319 McBath St, State College, PA 16801; rak10@psu.edu. **QST**

A SIMPLE 50-Ω FEED FOR W8JK BEAMS

(continued from page 42)

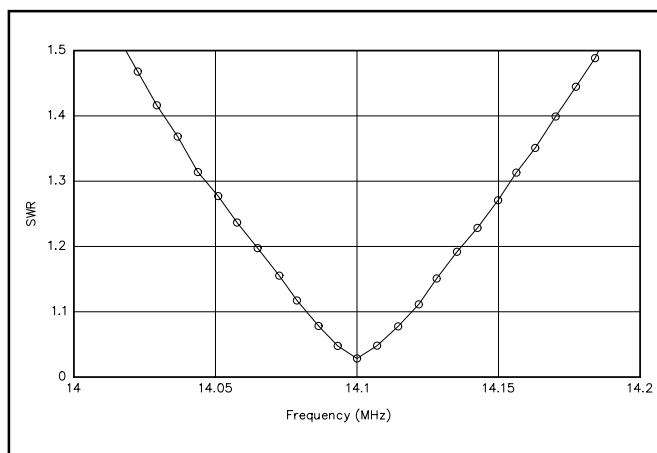


Figure 7—Frequency-scaled SWR plot showing the performance you can expect from a W8JK beam cut for 14.1 MHz.



A close-up of the antenna feedpoint. On the element to the right, you can also see the 25-Ω feedpoint arrangement that is detailed in Figure 4.

Summary

This simple design yields real gain (and an excellent feed-line match) for an afternoon's effort. If you have room for a dipole, you likely have room for a W8JK beam.

My thanks to Dean Straw, N6BV, for his help in numerical antenna modeling. I dedicate this paper to John D. Kraus, W8JK, an antenna pioneer.

Notes

¹John D. Kraus, W8JK, "A Small but Effective Flat Top Beam Antenna," *Radio*, Mar 1937, pp 56-58, and Jun 1937, pp 10-16.

²John Kraus, W8JK, "Directional Antennas with Closely-Spaced Elements," *QST*, Jan 1938, pp 21-23.

³John Kraus, W8JK, "The W8JK Antenna," *QST*, Jun 1982, pp 11-14.

⁴Roy Lewallen, W7EL, PO Box 6658, Beaverton, OR 97007.

Until recently, Bob Zimmerman, NP4B, was a radar transmitter engineer at the National Astronomy and Ionosphere Center, Arecibo Observatory, Arecibo, Puerto Rico. In October 1998, he moved to New Mexico where he now works on high-energy particle accelerators at the Los Alamos National Laboratory. You can contact Bob at: PO Box 161, Los Alamos, NM 87544-0161; zimmerman@lanl.gov. **QST**

See Feedback in July 1999 *QST*.

RF Safety at Field Day

A case study of Field Day 1998 with the North Shore Radio Club (NSRC) in Village Green Park, Northbrook, Illinois.

By now, we should all be aware of our responsibility to keep the public, and ourselves, safe from excessive exposure to RF energy. On January 1, 1998, new FCC regulations dealing with this issue went into effect for the Amateur Radio service. The specific wording can be found in the FCC Rules and Regulations,¹ Sections §1.1307b, §1.1310, §2.1093, §97.13c, and §97.503. At home, many of us are not required to assess RF exposure from our stations, as described in the table of exclusions listed in §97.13c. At the power levels listed in this table, it is highly unlikely that a situation can arise in which a person is exposed to unsafe levels of RF energy.

Field Day presents a different problem for RF safety. At a contest, we can reasonably expect more transmitting than would be done in usual operations. Since a Field Day site is temporary, it is likely that antennas will not be mounted as high as we would normally put them. Many Field Day sites operate two or more transmitters simultaneously. Field Day sites are often set up in public places, where it is possible for passersby to come in close proximity to actively transmitting equipment. Thus, a certain amount of preparation is necessary to ensure that a Field Day site will be operated safely and legally.

The "Exclusion"

Let's first examine the exclusion to performing a routine RF environmental evaluation. Section §97.13(c)(1) of the FCC Rules and Regulations states: "The licensee must perform the routine RF environmental evaluation prescribed by §1.1307(b) of this chapter, if the transmitter PEP exceeds the following limits." In the table that follows this text, the 160-40 meter bands have limits of 500 W, the 20 meter band has a 225 W limit, the 15 meter band has a 100 W limit, the 10-1.25 meter bands have limits of 50 W, and the 70 cm band has a 70 W limit.

The wording of this regulation could be interpreted to mean that if an amateur transmits less than the amounts of power listed in the table, it is not necessary to worry about RF safety. *This is not the case!* FCC OET Bulletin 65^{2,3} clarifies this:

"No station is exempt from *compliance* with the FCC's rules and with the MPE limits. However, many amateur stations are categorically exempt from the requirement to perform a *routine station evaluation* for compliance. Stations operating at or below the power levels given in Table 1, are not required by the FCC to perform a routine evaluation for compliance..."

"...Under some circumstances, such as an antenna that is located unusually near people ... the FCC could require a station evaluation or take other action."

We, as responsible Amateur Radio op-

erators, should not wait for the FCC to act, but rather should perform an RF safety evaluation if we suspect that people will be in proximity to our antennas. Field Day is one such case.

General Elements of the RF Safety Evaluation

In performing an RF safety evaluation, we are concerned that the total RF exposure remains below recognized safety limits, as required by the FCC Rules and Regulations.¹ The FCC has based the RF exposure levels that they consider to

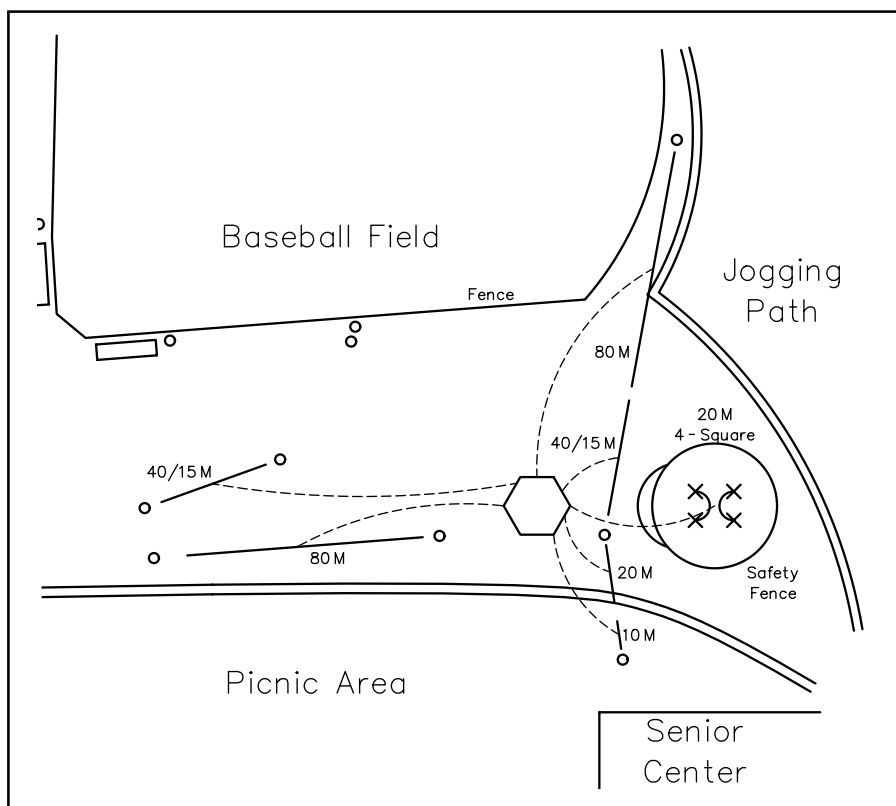


Figure 1—Map of the NSRC Field Day site. Antennas are labeled. Dashed lines indicate coaxial cable. All dipole antennas are at a 40-foot (12.3-meter) height. The 4-square antenna is the only one that requires a line delimiting the MPE threshold for the General Population. Notice the extension of the MPE threshold region adjacent to the 80-meter, 40/15-meter and 20-meter dipoles.

¹Notes appear on page 51.

be safe on standards developed by scientific experts at the IEEE⁴ and the NCRP.⁵ RF exposure is affected by the following factors:

- Amount of RF power transmitted.
- Type of modulation.
- Duration of transmissions.
- RF power loss in the feed line to the antenna.
- Antenna pattern.
- Distance between antennas and people.
- The number of antennas near one location.
- The amount of time a person might be in that location.

RF Transmissions

The following text discusses some of the factors that go into accurately deciding the RF safety implications of your Field Day station. It is very difficult to exactly calculate the RF exposure; many values are estimated, with any estimation errors tending to overestimate the power. This is based on the principle that it is better to err on the side of safety.

After seeing the complexity of some of these calculations, you may not want to go to the trouble. In reality, most stations do not need to do so. The simplest calculations are to assume that every station transmits its full power to the antenna 100% of the time. While not realistic, if your station is deemed to comply with Maximum Permissible Exposure (MPE) limits while making this simplification, there will be no chance of excessive exposure. The only time that it is necessary to perform the more complex calculations is when you find, using the simple method, that your station does not meet the requirements for safe operation. Refining the calculations may then show that it actually is within the proscribed limits.

Modulation

Modulation affects the percentage of average power that is transmitted. Although subjective, the differences are minor for the purposes of estimating RF safety. A CW signal transmits only during key-down. The ratio of transmit to non-transmit time depends on speed and keying style. For practical purposes, an estimate of 50% key down during a transmission in a contest is reasonable. The relationship between PEP and average power in SSB transmissions is dependent on voice characteristics, speech patterns, and audio processing. Generally, estimating average power as 25% of PEP is accurate, but in a contest situation, 50% may be more realistic. RTTY and FM use 100% average power during transmission.

Duration of Exposure

Biological effects of RF energy depend on both the absorbed power density and the duration of the exposure. While there is a continuous relationship between these, the FCC Rules and Regulations are simplified

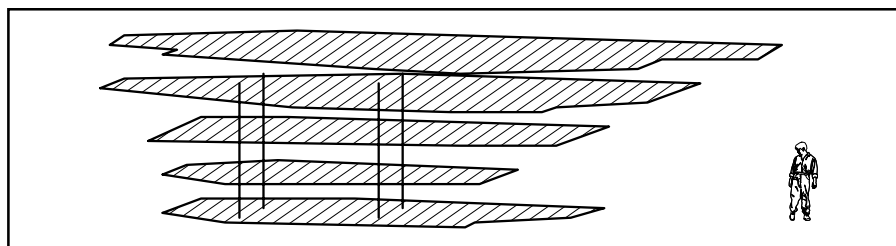


Figure 2—Three-dimensional representation of 4-square antenna near-field radiation pattern. Crosshatched regions represent horizontal planes where power density is greater than the MPE for the General Population. These regions are calculated at 5-foot (1.7-meter) intervals above the ground. The figure of a person represents a 6-foot (1.8-meter) tall individual. Since the pattern can be switched to four different directions, this represents one possibility. Inaccessible areas are defined by drawing a circle around the antenna with a radius equal to the farthest point above MPE.

fied by basing safety calculations on 6 minutes of continuous exposure for the Occupational Population or 30 minutes for the General Population. The Occupational (or Controlled) Population consists of people who know they are being exposed to RF and can do something about it. Hams and their families are considered to be part of this group. The General (or Uncontrolled) Population consists of people who do not know they are being exposed or cannot control their exposure, and consists of everyone else.

The transmit/receive duty cycle can further decrease the average continuous power transmitted. If this cycle time is less than 6 minutes for the Occupational Population and less than 30 minutes for the General Population, the power can be multiplied by the transmit/receive ratio. For instance, if you actually only transmit for 50% of the time and listen for the other 50%, your average power transmitted can usually be decreased by half. In a contest, such as Field Day, this is a valid approximation.

In a situation where long-winded rag chewing takes place, the actual portion of the 6 or 30 minute averaging interval during which the transmitter is active must be used. For example, if you talk for 6 minutes, and then listen for the next 6 minutes, you would use 100% of a 6-minute averaging period even though your transmit/receive duty cycle is still 50%.

Average Power Arriving at the Antenna

The time-averaged power from your transmitter is the output power level multiplied by the modulation factor and the transmit/receive duty cycle. For example, CW on a 100 W transmitter emits an average of 50 W during transmissions. With a short (< 3 min) 50% transmit/receive duty cycle, the average is further decreased to 25 W.

Power is lost as heat in antenna feed lines and does not affect RF exposure, so average power transmitted from the radio should now be corrected for feed line loss. As an example, 200 feet (62 meters) of RG-58U coax used on the 20 meter band

has approximately 3 dB of loss, or a loss factor of 0.5 (Loss factor = $10^{-dB/10}$). So now the transmissions from a 100 W transmitter tuned to 14.030 MHz, modulated with CW and fed through this feed line appear at the antenna as 12.5 W of average power.

Types of Antennas

Field Day antennas are typically different than those used at base stations. Rarely is it practical to erect a tall tower and mount a beam on top of it. Rather, Field Day sites use many dipoles and ground mounted verticals. When it is possible to mount a beam, it is not usually very high above the ground. There are several ways of determining the power density near an antenna. The most accurate is to model the antenna near-field pattern. Since we generally use only a few different antenna types, these have already been characterized and reasonable estimates can be made.

For most HF antennas, the near-field pattern best describes the antenna radiation pattern at distances up to 10 wavelengths away from the antenna. For example, for a 10 meter band half wave dipole, the pattern is in the near field until about 100 meters away. At that distance, power densities are usually low enough that biological exposure is not a concern. The near-field pattern does not always resemble the far-field pattern. For many common antennas, the near field patterns are standard, based on antenna height above ground, and can be found in tables and in books^{2,3,6}. Near-field patterns can also be calculated using one of the many antenna-modeling programs that use either *NEC2* or *MiniNEC*.

MPE Is Based on Frequency and Time of Exposure

At HF frequencies, with f in MHz, locations that have power densities $\geq 900/f^2$ for the Occupational Population, or $\geq 180/f^2$ for the General Population, are not safe for those groups, assuming that a person from the Occupational group remains in that area for at least 6 minutes, or a person from the General Population remains for at least 30 minutes. If it can be shown that people will remain in these areas for less time, the

exposure can be adjusted down by the fraction of the amount of time spent in the area divided by the averaging time for the group. However, if this consideration is used to make an antenna comply with MPE, it is important to ensure that people do not remain there for a longer period.

Total Transmitted Power Density Is Important

A biological organism is affected by the total energy density to which it is exposed. At any location, there can be RF energy emanating from many different sources. Signals that are transmitted far away have power densities that are orders of magnitude lower than safety thresholds and it is not necessary to consider them. However, for every antenna that is within about 25 meters of a location, the power density could be high enough that, when added to the components from other antennas, it affects RF safety. Field Day is one time that this becomes an issue.

The calculation of total RF exposure at every location in three-dimensional space is a task that is beyond most of our computing means. The job can be simplified by disregarding all places where people cannot be found, for example, at elevations above 2 meters (unless the terrain contains hills or structures that allow people to approach an antenna at a higher elevation). Any location that is more than 25 meters from any antenna-radiating element can also be disregarded. The remaining places should be analyzed for their total power density.

Combining Signals at Different Frequencies

Resonance effects complicate biological

exposure. This is why the MPE curves used by the FCC are not flat across frequency. The human body is more susceptible to damage from some frequencies because the energy is better absorbed due to resonance relationships between wavelength and the size of the organism.

At each location, the average power density of each frequency should be divided by the MPE for that frequency and the fractions should be added. If the result is greater than 1.0 (100% of MPE), that location is considered unsafe. For example, if an 80 meter vertical has an average power density of 7.2 mW/cm² at a location, and there is a 10 meter dipole overhead with an average power density of 0.15 mW/cm² at that point, the total fraction of MPE for the General Population is $[7.2 / (180/3.7^2) + 0.15 / (180/28.5^2)]$, which is equal to 1.22. This location is unsafe for a person from the General Population to remain for 30 minutes, even though the power density from each antenna alone is well below the MPE limit.

The FCC discusses a number of ways that areas, in which exposure exceeding MPE, can be marked to insure that RF safety is not compromised²⁻³. In particular, marking areas with safety signs and making unsafe areas inaccessible are preferred methods.

The NSRC Field Day Site

The North Shore Radio Club has participated each year in Field Day as NS9RC from Village Green Park in Northbrook, Illinois. This site has been ideal for the purposes of Field Day: The park was actively used, with playground equipment, a senior citizen center, picnic areas, and a baseball field. A large gazebo was the site of Field Day operations, with room for five stations (operating 3A

plus a Novice-Tech station and a VHF/satellite/packet station). The site contained a number of relatively tall trees that made excellent antenna supports.

Unlike past Field Days, where 100 W transmitters were used and all of the antennas were dipoles, in 1988 two of the three main stations were equipped with 500 W linear amplifiers and a directional vertical phased array was constructed for operation on 20 meters. With the 7-dB increase in power and transmissions from ground level on 20 meters, additional care was necessary to insure that the public using the park was safe from RF transmissions.

Mapping the Field Day Site

The first step in the process of modeling exposure was to map the site (see Figure 1). On the map, the important points of interest were the locations of the operating stations, the locations of all antennas, and the places that the public was likely to frequent. We assumed that all places on the map were equally accessible to hams and to the General Population, so only the more restrictive MPEs were considered.

Calculating Average Power at Each Antenna

The next step was to determine how much power was delivered to the feed point of each antenna. All calculations were based on worst-case approximations. The feed line loss was obtained from standard coaxial cable data, expressed in dB, and converted to a loss factor, as described earlier. All stations were used for both SSB and CW so the 50% modulation duty cycle was used. Also, the 50% transmit/receive duty cycle was used. The fractions of the two duty cycles (percent / 100) were multiplied by the feed line loss factor, which was then multiplied by the transmitter output power. The results represented the average power delivered to each antenna.

Determining Antenna Patterns

Near-field patterns for all of the antennas were calculated with the NEC2 method-of-moments algorithm, in a software package called NEEDS. The modeling package considered power delivered to the antenna and generated power densities at different points in space around the antenna. This software, like most, separated the EM field into components, giving results for the E field (in V/m) and the H field (in A/m). The product of these values at each location, divided by 10, gave the power density in mW/cm². The three-dimensional results were converted to two dimensions by taking the maximum power density of each point in the horizontal (XY) plane, between ground level and 2 meters above ground, and using that to represent the power density for that point on the map.

Determining RF Safety Areas

Once the power density patterns of the



Figure 3—Karl, AA9MN, designer of the NSRC 4-square antenna, standing in front of it. The area in which MPE limits can be exceeded has been made inaccessible by orange plastic safety fencing.

antennas were determined, the lines representing the MPE thresholds were marked on the map. Since all dipole antennas were erected 40 feet (12.3 meters) above the ground, only the 80 and 40 meter antennas were less than $\frac{1}{4}$ wavelength high. However, the modeling showed that from ground level to 2 meters high, MPE limits were not exceeded at those frequencies.

Next it was necessary to look for areas with appreciable exposure from more than one antenna. At the NSRC site, the region between the 20 meter 4-square antenna and the 80, 40/15 and 20 meter dipoles fell into this category. We assumed that all of these antennas would radiate simultaneously and exposure of a person in an area between them was the sum of the exposures from each antenna. It was necessary to return to the antenna models to look for points in that region where the sum of fractions of MPE for all of these antennas exceeded 1.0, as discussed previously. Based on these calculations, the radius of the protected area on one side of the 4-square antenna was increased.

Ensure that RF Safety is Maintained

At the NSRC site, we decided against warning signs since we felt that the general public would not correctly understand this. Rather, we made areas inaccessible by erecting an orange plastic safety fence around the 4-square antenna (Figures 1 and 3). Based on modeling, this was the only area that exceeded MPE. This type of fence was inexpensive, easy to erect, and easily seen.

It helped to have someone at the site at all times who had the responsibility of Field Day Safety Coordinator. The Safety Coordinator did not perform any other tasks while keeping an eye on the safety aspects of the Field Day site, observing the antennas to make sure no one entered a safety restricted area.

Some Basic RF Safety

After the evaluations were performed and the proper barriers erected, it was still important not to forget about basic, everyday RF safety. No radio equipment should



Figure 4—The NSRC RF safety display overlooking the 4-square antenna. Joel, a concerned citizen, learns about RF safety at Field Day.

be operated with the covers removed from the high power amplifier sections. No transmitter should be active without an adequate load. No one should be working around antennas with transmitters operating. Since Field Day tends to be a frenetic activity, with many people working on different things at once, it was easy to violate this last rule. Anyone who needed to work on antennas during Field Day operations arranged transmission stoppages with the Safety Coordinator, who made sure no one sat down at the idle station and started transmitting while the work was being performed.

Be Prepared to Discuss RF Safety

After making the effort to ensure that your Field Day site is safe, you should also make sure that the public knows it. At the NSRC site, a bulletin board was posted (Figure 4), displaying some of the modeling of the 4-square antenna. The site's Safety Coordinators were prepared to discuss RF safety with anyone who asked about it. The FCC has a good publication

containing answers to commonly asked questions about RF safety.⁷

Conclusion

With a few precautions, Amateur Radio is an inherently safe activity. At the Field Day site, there is more potential for RF exposure above accepted safe limits and it is necessary to understand where such situations can arise. In particular, the most likely sources of overexposure are ground-mounted verticals, horizontal or sloping antennas that are less than one quarter wavelength above people, antennas in the upper HF and VHF ranges, and areas with concurrent exposure from more than one antenna.

Field Day is Amateur Radio's annual opportunity to show off to the public what we do. Many of the people in the General Population know very little about RF signals and tend to distrust this unseen energy that is often referred to as "radiation." Field Day presents a perfect forum to show the public that we understand the implications of transmitting RF signals and are able to deal with ensuring that no one is harmed by our transmissions. Spend a little time to perform RF safety evaluations of your Field Day site and then display the results publicly. The good will that you generate will go a long way toward enhancing our hobby for the future.

Gregory D. Lapin, PhD, PE, N9GL, is chairman of the ARRL RF Safety Committee. You can contact Gregory at 1206 Somerset Ave, Deerfield, IL 60015; g.lapin@iecc.org.

Notes

¹Federal Communications Commission: Rules and Regulations. Title 47, US Code of Federal Regulations, Chapter 1, 10-1-97 Edition.

²Cleveland, R F Jr, Sylvar, D M, Ulcek, J L: *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*. Federal Communications Commission, Office of Engineering and Technology. OET Bulletin 65, Edition 97-01, August 1997.

³R. F. Cleveland, Jr, J. L. Ulcek: *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields: Additional Information for Amateur Radio Stations*. Federal Communications Commission, Office of Engineering and Technology. OET Bulletin 65, Supplement B, Edition 97-01, November 1997.

⁴ANSI-IEEE Standard C95.1-1992: *Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*. The Institute of Electrical and Electronics Engineers, New York, 1992.

⁵NCRP Report No. 86: *Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields*. National Council on Radiation Protection and Measurement, Bethesda, MD, 1986.

⁶E. F. Hare: *RF Safety and You*. American Radio Relay League, Newington, CT, 1998.

⁷OET Bulletin 56: *Questions and Answers About Biological Effects and Potential Hazard of Radiofrequency Radiation*. Third Edition, Federal Communications Commission, Office of Engineering and Technology, January 1989.

References 2, 3 and 7 can be obtained on the Web at <http://www.fcc.gov/oet/info/documents/bulletins>.

The ARRL RF Safety Committee

The ARRL maintains a volunteer committee of experts on the biological effects of electromagnetic energy—the RF Safety Committee. The committee is made up of scientists, physicians and engineers who are knowledgeable about interactions between electromagnetic energy and biological tissue. Many committee members participate in RF bioeffects activities outside of Amateur Radio. In addition to writing and maintaining the RF-safety related text that appears in ARRL publications (such as the *Handbook*, the *Antenna Book*, *License Manuals* and *RF Safety and You*), and reviewing RF-safety related questions in the Amateur Radio question pools, the RF Safety Committee has helped the FCC edit its recently enacted environmental exposure regulations.

Members of the committee monitor the scientific and popular press for new developments related to electromagnetic bioeffects. The committee advises the ARRL Board of Directors about all RF safety issues. The members of the RF Safety committee are Robert E. Gold, MD, WB0KIZ; Gerald D. Griffin, MD, K6MD; A. William Guy, PhD, W7PO; Gregory D. Lapin, PhD, PE, N9GL; Gary E. Myers, MS, CIH, K9CZB; William J. Raskoff, MD, K6SQL; and Kazimierz Siwiak, PE, PhD, KE4PT. Ed Hare, W1RFI, and Jim Maxwell, W6CF, are ARRL committee liaisons.

Québec Club Wins International Prize for Ice Storm Effort

January 6, 1998, was the brightest, sunniest of days in many years, said Daniel Lamoureux, VE2ZDL VE2KA, RAQI president. Lamoureux was 1000 km north of Montreal for a club engagement. He did not know that there was freezing rain in the city. At 3:40 PM, his beeper went off: "Urgent, contact the Sécurité Civile in Montreal."

A quick phone call and Lamoureux knew the score. The Réseau (network) d'Urgence (RU) had been activated and as deputy provincial coordinator for the western part of the province, he had to take charge of the operations.

In his absence, François Drien, VE2FDA, the regional coordinator for Montreal, had the operation started. He built the network of regional and sub-regional nets to serve the Sécurité Civile's needs as well as those of the municipalities and public safety agencies.

When Lamoureux arrived in Montreal on January 8, the freezing rain was still falling and he was met by a scene of desolation that proved to be unequal in the history of the country. The freezing rain fell on the southern part of the province for four straight days, destroying power and telephone lines, and closing roads that had thick coatings of sheer ice.

The Montreal station of the RU holds the call sign VE2RUG. It became the top level of a pyramid of networks that were set up according to needs. The second level was reserved for four nets, the Laval-Laurentiens net, the Montreal net, the South Shore net and the Health and Hospitals net. Each net was autonomous and had authority to manage itself and to create its own sublevel nets. A third level of nets catered to municipalities and counties. And a fourth level served specific agencies, such as a police or fire unit, area shelter, or ambulance company. Twenty nets were in simultaneous operation.

ARRL Board conveys its International Humanitarian Award to the Radio Amateur du Québec, Inc. (RAQI)



Yvon Laplante, VE2AOW; Yves Couture, VE2DYC; Gilles Dufault, VE2UF (general manager of Pierre Boucher Hospital) and André Bleau, VE2QAB, at the South Shore emergency communication center located in the hospital.

What is the ARRL International Humanitarian Award?

The International Humanitarian Award is an annual international prize awarded to outstanding Amateur Radio operators, or groups of amateurs, in areas of international humanitarianism and the furtherance of peace. The award is dedicated to those amateurs who, through Amateur Radio, are devoted to promoting the welfare of mankind. The selection of the recipient is made by a committee appointed by the President of the ARRL.

Any licensed radio amateur worldwide, or group of amateurs who, by use of his or their skills of Amateur Radio, have provided extraordinary service for the benefit of others in times of crisis or disaster, is qualified to receive the award. The award winner receives an engraved plaque, and is profiled in *QST*.



François Drien, VE2FDA, the regional coordinator for Montreal (seated) getting the latest information from Hydro workers at the emergency coordinating center.

Operators were placed in police vehicles, fire trucks, hospitals and city halls. At one time, more than 200 amateurs were at work in the field, with more than 700 having worked the operation at one time or another. Although the bulk of the operation was conducted on VHF and UHF, an HF net was activated to inform the outside world and to pass messages to and from afflicted families.

More than 1.3 million people lost power in the dead of winter. At one point, the city of Montreal declared its water supply unfit for drinking. The working environment for the operators was poor, with repeater systems and towers being affected, and generators running out of fuel. Despite the hardships, countless messages were passed, especially in the first 10 days of the operation, when every municipality had a desperate need for basic life support.

As conditions improved, and the government regained its communications, the critical need for amateur involvement abated. VE2RUG closed down its operations on January 20, two weeks after being activated.

Well-Deserved Recognition

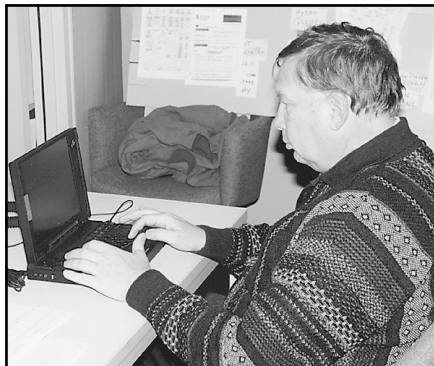
The social price of this horrendous event would have been much worse had it not been for the quick and professional response of the radio amateurs. Because of their outstanding effort, the Radio Amateur du Québec Inc has won the ARRL International Humanitarian Award for 1998. The selection was made by the League's Board at its January meeting in Houston, Texas. RAQI was recognized by the ARRL Board "for its profound commitment to civic responsibility" in the context of the storm relief effort.

RAQI was nominated for the award by Mario d'Amours, Director, Sécurité Civile du Québec. D'Amours cited RAQI services "to 1.4 million Quebecers who

were deprived of telephone service or electricity. The ham operators' contribution was remarkable under the circumstances," d'Amours said. "Quebecers affected by the ice storm are indebted to the Amateur Radio operators, who were also affected by the storm, for helping to maintain communications when no other communications channels had held up under the onslaught of the storm." The nomination of RAQI for the 1998 award was endorsed by the Canadian national Amateur Radio Society, Radio Amateurs of Canada (RAC). "RAQI's Réseau d'Urgence has contributed to the safety and well being of the residents of Québec for many years," said RAC President Patrick Doherty, VE3PD.

History of Quebec Emergency Communications

Prior to 1978, the Québec Provincial Government owned and operated several province-wide telecommunication networks. They were built for use by different govern-



Daniel Lamoureux, VE2ZDL, deputy provincial coordinator and president of RAQI, at work at the central crisis center in Montreal.

ment departments. The plan was that in case of an emergency, the networks would be activated to fulfill communication needs.

As an added precaution, in 1978, the Québec Government signed a protocol with RAQI, through which the civil security agency provided a complete amateur station in each of its nine regional offices, and in its headquarters in Québec City. A network of repeaters was also installed that covered the inhabited portions of the province. RAQI's job was to recruit and train operators to staff those stations, and also make alliances with clubs for further support.

The arrangement led to the construction of the "RTQ Network" (Réseau Trans-Québec, meaning trans-Quebec network), which boasts 86 linked repeaters covering the entire province. Any of these repeaters can be opened by any amateur with a simple coding system known to all, effecting communications via specific links or the entire system if needed. Each month, a province-wide exercise is held to test the system and its operators.

The Réseau (network) d'Urgence (RU) is managed by a committee led by a Provincial Coordinator and two deputies, who are responsible for nine regional committees. Each regional committee is responsible for recruiting and training enough operators. The committees enlist the services of area clubs and give them tools to train their personnel.

You can contact the author at 225 Main St, Newington, CT 06111; rpalm@arrrl.org.

New Products

NEW MFJ POWER STRIP PROVIDES CONNECTIONS FOR UP TO FOUR RADIOS

♦ MFJ's new '1117 dc power strip features four pairs of 5-way heavy duty binding posts for connecting multiple radios or accessories to a single dc power source. Two pairs of posts capable of 35 A each and two additional pairs rated for 35 A total are included. The binding posts are spaced to allow the use of standard dual banana plugs for convenient plug-in connection of your equipment.

The black aluminum enclosure is 8 × 2 × 3 inches and includes a predrilled flange for easy mounting. Six feet of #8 color-coded wires with ring tongue terminals is provided for connection to your dc supply. A separate grounding lug is also included.

The MFJ-1117 Power Strip is covered by MFJ's "No Matter What" one-year limited warranty. For more information, see your local Amateur Radio products dealer or contact MFJ, PO Box 494, Mississippi State, MS 39762; tel 800-647-1800, fax 601-323-6551; <http://www.mfjenterprises.com>.

Next New Product



NEW HAM COMPANION

The Doctor is IN

Q I'm trying to become active in slow-scan television (SSTV) with software that sends and receives images using my computer's sound card. I can receive images just fine, but I've been told that my transmitted images are very distorted. From the way my transmitted tones sound, I suspect that RF is getting into my sound card. In fact, if I reduce power substantially, the distortion disappears. I've placed ferrite cores on all of the leads going in and out of my PC, as well as on the cable going from the sound card output to the auxiliary audio input on my transceiver. They helped, but they didn't suppress the RFI completely. Can you suggest something else I could try?

My suggestion would be to try to isolate the sound card audio output line from the transceiver. You can do this by simply adding a 1:1 isolation transformer in the line (Figure 1). You may still need to use the ferrites, however, to get full suppression.

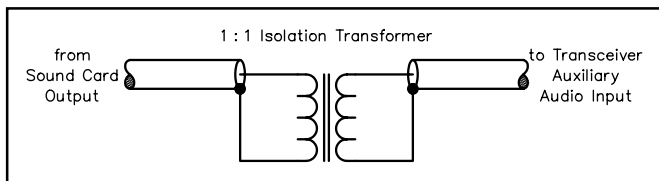


Figure 1—Adding a 1:1 isolation transformer between the sound card output and your transceiver may help alleviate some RFI woes. The transformer shown in this illustration is a RadioShack 273-1374.

Q Kent Taylor, K4AHU, asks, “I have not been operating for several years and I am looking forward to getting back on the air. I have moved to North Florida and I would like to make regular contacts with friends 40 to 60 miles away. Would 10 meters be adequate for this purpose if I was running a beam and 100 W?”

Ten meters is probably not the best band for your application. Depending on what the other stations are using for rigs and antennas, contact is probably possible, but the signals may be weak. You'd have better luck using 40 meters during the daytime and 80 or 160 meters at night.

Q This is a follow-up to my question about a homebrew vertical in your column in November 1998 *QST*. Following your advice, I added a temporary radial to the six I already

had and found the change in signal strength was so slight that I didn't bother to add any more radials. Then, a few months later in another magazine, I saw a column by a writer who bills himself as the “Kaped Krusader.” He labeled your advice as “more antenna hogwash.” Who am I to believe?

Old Doc saw that column too and wondered aloud: “Where has civil discourse gone?” Doc's only human, though, and there are times when he is sorely tempted to put on his own cape and reinvent himself as the “Caped Curmudgeon.” But then civility and sensibility returns to Doc's placid soul and he takes a deep breath and vows to remain positive, practical and helpful.

You wanted to gauge how much effort it would take to improve your vertical antenna system by adding radials. Doc's previous answer was a thoroughly practical one. Adding one radial would be unlikely to produce much of an improvement. Even the Kaped Krusader seemed to agree with that, although he went on to say that adding *a huge number of radials* would improve the situation further. After you sort through all the Kaped Krusader's tables and bombastic verbiage, adding 107 more radials will theoretically improve your signal by about 3 dB, one-half of an S unit.

The Kaped Krusader has stated many times before in print that 2 dB is barely detectable at the other guy's receiver—and Doc agrees with this. So, you will have to decide for yourself whether an extra 3 dB is worth going through all the work of digging up your lawn to put down more than 100 radials. Yes, you will be beaten out more often in the big DX pileups without that extra 3 dB. But even if your vertical were theoretically 100% perfect, do you have any illusions that you're going to beat out stations with big Yagis on tall towers?

Doc's choice? I'd spend the time enjoying myself, making friends and working people on the air—and being civilized about it.

Q When my shack computer is booting up a quick message flashes by concerning my hard drive. It is something about my drive being SMART compatible. What does this mean?

SMART stands for Self-Monitoring, Analysis and Reporting Technology. It is a feature of the hard drive that allows it to give advance warning of certain types of failures. Think of it as the hard drive reporting on the state of its health. The SMART concept seems terrific, until you realize that the drive manufacturers set the SMART parameters. That is, they decide how the relative health of the hard drive will be judged and reported. It isn't in their best interests to have hard drives calling in sick, so to speak, at the drop of a hat. The Doctor has seen some very sick hard drives reporting 100% health, so the value of SMART is questionable at best. If your BIOS supports SMART you can usually enable it in your SETUP, but I wouldn't expect too much. A religious devotion to backing up your drive on a regular basis is still the best insurance. After all, there are only two types of hard drives—those that have failed and those that haven't . . . yet.

Q Ron Vlach, WA0QMP, asks, “When I contact a DX station and he tells me to ‘QSL VIA CBA.’ What does that mean?”

“CBA” means *Callbook* Address. He is saying that you can send your QSL card to him directly by looking up his postal address. The *Callbook* is the *Radio Amateur's Callbook*, which used to be a telephone-directory style publication, but is now available on CD-ROM only. The term is rather generic, though. (Like saying, “Please give me a Kleenex” when you really just want any brand of tissue.) When DX stations tell you to send cards to their “CBA” addresses, they often mean the addresses shown in any number of DX address databases, not necessarily the *Callbook* alone.

Q I'd like to homebrew a 5-V, 1-A dc power supply that I can use with a frequency counter as well as some other projects. Can you suggest something that's compact, inexpensive and uses easy-to-find components?

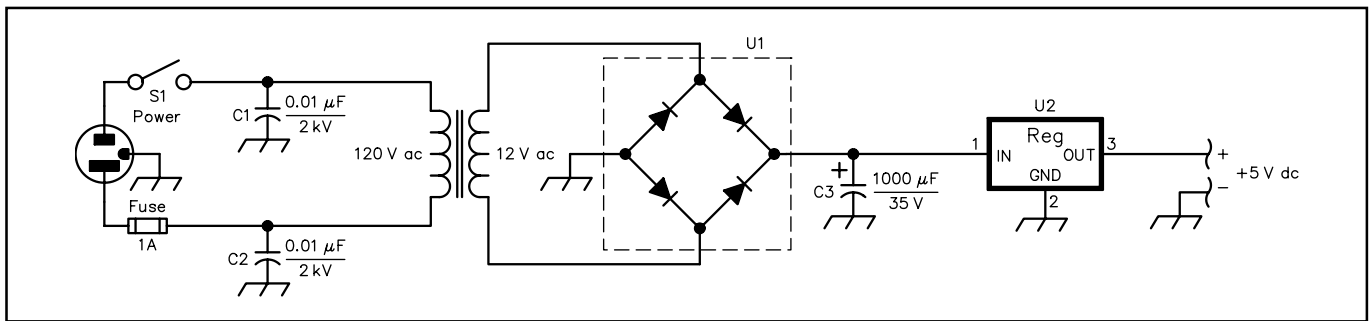


Figure 2—This little 5-V power supply is simple to build and should supply up to 1 A of current. Make sure you put a heat sink on U2, the voltage regulator. RadioShack part numbers are shown below.
T1—120/12 V transformer (273-1352)
U1—Bridge rectifier module (276-1146)
U2—7805 5-V voltage regulator (276-1770)
C1, C2—0.01 mF, 2000 V ceramic disc capacitors (272-160)
C3—1000 mF, 35 V electrolytic capacitor (272-1032)
S1—SPST toggle switch (275-602)

If you're going to challenge the Doctor, you have to do better than that! But seriously, take a look at the diagram in [Figure 2](#). This little 5-V supply should give you decent regulation. It meets your cheap-and-easy test, too.

Q There has been some discussion lately about changing the name of the ARRL. As a new member I'm curious: What does the "Relay" in "American Radio Relay League" mean?

In the early days of the League, hams (and everyone else) used frequencies at or below 200 meters (roughly 1500 kHz). The frequencies above 200 meters were considered useless, but hams were to disprove that quaint notion within another decade or so. Because of the limits of equipment and propagation at 200 meters and below, hams passed messages over great distances by *relaying* them from one station to another. This was one of the chief activities of amateurs in those days and it helped solidify Amateur Radio as a viable public-service network. So, it's understandable that the founders of our organization would choose a name that reflected the nature of Amateur Radio at that time. If you want to read more about the early days of our hobby, I highly recommend *200 Meters & Down* by Clinton DeSoto, W1CBD. See the [ARRL Bookcase](#) in this issue, or order on line at <http://www.arrl.org/catalog/>.

Q Can you describe how a trap dipole works?

The traps in a trap dipole are parallel-resonant tuned circuits that "trap" an RF signal to prevent it from passing beyond a specific point on a conductor (a wire, a metal tube, etc). At some other frequencies, however, the traps no longer act like "traps" and instead allow the RF to pass.

An antenna trap is designed for a particular operating frequency, and there may be several traps in the overall system, each designed for a specific frequency. Therefore, a 40- through 15-meter trap antenna, like the trap dipole shown in [Figure 3](#), might contain traps for 20 and 15 meters. When you're operating on 15 meters, the 15-meter traps effectively "shorten" the antenna by blocking the RF from traveling beyond them. If you switch to 20 meters, the 15-meter traps suddenly become transparent to the 20-meter RF, effectively "lengthening" the antenna. The 20-meter traps, however, are a kind of impedance roadblock to RF, keeping the signal from traveling farther. On 40 meters, all of the traps are "absorbed" into the system to become part of the overall 40-meter dipole antenna.

Because of the loading effect of the traps, the 40-meter portion of the antenna will be somewhat shorter than a full-sized 40-meter dipole without traps. The effective bandwidth on each band will be narrower than that of a standard dipole, too.

A trap-style antenna is not quite as efficient as a full-size dipole, but if the traps are well designed, the losses are not significant. Most hams consider the losses a fair trade-off for the

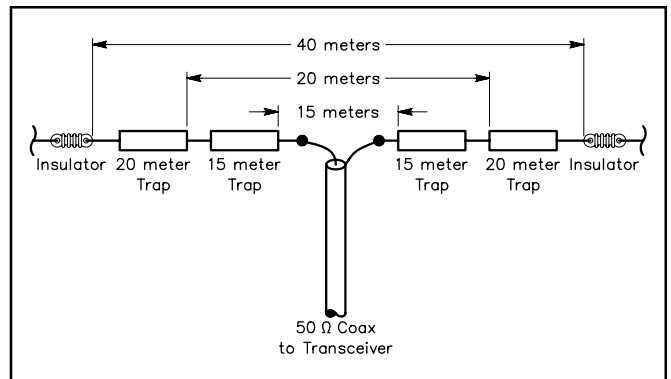


Figure 3—A typical 3-band trap dipole antenna. The traps block RF at a specific frequency, or allow it to pass. From an electrical standpoint, this effectively lengthens or shortens the antenna.

convenience of having an antenna that presents a 50-Ω match to coax on several bands.

Q Phil Speer, KF4VSK, asks, "I recently bought a 6-meter FM mobile transceiver that I often use at home with a simple dipole about 18 feet off the ground. When working simplex it seems that my maximum range is only about 20 miles. Shouldn't I be able to do better than this on 6 meters?"

Yes, you can do better, but there are a number of factors at play. The principal factor is terrain. If your home is surrounded by hills, mountains or other obstacles, your simplex range on 6 meters will be limited. In addition, you're not using a gain antenna (such as a Yagi) that would focus your power and provide greater range.

Despite all this, you should be able to work hundreds or even thousands of miles when the band is open. Spring and summer are among the best times for *sporadic E* band openings. Since your radio is FM only, I'd suggest that you leave it on 52.525 MHz, the national 6-meter FM simplex calling frequency. Just turn up the volume and close the squelch. If there is a band opening, you're likely to hear FM simplex activity on this frequency. In addition, the next year or two will likely yield some *F-layer* skip, which can carry your signal over huge distances. Watch the propagation forecasts and keep your ear to your radio!

[See Feedback in July 1999 QST.](#)

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; or e-mail doctor@arrl.org.

A Simple Killer Antenna

Forty meters (and more), fifteen bucks—lots of DX. An elevated ground system is the secret to the author's success. Try this antenna at home or during Field Day!

Here's an antenna that's inexpensive, easy to build, relatively "invisible," quite compact and a *very* good performer on 7 MHz (and the higher HF bands). A tree limb about 45 feet above the ground (or a tower) is required for a support, and a good antenna tuner is needed to provide a match between the antenna's 450- Ω ladder-line feed and the rig.

Feeding the antenna with ladder line is the only departure from conventional ground-plane antenna construction. It may at first sound odd, but my expectation was that the 450- Ω feed (1) would result in a low SWR across the entire 40-meter band and (2) would enable me to use the antenna on all the HF bands above 7 MHz. I was not disappointed!

As an aside, I'm a firm believer in using a good antenna tuner and antennas fed with single-wire, open-wire or ladder-line feeders. These antennas have served me well over many years.

My wife Maggie and I moved to the small village of Fitzwilliam, in the southwestern corner of New Hampshire, in July 1998. During the summer and fall I was so busy with all my moving and unpacking chores that I didn't have time to put up any serious antennas. When the air started to get a bit nippy, I began erecting some simple wire antennas to use during the winter. (Permanent antennas—and the tower—would have to wait until spring.)

Quite a few tall trees surround our home, and I planned to use them to support three wire antennas: (1) a 130-foot dipole, (2) a 250-foot end-fed Zepp, and (3) an antenna of some sort that would

perform well on 40 meters and the higher bands. I planned to use 450- Ω ladder line to feed each antenna. But first I had to decide what antenna to build for "7 MHz and up."

Jack Colson, W3TMZ, a long-time friend, has a simple but effective antenna for 160 meters—an elevated ground-plane in an inverted **L** configuration. A 33-foot vertical section rises from the feed point, with a 97-foot horizontal section connected to the top of the vertical piece, for a total length of 130 feet—a quarter wavelength on 160 meters. Jack then added two 130-foot radials, not connected to ground, at the antenna end and about eight feet above the ground. Very simple—and *very* effective! Jack works just about anyone he hears on 160 meters.

Construction

His success led me to try an appropriately scaled elevated ground-plane with a ladder-line feed as my 40-meter antenna. I



The author's elevated ground-plane antenna is shown on the right side of the frame. You can see the ladder line, but the antenna doesn't show up very well because it's practically invisible. Even if you can't see the antenna, you can appreciate the view of Mount Monadnock!

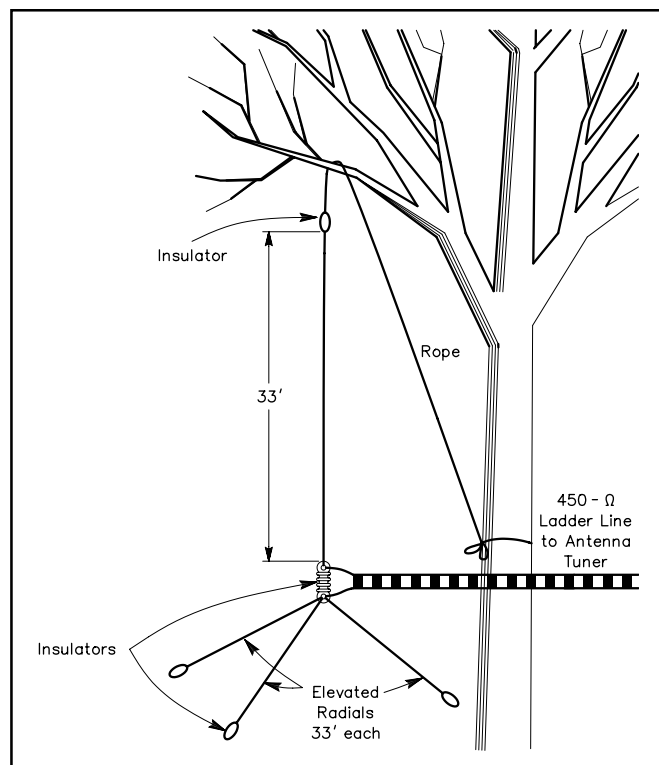


Figure 1—The elevated ground-plane is made up of one 33-foot vertical element and three 33-foot radials. The antenna is made from stranded copper wire and is fed with 450- Ω ladder line. The top of the antenna is supported by a tree limb about 45 feet above the ground and the radials are spread out at mutual angles of 120° and tied off to nearby trees. The radials are about 10 feet above the ground.

DATE	MC	GMT		STATION WORKED	RST		REMARKS
		Start	End		HIS	MY	
27 DEC 1998	28	1453	1502	DH2DAM	599	599	RALE COLOGNE, GERMANY
		2051	2052	TL5R	599	599	CENTRAL AFRICA
	7	2057	2132	YK6DX	599	599	DANE PERTH, AUST (LONG PATH)
	14	2133	2138	TF8SM	599	599	SMARI ICELAND
28 DEC 1998	7	0218	0221	FM18MV	599	599	MEL MARTINIQUE
		0311	0312	SV1SV/46	599	599	GREECE
		0356	0357	UA0UDC	599	599	MICE ASIATIC RUSSIA
		0359	0359	ZS1BAX	599	599	AL CAPESTOWN, SO. AFR.
		0530	0534	GH12	599	599	MARAO MALTA
		0543	0547	SV2AVP	599	599	THEO GREECE
		0556	0600	TK/DLTHE	599	599	TAR CORSICA
		0608	0619	ON6KD	599	599	KARL GHENT, BELGIUM
		0620	0624	HB9AAG	599	599	FRED HAG, SWITZERLAND
		0624	0630	DF1TJ	599	599	EUGEN KERSCH, GERMANY
		0635	0640	TK5MP	599	599	TOMASO BONIFED, COSSICA
		0649	0656	DJ4ZA	599	599	HARRY HATTINGEN, GERMANY
		0656	0705	DL5DTL	599	599	BENEL DRESDEN, GERMANY
		0705	0713	IN3CEK	599	599	BEUNO TRENTO, ITALY
		0713	0720	IT1MMR	599	599	MAURO GENOA, ITALY
		0720	0727	DF52V	599	599	PRISA (Y) HARBURG, GERMANY
		0727	0731	DL1SKB	599	599	HAR SCHWEIN, GERMANY
		0731	0739	DL6SK1	599	599	KARL PLAU, GERMANY
		0739	0745	DJ7YT	599	599	JURGEN PLOEN, GERMANY
		0745	0752	DK7JL	599	599	BEET (7W) KÖLN, GERMANY
		0752	0755	F6BEE	599	599	JACK FRANCE
		0816	0820	PT1JD	599	599	JORO RIO DE JANEIRO, BRAZIL
		0823	0824	PASDE/PT1K	599	599	METHELANDS
29 DEC 1998		2112	2115	GW4GEL	599	599	STEVE WALES
		2119	2122	JAXXNH	599	599	MIO JAPAN
		2132	2154	DL2QB	599	599	KLAUS COLOGNE, GERMANY

Figure 2—An extract from W1AB's log for December 27-29, 1998.

cut four 33-foot pieces of wire, using one as the vertical radiating element and the other three as elevated radials.

I used a slingshot and a 3-ounce spherical fishing weight to shoot a line over a tree limb to support the antenna. First I shot nylon twine into the tree. When I got the twine over an acceptable limb (about 45 feet above the ground), I used it to pull up a polypropylene rope. (There are better materials to use for antenna-support ropes, but I can get polypropylene rope at my local hardware store.)

I then pulled the antenna's top insulator up to the limb and connected a piece of nylon twine from the base insulator to the ground and tied it off to a "dead man"—a 4-foot length of log—with the twine attached near one end of the log. If the tree holding up the antenna sways and pulls the antenna upward, the antenna will lift the end of the log off the ground, which keeps the strain from breaking the antenna or the top support rope.

I spread the three 33-foot radials out in a roughly equiangular configuration to form an elevated counterpoise—which is *not* connected to ground—and tied them off to nearby trees using twine. The feed point is about 10 feet above the ground. Because the tree leans toward the antenna, the "vertical" element is, serendipitously, nearly vertical (see Figure 1).

On the Air

By the time I finished erecting the antenna it was a couple of hours before sunset. I went into the shack, connected the ladder line to my antenna tuner, found a clear frequency near 7030 kHz and tuned up. I signed my call sign once: **DE W1AB AR**.

I had assumed that no one would call me, but a station in the Czech Republic called (keep in mind that this was two hours before sunset) and told me I was 30 dB over S9! His English was fluent and we had a nice ragchew.

When we signed clear, a Greek ham called me and gave me a 589 report, saying (as I noted in my log), "**UR ANT DOING MIRACLES!**"

Holy smokes! This \$15 antenna, which I put up in a couple of hours, was *hot* on 40 meters.

Over the next few days I continued to work DX easily on 40 meters, including Japan via the long path in the early evening and via the short path in the morning, sometimes as late as 1030 local time. In pileups I found that I could contact stations with my first call about 75% of the time by merely throwing my call sign out once—and that was in competition with the Big Boys.

I soon began trying the antenna on the HF bands above 7 MHz and found that it worked quite well on *all* of them—harmonically related or otherwise. Frankly, I didn't expect this because a 40-meter vertical tends to develop nasty high-angle lobes when

used on bands above 20 meters. If some of my radiation at frequencies above 20 meters is going straight up, at least a significant portion must be going sideways, too. Using the antenna in the 1998 ARRL 10-Meter Contest, I worked DX all over the world, including New Zealand. And I got nothing less than 599 reports (that's a joke, by the way, considering that everyone seems to get 599 reports during contests these days).

Even on the competitive 20-meter band I found that I could work through pileups easily with 100 W, often beating out stations with Serious Antennas and High Power. One evening when 20 meters appeared to be dead for DX, I had a nice chat with long-time friend K4LTA in Tennessee. After we finished, a Japanese ham called me and gave me a 599, telling me that he was beaming via the long path. Then a ham in Norway, north of the Arctic Circle, called in with a 599. Then HS98AG (Thailand's special event station commemorating their hosting of the Asian Games) called and gave me a 599. Please note that these stations called me, rather than my having to chase them down. And even in outrageous 20-meter pileups, the antenna makes me quite competitive!

After sunrise one morning, I tuned up on 80 meters for some ragchewing, but forgot to switch from the 40-meter ground plane to my 80-meter dipole. I got a 599 (an actual report, since this wasn't in a contest) from a station in the Deep South. It surprised me that the antenna works so well on 80, but I'll take the unexpected bonus!

Conditions in the 1998 ARRL 160-Meter Contest were only fair, and I had to work hard for contacts using my 250-foot end-fed Zepp. At one point I had called a Wyoming station for several minutes on the Zepp—with no success. Then I called him using my 130-foot dipole (a fair performer on 160 meters)—still no reply. What the heck—I tried the 40-meter ground plane (at reduced power to avoid arcing in my tuner)...and got him on the first call! The antenna *shouldn't* work very well on 160 meters, but it made the long-haul contact when my other—supposedly better—antennas didn't. Go figure!

During the few days following Christmas 1998, I spent a bit more time than usual on the air. Figure 2 is an extract from my log for some of the contacts during that period—mostly on 40 meters. Note the time period from 0649 to 0755 UTC on December 28; every time I would sign clear from one contact, between two and a dozen other stations would call! On December 29 at 2119, you see another long-path Japanese contact (Mio has a *very* big signal via 40-meter long-path propagation on a regular basis).

I can't promise that you will experience similar results—as the car dealers say, "your mileage may vary"—but you might be surprised at how well you can get out with this simple antenna.

Several hams have asked me about the vertical element being so close to the vertical tree trunk, and what losses that proximity might induce. Even when the trees were most conductive (when the sap was running), the antenna worked quite well. If there was any loss, it wasn't enough to bother my DXing!

It's a pleasure to see how well a vertical antenna works when using a 450-Ω ladder-line feed. I decided to leave my killer vertical in place when going to my "permanent" antenna field!

258 Upper Troy Rd
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w1ab@aol.com

QST



The **ARRL Web**
Extra for Members
Only

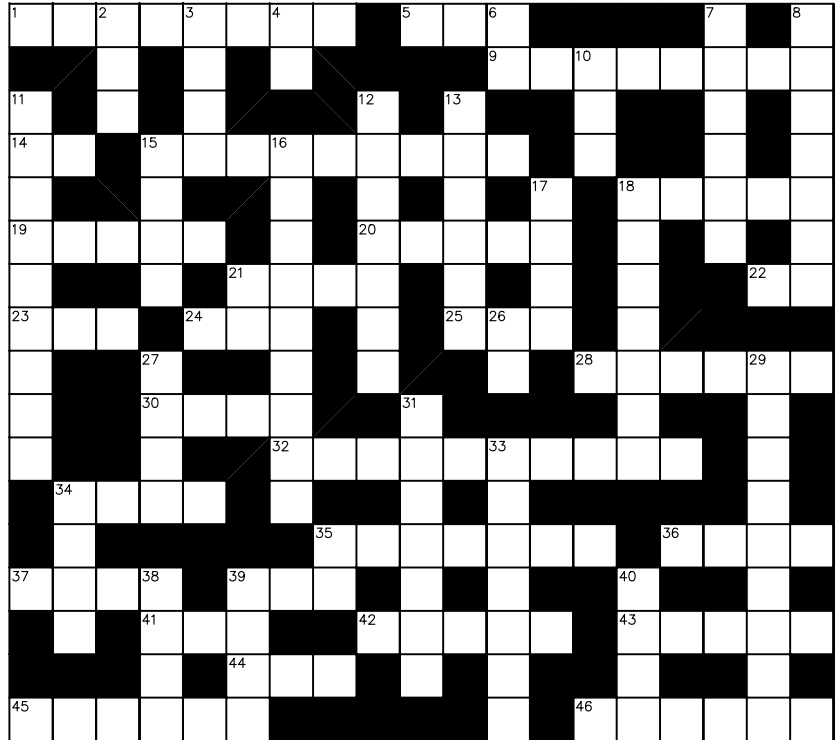
<http://www.arrl.org/members>

Test Your Knowledge!

Get ready for the big event with this Field Day crossword!

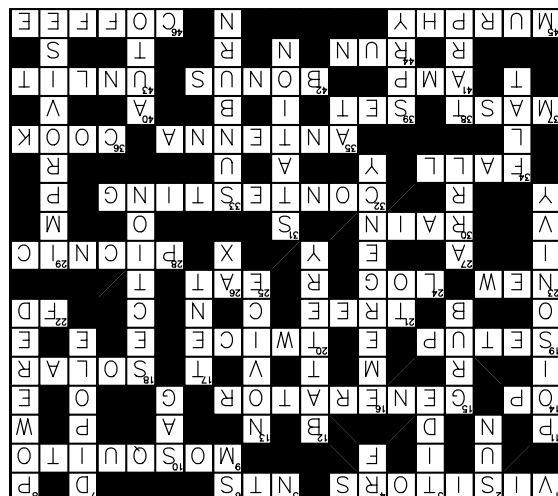
Across

1. Public sites attract these
5. Handles traffic (abbreviation)
9. Common Field Day pest
14. Who mans the rig (abbreviation)
15. Supplies ac power
18. Bonus power source
19. Do this first (two words)
20. CW contacts count _____ as much as SSB
21. Handy antenna support
22. CQ _____ (abbreviation)
23. Field Day is a good way to meet _____ club members
24. Contacts are kept in a _____
25. Fueling the operators
28. Field Day is also a club _____
30. Bad news on Field Day
32. Field Day gives many their first taste of _____
34. Poorly guyed antennas do this
35. If it stays up, it's not big enough
36. The most popular person at Field Day
37. Holds up an antenna
39. Ready, _____, CQ Field Day!
41. This makes for a big signal
42. Special activities earn _____ points
43. Without light
44. Hold a frequency to do this
45. The worst visitor
46. Gas for the operators



Down

2. Hope this shines on your Field Day operation
3. Beach operators better keep an eye on this
4. Poor grounding might give you this kind of burn
6. Send your Field Day message to this person (abbreviation)
7. Simplest wire antenna
8. Class E stations are emergency-_____
10. Loose ropes let wire antenna _____
11. Not a pretty vine
12. Dc power source
13. These operators get a station all their own
15. Mealtime depends on this
16. What Field Day is preparation for
17. Keeps the station dry
18. East Bay is an ARRL _____
21. Bring equipment _____ the site
26. Chops firewood
27. Sponsor of Field Day
29. Make do
31. An operating set of radio equipment
33. Too little shade leads to this
34. A balloon with a hole
35. Tunes the antenna automatically (abbreviation)
38. These cover equipment
39. Tree climbers need to be _____
40. Hauls the Field Day equipment



How to Choose and Use a Portable Power Generator

June—Field Day month—gives us a great excuse to operate from woods, mountain peaks or jungles (concrete or otherwise) in an age-old exercise to improve our emergency communication skills. But what about electrical power? If you're operating "off the grid," a portable generator may be just what you need. Here's some practical advice about choosing the right generator and using it safely.

Setting up a radio station at the local park and working stations here, there and everywhere with a bunch of your best radio buddies is what makes Field Day special. That, and the beer, hamburgers or whatever you're serving in your neck of the radio woods. In addition to a weekend of fun and camaraderie, we improve our ability to serve the public in times of need—and our operating skills probably inch up a notch or two as well.

If you're new to this game you may be wondering about how everything is powered. And even if your operating site has electrical power (campground, softball park, courthouse lawn, etc), you may not want to avail yourself of its convenience. Field Day is ostensibly about practicing for communication emergencies when the ac mains might be out of commission.

Common power sources include batteries, vehicle alternators, wind-powered alternators, solar panels and engine-driven portable power generators. And speaking of portable power generators (PPGs for short), we see them at golf courses, in hardware stores and on TV news reports during floods and ice storms—but we don't see much about them in Amateur Radio publications!

I hope this article gives you a leg up on choosing and using the right portable power generator for your applications, Field Day or otherwise. Pay special attention to the safety issues. Generators—like all engine-powered devices—can injure or even kill you if you don't respect them. And unlike your garden tractor, these power-

houses can *electrocute* you (or others). Don't be afraid—but do pay attention!

The most basic units have preset throttle/engine speeds that can be adjusted to match required loads. These are most useful for powering incandescent lights or small ac motors (saws, drills, etc), which can safely tolerate "cruddy power." Use them to power solid-state devices at your own risk!

Because there are no free lunches, PPGs that offer better regulation and greater output power cost more money. Units that have little or no automatic regulation and less capacity are more affordable—unless you're talking about the tiny "hand-held" units that weigh in at 25 to 60 pounds, which cost more than some higher-powered, beefier, standard models!

And as if that's not enough, in addition to power capacity and regulation, there are other factors to consider such as engine type, noise level, fuel options, fuel tank capacity, run time, size, weight, cost, connectors, miscellaneous bells and whistles, etc.

Buying a Portable Power Generator

Before you run down to your local hardware superstore and buy the first PPG that catches your eye, consider the following items in light of your personal requirements. Sure, you'll use the generator for Field Day, but don't forget to factor in other possible uses such as camping, power outages, and so on. Try to do some research of your own. Your exact requirements may vary, and you may need a solution that fits.

The generators we're discussing here are designed for consumers, contractors and farmers. They're designed for occasional use, not for continuous, long-term applications. Units designed for continuous service and ultra-reliability (for marine, medical and telecommunication systems) are available through specialty suppliers, but the prices are prohibitive for casual users.

PPGs powered by diesel, kerosene, propane and natural gas are also available (at similarly high prices), as are ultra-quiet, liquid cooled, and specially sized and shaped generators. The PPGs we'll be considering are air-cooled and powered by gasoline. The four PPGs I tested while writing this article are shown in [Figure 1](#).

Capacity

To be useful, your generator must be able to safely power all of the devices that will be attached to it. On a basic level that's just common sense. Simply add up the power requirements of *all* the devices, add a reasonable safety margin (25 to 30%) and choose a suitably powerful generator that meets your other requirements.

When you read the fine print, however, things get tricky. Some devices—most notably motors—take a lot more power to start up than they do to keep running. For example, a motor that takes 1000 W to run may take 2000 to 3000 W to start. Light bulbs, soldering irons, space heaters and most radios don't require extra start-up power, but be sure to plan accordingly.

Size and Weight

PPG size and weight usually vary according to power output—



Figure 1—The author tested these four portable power generators during the creation of this article. See [Table 1](#) and the "[Resources](#)" sidebar for more information. (All photos by the author)

low-power units are lightweight and physically small, while beefier models are larger and weigh more. Some models are wrapped in a large protective frame while others have less “air space” inside the “cage.”

Tiny camper models (800 to 1000 W output) are amazingly small and lightweight, but some units lack sufficient regulation and may not be recommended for powering solid-state devices. On the other hand, some teeny gens can put out a whopping 70 A of 12-V dc for charging batteries. If your gear is battery-powered, you may still be in luck.

Engines and Fuel

Most portable generators are driven by small gasoline engines similar to those used to power lawnmowers or go-carts. Basic models are powered by standard side-valve engines. These often make more noise, need more-frequent servicing and often don't live very long. More expensive models have overhead-valve (OHV) engines, pressure lubrication, low-oil shutdown, cast-iron cylinder sleeves, oil filters and electronic ignition systems. These features may be overkill if your generator will be used only occasionally. But if your generator needs are more consistent, “upgrade” models may offer much better service.

Run Time

Let's face it: Filling the generator's gas tank every hour can be a hassle—especially if you do it safely by shutting off the engine and letting it cool briefly before carefully pouring in more gas.

As a rule, smaller PPGs have smaller gas tanks (and vice versa)—but that doesn't necessarily mean that they need more frequent refueling. Some small engines are more efficient than their larger counterparts and may run for half a day while powering small loads.

When you look at generator specs, remember that the run times for most units are shown for 50% loads. If you're running closer to max capacity, your run times may be seriously degraded. The opposite is also true. “Extended Run” models usually have more efficient engines and larger gas tanks. The generator unit, however, is usually unchanged.

Typical PPGs run from three to nine hours on a full tank of gas at a 50% load.

Noise

Subject to a few exceptions, generators are almost always too loud. That is, we'd always prefer them to be less obvious. If you're set up for Field Day way out in the woods, generator noise probably isn't a problem. If you're set up in a campground or other more-public space, however, PPGs can sound like a rock concert. Keeping the things quiet isn't always possible!

Noise levels for many models are stated right on the box, but because there's no set standard for measuring generator noise, take these with a grain of salt and try to test them yourself before buying.

Was the PPG three feet away from the sound level meter, or was it 10 or 20? Was the muffler facing the test set, or was it hiding behind the unit's engine? Did the noise tests take place in an open field, or were buildings or other reflective structures nearby? You get the idea!

That said, some models are definitely quieter than others. Some gens *do* have quieter engines and muffler systems, but most of the noise is actually produced by rotating generator parts and vibrating sheet metal. If you take great pains to make the exhaust quieter—as some users attempt—you may be shocked to discover that your improved “stealth generator” is only marginally less noisy!

Water-cooled PPGs (rare and somewhat expensive) produce less noise, as do units designed to be housed in special compartments found in boats and RVs. They're not a free lunch, though. RV gens are expensive and heavy.

Regulation

As previously mentioned, voltage and frequency regulation—or lack thereof—may significantly influence your buying decision. The bottom line is that *any* PPG can safely power lightbulbs, heating elements and power saws, but when it comes to computers, TVs and expensive ham radios, units with mechanical or electronic regula-



Figure 2—Prized by RVers, PowerWatch Technologies' Good Governor is a handy unit that visually indicates ac wiring faults and accurately displays the voltage and frequency of the ac line source it's plugged into. If you can't find one at your local RV dealership, contact the manufacturer at PO Box 22988, Denver, CO 80222.

tion may be required, if only for peace of mind! (All of the gens I tested safely powered solid-state devices. Initial tests, however, were made with a small TV set I'd purchased for \$5 at a garage sale, just to be sure!)

Unloaded generators may put out 130 V at 62-63 Hz. As loads increase, frequency and voltage decrease. Under full load, output values may fall as low as 105 V at 58-59 Hz. Normal operating conditions are somewhere in between.

To add an extra measure of safety, consider inserting an uninterruptable power supply (UPS) or a line conditioner between the generator and your sensitive gear. These devices are often used to maintain steady, clean ac power for computers and telecommunication equipment. As the mains voltage moves up and down, a line conditioner bucks or boosts accordingly. UPSs, with internal gel-cell batteries, provide power to the load if the ac mains (or your generator) go down.

If “electronic voltage regulation” isn't mentioned on the box, consider calling the manufacturer before you buy. And although you might get lucky, don't expect expert help from the salesperson at your local hardware store—they're used to helping contractors who want to power lights and saws. (To improve your odds of getting a unit with electronic regulation, consider buying a PPG intended for sale in Canada. Two manufacturers suggested that all Canadian PPGs must have electronic regulation.)

Dc Output

Some PPGs have 12-V dc outputs for charging batteries. These range from 2-A trickle chargers to 100-A powerhouses. Typical outputs run about 10 to 15 A. As with the ac outputs, be sure to test the dc outputs for voltage stability (under load if possible) and ripple. Batteries—especially when your car is stranded in a blizzard—aren't too fussy about a little ripple in the charging circuit, but your radio might not like it at all! It's better to be safe than sorry.

Miscellaneous

Other considerations include outlets (120 Vac, 240 Vac, 12 V dc, etc), circuit breakers (standard or GFCI), fuel-level gauges, handles (one or two), favorite brands, starters (pull or electric), engine operating speeds (faster means more noise, less weight and a shorter lifespan, and vice versa), wheels, handles or whatever you require.

Using Your Generator

Before we can connect “real” electrical loads in a Field Day situation we need to choose a grounding method—a real controversy among campers, RVers and home-power enthusiasts.

To complicate matters, almost all PPGs have ac generator grounds that are connected to the units' metal frames, but some units do not “bond” the ac neutral wires to the ac ground wires (as is done in typical house wiring). Although they might safely power your ham station all day long, units with “unbonded neutrals” may appear defective if tested with a standard outlet “polarity” tester.

Some users religiously drive copper ground rods into the ground or connect the metal frames of their generators to suitable existing

Table 1

Measurements and Data from the PPGs Shown in Figure 1

Model	Output Surge & Cont	Run Time @ 50% load (hours/gals)	V/f @ 0 W 500 W 1000 W	Reg. Method	Engine Type & Size	Weight (lb)	Price (Street)	Notes
Coleman Vantage 3500	4375 3500	9/3	128/63 125/62 125/62	Elect.	OHV 5.5 hp	110	\$1049	1,2,3,4 5,6,8,9
Coleman Pulse 1750	1750 1400	5/0.9	133/63 130/62 125/60	None	Std 3 hp	65	\$499	1,2,5,7,9
Homelite LR2500	2500 2300	7.2/3	157/64 151/64 149/64	Mech	Std 5 hp	87	\$479	2,5,9
Honda EZ2500A	2500 2300	2.6/1	124/63 122/61 119/60	Elect.	OHV 5.5 hp	81	\$789	5,6,7,8,9

1—Has 15-A, 12-V dc output.

2—"Extended Run" model.

3—Unit intended for sale in Canada.

4—Engine automatically idles when no loads are attached.

5—Unit has low-oil shutdown.

6—Unit has electronic ignition.

7—Unit is physically compact.

8—Unit is noticeably quieter than typical units in its class.

9—Unit should be adjusted for best voltage and frequency before regular use.

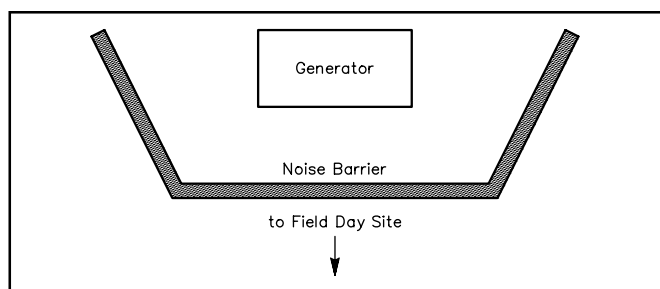


Figure 3—A two- or three-sided “room divider”-style noise shield is a handy, low-tech way to put a barrier between you and your Field Day generator. Use cardboard or carpet-covered plywood (with hinges, perhaps?), but don’t put the generator in a covered box!

grounds, while others vigorously oppose this method and let their gens float with respect to earth ground. Some user manuals insist on the ground connection, while others don’t. The same is true for various electrical codes.

Follow the instructions in your user’s manual and comply with local electrical codes. Grounding can also be a consideration with respect to lightning protection. See the ARRL Technical Information Service package on lightning-protection methods at <http://www.arrl.org/tis/info/lightnin.html>.

Regardless of the grounding method you choose, a few electrical safety rules remain the same. Your extension cords *must* have intact, waterproof insulation, three “prongs” and three wires, and must be sized according to loads and cable runs. Use 14-16 gauge, three-wire extension cords for low-wattage runs of 100 feet or less. For high-wattage loads, use heavier 12-gauge, three-wire cords designed for air compressors, air conditioners or RV service feeds. If you use long extension cords to power heavy loads, you may damage your generator and/or your radio gear. When it comes to power cords, think *big*. Try to position extension cords so they won’t be tripped over or run over by vehicles. And don’t run electrical cords through standing water or over wet, sloppy terrain.

During Field Day operations, try to let all operators know when the generator will be shut down for refueling so radio and computer gear can be shut down in a civilized manner. Keep the loads disconnected at the generator until the generator has been refueled and restarted. And keep a sharp eye out for late night ops who try to sneak space heaters, leg warmers or coffee makers into the tents. An extra 1500 W of power draw can crash the generator in a hurry!

Resources

If you can’t find a decent selection of PPGs at your local hardware superstore (with the Y2K craze, PPGs are in short supply everywhere), call Northern Hydraulics (800-533-5545) or Harbor Freight Tools (800-423-2567) and request catalogs. They’re handy for other items, too!

For more information on the generators I mention in this article, surf or call: Honda generators, <http://www.honda-generators.com/generators/index.html>; Coleman generators, 800-445-1805; Home-lite generators, <http://www.homelite.com/homelite/products/>.

For information on UPSs, line conditioners and inverters, start with Statpower (<http://www.statpower.com/home.htm>) and American Power Conversion (APC) <http://www.apcc.com/>.

Handy Tips

Ask any Generator Elmer and you’ll get a flood of helpful hints—many learned the hard way. Here are a few:

Light Bulb Load Stabilizer

To keep generator output as stable as possible when switching loads on and off (keying a transmitter, for example), try keeping a small load (two light bulbs, for example) connected for the duration. The constant load can reduce power swings while the engine governor “hunts” to maintain proper shaft speeds.

Noise Reduction

According to many trial-and-error users, the best way to tame a noisy PPG during Field Day is to set it up in an out-of-the-way area and make a two- or three-sided sound shield from carpet-covered plywood or stiff cardboard (these look like small, folding room dividers). Keep the sound absorber/reflector between you and the gen. Do *not* make a four-sided shield or put the generator into any type of box. Gens need airflow to keep cool. See Figure 3.

Storage

When Field Day fun is over, don’t just shove your generator into a dark corner of the garage. Follow the user manual’s storage procedures and consider adding a small amount of gasoline stabilizer to keep the gasoline from oxidizing and gumming up the carburetor.

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QST

This Ain't Baseball: It's the 1998 CW Sweepstakes

Yogi Berra, the great New York Yankee catcher, is generally credited with coming up with the expression "It ain't over 'til it's over!" Berra was a baseball player, not a contender. In contesting it ain't over when it's over—it ain't over 'til the log checker sings.

And the log checkers did quite a bit of singing and dinging this year, digital dinging. Tree, N6TR, and Trey, N5KO, totally revamped the ARRL contest computer log-checking system so that electronic log submissions could be entered into a database, acknowledged automatically (eliminating lost logs, we hope) and then subjected to an extremely rigorous cross checking. The list of "Logs Received" available on the Web also helped ensure arrival of logs. It's safe to say this year's contest was the most thoroughly checked in Sweepstakes history.

After the last out in baseball, you know the final score. After the last QSO in Sweepstakes, you don't. The preliminary results are quickly available. Tired, but anxious to find out how the competition did, many players sit around the virtual locker room on 3830, knock back a nonvirtual ice cold 807, and partake of the postmortem before heading to the showers.

There is even a strategy to reporting in

Top Ten

CW			
Single Operator, QRP		Single Operator, High Power	
W4PA	125,736	K1TO	240,792
KG5U	120,588	WP3R (KE3Q,op)	232,260
K1TR	117,936	W5WMU (N6TR,op)	232,102
N6MU (at N6NB)	116,220	K5GN (at W5KU)	222,938
N0AX	112,112	N2IC	221,674
N9CIQ	107,124	N5KO	216,618
K3CR (KB3AFT op)	106,080	N0NI (AG9A,op)	216,302
W1MJ (at K1TTT)	101,556	W4AN (K4BAI,op)	214,722
AC5K	97,636	N2NT (N2NC,op)	213,616
K0FRP	95,784	WX0B (K5GA,op)	212,194
Single Operator, Low Power		Multioperator	
N5TJ	208,244	K0RF	212,826
K0EU	199,554	K4OJ	202,398
K4WX	180,804	K0VBU	194,814
K6LA	170,352	KT0R	187,862
K7UP	169,884	AB0S	185,650
N0NR	166,374	K2TW	179,014
KY7M	164,162	W2PV	177,750
K9IG	159,580	K07X	177,528
K8BL	158,000	K4LT	171,904
K0RX	157,842	W3GH	169,218

hitters wait till there are two outs in the bottom of the ninth. By 0330 the all-stars have reported, signed off, and headed for the showers, pretty well knowing where in the standings they finished.

If you've never listened to 3830 kHz right after the finish of Sweepstakes, you've missed out on some of the fun and part of the camaraderie of contesting. Hear the veterans' and rookies' claimed scores, along with myriad comments about sweeps, band conditions, multipliers found or lost, visits from Murphy, etc. It's also an opportunity to go up a few kHz with the locals. In the last few years a post-contest post to the virtual 3830 in cyberspace (3830@contesting.com) has become as common as a QSL. On the virtual 3830 the preliminary results are compiled and the final Top Ten and Regional boxes are apparent after only a few days.

The 3830 CW SS buzz from the virtual locker room after this running of the fall classic was that the game had a terrific beginning on Saturday followed by a dismal ending Sunday. After a high-scoring first two innings in which many found they were off to their best starts ever in CW Sweepstakes, the same many found a solar flare shut them out and dropped them behind last year's rate sheet by the end of the fourth. It was like going from an Ernie Banks "Let's play two" kind of day to a long rain delay.

after the short walk from the dugout of CW to the SSB locker room on 3830! Right after the national anthem, a short cacophony of "hooooooooo yaaaahhhhhhhhhhh's" and "hellllllloooooo raaaaadioooooooo's" of unknown origin, someone starts taking the list and repeating the score just reported for the straining ears of the distant crowd. Some big guns like to lead off, some top-10 regulars like to report clean up, and some pinch

Top Five—CW

Boxes list call sign, score and class (Q = QRP, A = Low Power, B = High Power, M = Multioperator)

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)		Southeast Region (Delta, Roanoke and Southeastern Divisions)		Central Region (Central and Great Lakes Divisions; Ontario Section)		Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)		West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)	
K1TR	117,936 Q	W4PA	125,736 Q	N9CIQ	107,124 Q	KG5U	120,588 Q	N6MU (at N6NB)	116,220 Q
K3CR (KB3AFT op)	106,080 Q	N4ROA	84,804 Q	W8RU	95,004 Q	AC5K	97,636 Q	N0AX	112,112 Q
W1MJ (at K1TTT)	101,556 Q	K5IID	78,540 Q	N9NE	88,140 Q	K0FRP	95,784 Q	K7MM	91,050 Q
W1EAT	92,246 Q	N4UW	69,116 Q	K9OM	77,088 Q	N0UR	93,016 Q	W6JTI	86,640 Q
K3AN	88,704 Q	W8DL	66,272 Q	VE3SMA	74,400 Q	K5WO	83,776 Q	N7IR	85,728 Q
W2TZ	152,154 A	K4WX	180,804 A	K9IG	159,580 A	N5TJ	208,244 A	K6LA	170,352 A
KM1X	150,766 A	N44K	157,248 A	K8BL	158,000 A	K0EU	199,554 A	KY7M	164,162 A
WA1S	149,448 A	NP3A	154,998 A	W8MJ	151,838 A	K7UP	169,884 A	K7BG	155,946 A
K1HT	141,208 A	N8II	149,842 A	K9TR	144,606 A	N0NR	166,374 A	N7OU	154,128 A
K1VUT	138,624 A	WD4AHZ	149,626 A	KU8E	142,516 A	K0RX	157,842 A	KE7X	151,048 A
N2NT (N2NC,op)	213,616 B	K1TO	240,792 B	N9RV	197,658 B	K5GN (at W5KU)	222,938 B	K6LL	203,662 B
K5ZD	202,556 B	WP3R (KE3Q,op)	232,260 B	W9RE	181,384 B	N2IC	221,674 B	W6GO (N6IG,op)	196,236 B
K3LR (K3UA,op)	201,292 B	W5WMU (N6TR,op)	232,102 B	K9AN	168,428 B	N5KO	216,618 B	K7GJ	193,708 B
W2RQ	192,660 B	W4AN (K4BAI,op)	214,722 B	K1AO	161,160 B	N0NI (AG9A,op)	216,302 B	KG6OK	181,272 B
K3MM	190,788 B	N4BP	205,436 B	W0AIH (VE4VV,op)	160,622 B	WX0B (K5GA,op)	212,194 B	K6KM (N6TV,op)	176,170 B
K2TW	179,014 M	K4OJ	202,398 M	K4LT	171,904 M	K0RF	212,826 M	N6ZS	154,998 M
W2PV	177,750 M	W4MYA	166,690 M	AA8U	145,518 M	K0VBU	194,814 M	N6KI	149,760 M
W3GH	169,218 M	K5MDX	163,488 M	K9MMS	145,202 M	KT0R	187,862 M	K6RC	146,016 M
W2RE	163,688 M	W4RM	150,384 M	N9FH	137,618 M	AB0S	185,650 M	K6NO	139,832 M
AA2FB	154,366 M	N4EC	147,224 M	W8AV	136,656 M	K07X	177,528 M	K6SG	116,578 M

ARRL November Sweepstakes Plaque Winners

Listed below are all of the plaque category winners. Only plaques with sponsors will be awarded. If you have won a plaque category without a sponsor, you may purchase your own plaque. The cost is \$60 per plaque. If you, your club, or business is interested in sponsoring any of the unsponsored plaques call Dan Henderson, N1ND at ARRL HQ.

Category	Winner	Donor	Category	Winner	Donor
Overall			Northwestern Division		
QRP CW	W4PA	MI QRP Club	QRP CW	N0AX	Paladin Contest Club
Low Power CW	N5TJ	In Memory of Charles Oakes, W6UQF	Low Power CW	K7BG	
High Power CW	K1TO	N5KO and W0UA	High Power CW	K7QQ	
Multioperator CW	K0RF		Multioperator CW	K7FD	
Atlantic Division			Pacific Division		
QRP CW	K3CR (KB3AFT op)	Gary Hembree, N7IR	QRP CW	N6MU (at N6NB)	Robert A. Wilson, N6TV Richard Hallman, N7TR
Low Power CW	W2TZ	North Coast Contesters	Low Power CW	WX6V	
High Power CW	K3LR (K3UA, op)		High Power CW	W6GO (N6IG, op)	
Multioperator CW	W3GH	North Coast Contesters	Multioperator CW	N6ZS	
Central Division			Roanoke Division		
QRP CW	N9CIQ	W9QOX Memorial	QRP CW	N4ROA	Raleigh Amateur Radio Society
Low Power CW	K9IG	In Memory of Mike Corke, N9AEJ	Low Power CW	N8II	
High Power CW	N9RV	In Memory of Richard Harper, W9RW	High Power CW	N4AF	Tidewater Morse Code Society
Multioperator CW	K9MMS	Don Haney, W9WW	Multioperator CW	W4MYA	
Dakota Division			Rocky Mountain Division		
QRP CW	N0UR	Tod Olson, K0TO	QRP CW	K0FRP	Ron Stark, KU7Y Ron Stark, KU7Y Southern New Mexico DX Assn—WW5DX
Low Power CW	N0AT (N0KK, op)	Minnesota Wireless Assn, W0AA	Low Power CW	K0EU	
High Power CW	W0SD (WD0T, op)	Minnesota Wireless Assn, W0AA	High Power CW	N2IC	
Multioperator CW	KT0R	Minnesota Wireless Assn, W0AA	Multioperator CW	K0RF	
Delta Division			Southeastern Division		
QRP CW	W4PA	Pat Sonnier, W5WMU	QRP CW	W4DEC	Bill Harding, K4AHK
Low Power CW	K4WX	Pat Sonnier, W5WMU	Low Power CW	NP3A	
High Power CW	W5WMU (N6TR, op)	Pat Sonnier, W5WMU	High Power CW	K1TO	
Multioperator CW	K5MDX		Multioperator CW	K4QJ	
Great Lakes Division			Southwestern Division		
QRP CW	W8RU	Bill Maxson, N4AR	QRP CW	N7IR	Ray Day, N6HE and Donna Day, N6HTH Larry Serra, N6NC
Low Power CW	K8BL	Mad River Radio Club	Low Power CW	K6LA	
High Power CW	K1AO	North Coast Contesters	High Power CW	K6LL	Warren Hill, K7WX
Multioperator CW	K4LT	David Smith, ND4Y	Multioperator CW	N6KI	
Hudson Division			West Gulf Division		
QRP CW	K2WK	NJ-QRP Club	QRP CW	KG5U	AZ ScQRPIons D. Craig Boyer, AH9B Leo E. Oyler, Jr, W0GOW—W5RO Memorial Young Gunners DX Foundation
Low Power CW	K2UF	John Golomb, N2NC and Andy Blank, N2NT	Low Power CW	N5TJ	
High Power CW	N2NT (N2NC, op)	Stuart Silverstein, K3UEI, Memorial	High Power CW	K5GN (at W5KU)	
Multioperator CW	K2TW		Multioperator CW	NA5B	
Midwest Division			Canada		
QRP CW	N0OCT	Brian Keegan, KF2HC	QRP CW	VE3SMA	Chuck Adams, K5FO Don Haney, W9WW
Low Power CW	K0RX	Johnson County Contest Club, N0JX	Low Power CW	VE7CC	
High Power CW	N0NI (AG9A, op)		High Power CW	VY1A (KN5H op)	
Multioperator CW	K0VBU		Multioperator CW	VE9HF	
New England Division					
QRP CW	K1TR				
Low Power CW	KM1X				
High Power CW	K5ZD				
Multioperator CW	K1IG				

One comment was “40 meters sounded like a haunted house at night.” To paraphrase a W4, “W8s fluttered like Russians over the Pole.” While 10 meters came back with a vengeance from prior years at the start, the solar flare trashed the band and even put 15 meters on the disabled list. The dugouts all emptied on 20 meters, and it made for quite a brouhaha. The brawl was best summed up by N6IG at W6GO who, perhaps wishing there had been someone to call in from the bullpen, lamented, “I don’t want to talk about it!”

For 1998, when the log checkers finally sang, the number 2 claimed score, due to its low 0.9 ERA (error rate average) wound up in the number 1 spot in the prestigious High Power CW Sweepstakes category. It was the Grapefruit League’s Ted Williams (Dan, K1TO) passing Caribbean League Babe Ruth (Rich, KE3Q, at WP3R). The Babe hit more homers (claimed QSOs), but Ted struck out less and had a better right on base average (fewer lost QSOs). K1TO’s total also set a Mark McGuire type all-time high score in this category. Rich did hang on to the number 2 spot by one QSO over Tree, N6TR, visiting at W5WMU. The final statistics show K1TO lost only 14 QSOs with no call sign errors for a B-Power

League leading 0.9% ERA.

John, N6MU, won the Golden Glove for ERA accuracy among the top ten finishers in all categories. Out of 748 QSOs, John erred in only three exchanges for a great error rate of 0.4%. The overall ERA leader was Ralph, VE7XF, who had one error in 353 at bats for a 0.3% rate. Greg, K7KJ, was a close second with one error in 298 chances. Both play in the A Power League along with Dave, K0RX, who was the A Power League ERA accuracy top-ten champ with a 1.3% error rate. Bob, N4BP, lead the B Power League top ten with a nifty zero exchange miscues and merely 5 busted calls in 1360 total QSOs.

The Midwest Region was the place to be for a top ten Big Power League finish. Dave, K5GN, at W5KU, took the number 4 spot and top regional honors, followed by Steve, N2IC number 5, Trey, N5KO, number 6, Mark, AG9A, visiting at N0NI number 7 and Bill, K5GA, away at WX0B, number 10. Rounding out the top ten were John, K4BAI, at W4AN number 8 and John, N2NC playing at N2NT, number 9 overall and tops in the Northeast Region. Greg, K9IG, was the man in the Central Region. In the Cactus League, once again, Dave, K6LL, came out ahead of the rest

of the West Coast Region.

The most amazing overall performance in the contest was by Jeff, N5TJ, who not only finished first in the low power category, but also missed the high power top ten by only 26 QSOs. Jeff is simply in a league of his own. The Midwest Region was also the place to be to make the low power top ten with number 2 Randy, K0EU, number 5 John, K7UP, number 6 Glen, N0NR and number 10 Dave, K0RX.

Ed, K4WX wound up number 3 overall in low power and number 1 in the Southeast Region. The top slugger in the West Coast Region was number 4 finisher Ken, K6LA. In the number 5 spot was John, K7UP followed by Glen, N0NR. Right behind was Lee, KY7M at number 7. Greg, K9IG, was number 8 overall while taking top honors in the Central Region closely followed there by number 9 Bob, K8BL. Carl, W2TZ, was number 1 in the Northeast Region.

It is interesting to note that while seven of the top ten high power players were designated hitters at visiting team stadiums (guests ops) all of the low power top ten had the home field advantage.

In the Little Watt League Scott, W4PA made his own runs, bunting and stealing every fraction of a dB on his way to the

number 1 QRP spot. Dale, KG5U, finished number 2 and tops in the Midwest Region. Ed, K1TR, was number 3 and the pennant winner in the Northeast Region. John, N6MU, at N6NB was number 4 overall and took top West Coast Region honors. Ward, N0AX finished number 5. Number 6, Jay, N9CIQ, finished first in the Central Region. Jim, KB3AFT, at K3CR was number 7, followed by Eliot, W1MJ, at K1TTT. John, AC5K, and Alan, K0RPF rounded out the QRP top ten. A special note: 176 QRP entries were received this year. Maybe we are seeing a come back of the old bunt-and-run contesting to complement the gorilla sluggers in the High Power League.

The Midwest Region was also the place to be in the Multi-op category, with K0RPF leading the league. In the same tough re-

gion were number 3 K0BVU, number 4 KT0R, number 5 AB0S; and number 8 KO7X. Preventing a Midwest top 5 sweep was Southeast Region leader K4OJ. K2TW finished number 6 overall and first in the Northeast Region, immediately followed by W2PV. K4LT was number 9 overall, taking top honors in the Central Region.

W3GH rounded out the top 10. N6ZS was first from the West Coast.

From the fans whose favorite just missed making the Top Ten or Regional boxes, a sigh and a cry of "wait 'til next year!"

Next month: Sweepstakes phone results, club competition results and a summary of the collegiate championship scores.

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Have you ordered your 1998 Clean Sweep Cup? We still have a limited quantity left in stock. Send a copy of your summary sheet along with a check for \$10 per cup and order yours today. We also have limited quantities of Clean Sweep Cups from previous years. Send in your request, with the appropriate summary sheet (make sure the Sweepstakes year is clearly noted), and \$10 per cup to: Sweepstakes Cups, ARRL, 225 Main St, Newington, CT 06111.

Scores

Within each Section, scores are listed in descending order, by power categories, followed by multioperators. Line scores list call sign, score QSOs, multipliers, hours, class (Q = QRP, A = Low Power, B = High Power, M = Multioperator, C=Collegiate)

1 Connecticut										Northern New Jersey										K3JGJ (+NET)										N3NZ									
N1TMT	48,008	353	68	24	Q					K2WK	64,200	428	75	12	Q					41,870	265	79	15	M					N3RM	13,392	108	62	16	A					
N1MT	18,492	138	67	24	Q					KF2HC	46,080	320	72	20	Q					K2VT (+K2VS)									K3EZ	13,300	133	50	8	A					
NM1K	11,200	112	50	7	Q					N2NO	21,632	169	64	10	Q					40,260	305	66	22	M				K3BFD	11,660	106	55	13	A						
W1NN	110,604	709	78	15	A					W2YWC	14,300	130	55	12	Q					Western New York										W3SSS	10,272	107	48	9	A				
W1ECH	100,932	647	78	16	A					W3BBO	8,750	125	35	11	Q					W2EB	30,056	221	68	20	Q				W3SD	9,870	105	47	9	A					
NX1Q	38,766	273	71	10	A					KF2EW	4,992	64	39	6	Q					KF2JC	10,488	114	46	11	Q				K2CD	8,400	100	42	24	A					
KA1MWX	35,632	262	68	20	A					N2ED	89,206	611	73	19	A					NQ2RP	7,304	83	44	8	Q				WB3FJOJ	2,610	45	29	10	A					
K1KAV	34,770	285	61	16	A					W2LRO	42,174	297	71	15	A					W2VZ	2,800	40	35	12	Q				KA3B	172,220	1090	79	24	B					
K1JN	22,200	185	60	10	A					W2ASQ	37,380	267	70	13	A					W2TZ	152,154	963	79	24	A				K3TEJ	152,412	977	78	23	B					
N1JW	18,476	149	62	5	A					K2WA	36,176	266	68	20	A					KU2X	112,176	779	72	24	A				K3SV	143,306	907	79	24	B					
K1STM	8,544	89	48	4	A					N2ZW	32,776	241	68	19	A					W2KA	99,540	630	79	18	A				AA3TT	120,432	772	78	23	B					
K1RM	180,796	1174	77	24	B					W2ZK	31,668	203	78	16	A					K1PY	67,306	461	73	24	A				WU3M	119,496	766	78	24	B					
KQ2M	169,850	1075	79	20	B					N2ST	17,632	152	58	24	A					AE2T	65,250	435	75	12	A				N3RD	51,668	368	70	6	B					
K1ZZ	79,404	509	78	6.5	B					W2TI	13,328	196	34	12	A					W4EZA	64,372	418	77	24	A				K3TAE	39,798	297	67	24	B					
NQ1K	46,950	313	75	24	B					KC2EEQ/N	780	26	15	6	A					AA2VX	54,568	359	76	18	A				W3IZ	18,910	155	61	12	B					
K1WB	46,926	297	79	9	B					N2XSE	750	25	15	3	A					KU2N	48,984	314	78	11	A				K3WW (+NET)										
K1KI	38,726	289	67	3	B					KB2WNU	72	6	6	24	A					W2FE	33,180	237	70	16	A				K3II (+NET)	54,054	351	77	16	M					
N4XR	31,200	208	75	7	B					K1G (+NET)										N2UM	32,092	226	71	24	A				KQ3F (+NET)										
W1BHH	26,112	192	68	3	B						94,326	597	79	9	M					WB2ELW (K2CF,op)										32,136	206	78	8	M					
W1QK	26,108	214	61	6	B					W1OP (W1UJX,W1G5,K1NJY,ops)											30,912	224	69	11	A				WY3T (+NET)										
WS1F (+KA1WVG)											45,698	313	73	20	M							30,912	224	69	11	A				W3OV (+NET)									
K2RD (+NET)	34,918	221	79	7	M																	30,912	224	69	11	A					28,908	198	73	15	M				
Eastern Massachusetts																																							
K1RC	82,056	526	78	23	Q					Vermont																													
W1MK	6,636	79	42	4	Q					W1EAT	92,246	599	77	21	Q																								
K1HT	141,208	929	76	24	A					W1UT	12,200	100	61	8	Q																								
K1VUT	138,624	912	76	24	A					WB2CWA	4,690	67	35	13	Q																								
N1BB	139,122	887	78	24	A					N1RL	113,444	718	79	20	A																								
K1NTR	76,500	510	75	12	A					AA1SU	63,080	415	76	22	A																								
WA1OLV	61,056	424	72	22	A					N1RJF	53,088	336	79	24	A																								
KO1O	53,872	364	74	17	A					AB1T	40,880	292	70	24	A																								
WG1Z	47,268	303	78	19	A					NO1CI	31,440	262	60	23	A																								
K1EP	46,720	320	73	21	A					W1SJ	128,128	832	77	24	B																								
WZ1K	40,880	292	70	23	A					Western Massachusetts																													
K1XM	28,470	219	65	24	A					W1MJ (at K1TTT)																													
W1EM	27,156	186	73	16	A					K21M	101,556	651	78	24	Q																								
K1OA	26,296	173	76	24	A					K21M	114,036	731	78	17	A																								
K1SEC	19,656	182	54	7	A					AA1HB	9,180	102	45	3	A																								
K1TH	18,480	154	60	4	A					K5ZD	202,556	1282	79	24	B																								
KR1B	15,392	148	52	8	A					KB1W	166,058	1051	79	23	B																								
K1SM	10,212	111	46	2	A					W1YK (LN1M,N1FY,N2YHK,W1NT,ops)																													
W1SR	7,140	85	42	3	A						59,792	404	74	24	C																								
K1MC	3,696	56	33	3	A					2																													
K1UCA	448	16	14	3	A					Eastern New York																													
K5MA	128,282	833	77	16	B					W2VT	57,442	373	77	13	Q																								
W1ZT	124,820	790	79	22	B					K2UF	130,416	836	78	21	A																								
K1AJ	68,484	439	78	24	B					K2DW	72,708	498	73	24	A																								
WR1P	42,780	310	69	9.5	B					K2YR	68,256	474	72	21	A																								
K1IR	28,616	292	49	8	B					AA2Y	40,424	326	62	12	A																								
K0TB/1	22,278	141	79	24	B					W2ENY	35,728	232	77	21	A																								
W1SMH (W1XS,W1CI,W1ET)										W2XM	26,240	205	64	10	A																								
K1NU (+NET)	38,236	242	79	16	M					W2DK	20,100	150	67	13	A																								
WO1N (+NET)	23,718	201	59	8	M					W2NRD	13,286	91	73	10	A																								

WA3HAE	132,444	849	78	24	A
K3C (N13S,op)					
ADBJ	103,174	653	79	23	A
W3TWI	53,620	383	70	14	A
NBJ4J	51,408	357	72	23	A
W3IA	37,740	255	74	18	A
K3MJW (KA3JWJ,op)	28,152	204	69	11	A
WA3GPP	25,134	213	59	5	A
AA3ML	18,560	160	58	11	A
KS1F	15,510	141	55	8	A
N13I	11,552	76	76	15	A
N3YE	10,300	103	50	48	A
KE3KD	10,272	107	48	19	A
KB3AZK/N	4,464	72	31	24	A
K3LR (K3UA,op)	2,376	44	27	13	A

W3GH (+NDBL,W9XR)	201,292	1274	79	24	B
K3MD (+N3PUR)	169,218	1071	79	24	B
WA3SES (+N3IXR)	117,348	762	77	21	M
WW3S (+NET)	103,350	689	75	24	M
	56,880	360	79	15	M

4

Alabama					
W4DEC	55,350	369	75	20	Q
K2VL	12,470	145	43	13	Q
KUOC4	116,064	744	78	21	A
KC4TEO	102,068	646	79	24	A
N8VW	90,792	582	78	18	A
K2RUE	74,900	535	70	24	A
K4GU	57,962	397	73	16	A
N4QB	22,500	150	75	10	A
K4NVJ	14,152	122	58	7	A
W5DLM	11,322	111	51	8	A
WB4HUX	5,112	71	36	10	A
KT4XA	2,116	46	23	7	A
K4BFT (NB9P,op)					
KS4YT (+KV4T)	1,260	30	21	2	A
	5,016	76	33	3	M

Georgia

K4OGG	135,058	877	77	24	A
N8LM	81,928	532	77	17	A
KWAE	24,220	173	70	7	A
NJ8J	19,690	179	55	8	A
K2UFT	19,560	163	60	3	A
K4OM	18,960	120	79	18	A
KD3GC	14,706	129	57	11	A
W4ATL	9,792	102	48	9	A
K4PK	4,524	58	39	5	A
W4SAS	160	10	8	2	A
W4AN (K4BAI,op)					
	214,722	1359	79	24	B
W4TM	111,074	703	79	15	B
W4AQL (KF4UJB,op)	3,060	51	30	8	C

Kentucky

K4IE	103,116	661	78	24	A
K4FXN	93,852	594	79	14	A
AA2GS	47,808	332	72	13	A
KM4FO	42,600	300	71	19	A
KC4WQ	42,032	296	71	9	A
KF8VS	36,190	235	77	17	A
KO4OL	32,912	242	68	12	A
KE4IL	25,134	177	71	21	A
K4FU	12,482	79	79	10	A
KD4HXT	11,280	120	47	6	A
AC4VW	7,968	83	8	8	A
K1AIO	16,160	1020	79	17	B
K8TW	79,926	519	77	18	B
N4XM	34,444	218	79	9	B
K4LT (+W8RZ,K9NW)	171,904	1088	79	24	M

North Carolina

W4WS (N4VHK,op)					
N2WG	20,130	165	61	9	Q
AE4EC	19,642	161	61	16	Q
N4EUK	11,832	116	51	13	Q
W4JBB	416	16	13	2	Q
K7GM	121,814	791	77	24	A
K4OPL	114,304	752	76	24	A
K4MA	110,126	697	79	24	A
NW6S	85,952	544	79	15	A
W4IDB	82,236	534	77	23	A
K4PB	44,844	303	74	15	A
AD4IE	31,490	235	67	11	A
KZ2I	26,400	176	75	11	A
KE4QZB	14,560	140	52	7	A
NU4G	14,410	131	55	7	A
KQ2V	13,780	130	53	4	A
XX9T	12,096	112	54	9	A
W4SI	10,700	100	50	14	A
W4AGI	8,480	106	40	5	A
KS4S	6,528	96	34	7	A
K4EYE	3,200	50	32	3	A
AA4S	360	15	12	2	A
N4AF	190,706	1207	79	24	B
W4MR (AA4NC,op)					
	184,548	1183	78	23	B
N4CW	150,304	976	77	24	B
K3KO	100,562	653	77	12	B
K2AV	60,590	415	73	11	B
NT4D (+NET)					
	110,284	698	79	23	M
W4ZYT (+W4SD,KC4VZ,AF4CD, KU4EO)	100,488	636	79	23	M
N4ARW (+K4AAPA)					
	10,710	105	51	14	M

W4ATC (K04PY,N44G,KF4ARS, KE4LSU,N3QYE,KD4SKW,KF4USQ, KF4LNU,ops)	80,964	519	78	24	C
North Florida					
K4VYF (N3JW,op)	42,336	294	72	13	Q

AD4TT	33,184	244	68	16	Q
N3OIE	3,630	55	33	24	Q
KX5U	240	12	10	7	Q
NU4Y	109,200	728	75	24	A
K4LDR	78,078	507	77	22	A
W4SDE	41,888	308	68	12	A
W4CU	32,760	234	70	10	A
K8WK	7,930	65	61	24	A
WC4E	190,864	1208	79	24	B
W7QF	54,000	360	75	13	B
AE4TA	3,348	54	31	3	B
N4EK	1,408	32	22	8	B
N4EC (+N4II)	147,224	956	77	24	M

Puerto Rico

NP3A	154,998	981	79	22	A
WP3R (KE3Q,op)					
	232,260	1470	79	24	B
NP3G	143,780	910	79	19	B

South Carolina

W4OC	127,820	830	77	16	A
N1CC	70,980	455	78	15	A
N4GJ	51,072	336	76	15	A
WB8PC	39,156	251	78	15	A
W48OJR	38,860	290	67	9	A
N4EE	2	1	1	1	A
W4YDD	102,712	694	74	24	B
AC4WW (+KB4GYT)	53,720	340	79	15	M

Southern Florida

W4PJ	48,000	320	75	16	Q
AJ4Y	18,900	150	63	10	Q
KR4YL	1,872	36	26	3	Q
WD4AHZ	149,626	947	79	24	A
NA4CW	106,018	671	79	24	A
W4LOO	52,360	385	68	8	A
W43NKO	36,312	267	68	12	A
N4RP	34,602	237	73	24	A
K2ACW	22,144	173	64	24	A
W3DHN	12,852	119	54	13	A
WN4DX	10,920	105	52	10	A
WBRTU/4	10,506	103	51	14	A
KS4GW	8,282	101	41	17	A
KN4JN	4,148	61	34	5	A
K8BPX	1,156	34	17	1	A
K1TO	240,792	1524	79	24	B
N4BP	205,436	1334	77	24	B
K4LQ	88,184	604	73	22	B
K1PT	75,504	484	78	11	B
N4TO	30,756	233	66	5	B
K4QJO (+ W1CW, W1YL)	202,398	1281	79	24	M
AE4RO (+AE4SW)	134,932	854	79	23	M
N8PR (+N4XN,W4SO)	117,964	766	77	15	M

Tennessee

W4PA	125,736	806	78	24	A
N4UW	69,116	467	74	22	Q
KT4OR	15,390	135	57	18	Q
KM7W	8	2	2	1	Q
K4WX	180,804	1159	78	24	A
NA4K	157,248	1008	78	24	A
K4RO	138,840	890	78	24	A
N4DD	133,036	842	79	24	A
W4O4O	118,950	793	75	20	A
N4CM	115,824	762	76	22	A
NA4US	101,752	644	79	19	A
W4TYU	37,582	261	72	24	A
N4U5G	18,240	160	57	11	A
N4ZI	16,632	154	54	4	A
W4HZD	15,846	139	57	24	A
AA5N	13,216	118	56	6	A
W4DAN	12,960	135	48	9	A
W4NI	12,720	120	53	7	A
KE4OAR	6,020	70	43	9	A
K0EJ	176,012	1114	79	23	B
W4CAT (K1KY,op)					
	167,544	1074	78	24	B
K4LTA	141,024	904	78	24	B
W9WI	137,436	881	78	24	B
N4IR	122,148	783	78	19	B
K4AMC	65,840	580	74	10	B
W4OGG	11,440	110	52	4	B

Virgin Islands

WP22 (W7GQ,op)					
KP2N	140,448	912	77	22	A
	23,316	174	67	10	A

Virginia

N4ROA	84,804	573	74	23	Q
W4PRO	48,510	315	77	14	Q
K4GEL	35,640	270	66	17	Q
WB4JJJ	10,560	110	48	8	Q
K1FR	1,116	31	18	1	Q
KC4ATU/T	384	16	12	12	Q
W4YE	132,878	841	79	22	A
K4MX	128,544	824	78	24	A
W4DF	94,800	600	79	22	A
W4AU	85,932	558	77	11	A
K4IQ	80,700	538	75	16	A
KB4CG	64,224	446	72	24	A
AL7HW	58,022	433	67	16	A
K5VG	57,608	379	76	13	A
K4UK	50,076	321	78	16	A
W4VG	40,044	282	71	14	A
K4JK	38,324	286	67	14	A
NA4GU	38,216	281	68	10	A
AA4KD	35,224	259	68	24	A
N4PD	34,960	230	76	24	A
W4DC	34,286	217	79	24	A
KU3M	33,930	261	65	13	A
KK4R	26,934	201	67	7	A
W4VC	23,500	161	73	10	A
W6IHG	22,560	188	60	17	A
W2YE	16,352	146	56	8	A
KE4UKX	15,900	150	53	19	A
N4ST	14,300	130	55	7	A
N6MW	8,832	69	64	10	A
W4SNH	6,960	60	58	10	A
N4BTO	6,716	73	46	10	A
W4DAI	6,688	76	44	5	A

AD4TJ	1,716	39	22	2	A
KT4AD	1,518	33	23	5	A
K54JB	1,120	28	20	24	A
N3TG	208	13	8	1	A
N4MM	50	5	5	1	A
K73Y	175,560	1140	77	24	B
K4OAO	143,682	933	77	22	B
K1GG	19,370	149	65	8	B
K4SO	12,312	114	54	2	B
AE4IX	11,856	114	52	10	B
W4MYA (+W4AQDM)	166,690	1055	79	23	M
W4RM (+NET)					

QST

Product Review

Edited by Joe Bottiglieri, AA1GW • Assistant Technical Editor

The Yaesu FT-100 MF/HF/VHF/UHF All-Mode Transceiver

Reviewed by Rick Lindquist
Senior News Editor

By the time this review appears, it will have been more than one year since Yaesu debuted its FT-100 “Field Commander” all-mode MF/HF/VHF/UHF transceiver at the 1998 Dayton Hamvention. At the time, it broke new ground as the first subcompact transceiver to stuff a huge portion of the amateur spectrum into a package whose size belies its multiple capabilities. In the interim, a competing manufacturer announced, then delivered, a subcompact transceiver of its own that’s similarly—although not identically—endowed. So, the competition began heating up before either radio actually hit the street.

So now, we’ll try to give you some idea of whether the FT-100 was worth the wait. Yaesu has imbued this—its premier entry in the subcompact transceiver class—with capabilities and qualities heretofore only found on its larger siblings and peers. Ignoring satellite capabilities for a moment, the FT-100 compares very neatly, feature-for-feature, with Yaesu’s FT-847. At the same time, Yaesu has kept the cost of the FT-100 within reasonable reach.

Not only were we wowed by some of the things the FT-100 can do—and with how well it can do them—we’re still awestruck with the whole concept of getting more and more into less and less. Within the decade, we’ve seen manufacturers cram all the HF bands plus general coverage receive into a box smaller than the original 2-meter mobile transceiver. They followed that act by adding VHF, and now UHF, capabilities, DSP, internal keyers, more power on VHF and UHF and other features. For now at least, Yaesu has bragging rights for having the smallest transceiver in the burgeoning subcompact, multiband, multimode market class. One can only wonder what we can expect the new millennium to bring.

As more and more hams seek the sorts of mobile or portable capabilities these subcompact transceivers make possible, this marketplace segment is becoming the one to watch. Let’s take a look at the FT-100 so you can decide if it will turn up at the top of your “must-have” list. (How many more shopping days until Christmas?)

Front and Center

The front panel is crowded, although the bluish LCD display is large and easy to read from most angles. You can adjust the brightness level over a wide range. Some users with larger fingers might find it hard to press the



desired button without also actuating an adjacent button. The important **UP** and **DWN** buttons—used to change bands—are sandwiched between the **MODE** and **FUNC** buttons. The **MODE** button steps through the operating modes. The **FUNC** button accesses the menus. More on those later.

The **CLAR/IF SHIFT** button—a little lighted bump almost hidden between the two rotary controls on the radio’s left—is difficult to see and access. Pressing it activates the clarifier (RIT); pressing and holding it activates the IF shift. The tiny button illuminates green when RIT is enabled. Another sharp press takes you out of clarifier mode and extinguishes the green LED while leaving the IF shift enabled. So, you can envision lots of circumstances where you’d be pushing this particular button. It’s really a shame that it’s not more prominent and accessible.

You adjust both the clarifier and IF shift functions using the multifunction, detented **SELECT** knob (also the “fast tuning” knob for the FT-100). This single-button arrangement also precludes simultaneous access to both of these important functions. There is no separate RIT readout. When the **CLAR** button is enabled, you can adjust the receive frequency ± 10 kHz, and the main frequency

readout reflects the change in receive frequency.

The **IF SHIFT** goes *waaaay* out beyond what the little display icon shows, although you’ll have to crank on the **SELECT** knob a bit more than you’re likely used to. The **IF SHIFT** was *very* effective as an aid in dodging QRM. The FT-100 also includes a split function, accessible through the menu. It even permits crossband operation.

To tune in FM-type steps, press the **STEP** button to pick a step and use the little **SELECT** knob to do the actual tuning.

The smallish **MAIN DIAL** tuning knob is to the right of the display and between two vertical columns of function buttons. The knob’s barely perceptible tuning dimple is a case where less really *is* less. Many users will find it insubstantial and unusable for twirling the control. It’s too small except for the most dainty of index fingers. I found that I could manipulate the knob using my thumbnail, however. The knob is surrounded by a rubber grip ring.

The FT-100 does not offer the “fuzzy logic” feature available on some radios whereby the faster you turn, the faster you tune. Instead, you get a wide selection of mode-specific variable tuning step sizes for fine tuning, and use the 30-position detented **SELECT** knob for coarser changes. The **UP** and **DOWN** buttons can also be used to easily cycle through the amateur bands.

For the SSB, CW and the AFSK modes, successive presses of the **STEP** button result in main *tuning step* sizes of 1.25; 2.5; 5; 10; 25; 50 or 100 Hz. The current tuning step size

Bottom Line

For the money, Yaesu has packed a lot of operating pleasure into the FT-100 Field Commander transceiver. Perhaps good things *do* come in small packages.

Table 1**Yaesu FT-100, serial number 9D021081****Manufacturer's Claimed Specifications**

Frequency coverage: Receive, 0.1-30, 50-54, 76-108, 144-148, 430-450 MHz; transmit, 1.8-2, 3.5-4, 7-7.3, 10.1-10.15, 14-14.35, 18.068-18.168, 21-21.45, 24.89-24.99, 28-29.7, 50-54, 144-148, 430-450 MHz.

Power requirement: Receive, 1.6 A; transmit, 22 A (100 W output).

Modes of operation: SSB, CW, AM, FM, AFSK.

Receiver

SSB/CW sensitivity, bandwidth not specified,
10 dB S/N: 1.8-30 MHz, $<0.25 \mu\text{V}^2$; 50-54 MHz,
 $<0.2 \mu\text{V}$; 144-148, 430-450 MHz, $<0.13 \mu\text{V}$.

AM sensitivity, 10 dB S/N: 0.3-1.8 MHz, $<32 \mu\text{V}^2$;
1.8-30 MHz, $<2 \mu\text{V}^2$; 50-54 MHz, $<2 \mu\text{V}$;
144-148, 430-450 MHz, $<2 \mu\text{V}$.

FM sensitivity, 12 dB SINAD: 28-30 MHz, $<0.5 \mu\text{V}$;
50-54, 144-148, 430-450 MHz, $<0.2 \mu\text{V}$.

Blocking dynamic range: Not specified.

Two-tone, third-order IMD dynamic range: Not specified.

Third-order intercept: Not specified.

Second-order intercept: Not specified.

FM adjacent channel rejection: Not specified.

Measured in the ARRL Lab

Receive, 0.1-961 MHz (cell blocked)¹; transmit, as specified.

Receive, 1.3 A; transmit, 17 A. Tested at 13.8 V.
As specified.

Receiver Dynamic Testing

Noise floor (mds), 500-Hz filter:

	<i>Preamp off</i>	<i>Preamp on</i>
1.0 MHz	-132 dBm	-136 dBm
3.5 MHz	-133 dBm	-138 dBm
14 MHz	-133 dBm	-137 dBm
50 MHz	-130 dBm	-135 dBm
144 MHz	see note 3	-142 dBm
432 MHz	see note 3	-143 dBm

10 dB (S+N)/N, 1-kHz tone, 30% modulation:

	<i>Preamp off</i>	<i>Preamp on</i>
1.0 MHz	1.9 μV	1.1 μV
3.8 MHz	1.7 μV	0.97 μV
50 MHz	2.8 μV	1.2 μV
120 MHz	see note 3	0.98 μV
144 MHz	see note 3	0.42 μV
432 MHz	see note 3	0.43 μV

For 12 dB SINAD:

	<i>Preamp off</i>	<i>Preamp on</i>
29 MHz	0.62 μV	0.23 μV
52 MHz	0.66 μV	0.4 μV
146 MHz	see note 3	0.15 μV
440 MHz	see note 3	0.16 μV

Blocking dynamic range, 500-Hz filter:

	<i>Preamp off</i>	<i>Preamp on</i>
3.5 MHz	128 dB	121 dB
14 MHz	130 dB	125 dB
50 MHz	116 dB*	107 dB*
144 MHz	see note 3	113 dB
432 MHz	see note 3	113 dB

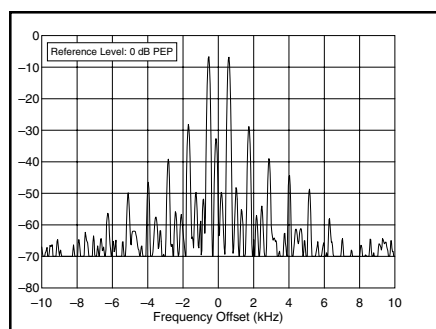
Two-tone, third-order IMD dynamic range, 500-Hz filter:

	<i>Preamp off</i>	<i>Preamp on</i>
3.5 MHz	92 dB	88 dB
14 MHz	94 dB	91 dB
50 MHz	94 dB*	90 dB
144 MHz	see note 3	84 dB
432 MHz	see note 3	82 dB

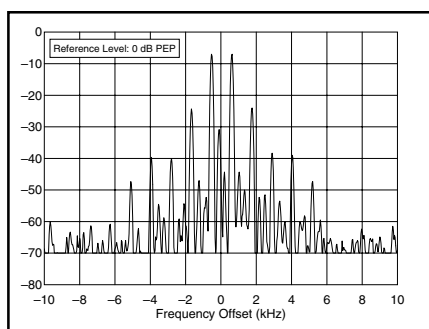
	<i>Preamp off</i>	<i>Preamp on</i>
3.5 MHz	+6.3 dBm	-5.7 dBm
14 MHz	+10 dBm	+4.2 dBm
50 MHz	+20 dBm	+1.2 dBm
144 MHz	see note 3	-13 dBm
432 MHz	see note 3	-16 dBm

Preamp off, +51.7 dBm; preamp on, +52.8 dBm.

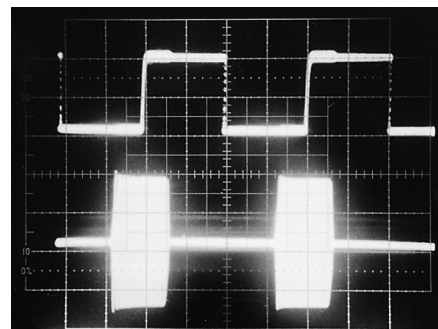
20 kHz channel spacing, preamp on: 29 MHz, 77 dB; 52 MHz,
72 dB; 146 MHz, 72 dB; 440 MHz, 69 dB.



1—Worst-case HF spectral display of the FT-100 transmitter during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 30 dB below PEP output, and the worst-case fifth-order product is down approximately 40 dB. The transceiver was being operated at 100 W PEP output at 24.95 MHz.



2—Worst-case VHF/UHF spectral display of the FT-100 transmitter during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 25 dB below PEP output, and the worst-case fifth-order product is down approximately 40 dB. The transceiver was being operated at 100 W PEP output at 50.2 MHz.



3—CW keying waveform for the FT-100 showing the first two dits in full-break-in (QSK) mode using external keying. Equivalent keying speed is approximately 60 wpm. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver was being operated at 100 W output at 14.2 MHz. Note the slight shortening of both dits.

Manufacturer's Claimed Specifications

FM two-tone, third-order IMD dynamic range: Not specified.

S-meter sensitivity: Not specified.

Squelch sensitivity: SSB, 1.8-30 MHz, <2.5 μ V; 50-54 MHz, <1.2 μ V; 144-148, 420-450 MHz, <0.8 μ V; FM, 28-30 MHz, <0.32 μ V; 50-54 MHz, <0.2 μ V; 144-148, 430-450 MHz, <0.16 μ V.

Receiver audio output: 1.5 W at 10% THD into 8 Ω .

IF/audio response: Not specified.

Spurious and image rejection: 1.8-30 MHz, 70 dB; 50-54 MHz, IF rejection, 60 dB, image rejection, 70 dB; 144-148, 430-450 MHz, IF rejection, 60 dB, image rejection, 60 dB.

Transmitter

Power output: HF & 50 MHz: SSB, CW, FM, 100 W (high); AM, 25 W (high); 144 MHz, 50 W (high); AM, 12.5 W (high); 430 MHz, 20 W (high); AM, 5 W (high).

Spurious-signal and harmonic suppression: ≥ 40 dB on HF for harmonics, ≥ 50 dB for spurious; ≥ 60 dB on VHF & UHF for harmonics and spurious.

SSB carrier suppression: ≥ 40 dB.

Undesired sideband suppression: ≥ 50 dB.

Third-order intermodulation distortion (IMD) products: Not specified.

CW keyer speed range: Not specified.

CW keying characteristics: Not specified.

Transmit-receive turn-around time (PTT release to 50% audio output): Not specified.

Receive-transmit turn-around time (tx delay): Not specified.

Composite transmitted noise: Not specified.

Bit-error rate (BER), 9600-baud: Not specified.

Size (HWD): 2.2 \times 6.3 \times 8.0 inches; weight, 6.6 pounds.

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

*Measurement was noise-limited at the value indicated.

Third-order intercept points were determined using S5 reference.

¹Receive sensitivity is reduced below 200 kHz, between 60 and 70 MHz and above 650 MHz.

²IPO off (preamp on).

³IPO not available above 70 MHz.

Measured in the ARRL Lab

20 kHz channel spacing, preamp on: 29 MHz, 72 dB; 52 MHz, 72 dB*; 146 MHz, 72 dB*; 440 MHz, 67 dB; 10 MHz channel spacing, preamp on: 52 MHz, 102 dB; 146 MHz, 86 dB; 440 MHz, 75 dB.

S9 signal at 14.2 MHz: preamp off, 32 μ V; preamp on, 15 μ V; 52 MHz, preamp off, 28 μ V; preamp on, 6.5 μ V; 146 MHz, preamp on, 5.8 μ V; 432 MHz, preamp on, 4.3 μ V.

At threshold, preamp on: SSB, 14 MHz, 1.8 μ V; FM, 29 MHz, 0.06 μ V; 52 MHz, 0.09 μ V; 146 MHz, 0.05 μ V; 440 MHz, 0.04 μ V.

1.7 W at 10% THD into 8 Ω .

Range at -6 dB points, (bandwidth):

CW-N (500-Hz filter): 419-953 Hz (534 Hz);

CW-W: 305-2242 Hz (1937 Hz); USB-W: 223-2180 Hz (1957 Hz);

LSB-W: 304-2329 Hz (2025 Hz); AM: 54-3409 Hz (3355 Hz).

First IF rejection, 14 MHz, 101 dB; 50 MHz, 68 dB; 144 MHz, 95 dB; 432 MHz, 115 dB; image rejection, 14 MHz, 113 dB; 50 MHz, 104 dB; 144 MHz, 80 dB; 432 MHz, 82 dB.

Transmitter Dynamic Testing

HF & 50 MHz: CW, SSB, FM, typically 97 W high, <1 W low; AM (see text); 144 MHz: CW, SSB, FM, typically 53 W high, <1 W low; AM (see text); 430 MHz: CW, SSB, FM, typically 20 W high, <1 W low; AM (see text).

HF, 40 dB; 50 MHz, 60 dB; 144 MHz, 60 dB; 430 MHz, 68 dB.

Meets FCC requirements for spectral purity.

As specified. >51 dB.

As specified. >63 dB.

See [Figures 1 and 2](#).

5.6 to 57 WPM.

See [Figure 3](#).

S9 signal, 15 ms.

SSB, 11 ms; FM, 13 ms. Unit is suitable for use on AMTOR.

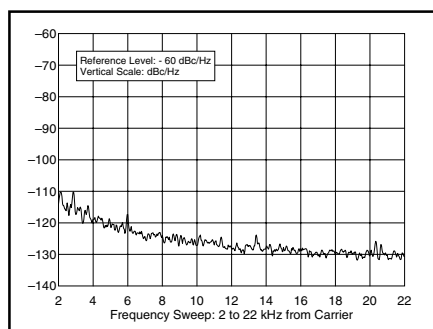
See [Figures 4 and 5](#).

146 MHz: Receiver: BER at 12-dB SINAD, 1.2×10^{-3} ; BER at 16-dB SINAD, 1.7×10^{-5} ; BER at -50 dBm, $<1.0 \times 10^{-5}$; transmitter: BER at 12-dB SINAD, 3.1×10^{-4} ; BER at 12-dB SINAD + 30 dB, $<1.0 \times 10^{-5}$.

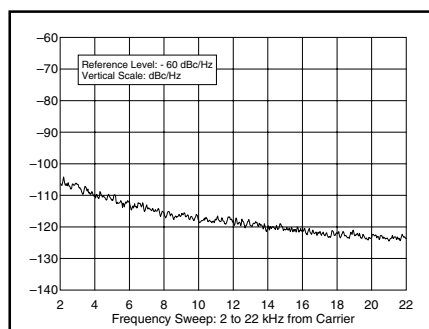
440 MHz: Receiver: BER at 12-dB SINAD, 1.1×10^{-3} ; BER at 16-dB SINAD, 1.5×10^{-5} ; BER at -50 dBm, $<1.0 \times 10^{-5}$; transmitter: BER at 12-dB SINAD, 2.5×10^{-4} ; BER at 12-dB SINAD + 30 dB, $<1.0 \times 10^{-5}$.

Expanded Product Review Report Available

The ARRL Laboratory offers a detailed test result report on the Yaesu FT-100 that gives in-depth, technical data on the transceiver's performance. Request the [FT-100 Test Result Report](#) from the ARRL Technical Department, 860-594-0278; e-mail mlevesque@arrl.org. Members can see this on-line on our Member's Only Web site.



4—Worst-case HF spectral display of the FT-100 transmitter output during composite-noise testing. Power output is 100 W at 3.520 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.



5—Worst-case VHF/UHF spectral display of the FT-100 transmitter output during composite-noise testing. Power output is 20 W at 432.02 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

is indicated on the display. Press and hold the **STEP** button and the main tuning knob changes the frequency in 1-kHz steps, about as coarse as you'd ever want it on HF. The *tuning rate* of the main dial also is adjustable via the "dial pulse" menu. The default setting of 200 means one rotation of the main tuning dial generates 200 encoder "pulses." The alternative 100 setting effectively cuts the tuning rate in half. A front panel **LOCK** button disables the main tuning knob; but there's no mechanical drag adjustment.

In the above modes, rotating the **SELECT** knob tunes in 10 kHz steps. A quick press of the **SELECT** knob results in 1-MHz frequency steps. If you press and hold the **SELECT** knob for $\frac{1}{2}$ second, this same control will now tune in 10 MHz increments.

For AM and FM, the main tuning knob changes the frequency in 100-Hz steps. The **SELECT** knob is used to change the frequency

by your selected step size. For AM, six step sizes—including 9 kHz—are provided. For FM, seven step sizes between 5 and 50 kHz are available. For WFM, the main tuning knob tunes in 1-kHz steps, and you can choose between **SELECT** knob step sizes of 50 or 100 kHz.

In addition to **UP**, **DWN**, **MODE** and **STEP**, other front-panel buttons provide ready access to the DSP menu (**DSP**), memory or VFO (**VFO/MR**), **HOME** (a pre-programmed calling frequency) and **LOCK**. Concentric rotary controls let you adjust volume (**AF**) and either squelch (**SQL**) or RF gain (**RF**).

The S-meter is an LCD bar below the frequency readout. The calibration scale shows S1, 5, 9, +20 and +60. Intermediate readings are left to your imagination. The **MET** function button lets you select either an ALC scale or a tiny, horizontal line that represents SWR during transmit. The PO (power output) scale is always there during transmit. It is similarly vague, however. It displays 10, 50 and 100 W, although it's possible to adjust the power output along a continuum from practically nil to full output.

Menu Magic

Functions lacking dedicated controls are accessed using the four (**A**, **B**, **C**, **D**) function buttons arrayed immediately below the display. Depending upon the menu selected by the **FUNC** button the display lists the function of each of the four keys. There are nine menus in all, each containing a related functional group. Each press of the **FUNC** button steps through another group of up to four separate functions. For example, the **A/B**, **A=B**, **SPL** (split) and **QMB** ("quick memory bank") keys are in the same group, while **TON** (activates the CTCSS system), **DCS** (digital code squelch) and **ART** (Yaesu's proprietary Auto-Range Transponder mode) are in another. Functions related to the onboard keyer—**WRI** (write to memory), **PLY** (play memory), **BK** (activates break-in operation) and **KYR** (activates the built-in keyer) are together too. So are **IPO** ("intercept point optimization," a fancy way for saying the preamp is turned off), **ATT** (an 18-dB attenuator), **AGC** (fast, slow or auto) and **NB** (noise blanker).

Push and hold the button (**A**, **B**, **C**, **D**) for certain functions and you get the main menu item behind it. This is highly convenient. For example, press and hold the **TON** function button and you get the menu that lets you select the desired CTCSS tone. Press and hold the **PRO** (processor) function button and there's the menu that lets you adjust the compression level. This is much simpler than the methods other transceivers employ. I, for one, wished that Yaesu had followed this concept with the keyer speed adjustment. More on this later.

Users liked the fact that the menus were logically grouped with related functions. There's no searching around among several hidden or branching menus on the FT-100!

Breaking Up Is Hard To Do?

The FT-100 faceplate is remotable—practically a must these days as it becomes

next to impossible to find places to mount radio gear in cars. That's good news, at least if you plan to install the FT-100 and leave it in place. The not-so-good news is that the separation cable (1) attaches to the faceplate (actually a mounting plate that, in turn, clips to the faceplate) and, at the other end, to the transceiver body with little screws, (2) uses a second separate wire for the microphone connection—the mike connects to the body behind the faceplate, and (3) requires running a *third* wire if you plan to install an extension speaker. All three wires, the face mounting plate and screws are included in the optional YSK-100 separation kit. A simple mobile mounting bracket, a mounting hardware pack and a mike hanger are included with the radio.

By comparison, the single wire IC-706 separation cable includes the microphone and headphone/extension speaker wiring, and you can install it in a snap (well, two snaps, actually). Yaesu's separation scheme reminded me of the one for the Alinco DX-70T (see "Product Review," *QST*, December 1995). Yaesu's multi-cable system and its screw-on connections might prove inconvenient for users who plan to use the FT-100 in a variety of fixed and mobile installations, such as for traveling, rather than leaving the rig in one place.

Missing from the front panel (or anywhere else on the radio) was a headphone jack. The *Operating Manual* says the radio's "extremely compact size" doesn't allow for one, perhaps defining the tip of the iceberg in the debate over "how small is too small?" (All but one of the competitors' slightly larger subcompact radios include separate jacks for headphones and an external speaker.) The manual gives details on how to lash up an attenuator to permit hooking up low-impedance headphones to the rear-panel extension jack. This, of course, makes use of both an external speaker and headphones a bit problematic, especially given the jack's location.

Taking Up The Rear

The rear panel of the FT-100 is pretty spare. Twin cooling fans replace the heat-sink cooling fins that adorn most rear panels these days, a design feature that keeps the radio even more compact than the competition. Major connections—antennas, power, and **BAND DATA**—are deployed at the ends of pigtails, apparently another space-saving measure. Compared to bulkhead-mounted connectors, pigtail connections are vulnerable to numerous hazards may not be as reliable over the long haul. Only one pigtail is actually labeled with a metallized tag that reads "HF/50 MHz." It would be easy to imagine hooking up the wrong antenna to one of these, especially after the label tag falls off.

The **BAND DATA** jack is also used for connecting the optional CT-62 interface cable for controlling the radio with a personal computer. Yaesu does not offer a software package, but the manual does include information on the command set.

At a point when manufacturers appeared to be converging on the six-pin Molex-type connector as the standard for HF power connections, Yaesu employs a flat-bladed Jones type connector on the FT-100. It's quite sturdy, however.

The rear panel also provides a six-pin mini DIN-type **DATA** jack, for AFSK or FSK input from a TNC and for fixed-level receiver audio output, PTT and ground connections. Additionally, there are 3.5 mm jacks for accessory (ALC and T/R control for a linear), key and external speaker.

The twin fans coupled with internal heat-sinking via the radio's mounting frame provide adequate cooling for the radio. The downside is that the fans are annoyingly loud and kick into high gear whenever you key the transmitter—even if it's just for an instant or if you have the power level turned all the way down. The fans continue to run for approximately 10 seconds after you return to receive. As one user put it: "The effect on practical operation is that the first 10 seconds of received audio always has to compete with the sound of the fans."

Digital Signal Processing Menu

The DSP menu is always available by pressing the dedicated **DSP** button, a thoughtful inclusion. The FT-100's DSP menu features are well thought out and just superb and include digital noise reduction (DNR), digital notch filter (DNF), and a digital band-pass filter (DBP). Incorporating DSP as a standard feature on a subcompact radio like this is a first and a very welcome addition.

Digital noise reduction ameliorates random noise. It works in all modes. The DNR is adjustable over a range via the menu. In the ARRL Lab, we measured only an average of 10 dB of noise reduction near the 1 kHz reference signal at the maximum menu setting (16), but we also noticed something a bit peculiar. While the NR in most other rigs is fairly flat across the audio spectrum, the NR in the FT-100 has a noticeable roll-off toward the upper part of the passband (2 kHz and higher), and there's a considerable amount of "ripple" in the frequency response.

The adjustable digital band-pass (DBP) filter is a wonderfully useful inclusion. There are separate, menu-settable parameters for setting the BPF high and low-cut frequencies for voice modes, plus a separate narrow DBP filter for CW, a terrific addition and totally unexpected on a radio this small.

In SSB, AM, FM and AFSK modes, you press and hold the **DBP** button to access the menu, then use the **SELECT** knob to adjust the high-frequency cutoff of the DSP low-pass filter. The range is between 1000 and 6000 Hz. An adjacent menu item lets you adjust the low-cut characteristics of the DSP high-pass filter between 100 and 1000 Hz.

On CW, you can set the BPF width at 60, 120 or 240 Hz. Even without the optional crystal filters, the 120 or 60 Hz setting is super—almost, but not quite, crystal filtering. Yes, I could still see nearby signals on the S meter, but I could not hear them. The AGC

pumping was detectable, however. Add in the optional 500 and/or 300-Hz narrow crystal filters and it's a formidable combination.

On SSB, enabling the DNR and adjusting the DBP yielded a tremendous improvement in overall readability in the presence of adjacent-channel interference. Hit the **DNF** key to engage the auto notch. We found that its measured notch depth of around 20 dB does not exactly vanquish annoying heterodynes, but it does attenuate them. We'd prefer not to hear them at all, however.

Overall, the DSP features definitely are a job well done!

Howizzit? Howizzit?

The FT-100 receiver sounds very quiet. Punch in the DNR and tune and signals seem to spring out of nowhere. At one point, I had to check to make sure the antenna was hooked up. If there's a drawback to how this receiver sounds it's the internal speaker, another apparent victim of keeping the radio compact. It's pretty small and rather tinny-sounding.

If there is one feature to single out for special praise it's the noise blanker (NB). In short, it *works*. The FT-100 noise blanker is very effective, and its level is continuously adjustable from within the main menu—another plus. It worked well to eliminate noise from the furnace igniter, from a vacuum cleaner just a few feet from the antenna and from other pulse-noise sources. I hate to say that it made the noise blankers on my two subcompact transceivers—a Kenwood TS-50S and an “original” ICOM IC-706—look pretty sorry in comparison. While I was seeing S5 ignition noise on my TS-50S, the FT-100 was quiet as a mouse—and that was at the default NB setting. This was the case with the preamp on or off, too. Bravo, Yaesu!

After using the radio, we were not surprised to learn that the blocking dynamic range numbers topped those of the competition—130 dB on 20 meters with the preamp off. Two-tone, third-order IMD dynamic range numbers on HF were in the 90s and weren't noise-limited either (see [Table 1](#)). This is sweet icing on a radio of this genre.

The FT-100 hears very well too, at least on the amateur bands. It has a noise floor in the -130 dBm range on HF without the preamp (enabling the IPO turns off the receiver's preamp). Apparently, the preamp is *always* on for the 2-meter and 70-cm bands.

The FT-100 was not designed to be a satellite radio. Yaesu offers the FT-847 for that kind of operation. However, we were able to easily monitor several moderately strong packet satellites on 70 cm. We also were able to successfully make Mode A and Mode KA contacts. By the way, the radio is capable of 300 bps HF or 1200 and 9600 bps FM operation; you select the mode via the AFSK mode menu. You can only operate semi-duplex with the FT-100.

Extended receive sensitivity (measured in CW mode) also is good except on LF, (below 200 kHz or so) and around 70 MHz while using the HF/50 MHz antenna connection. By the way, the radio seems to

switch from Antenna 1 (HF/50 MHz) to Antenna 2 at around 70.5 MHz, but it depends on which way you're tuning. Sensitivity is a bit reduced (worse than 1 μ V) above 650 MHz, too.

The FT-100 covers the FM broadcast band, but on wideband FM (WFM) at 100 MHz, the radio is a bit deaf. We measured sensitivity at 8 μ V. There's no sensitivity specification for this mode, however, and the radio heard local FM broadcast stations quite well with a very modest antenna connected.

The MH-36_{B6JS} multi-button DTMF microphone comes standard with the FT-100. It includes **UP** and **DOWN** buttons that will tune in the default step size. The **ACC** button is the same as the **HOME** button. The **P** button swaps between VFO and memory. Under the default settings, the **P1** button is a band down button, while the **P2** button is a band up button. You also can program the **P**, **P1** and **P2** buttons to control other functions.

Although the supplied mike includes a DTMF keypad, the radio does not feature direct keypad frequency entry.

We got good SSB audio reports, and the DSP TX EQ is a splendid feature! It offers three setting choices (for my particular voice characteristics, the #3 setting was the best). The radio includes VOX and an audio processor, features not found on all the competitors.

FM operation was simple and straightforward. Will the FT-100 supplant your need for a full-blown, dedicated FM mobile? It very well might, unless you're an FM power user. Yaesu imported to the FT-100 the *Smart Search* feature previously included on some of its FM mobiles. Smart Search automatically stores the frequencies of signals it intercepts during a search of the band. This is great for those who travel a lot and want to find a local repeater or two. Yaesu has included this feature on some of its dualband FM transceivers; this might be a first for a transceiver of this type, however.

CTCSS and DCS encode is built in. Decode can be added by installing the optional FTS-27 decode unit. Tone scan capabilities and the ability to use separate tones or codes for transmit and receive on the same frequency or repeater pair are not available.

The FT-100 even gives you some control over your FM deviation. You can select from among 2.3, 2.5 or 5.0 kHz via the main menu.

We got great FM audio reports. The press of a key puts you into repeater mode, and the FT-100 knows automatically whether the split is up or down. You set the actual split for each of HF, 50 MHz, 144 MHz and 440 MHz via the menu.

On CW, the keying reports we elicited by and large were favorable (see [Figure 3](#)). The only complaints were of some shortening or clipping of characters when transmitting at speeds higher than 30 WPM or so in full-break-in mode using the internal keyer. In an impromptu comparison, my group of CW connoisseurs ranked the FT-100 ahead of my “original” IC-706 in this regard.

The FT-100's built-in keyer was smooth and trouble-free. Its single memory bank

holds up to 50 characters and is simple to program. Go to the CW menu, push the **WRI** function button until it beeps, and send the desired string. To play it back, push the **PLY** button.

Holding the **KEYR** button gets you to the menu that lets you select the type of keyer (it offers two iambic types, plus a “bug” setting, or no keyer). The ability to independently set dot and dash lengths in the EL1 keyer mode is a super addition for CW connoisseurs. I found this preferable to using the other available keyer mode (EL2) that offers automatic character spacing.

I, for one, wished that pressing and holding the **KEYR** button got you to the keyer speed, however, instead of keyer type. Keyer speed—one adjustment to which CW ops need quick, convenient access—is found elsewhere in the main menu. To get there, you push and hold the **FUNC** button to access the main menu, dial up menu 52, and use the main tuning knob to set the keyer speed by picking a number between 0 and 100. For some reason best known only to Yaesu, the number on the display does not reflect the actual keyer speed. Apparently, it's just a relative indication, so you'll have to guess how fast you're sending. We measured the keyer's range at approximately 6 to 57 wpm.

Adjusting the CW sidetone volume is more inconvenient, but if you operate CW from your car, you'll probably need to. It's just not loud enough to overcome road noise. This requires going inside the radio and adjusting VR1004 (marked **VR04** and located next to the speaker connection). Adjusting the beep level also means opening up the radio.

The FT-100 provides the ability to bump its CW output stream by up to 30 ms to avoid sequencing problems when using a linear amplifier or other device that's dependent on relay switching. We have not seen this on any other transceiver, at least not one in this price or size class.

Spectrum Scope

Compared to similar implementations by other manufacturers, the *Spectrum Scope* in the FT-100 is pretty rudimentary and much less useful. While it will work in other modes, it's really designed for use on FM. To enable it, you have to go into the main menu (as opposed to the function menu addressed via the **A**, **B**, **C** and **D** buttons). Possible choices are a single sweep, a sweep every 30 seconds or a continuous sweep.

Audio is muted during sweeps. In the single sweep mode, you can activate sweeps by pressing the **FUNC** button, even if you're out of the main menu. The scope display occupies the area normally taken up by the functional menu items above the **A**, **B**, **C** and **D** keys, so as long as the Spectrum Scope is enabled, you can't tell what menu you're in.

The Spectrum Scope scans 15 “channels” (depending on the step setting) above and below the operating frequency. Unclear is the minimum signal required to show up on the bar graph.

Intercepted signals show up as vertical

bars according to their relative signal strength. Given that this mode only works in FM and provides no way to tune to a particular signal, however, makes it less than very useful.

Power Output Conundrums

On the menu, output power levels for all bands are given as 0-100, even though the output on 2 meters is 50 W and the output on 70 cm is 20 W. Yaesu says the number selected represents "a percentage of the maximum" output power.

Speaking of power output, we discovered something quite odd when we checked our radio's power consumption in the ARRL Lab. While our FT-100 drew 17 A at full power—100 W—on HF, it drew 15 A at full power—50 W—on 2 meters, and it drew a whopping 10 A while generating full output—20 W—on 70 cm. The schematic reveals that the FT-100 uses a common output power module for VHF and UHF, so the resulting inefficiency appears to be an indirect consequence of design efforts to keep the radio small. Delving further, however, we determined that the radio also drew 10 A to put out 20 W on 20 meters!

Lab tests turned up some problems with AM transmit performance. The power output on all bands was erratic and the transmitted audio was severely distorted. A second unit tested worked properly on HF, but exhibited similar difficulties on frequencies above 50 MHz. At the time this review went to press, Yaesu was investigating. Since most amateur AM activity primarily involves the use of classic equipment, perhaps many will

find this shortcoming inconsequential. A section discussing AM transmission is not included in the manual—the receiver works fine in the AM mode.

During our temperature chamber test, we found that power output on HF at the coldest temperature (−10° C/+14 F) dropped to about 20 W. Power output gradually recovered with internal warming while transmitting.

Optional IF Filters

The "standard" IF filter is 2.4 kHz. Optional crystal IF filters are available for the FT-100. For CW, you can get optional 300 or 500-Hz narrow crystal filter. A 6-kHz AM filter also is available, but apparently there are no optional IF filters for SSB. You can install two filters in the radio. This means you can have two CW filters or one CW and one AM filter installed at the same time.

Installing the filter(s) is a bit of a bear, however—more complicated than most filter installations. We won't outline the entire process but suffice it to say that it entails having to remove the screws securing a circuit board and removing the cables connected to it to allow the board to be lifted. Then, you have to solder the filter in place. In our original FT-100, a piece of cabling that prevented sufficiently lifting the board made the soldering job a bit riskier than necessary. In a somewhat later unit, this cable had been rerouted so it was no longer in the way.

Filter selection is via a main menu group. The choices are **6.0**, **2.4**, **500** and **300**. Filter selection is independent of mode, so it's possible to select the 500 or 300-Hz filter while

in SSB mode. That's something you'll find very handy if you plan to operate in the PSK31 keyboard-to-keyboard mode that's becoming more popular by the week.

Also Worth Noting

As usual, Yaesu produced a great *Operating Manual* for the FT-100. It's compact enough to pack with the radio (competitors take note), yet thorough and easy to follow. The FT-100 package even includes a complete set of schematics.

The FT-100 has available an optional temperature-compensated high-stability reference oscillator (TCXO-8). This might be handy for those seeking improved frequency accuracy.

Final Final

It's trite but true: This radio contains features once found only in more-expensive transceivers. Yes, there's a bit of room for improvement here. Yes, a few operators may view some of its less-desirable aspects as major stumbling blocks. But, the FT-100 offers quite a lot in the plus column to outweigh any perceived deficiencies.

Manufacturer: Yaesu USA, 17210 Edwards Rd, Cerritos, CA 90703; tel 562-404-2700, <http://www.yaesu.com>. Manufacturer's suggested retail price, FT-100 \$1689. Typical current street price, \$1350. YSK-100 separation kit, \$79; XF-117C 500-Hz CW filter, \$157; XF-117 CN300-Hz CW filter, \$157; XF-117A 6-kHz AM filter, \$127; FTS-27 decode unit, \$47; TCXO-8 high stability oscillator unit \$99.

Hamtronics R139 Weather Satellite Receiver

Reviewed by Steve Ford, WB8IMY
QST Managing Editor

People see satellite weather images every day. With coffee in one hand and a TV remote control in the other, they watch ominous storm fronts marching across the continent as they hurry through their morning rituals. Or, they take a more leisurely approach and surf the Web to find the weather images of their choice. Most folks realize that satellites provide these images, but the magic behind the technology remains a mystery (one they waste little time pondering).

For hams, however, the direct pursuit of knowledge and mystery is our *raison d'être*. If we cared only to *communicate* with people in other nations, we'd pick up our telephones or connect to the Internet. Only a lunatic in love with the magic of wireless attempts to accomplish the same goal by assembling a radio station and throwing him or herself upon the mercy of a fickle ionosphere. Hams are not content to merely communicate through the instruments of multinational corporations, we want to generate and receive signals ourselves—with equipment we control and operate.

That's why weather satellite image recep-



tion remains a vibrant subset of the Amateur Radio hobby. Rather than wait upon the images that TV stations and the Web can provide, we prefer to go directly to the source and see them in real time!

Weather satellites can be divided into two groups: those that zip around the Earth in low polar orbits, and those that appear to hover in distant geostationary orbits. The polar orbiters are the most popular among

hobbyists. These satellites transmit strong signals on frequencies easily received by VHF radios.

Russia, the United States and China have launched polar orbiting weather satellites. As they circle the globe these satellites are continuously transmitting visible light and infrared images of the ground and clouds below. They beam the images to Earth in what is known as the APT—Automatic Picture Transmission—format. It is a wideband (about 40 kHz) FM signal composed of sync pulses and varying audio tones. The Russian Meteor satellites transmit on 137.300, 137.400 or 137.850 MHz. The American NOAA birds transmit on 137.500 and 137.620 MHz.

If you have a 2-meter FM rig that can tune through the weather-satellite frequencies, you can often hear them. As they come into range you'll notice an odd tick-tock metronome-type sound. Unfortunately, most ham receivers don't have a sufficiently wide bandwidth to enable image reception. That's where the Hamtronics R139 comes in!

Bottom Line

The R139, a simple antenna, some software and a sound card equipped PC is all that's required for receiving real-time images directly from a variety of orbiting weather satellites.

Introducing the R139

The Hamtronics R139 weather satellite receiver is essentially a five-channel crystal-

Table 2**Hamtronics R139****Manufacturer's Claimed Specifications**

Frequency coverage: Receive, 137.3, 137.4, 137.5, 137.62, 137.85 MHz with supplied crystals.

Modes of operation: WFM.

Power requirements: 0.12 A (max volume), 10-15 V dc.

Size (HWD): 2.3x4.9x4 inches; weight, 14.2 ounces.

FM wide sensitivity (12 dB SINAD): 137 MHz, 0.2 μ V.

FM adjacent channel rejection: Not specified.

FM two-tone, third-order IMD dynamic range: Not specified.

Spurious and Image rejection: Not specified.

Squelch sensitivity (threshold): Not specified.

Audio output: 1 W¹ into 8 Ω (THD not specified).

Measured in the ARRL Lab

As specified.

As specified.

0.1 A (max volume, no signal), tested at 13.8 V dc.

137 MHz, 0.18 μ V.

100 kHz spacing, 137 MHz: 48 dB.

100 kHz spacing, 137 MHz, 48 dB.*

IF: 137 MHz, 105 dB; image, 53 dB.

At threshold: FM, 137 MHz, 0.05 μ V.

300 mW at 3.5% THD (max volume) into 8 Ω .

*Measurement was noise-limited at the value indicated.

¹Maximum rating of the audio amplifier used in the circuit.

controlled scanner that sweeps through the APT satellite frequencies mentioned above. The R139 offers the necessary bandwidth while maintaining low noise performance and good sensitivity. (I should note that the R139 could also be used as an "IF" for a microwave downconverter if you wish to capture images from the geostationary birds.)

Dual-gate FETs are at the heart of both the RF amplifier and mixer circuits. Five individual crystal oscillators are switched automatically (or manually) by a 4017 ring counter IC. Their signals are mixed to a 10.7 MHz IF, which is then processed all the way to low-level audio by a single IC (an MC3361). An LM380N provides the audio boost sufficient to drive a speaker.

The compact exterior of the R139 reflects the simplicity of the design. Sizeable **VOLUME** and **SQUELCH** controls dominate

the front panel. Between and below the controls are five red LEDs numbered one through five. Small toggle switches select **POWER** and **AUTO** (scan) or **MANUAL** channel selection.

The rear panel offers a BNC antenna connector. The power, audio output, demodulator output and tape recorder controls are provided via a DB-9 socket. The choice of the DB-9 is a bit odd, but it's probably less expensive than installing separate connectors. It would have been helpful if Hamtronics had included a prewired DB-9 plug, but this is a minor nit to pick.

Setting up the R139

The Hamtronics R139 comes with an excellent manual, which makes installation and setup a breeze. The receiver requires 12 V dc and a small wall-module power supply is provided. You must wire the sup-

ply to the included DB-9 plug, which could be a problem for those unaccustomed to soldering wires onto small, multipin connectors. Just make sure you follow the manual diagram carefully. The same holds true for wiring the other DB-9 connections.

The first thing I did was to simply wire up a speaker and listen to a satellite pass. I used my satellite-tracking software to pinpoint the next NOAA-12 appearance and, sure enough, there it was—beeps, tick-tocks and all. Although my antenna was a small 2-meter Yagi in my attic, the satellite's signal was loud and clear. For most of my experiments with the R139, I used NOAA-12 and NOAA-14. Each satellite provides two overhead passes every 24 hours.

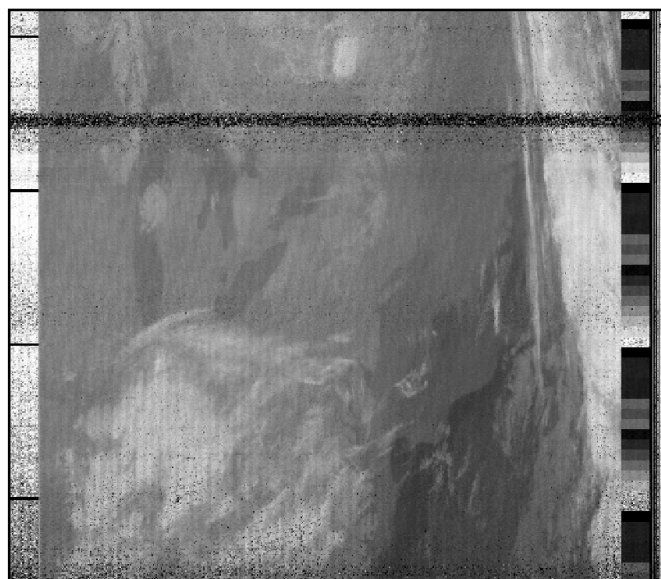
For the next NOAA-12 pass the following morning, I squelched the R139 and put it in the scanning mode. As NOAA-12 climbed to about 20° above the horizon, the R139 suddenly locked onto channel 3 (137.500 MHz) and the squelch opened to the rhythmic sound of the satellite.

Receiving and Demodulating Images

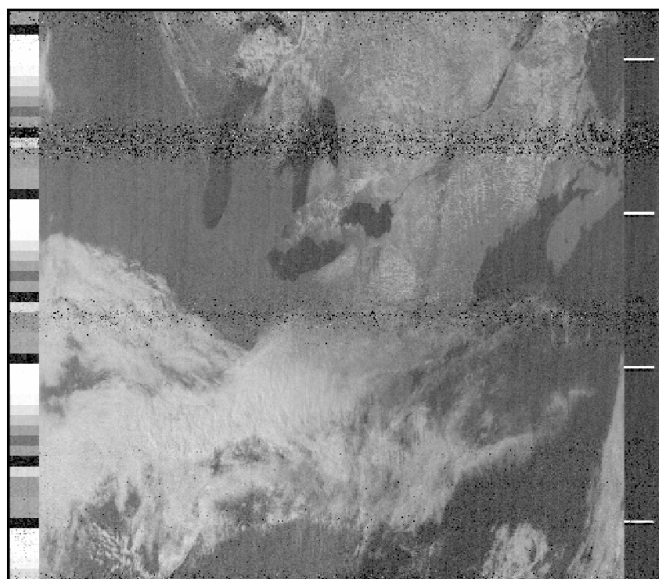
In the old days (prior to about 1996 or so) the only way to demodulate a weather satellite signal and display the resulting image on a computer was to use a stand-alone demodulator. Usually this took the form of yet another box that you placed beside your satellite receiver. And if you wanted to record images while you were away from home, you needed to have the means to store the signals, typically by using an audio tape recorder.

The R139 is equipped with a demodulator signal output line for those who still own hardware demodulators. It even includes a nifty tape-recorder control that "closes" a transistor switch whenever the squelch opens.

But for those of us who own PCs with



NOAA-14 at 3:21 AM. Night still blankets the upper Midwest and east coast, so this image was captured in infrared automatically while I slept! The satellite was passing behind my attic Yagi, which accounts for the noise in the signal. Even so, the image is fairly clear.



NOAA-12 crossed almost directly through the primary pattern of my antenna for this image. The Great Lakes and a large part of the Canadian Maritimes are clearly visible.

sound cards—and that is most PCs sold today—there is a much easier method. Everything the external demodulators and tape recorders used to do can now be accomplished with software. The program of choice, and the one that I use, is *WXSAT* by Christian Bock. You can find *WXSAT* on the Web at <http://ourworld.compuserve.com/homepages/HFFax/toc20.htm>. This ingenious piece of software uses the DSP power of the sound card and PC to demodulate weather satellite images. *WXSAT* displays and analyzes the images for you. It will even do sophisticated automatic image processing and storage of both the images and the audio files.

The Hamtronics R139 and *WXSAT* are a superb combination. Connecting the two was as easy as running a shielded audio cable between the R139 and my sound card input. I was able to leave *WXSAT* and the R139 running almost continuously, grabbing satellite images whenever the birds came within range. Since *WXSAT* is *Windows* software, you can multitask, too. Believe it or not, as I was typing the previous paragraph in *Word97*, *WXSAT* was receiving an image from the Meteor 3-5 satellite!

But how well does it work?

My meager station is far from ideal for monitoring weather satellites. Not only is my antenna in the attic, it is a fixed Yagi. This is a liability because my reception is limited to only that portion of each satellite pass that travels through my Yagi's pattern. Unless you can track the satellite throughout a pass using an azimuth/elevation rotator, a beam antenna does more harm than good. You are probably better off with an omnidirectional antenna such as a turnstile (Hamtronics sells these), eggbeater or quadrifilar.

My other liabilities include the fact that my antenna is close to my PC (enough birdies to make Alfred Hitchcock envious), and that fact that I don't have a receive preamplifier. Despite all this, the R139 did a remarkable job (see the sample images).

Conclusion

If you want to receive APT weather satellite images with your bare hands, you can't go wrong with the R139. It is a good receiver at an economical price. If you enjoy building, you can purchase the kit version of the R139 and save even more money.

Teachers should take note. The R139 is probably the least expensive means possible to expose your students to the awe and wonder of satellites. With the R139, the *WXSAT* software, a simple antenna and a desktop or laptop PC, students will be treated to an astronaut's view of their home planet. It's important to emphasize that the image they are seeing is not a stored picture that's hours or days old—it is a real-time snapshot taken from a spacecraft at the very moment that it's streaking over their heads! Radio doesn't get much more impressive than this. Ask any ham.

Manufacturer: Hamtronics Inc, 65 Moul Rd, Hilton, NY 14468; tel 716-392-9430; fax

716-392-9420; jv@hamtronics.com; <http://www.hamtronics.com>. Manufacturer's retail price, assembled with cabinet and 115 Vac adapter: \$239; in kit form with cabinet and ac adapter: \$189; in kit form less cabinet and ac adapter: \$159.

SOLICITATION FOR PRODUCT REVIEW EQUIPMENT BIDS

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

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

ADI AT-201 2-meter FM handheld transceiver, serial number 7S40030019 (see "Product Review," December 1997 *QST*). Minimum bid: \$90.

Alinco DJ-S11T 2-meter FM hand-held transceiver, serial number T003447 (see "Product Review," December 1997 *QST*). Minimum bid: \$60.

Alinco DR-140TQ 2-meter FM mobile transceiver, serial number T003282 (see "Product Review," March 1999 *QST*). Minimum bid: \$130.

ICOM IC-2100H 2-meter/70-cm FM mobile transceiver, serial number 004132 (see "Product Review," January 1999 *QST*). Minimum bid: \$125.

ICOM IC-PCR1000 computer-controlled communications receiver, serial number 001854 (see "Product Review," July 1998 *QST*). Minimum bid: \$300.

ICOM IC-Q7A 2-meter/70-cm FM handheld transceiver, serial number 002103 (see "Product Review," May 1999 *QST*). Minimum bid: \$120.

Japan Radio Company NRD-545 DSP receiver, serial number 05112 (see "Product Review," February 1999 *QST*). Minimum bid: \$1100.

Kenwood TM-V7A 2-meter/70 cm FM mobile transceiver, serial number 90200212 (see "Product Review," November 1998 *QST*). Minimum bid: \$280.

Kenwood TS-570S(G) HF/6-meter transceiver, serial number 00600059, with YK-88C-1 500 Hz CW filter (see "Product Review," May 1999 *QST*). Minimum bid: \$935.

Maha/Rexon RL-112HP 2-meter FM handheld transceiver, serial number T809992 (see "Product Review," April 1999 *QST*). Minimum bid: \$100.

Maha/Rexon RL-115HP 2-meter FM handheld transceiver, serial number T840010 (see "Product Review," April 1999 *QST*). Minimum bid: \$130.

Ten-Tec RX-320 PC radio, serial number 07A10608 (see "Product Review," March 1999 *QST*). Minimum bid: \$180.

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

In your bid, clearly identify the item you are bidding on, using the manufacturer's name and model number, or other identification number, if specified. Each item requires a separate bid and envelope. Shipping charges will be paid by ARRL. Please include a daytime telephone number. The successful bidder will be advised by telephone or by mail. Once notified, confirmation from the successful bidder of intent to purchase the item must be made within two weeks. No response within this period will be interpreted as an indication of the winning bidder's refusal to complete the transaction. The next highest bidder will then have the option of purchasing the item. No other notifications will be made, and no information will be given to anyone other than successful bidders regarding final price or identity of the successful bidder. If you include a self-addressed, stamped postcard with your bid and you are not the high bidder on that item, we will return the postcard to you when the unit has been shipped to the successful bidder.

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

New Products

NEW POWER DEVICES CATALOG FROM PHILLIPS ECG

♦ The 18th edition of the *ECG Power Devices* catalog (ET-2867) features 322 industrial high current (3 to 2,200 A) semiconductor part numbers in 44 different package outlines with complete electrical specifications.

This handy reference includes information on bridge rectifiers, industrial rectifiers, SCRs, triacs, overvoltage transient suppressors and industrial power modules. Cross references to similar power devices by other manufacturers is also provided.

To locate an ECG distributor in your area, call 800-526-9354 or visit their Web site at <http://www.ecgproducts.com/>. Phillips ECG, 1001 Snapps Ferry Rd, Greenville, TN 37744; tel 423-636-5688, fax 423-636-5809. **QST**

SIMPLIFIED ANTENNA CURRENT MONITORING

◇ The “Revisions to the Simplified Antenna Current Monitoring” (*Hints & Kinks*, *QST*, March 1999, p 77) omitted one essential component: a load resistor for the current-sensing toroid. See Figure 1. The toroid works as a current transformer and—like all current transformers—needs a load that forms a return path for its secondary current. Without it, transmitter power is dissipated in the toroid and diode, not the antenna.

The value and power rating of the load resistor depend on the current monitored and the voltage needed for the diode rectifier and meter. Let us assume the antenna current is 2 A, for a 200-W transmitter in a 50-Ω system. Practical values might be ten turns for the transformer secondary and a 10-Ω load resistor across it. Because of the turns ratio, one-tenth of 2 A will flow in the secondary circuit (in this case the load resistor); 0.2 A through 10 Ω produces 2 V, a convenient value for the meter circuit. More turns produce a *lower* voltage, because they divide the current by a larger ratio from our one-turn primary. For these values, the resistor dissipates $0.2 \times 2 =$

0.4 W; a higher value of resistor gives more voltage for the meter circuit, but dissipates more power. So, choose the number of turns and the resistor wattage to suit your antenna current. Use a noninductive carbon or metal-film resistor of sufficient dissipation, or a parallel combination if you can’t get the ohmic value low enough or the power rating high enough.

As a current indicator, the circuit is a very practical, useful aid to mobile work. With careful choice of components and a metering circuit following the design of low-voltage RF voltmeters that have appeared in articles over the years, you can build an RF ammeter that is both more accurate and more robust than the thermocouple RF ammeters that are becoming so scarce now.—*John S. Innes, VK2AUI, 120 MacPherson St, Cremorne, NSW 2090, Australia; jinnes@sydney.dialix.com.au*

THE SOLAR K.I.S.S.

◇ Here is a circuit that makes more efficient use of generated solar power. Get ready for Field Day, an emergency, a day at the lake or a backpacking hike with your sun-powered kit.

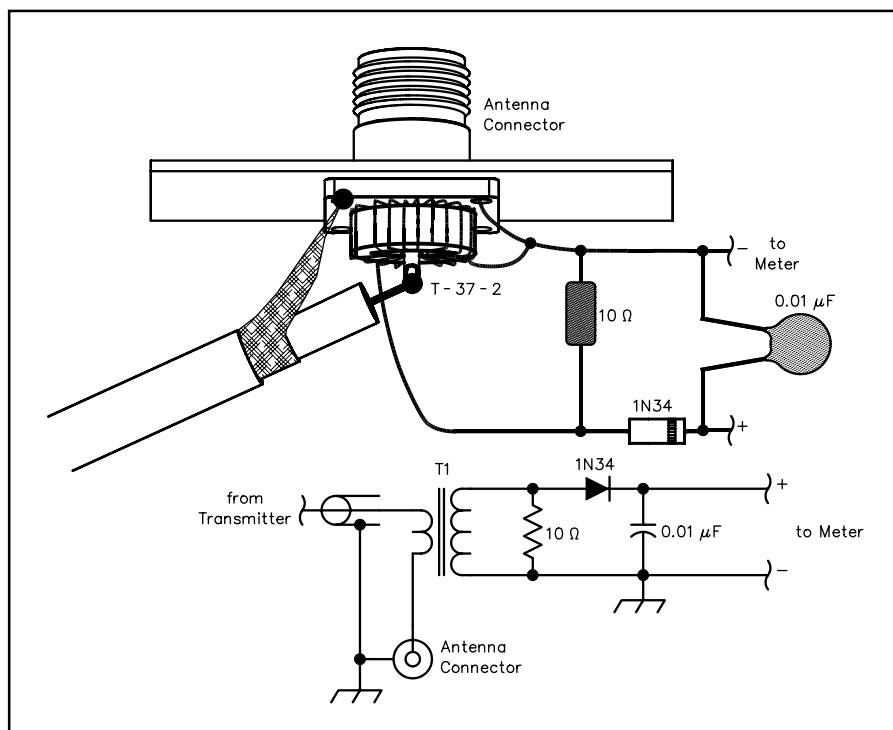


Figure 1—A revised pictorial and schematic from the “Simplified Antenna Current Monitoring” hint in the *January* and *March 1999* columns.

One of the few negative considerations about using solar power is the loss inherent in dropping the typical 16 V panel output to a safe value for equipment intended to operate at 13.8 V dc. (Typical automotive charging systems use 13.8 V to charge the battery. Most mobile equipment allows a $\pm 10\%$ tolerance, and operates from 12.4 to 15.2 V.—*Ed.*) Charging some (nominal) 12 V batteries at the full panel output can be injurious to them, just as applying 16 V to some equipment may damage it.

“Oh well, use a regulator,” you say? Or brute force, a dropping resistor? Well, the regulator costs money, and what happens to the difference between the panel output of 16 V and the regulated output of 13.8 V? It is nonchalantly discarded, that’s what.

The use of a dropping resistor is such a poor idea I will not even consider it here. This article describes a field (or auxiliary home emergency) system. The field system uses two solar panels producing 16 V at 4 A. Because I abhor the idea of wasting this hard-won power, I devised the following scheme to collect and store it for subsequent or immediate use.

I made a battery of 14 V by series connecting 8 and 6 V units. (Suppliers now make 8-V batteries to replace the 6-V batteries used in older automobiles.) It is necessary to protect the panels from reverse current that could flow if they were connected directly to the batteries and the panel voltage fell below that of the battery—a common occurrence.

I selected RadioShack #276-1661, 6-A, 50-PIV diodes and parallel connected two of these as the isolator. Considering the maximum panel output of less than 5 A, this is an ample safety factor. A 0.7-V drop inherent in the power diodes is fortuitous in this application: it provides 15.3 V, which is just more than a trickle-charge rate for a 14-V battery.¹

Figure 2 shows the circuit. I added three more of these diodes, switched in or out of the circuit by a rotary switch. These provide additional charge and output-voltage control using the same inherent voltage drop. I installed three metering points for monitoring the performance.

I use a four-pin tube socket (one large

¹ A higher charging rate is available by connecting the panel output directly to the battery terminals. There are two caveats: (1) All other loads should be disconnected and (2) the panels should be promptly disconnected from the battery when its output falls below battery voltage. The safe way is to leave the isolator in the circuit at all times.

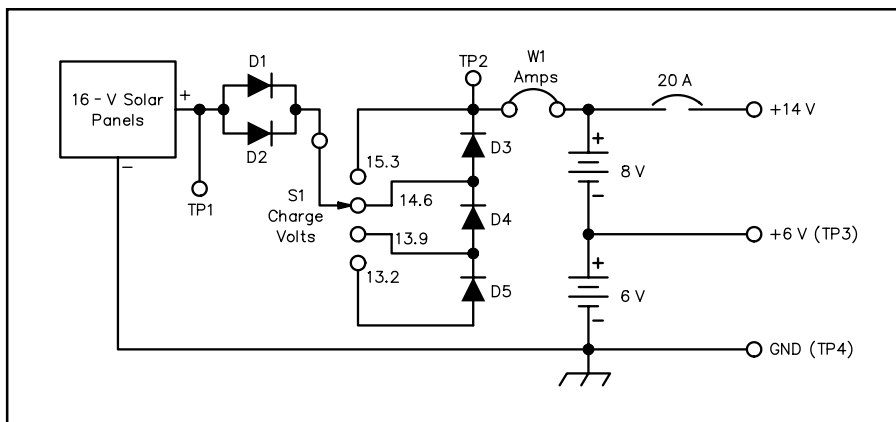


Figure 2—The circuit of the emergency or field solar-charging system with details of metering and switching. Equivalent parts may be substituted.

D1-D5—6-A, 50-PIV diodes
(RS #276-1661)

and one small pin paralleled for each polarity) protected by a 20-A switching circuit breaker. Separately fused two-pin polarized sockets and a cigar lighter socket complete the output power access. Six-volt equipment may be powered by connection to the junction of the two batteries. A good way to make a universal power connection is to use a fused or circuit breaker protected heavy-duty barrier strip at the battery outputs. One might then have the common (negative) and positive 6, 8 and 14-V terminals for connection to loads.

Red and black banana jacks connect the charging line to the battery via a shorting plug, which can be removed to insert an ammeter. Solar-panel power with no battery involved may be taken between the red ammeter jack (positive) and the black banana jack labeled "GROUND," which is also chassis ground and common negative. The voltage control is effective in this connection, which permits connecting to external loads for experimenting.

The stiff 14-V supply from the battery furnishes plenty of power to the load for several hours. Charging may be done simultaneously, of course. With the battery stabilizing the output and fed through a diode string, the voltage will be stable and not excessive for nominal 12 to 13.8 V equipment.—A. W. (Bill) Edwards, K5CN, 456 Glenmore St, Corpus Christi, TX 78412-2827

MAGNETS AND STAINLESS-STEEL ALLOYS

◊ In March 1994, I wrote a short hint showing that you could find the more desirable stainless-steel nuts, bolts and washers in your junk box by testing them with a magnet. In the June 1996 column (p 70), Stanley R Trout, PhD, PE, WB2SHR, correctly points out that some stainless steels that *are* attracted to a magnet (400 series, so called, *ferritic* stainless steels). These are usually found in specialty hardware and are unlikely to be found in the garden-variety

stainless found at local hardware stores. My original—and current—intention is to make a simple, easily remembered test for stainless steel. The short answer is, if a piece of hardware is attracted to a magnet, don't use it! Of course, users can differentiate stainless steel from other nonmagnetic materials such as copper, brass and bronze by their distinctive yellowish color. The average user is unlikely to encounter *ferritic* stainless steels except in rare cases. The rare pieces of stainless that you don't use in antennas—because of their attraction to a magnet—are not worth the worry.—*Bob Mandeville, N1EDM, 94 Florence St, Brockton, MA 02401; mandevil@battelle.org*

INTERESTING NOISE SOURCE

◊ While listening on 20 meters the other night, my receiver was clobbered by an S-9+ noise. It had an interesting character: about 2 kHz wide and could be found every 23 kHz. In addition, there was an apparent amplitude modulation with a frequency of around 2 to 3 Hz. I tuned through several bands and found the characteristic noise, spaced every 23 kHz from 3 MHz to 15 MHz. It was time to do a little DFing.

I got out my Grundig Yacht Boy 400 and put it in AM mode. I walked around my house but found little correlation with position within the house. It was a nice evening so outside I went. I walked to the west about 100 yards and the signal decreased noticeably. Back to the east now the signal increased by my house but decreased again as I passed the neighbor's house to the east. Aha! It must be that guy's new computer. But I hadn't gone across the street yet, so north I went. The Yacht Boy's S-meter started to really climb, and as I went up to the neighbor's front door, it went to full scale. I rang the doorbell—no answer. I saw my neighbors out walking not long ago so I knew they were home. So I went back home and called them on the telephone. The wife answered and said she

was sorry she didn't hear the doorbell because her husband was working out on his new electric treadmill. I asked if I could come over and watch him, and she agreed. I took the Yacht Boy receiver with me, and as soon as I entered the house the noise stopped. I asked him to get back on the treadmill and the noise reappeared. My neighbor understood the problem immediately and we established "Silent Hours" for his workouts.

The treadmill is a Sears PRO FORM model 730 SI. It has a rather sophisticated computer in it that is likely the source of the noise. By the way, I determined that the amplitude modulation was directly related to the user's walking pace so I can now monitor how my neighbor is doing in his workouts.—*Rod McLennan, W6MWB, 3727 Cedarbrae Ln, San Diego, CA 92106; 103123.1461@compuserve.com*

SALVAGING PARTS FROM SCRAP PC BOARDS

◊ I use a heat gun to melt the solder on boards after all of the thermoplastic parts have been removed with a vacuum soldering iron or solder wick.

Do not hesitate to use pulled parts for your projects. Simply measure the parts to ensure that they aren't damaged. In many cases you will find that these "aged" parts are more stable than new, off-the-shelf items.

If there are monolithic capacitors and resistors on the boards, remove them with solder wick. Even if you lose the wires attached to these devices remove the plastic dip package and you may find a chip capacitor or resistor.

Do this type of work in a well-ventilated area or better yet outside. Be aware of the possible fire hazard. The heat gun I use is the Wagner Power Stripper. It has a high-heat position with a temperature of about 1500°F close to the nozzle, about 800°F in the low position. You may want to use a motor-speed control to get the temperature just right. Solders melt in the range from 500° to 800°F.

I usually bring the solder to the melting point and then give the board a rap or two over a metal bucket. Hold the board with a pair of locking pliers. If their leads are not bent, most parts will come out easily. A set of long-nose pliers is handy, too. Again, *caution*, the heat and fumes are both hazardous.—*Lloyd G. Hanson, W9YCB, 490 E 300 N, Angola, IN 46703*

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](http://page.10)), or via e-mail to rschetgen@arrl.org. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments.



Technical Correspondence

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

TESTING MATCHING AND LOADING NETWORKS AT FULL POWER

By **Mitchell Lee, KB6FPW**, 172 N 24th St, San Jose, CA 95116

◇ Components used in transmitter-matching and antenna-loading networks are frequently subjected to a lot of stress. Capacitors are usually limited by their breakdown (or flashover) voltage and inductors are limited by winding and core losses that create heat.

To test the network described in my April 1997 Hints and Kinks item,¹ I constructed a test fixture (see the pictorial diagram in [Figure 1](#)) that allows me to place the network in series with a dummy load. The fixture consists of a 1³/₈×1³/₈×6-inch copper-plated box (a discarded Jerrold 1505XG 4-way receiver splitter) with four 5-way binding posts mounted in place of the original F connectors, and an SO-239 connector at each box end. (A length of 1-inch-wide aluminum U channel, with the SO-239s attached to the side of the channel will serve the purpose.) Binding posts 2 and 3 are connected together; posts 1 and 4 are connected to the adjacent SO-239s. A 100 W transmitter and SWR meter are connected in series to one SO-239, a dummy load to the other.

The loading network is series-resonant on 40 meters. I connected it to terminals 1 and 4, so at resonance the transmitter sees straight through the network to the dummy load. At 100 W, the network carries an RF current of 1.4 A.

On 80 meters, the network exhibits an inductance of 7 µH. I wired the network between terminals 1 and 2, and connected a

500 pF air-dielectric variable capacitor between terminals 3 and 4 to series-resonate the network. With the capacitor adjusted for minimum SWR, I could apply full power as the transmitter once more sees only the dummy load.

Parallel-resonant circuits (as this network appears on 30 meters) can be tested to a limited extent by shorting together terminals 1 and 4 and connected the resonant circuit between terminal 4 and ground (a fifth binding post can be added for this purpose). The network will see 70.7 V RMS, which is a fraction of what might be experienced in, say, a trap application. Individual capacitors and inductors can be tested by simply resonating them with their complement, as described in the 80 meter test earlier.

When testing networks and components, exercise caution. First apply low power, perhaps as little as 1 to 5 W. Check the SWR and tune the transmitter, the components, or both, for minimum SWR. Watch the SWR meter for fluctuations that could signal catastrophic changes in one or more of the components.

Turn off the transmitter and check for signs of component heating. If the components are still cold, retest, gradually increasing the power applied and observing the components and SWR meter. If all is well at 100 W, let the components “soak” for as long as you like. Always turn off the transmitter before touching the components.

You can estimate the voltage drop across a component in a series-resonant circuit. Assuming 100 W passes through to a 50 Ω load, the circuit current is 1.4 A RMS. Multiply this value by the reactance of the component in question and you’ll have the answer. For example, a 50 pF capacitor exhibits 849 Ω reactance at 80 meters. With 1.4 A passing through it, the resultant voltage drop is 1188 V RMS.

A SIMPLE dBm CALCULATOR

By **Paul Atkins, K2OZ**, 56 Ormsay St, Park Ridge, NJ 07656-2205

◇ I always read the Technical Correspondence column. The July and October 1998 Technical Correspondence columns^{2,3} left me wondering why this simple formula for calculating dBm wasn’t given:

$$P_{\text{dBm}} = \log(P/0.001) \times 10 \quad (\text{Eq 1})$$

where

P = Power in watts

As an example, to convert 0.8 W to dBm:

$$P_{\text{dBm}} = \log(0.8/0.001) \times 10 = 29.03 \text{ dBm} \quad (\text{Eq 2})$$

With this formula, one does not have to carry around sheets of paper or notes to arrive at the proper answer. A simple, inexpensive calculator equipped with a log function will do the job. Programmable calculators allow you to store the program and call it up when needed.

DRIVE BELTS FOR HEATH GEAR

By **Art Pahr, K9XJ**, N8029 Willow Rd, Plymouth, WI 53073-2929

◇ Several of the rigs marketed by Heath in the 1970s use rubber belts to drive variable capacitors for the **PRESELECTOR**, **TUNING** and **LOAD** controls. As these rubber belts age, they become brittle and break. For almost 25 years, I clung to my venerable SB-102 before treating myself to a rig of the ’90s. The SB-102 still has a lot of years left in it, but I was at a loss for a source of

²Jay Craswell, W0VNE, “Converting Between dBm, Milliwatts and Watts,” Technical Correspondence, *QST*, Jul 1998, p 70

³Edward K. Conklin, KH7JJ, “Once More: Converting Between dBm/Milliwatts/Watts,” Technical Correspondence, *QST*, Oct 1998, pp 80-81.

¹Mitchell Lee, KB6FPW, “A Three-Band, No-Tune Apex Loading Network for an 80-Meter Inverted L,” Hints and Kinks, *QST*, Apr 1997, pp 67-68.

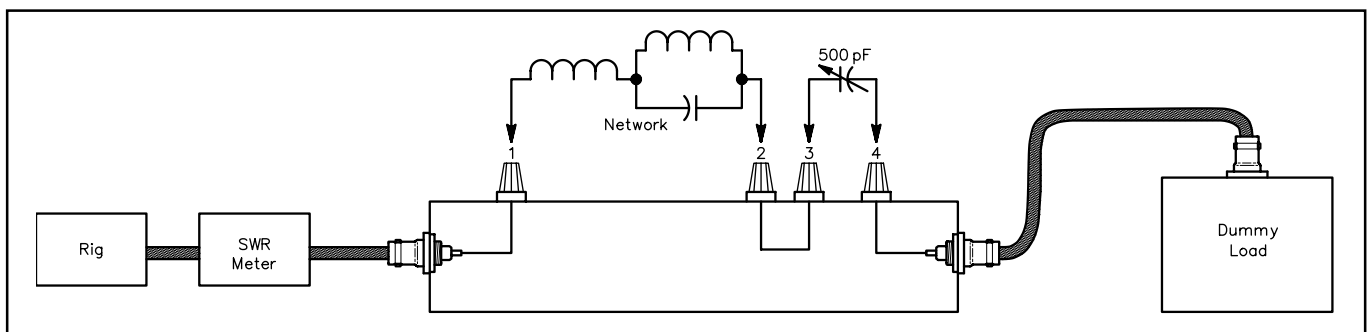


Figure 1—You can evaluate components at the full output power of your transceiver using this test fixture.

replacement drive belts. Then, one day as I was driving past a local bearing supply company, the “bulb in my head” lit. Another day, I stopped to check out the company’s supply of **O** rings. Using an old belt from the SB-102 as a sample, the clerk came up with a $1/8 \times 2 1/8 \times 2 3/8$ -inch OD **O** ring. The rings are sold in bags of five at \$3.50 plus tax. I needed only three rings (belts), but now have two spares to go with the rig when I sell it at a swap fest.

COHERENT CW AND GPS—SOME IDEAS

By William H. Alliston, W3ICB, 4880
Greensburg Rd, Murrysville, PA 15668;
williama@nb.net

◊ The excellent article by Brooks Shera, W5OJM,⁴ can also be the basis for a coming of age for coherent CW. With a frequency (and hence, timing) standard better than 1 part in 10^{10} , it should be practical to keep a coherent CW transmitter and receiver synchronized for something like a year at speeds up to 40 WPM, with no further synchronizing adjustments! (And—thanks to the orbiting GPS atomic clocks—at global distances).

The original concept for coherent CW had obvious advantages in terms of very narrow bandwidths, maximizing the number of stations that could operate within an assigned band and the ability to copy signals down in the noise. But the thought of copying hours on end of perfectly sent Morse at the proposed 12 WPM is enough to send any experienced CW operator running for the hills!

Improved timing from the GPS satellites will allow the 12-WPM-only idea to be scrapped in favor of a selectable set of code speeds suitable for most operator skill levels. For example, speeds of 10, 12, 13.3, 15, 17, 20, 24, 30 and 40 WPM might be selected by the stations in contact by using multiples of a basic (fastest) timing interval for each Morse character. The set of speeds in this example would be available using a basic timing interval corresponding to a dot length at 120 WPM, which would still allow two stations to remain synched for months without further adjustment.

Coherent CW on this new basis provides something for everyone interested in CW operation. An operator could select copy by ear, and send using a conventional key or keyer. The operator would hear the as-keyed sidetone, and remain blissfully unaware that a microcomputer interlaced to the transmitter was continuously adjusting the Morse timing to match the timing of the coherent CW channel. The only clue might be an occasional prompt from the computer if the timing of the keyed-in message starts to fall behind the timing of the transmitted coherent CW signal. On the other hand, the operator not interested in

CW *per se* can type a message as if for Packet or RTTY, and allow the computer to copy the return message and display it on a monitor or send it to a printer.


Faster code speeds would, of course, result in wider bandwidths. But this should not be a limiting factor, considering the small bandwidth needed anyway; the data rate per Hertz of bandwidth would be maintained regardless. In fact, mark and space frequencies could be used, resulting in a readability improvement of several decibels. These frequencies could be separated by several hundred Hertz for better frequency diversity. Several channel frequencies could then be interleaved, so that other stations could operate between them using channel spacing smaller than the mark and space difference of any two stations in communication. Even separate dot and dash frequencies, with other mark and space arrangements, can be considered. The overwhelming number of arrangements possible obviously calls for setting standards.

With synchronized coherent CW using channelized frequencies, it will be much easier to use correlation techniques to copy signals down in the noise. The computer at the receiving end need only determine if a signal was, or was not, present in each timing interval. Use of separate mark and space frequencies would further improve the reliability of this decision, and added improvement could come from the standard Morse timing and its 1:3 dot/dash ratio. (If separate dot and dash frequencies were used, the fact that a station would never send a dot and dash simultaneously could be used for a further gain in reliability, but now the extra bandwidth starts to add up). Finally, when automatic (computer) copy is in use, the computer could reject any non-Morse combination of dots and dashes, for more accuracy.

This is a bit of speculation on my part as to what might now be done with coherent CW. Getting something started needs the cooperation of several interested hams. I would appreciate hearing from others interested in trying it, or who have suggestions on changes.

Letters for this column may be sent to Technical Correspondence, ARRL, 225 Main St, Newington, CT 06111, or via e-mail to ppagel@arll.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.

Feedback

◊ Please refer to “The W3KH Quadrifilar Helix Antenna,” *QST*, Aug 1996, page 33, Figure 7. The labels S1T and S2T in Figure 7A are transposed; please reverse them. —*tnx Eugene F. Ruperto, W3KH* 

VHF/UHF Century Club Awards

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations for contacts with the minimum number of Maidenhead grid-square locators (indicated in *italics*) for each band listing. The numbers preceding the call signs indicate total grid squares claimed. The numbers following the call signs indicate endorsement levels claimed. The totals shown are for credits given from February 2, 1999 to April 16, 1999. The VUCC application form, field sheets and complete list of VHF Awards Managers can be found on the Web at <http://www.arrl.org/awards/vucc/>. Please send an SASE if you cannot download the forms online. VUCC lapel pins are available for \$5 each. If you have questions concerning VUCC, send an e-mail to vucc@arrl.org.

Compiled By Bill Moore, NC1L, Century Clubs Manager

50 MHz		222 MHz	
	<i>100</i>		<i>50</i>
1007	N9XMU	101	W9JN
1008	W2BZY		
1009	KC6WFS		
1010	KL7NO		432 MHz
1011	KB8O		<i>50</i>
1012	KOVSV	276	WD9BGA
1013	KD8DR	277	K7XD
1014	NE0P	N5FAC	100
1015	NE0P/9		
OK1MP	150		1296
KOVSV	150		<i>25</i>
NE0P/9	125	K3HZO	75
KOOST	200		
W2BZY	175		5.7 GHz
WD5K	825		<i>5</i>
W5DB	200	38	WA8RJF
KL7NO	275		
KB8O	175		10 GHz
K8PT	200		<i>5</i>
W9JN	400	100	WA8RJF
144 MHz		Satellite	
	<i>100</i>		<i>100</i>
561	K0DOK		
562	KY4SA	N1JEZ	300
563	NY2Z	K8TL	450
564	W4KXY		
KB8O	150		
WA9PWP	125		

Strays

FREE FIELD DAY SOFTWARE

◊ Scott, N3FJP, is offering free logging software just in time for Field Day. His *Field Day Logging Program*, version 1.0, checks for duplicates (including partials), lists sections (that change color when they've been worked), lists all contacts, writes ASCII log, dupe and summary files, and provides many statistics. You can download it from the Web at <http://members.aol.com/snkDavis/page1.html>.

I would like to get in touch with...

♦...anyone who may have known my grand-
 father, Clinton "Pappy" Painter, W5HNF.
 He passed away in November 1998. This is
 my feeble attempt to lay him to rest since I
 live in Okinawa and was unable to be with
 my family at the funeral. You can contact
 me, Jill Syrotchen, via e-mail at
syrotchen@sunnynet.or.jp.

FREE E-MAIL AND WEB HOSTING

♦ Mike Crane, KC5GJN, is offering free e-mail and Web hosting to amateurs at the Ham's Net International Amateur Radio Club site at <http://www.hamsnet.net/home.htm>. Services include up to 5 Mbytes of mailbox and personal Web page space.

Next Stray

⁴Brooks Shera, W5OJM, "A GPS-Based Frequency Standard." *QST*, Jul 1998, pp 37-43.

Swatch Beats Retreat on “Beatnik” Mission

Swatch Watch called off its controversial “Beatnik” mission satellite at the eleventh hour, opting to spread its “beat” message from cyberspace instead of outer space. The satellite, the third in a series of mini-Sputniks, was launched “dead” on April 16 from the Russian *Mir* space station. It was to transmit on 2 meters messages gathered by the watchmaker. As an alternative, Swatch held a live video-conference on the Internet April 22.

The messages in question, collected via the Swatch Web site, related to the Swatch company’s campaign to establish the “Swatch Beat” as a new “global concept of time.” Messages selected for use were supposed to reference the “beat” theme.

But Amateur Radio operators around the world, citing international regulations, protested the plans because of their commercial connection. Rob Carlson, KC2AEI, opened a “Swatch Protest and Boycott” site on the Internet to collect opinions and as a clearing house for information on the topic.

The controversy over the use of Amateur Radio frequencies to transmit the messages eventually grew to international proportions, and the story was picked up by media ranging from *Wired News* and

MSNBC to *The Sunday Times of London* and *Forbes* magazine.

Swatch pinned the blame for cancellation of its Beatnik satellite on the April 12 failure of the Luch 1/Gelios satellite the *Mir* crew uses for communication with Earth. “Swatch has decided to assist the Spaceflight Control Centre and donate the batteries supporting the Beatnik satellite to the *Mir* cosmonauts, thus cancelling the possibility of any radio transmission from space,” Swatch said on its Web site.

Full-page Swatch ads in the April 16 editions of the *New York Times* and *Los Angeles Times* to announce the change in plans expanded on the battery swap explanation. According to the *Times* ads, cosmonauts would use the batteries to run an onboard printer “which is the lifeline to earth through which the Cosmonauts receive their daily instructions and key operations points.” The Luch-1/Gelios is the only geostationary satellite available for *Mir* communications.

The ARRL weighed in on the Beatnik satellite controversy April 7 by suggesting to Swatch Group CEO Nicolas E. Hayek that the Swiss firm cancel the launch and use a commercial satellite instead. ARRL

Executive Vice President David Sumner, K1ZZ, noted that international regulations define the amateur service as one engaged in by “duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.”

Although Swatch asserted the messages were not advertising, Sumner pointed out to Hayek that any commercial arrangements to transmit messages on amateur frequencies would be contrary to international law. “I think this was a new thought to him, frankly, because this is not the way they had been viewing it,” Sumner said.

The transmit-only mini-satellite had arrived on *Mir* aboard a Progress rocket April 4. AMSAT-France, had contracted with AMSAT-Russia to build the electronics for the mini-Sputnik. After learning of the Swatch contract, AMSAT-F distanced itself from the project and apologized for its involvement. AMSAT-F had attempted to get Swatch to either modify the satellite and launch it later or to turn off the voice circuit. AMSAT-Russia President Eugene Labutin, RA3APR, also apologized, saying the arrangements with Swatch were made without AMSAT-Russia’s knowledge.

FCC Official Acknowledges “Official” Role for OOs

The FCC’s top amateur enforcer, Riley Hollingsworth, K4ZDH, says that hams who receive notices from ARRL Official Observers should take them seriously or take the consequences. “Failure to take the notices seriously and to take corrective action where possible will not be tolerated by the Commission,” Hollingsworth said in an enforcement-related letter to a South Carolina amateur. “The volunteer work of these Official Observers is a critical element of the Commission’s enforcement program,” he said.

Hollingsworth subsequently clarified that OOs do not take official action nor do they work as legal agents of the FCC. “They are voluntary only and advisory only,” he said. Official Observers work “in accordance with an agreement between the Commission and the ARRL and in accordance with our statutory authority,” he explained. “There is no obligation to respond.” But he said the FCC would not look kindly on a history of ignoring notices from Official Observers in situations where the Commission has brought a case based on its own

evidence of similar infractions.

Hollingsworth’s comments were contained in an April 7 station-inspection follow-up letter to Richard Whiten, WB2OTK. Hollingsworth said that Whiten apparently had ignored OO notices. “One thing I have really picked up as I travel around to groups is the frustration of the OOs,” Hollingsworth told the League. “We’re going to correct that, pure and simple.”

Hollingsworth and an FCC engineering team visited Whiten’s station on January 22 after what Hollingsworth called “longstanding complaints” about the operation of Whiten’s station. Whiten reportedly cooperated in the station inspection.

In his letter, Hollingsworth told Whiten that the success of Amateur Radio self-policing “depends upon the adherence to notices of possible improper operation from other licensed amateurs who are recognized Official Observers.” The FCC asked Whiten to list all notices from OOs he has received since his license term began in 1994 and any actions he’d taken in response.

Hollingsworth also took advantage of the opportunity provided by his letter to Whiten to spell out the FCC’s position on obscene and indecent Amateur Radio transmissions. “Obscene speech is not protected by the First Amendment and cannot be broadcast at any time,” he advised. Indecent speech also is not protected between 6 AM and 10 PM, in accordance with the so-called “safe harbor” policy the FCC uses with commercial broadcasters.

The FCC subsequently forwarded to Whiten tape recordings made of his transmissions last November on 20 meters. Whiten has been requested to provide “a full explanation for those radio transmissions.”

Hollingsworth says no decisions have been made yet in Whiten’s case. “We’re still seeking information,” he said.

RETESTING, SHORT-TERM RENEWALS ARE ENFORCEMENT TOOLS

The FCC’s Riley Hollingsworth, K4ZDH, says he plans to make judicious use of both the short-term renewal and

retesting to boost amateur compliance.

Hollingsworth employed a short-term renewal as a sanction in a recent amateur case where a newly licensed teenaged ham was found to be transmitting music on a police frequency using a modified handheld. On April 14, Hollingsworth reinstated the ham's Technician license—which had been suspended—but imposed a one-year renewal. Local police in New Jersey had reported to the FCC that Mike Mustachio, now KC2EUT, had transmitted music on a police frequency for about 12 minutes on March 16—just days before his ham ticket was granted.

Hollingsworth said he spoke with the 14-year-old licensee and his parents before making a “judgment call” in the case to go with a short-term renewal. He expects the sanction might come in handy in other pending enforcement cases as well, but he still expects to use it only “in rare cases where there are mitigating circumstances and a good likelihood of compliance.”

Retesting is another administrative prerogative that Hollingsworth has been taking advantage of. The FCC has the authority to request that any amateur who obtained a license through the Volunteer Examiner program retest either at an FCC office or using another Volunteer Examiner Coordinator.

Earlier this year, Hollingsworth notified a Delaware ham that she had to retake her Extra class examination or lose her ticket. More recently, the FCC asked a Michigan ham to retake his General and Advanced class examinations. Other retesting requests went out in April in several cases where licensees either had not responded to a written Warning Notice or where something about the licensee's actions or responses raised questions about the individual's qualifications.

“We're going to use this very carefully,” Hollingsworth said. “We don't want to scare everybody into thinking that they could get a recall in the mail.”

ARRL MEMBERSHIP ON THE RISE AGAIN!

ARRL membership increased by 1327 during the first quarter of 1999, to a total of 163,953. Improved renewal rates and an increase in new memberships both contributed to the first sustained membership growth since the first quarter of 1997.

“The effects of the 1997 dues increase are now behind us,” said Executive Vice President David Sumner, K1ZZ. “Also, new members and old agree that the new Web-based membership benefits have enhanced the value of belonging to the League.” More than 50,000 members have registered to use the ARRL Members Only Web Site in just eight months, earning this new membership benefit a popularity ranking that is second only to *QST* magazine. Among other things, the Members Only site offers access to the League's on-line news

and features magazine, *The ARRLWeb Extra*, as well as *QST* product reviews, search capability of *QST* and *QEX*, and the ability to sign up to receive *The ARRL Letter* and WIAW bulletins. The site also offers early access to contest results.

“The support of our members is very important to the success of the League, and is deeply appreciated,” Sumner added. “At a time when many organizations are having problems attracting and retaining members, it is nice to be able to report that we seem to be bucking the trend.”

NASA PROVIDES SPACE QUALIFICATION FUNDING TO SAREX/ARISS

NASA has given a \$90,000 boost to the cause of giving Amateur Radio a permanent place in space. The money, recently transferred to the US-based Space Amateur

Radio EXperiment (SAREX) team from NASA's Education Office will support the space qualification of Amateur Radio hardware bound for the International Space Station as part of the Amateur Radio on the International Space Station (ARISS) program.

AMSAT-NA's Vice President for Human Spaceflight Programs and ARISS Administrative Chairman Frank Bauer, KA3HDO, says ARISS was “ecstatic” to learn of the subsidy for this crucial facet of the ARISS hardware development. “While this may sound like a great deal of funding to the Amateur Radio community, it represents approximately one-seventh of what we expect will be required to fully develop all three phases of the ARISS hardware system,” he said.

The ARISS initial station hardware—basically dualband H-Ts—is currently be-

N1GNV Joins ARRL HQ Staff as Advertising Manager

John “John Bee” Bartscherer, N1GNV, became the League's new Advertising Manager May 3. He comes to the League after a 30-year career in the bicycle business, and just two weeks shy of his tenth anniversary as an amateur. For 15 years, he ran a bicycle store in Meriden, Connecticut. Most recently, he was national sales manager for a major bicycle company.

“The bicycle business is very similar, in many ways, to Amateur Radio,” he said. “Learning to ride a bicycle is something most people can do if they want to, just like getting a ham ticket. From there, it's a matter of how seriously one wants to get involved.”

Bee says that in today's world, individuals often find themselves hard-pressed to find time to enjoy their avocations, and increasingly rely on trusted sources to provide accurate and timely information. “As a ham, that has always meant *QST* and the other League publications,” he said.

Bee says he's constantly amazed Amateur Radio's variety. “A friend of mine is fond of pointing out that there are 26 different kinds of ham radio,” he said. His own choice is fox hunting. “I'm amazed at what you can do with an H-T and \$10 worth of stuff from the hardware store.” For one fox hunt, he said, he put together a “fox” consisting of a “credit card” H-T and parts from a voice recorder scavenged from his son's discarded toys. He hid it inside a cyclist's water bottle.

His most memorable QSO? “I worked an Argentinean ham, and after the usual name and QTH, I told him what I did for a living,” he recalled. “It turned out that his son attended school in the next town from me, and he had been in my store just a week ago!”

The League's new advertising manager sees a bright future for Amateur Radio, especially in the waxing solar cycle and greater public awareness of the hobby and the services it provides. “Ham Radio is magic, pure and simple,” he says. “To communicate with someone on the other side of the world, often with no more power than a common flashlight, with antennas and equipment that I built myself, out of a handful of parts from here and there—What else could all of that be but magic?”

Bee also emphasized that a healthy Amateur Radio industry “is as important as anything else to the vitality and growth that keeps the spark of excitement alive and attracts new members.”

Bee succeeds former Advertising Manager Brad Thomas, KC1EX.



New ARRL Advertising Manager John Bee, N1GNV, meets with advertising assistants Hanan Suleiman, KB1AFX (left), and Robin Micket, N1WAL.

ing prepared for launch this October on STS-101. More sophisticated transportable ham gear will be delivered in late 2000 or early 2001. The rack-mounted permanent station is expected to be launched in 2003 or 2004. Qualification testing—sometimes called “shake-and-bake testing”—is required of all equipment bound for the ISS or used in manned spaceflight. The detailed, rigorous testing sequences are aimed at ensuring crew safety and minimizing equipment failure.

The bulk of the \$90,000 will go to support space qualification of the ARISS initial station hardware and some early aspects of the transportable station.

The ARISS team has been working at Goddard Space Flight Center with a NASA contractor team from Orbital Sciences Corporation to deliver the ARISS Safety Data Package and ensure the ARISS hardware is flight-qualified.

VANITY CALL SIGN APPLICATION FEE TO RISE SLIGHTLY

The cost of applying for an amateur vanity call sign is expected to rise slightly this fall. In a Notice of Proposed Rulemaking involving assessment and collection of regulatory fees for Fiscal Year 1999 (MD Docket 98-200), the FCC has proposed increasing the vanity fee to \$1.42 per year or \$14.20 for the 10-year term.

The current \$13 vanity fee was “rounded up” from \$1.29 to \$1.30 per year by the FCC when it was implemented last fall. The likely end figure this year will be \$14.

The FCC projects 6800 vanity applications in FY 1999 for a total revenue figure of more than \$96,000.

FCC SAYS RECIPROCAL PERMITS NOW “PAPERLESS”

The FCC is advising applicants for reciprocal operating permits that an application is no longer required. Under new ULS rules that took effect February 12, the FCC Form 610A has passed into history. The new rules also will pave the way for US hams to more easily operate in most of Europe. A *Public Notice* spelling out the details was issued April 9.

Alien visitors to the US holding an amateur license issued by their home country may operate in the US without submitting any FCC paperwork—provided that a reciprocal operating agreement is in effect between the two countries. The only documentation required is proof of citizenship and an Amateur Radio license issued by the country of citizenship. These arrangements are similar to longstanding arrangements between the US and Canada.

The new rules move the US a step closer to participation in the licensing arrangements of CEPT, the European Conference of Postal and Telecommunications Administrations. The US State Department applied for US participation in 1997, and the request was approved in early 1998. Com-

pletion of the final steps to make this a reality is understood to be imminent. These include formal US notification to the European Radiocommunications Office that the US is prepared to carry out its responsibilities under CEPT Recommendation T/R 61-01, and the issuance of a *Public Notice* in English, French and German.

Under the CEPT arrangements, a US Technician licensee will be recognized as holding the equivalent of a CEPT Class 2 (VHF-only) license. Holders of Tech Plus through Extra tickets will have the full HF and VHF privileges of a CEPT Class 1 license. Novice licensees will not be eligible.

Additionally, the ARRL informed the US State Department that it planned to go forward with arrangements to issue International Amateur Radio Permits to US hams in accordance with the CITEL Amateur Convention, signed by several countries in the Americas. The League has offered its services to issue IARPs to US hams. An IARP is not a license, but it certifies the existence of a license.

The new rules will not change the procedures for US hams wishing to operate overseas in countries that are not CEPT

members or CITEL Amateur Convention signatories.

ARRL REBUTS LATE-FILED ARGUMENTS IN LF PROCEEDING

The ARRL has rebutted assertions that amateur LF allocations at 136 and 160 kHz could lead to interference with utility-operated power line carrier (PLC) systems. The unallocated and unlicensed Part 15 PLC systems are used by electric utilities to send control signals, data and voice. At the same time, the League urged the FCC to issue a Notice of Proposed Rulemaking to open the LF bands up to amateurs.

Last October, the League petitioned the FCC to create low-frequency Amateur Radio allocations at 135.7 to 137.8 kHz and 160 to 190 kHz. The ARRL proposed a maximum power level of 2 W effective isotropic radiated power. The utilities' PLCs operate between 10 and 490 kHz.

The comments in question—from four parties including Commonwealth Edison and ComEd employee Mark Simon—arrived at the FCC well beyond the December 23, 1998, comment and the January 7, 1999, reply comment deadlines.

FORMER PACIFIC VICE DIRECTOR RON MARTIN, W6ZF, SK

Former ARRL Pacific Division Vice Director Ronald G. Martin, W6ZF, of Napa, California, died March 16. He was 91. An ARRL Life Member, Martin served as Pacific Division Vice Director from 1958 until 1968. First licensed in 1919 as 9HW and later as 9AHU, he became 6AYC when he moved to California. He worked as shipboard operator and later at KUP, the Press Wireless station, and for Pacific Telephone & Telegraph. During WWII, he served in the US Army and helped design and construct the worldwide Army Airways Communication Service system for the Army Air Force.

A contributor to *QST*, he was a past ARRL East Bay Section Communications Manager and was an Assistant Director in the Pacific Division. He was instrumental in creating the Air Force Military Amateur Radio System station at Travis AFB and, for many years, the key organizer of the Armed Forces Day operation at NPG at Skaggs Island, coordinating the simultaneous operations of several clubs. During the 1950s, 60s, and 70s, W6ZF generated on 80 and 40 meters the weekly Pacific Coast Bulletin consisting of ARRL news and propagation forecasts.—Brad Wyatt, K6WR



AES FOUNDER TERRY J. STERMAN, W9DIA, SK

Terry Sterman, W9DIA, the man who founded Amateur Electronic Supply as a teenager in the 1950s, has died. He was 60 and had been in ill health for several years. Sterman died March 30 following a fire in his Northwest Milwaukee home.

First licensed in 1953, Sterman got into the Amateur Radio business as a teenager working in his father's TV and electronics parts store, Harris Radio Corporation, in his home town of Fond du Lac, Wisconsin. He went on to have a substantial impact on the ham radio marketplace. He founded Amateur Electronic Supply in 1957, when he was just 18.

AES changed hands January 1, 1998. The new owner is Amateur Electronic Supply LLC.



The League has requested that the FCC strike the late-filed comments from the official record. But the ARRL also rebutted their substance in the event the FCC decides to accept them anyway.

The League debunked Simon's suggestion that ham interference could lead to dire consequences to unlicensed PLC systems and even lead to power outages. The League said Simon fails to explain why a marginal-level amateur signal would cause problems "where loud static crashes in the same bands do not." The League said PLC systems already have been shown to operate effectively "in an environment of extremely high-power government stations using thousands of watts of EIRP."

The League also took ComEd to task for suggesting that hams be obliged to protect PLC systems against interference. The ARRL pointed out that PLCs have "no incumbent allocation status" and are not entitled to protection from licensed systems. An ARRL technical analysis submitted last fall indicated that that amateur interference to PLCs was unlikely.

The League suggested that the utilities make available an industry database of PLC operating parameters that hams could consult as a guide to avoid interference and said it remains willing to address any interference cases that might arise. The ARRL urged the FCC to issue a Notice of Proposed Rulemaking on the ARRL's request "without further delay."

HAARP AMATEUR TEST SUCCESSFUL

An Amateur Radio experiment conducted by the High Frequency Active Auroral Research Program (HAARP) facility in Gakona, Alaska, and amateurs in Alaska and Canada, has yielded some encouraging results.

During the experiment March 20, HAARP attempted to generate what are called "field-aligned irregularities" in the F-region over the HAARP facility. Participants, under the direction of principal investigator Ed Cole, AL7EB, attempted to establish communication by scattering VHF signals off the FAI.

The test was conducted at 144.1 MHz. HAARP's Ed Kennedy, K3NS, said two stations, WL7BQM and AL7EB, were able to detect KL7X's scattered signal off of the field aligned irregularities generated in the F-layer over HAARP. KL7X ran 1 kW into a 28 dB EME antenna. Receiving stations used AF9Y FTTDSP software.

"The scattered signals had an interesting Doppler characteristic and were on the order of 20-30 dB above the detectable threshold for the equipment used by the receiving stations," Kennedy said.

During the Amateur Radio test, he explained, HAARP cranked up its transmitters to full power, 960 kW, "to produce the best possible conditions for creating the scatter structures in the F-region."

In Brief

• **Get Ready to Promote Amateur Radio Week, June 20-27:** Each year, Amateur Radio Week gives you an excellent opportunity to raise awareness about your local ham radio activities, and of course the week's culminating event, Field Day. Several states have issued proclamations recognizing Amateur Radio during June. Typical Amateur Radio Week activities have included putting on demonstrations, the signing of mayoral proclamations and spreading the word about the upcoming Field Day weekend. Contact ARRL's PR department today to get your 1999 Amateur Radio Week/Field Day press kit. Contact Jennifer Hagy, N1TDY, 860-594-0328; jhagy@arrl.org.—Jennifer Hagy, N1TDY

• **Cincinnati hams respond as tornado strikes:** The Cincinnati SKYWARN Weather Amateur Radio Net was in operation April 9 when a killer tornado struck the Blue Ash/Montgomery area of the city around 6 AM. Six people died as a result of the storm, which caused heavy damage and power outages. WARN, with its W8NWS net control site at WLW radio, quickly reported weather conditions and damage as it occurred and alerted police and emergency crews. As a result, WARN Public Information Officer and ARRL PIO Michael Nie, KB8VMX, ended up as the live lead story on the 6 o'clock news on April 15 on Cincinnati's WKRC-TV Channel 12. The station's Chief Meteorologist, Tim Hedrick, interviewed Nie live on the value of severe weather spotters and especially ham radio spotters. During the interview, Nie told how two local spotters used Amateur Radio to relay the first reports of a tornado on the ground, as they dove for cover in a ditch. Despite the close call, the spotters were not injured. For more information, visit the WARN Web site, <http://www.warn.org>.—Mike Nie, KB8VMX

• **New astro-ham:** The expedition commander of the first International Space Station crew, US astronaut William G. "Shep" Shepherd, has passed his Technician test. He's now KD5GSL. Shepherd will join Russian cosmonauts Yuri Gidzenko and Sergei Krikalev, U5MIR.

• **Dave Patton, NT1N, joins ARRL staff:** ARRL Executive Vice President David Sumner, K1ZZ, has announced that David C. Patton, NT1N (ex-W9QA), joined the ARRL staff April 26 as Special Assistant to the Executive Vice President. A former editor of the *National Contest Journal* (1997), Patton holds Bachelor's and Master's degrees from Western Illinois University. Prior to college he served as a Navy radioman. He was first licensed as WD9DCL in 1977 at age 12 and has held quite a long list of call signs since then. "I'm looking forward to tapping his training, skills, experience, and creative thinking as a member of the HQ team," Sumner said.

• **AMSAT-UK call for papers:** The 14th AMSAT-UK Colloquium, SpaceComm '99, will be held at Surrey University, Guildford, Surrey, UK, from July 23-25, 1999. AMSAT-UK invites authors to submit papers about amateur radio space and associated activities for this event and for the *Proceedings*. Offers of papers should be submitted as soon as possible; the final date for full documents is mid-June 1999. Submissions should be sent only to G3RWL, g3rwl@amsat.org, or R.W.L. Limebear, G3RWL, 60 Willow Rd, Enfield EN1 3NQ, UK.—SpaceNews

• **E-mail forwarding service now available for ARRL affiliated clubs:** Effective immediately, clubs affiliated with the ARRL can sign up for the League's new E-Mail Forwarding Service. The forwarding—or alias—service is available at no additional charge for ARRL affiliated clubs. It will provide clubs with a uniform "call sign@arrl.net" e-mail address that remains the same even if the user changes e-mail service providers. To sign up: (1) Send an e-mail (no text required) to subscribe@arrl.net. In return, you'll get a form to complete; (2) Send the completed form to clubregistration@arrl.net. That will send the form to ARRL HQ for processing. Your club's alias will be available within a day or so after you send it. The service does not affect usability of your original e-mail address. Address questions or comments about this service to clubs@arrl.org.

• **Wisconsin proclaims Amateur Radio Awareness Day:** Wisconsin Gov Tommy Thompson proclaimed April 22 "Amateur Radio Operator Awareness Day." The proclamation, originated by Duane "Mack" Brophy, N9NTB, honors Wisconsin hams for providing emergency communication at no cost to taxpayers. The proclamation also recognizes the contributions of ARES and RACES and ham radio classes, as well as Amateur Radio's role in publicizing Wisconsin's sesquicentennial last year, the Circus World Museum, the Great Circus Train, and the Great Circus Parade.

• **March QST Cover Plaque Award:** George Maier, K1GXT, has won the March QST Cover Plaque Award for his article "The Collins Collectors Association." Congratulations, George!

QST

The International Reply Coupon (IRC)

In 1863 US Postmaster General Montgomery Blair initiated a conference for delegates from the Americas and Europe to reform international mail. On October 9, 1874 Heinrich von Stephan led 22 nations to the Treaty of Berne, which created the General Postal Union. (This is the date is commemorated each year as World Post Day.) Many nations joined the union and in 1878 the name was changed to the Universal Postal Union (UPU), which now includes well over 200 DXCC Entities (see the sidebar, "DXCC Entities Belonging to the Universal Postal Union").

International Reply Coupons

Great Britain introduced the first International Reply Coupon (IRC) at the UPU Rome Congress meeting on October 1, 1907. The original purpose of the IRC was to ensure prepayment of reply letters expected from correspondents. The first IRCs sold for 28 gold centimes and could be used to purchase one postage stamp worth 25 gold centimes when exchanged at a post office. It wasn't until 1947 that the coupon was officially named the International Reply Coupon, thanks to the UPU Paris Congress.

Amateur Radio DXers have been using IRCs for many years. They are available at US Post Offices for \$1.05. These IRCs provide a method of sending return postage for obtaining QSL cards from DX stations. When DX stations receive the IRCs they can take the coupons to their local post offices and exchange them for the minimum airmail postage necessary to send a QSL back to you. For example, here in the US an IRC is exchangeable for enough postage to send 1/2 ounce via airmail (60 cents). One IRC is *supposed* to work in the same manner within the postal system of any country that is a member of the UPU. However, some stations have reported that a single IRC is not sufficient.

Good IRC or Bad IRC?

There is a lot of confusion both here in the US and abroad about what constitutes a good or bad IRC. IRCs can be purchased at the Post Office or from QSL managers, second hand. QSL managers normally sell them for between 60 and 75 cents vs \$1.05 at the Post Office.

Be aware, however, that not all IRCs are valid. The first thing to check is the date of issuance, which should be after January 1, 1975. (It doesn't matter whether it is a sur-



This IRC is invalid. Can you see why? It was stamped in the right-hand box!

face or air mail IRC.) You'll often find this date in the left-hand box on the coupon. It is the box marked, in French, "Empreinte de contrôle du pays d'origine (facultative)." This translates to "Control stamp of the country of origin (optional)." In addition to the date, the box is often marked to include the location of the office where the coupon was purchased. Countries such as Greece (Hellas), Netherlands (Nederland), Brazil (Brasil), Switzerland (Suisse), Sweden (Suede Sverige) and Germany (Republique Federale D'Allemagne) stamp in red ink the name of their country in the left-hand box. Some IRCs from outside the US have nothing in this box, but that is okay.

The center box on the coupon is labeled "Prix de vente (indication facultative)," which means "Selling price (optional)." If there is a price, most of the time it will be in red ink.

The box on the right says "Timbre du bureau qui effectue l'échange," which roughly translates to "Stamp of the office making the exchange." *If anything is in this box the IRC is invalid and worthless!*

What to Do with Bad IRCs

Many Amateur Radio operators consider the IRC as a kind of "ham currency." There are always going to be bad IRCs due to the fact that people just don't know the correct procedures at the post offices around the world.

What do you do if you have an invalid IRC? If you are a QSL manager you no doubt have already been faced with this issue. A good QSL manager will get rid of a bad IRC and not sell it back to the amateur community. More than likely your QSL request would then end up in the bureau and not go direct. Those who have a bad IRC should not forward it on to the next person. After all, someone is eventually going to attempt to turn it in for reimbursement.

NEW LOG SEARCH

Doug Brandon, N6RT, has announced a new and powerful log search engine at <http://dx.qsl.net/logs>. The home page intro says it best:

"Setting up a log search is now easy! Simply send in your log and we will do the rest! In addition to providing a fast search engine, the search results page displays log statistics and can also display QSL information, an e-mail address, a Web page address, and a picture of the QSL card. A small HTML form can be placed on any Web page to invoke a search of your log, or it can be accessed from the main log search page on DX.QSL.NET. If you do not have a Web page, <http://www.qsl.net> offers a free Web page and e-mail address to all hams. Visit www.qsl.net for details. A frequently updated list of links to other logs on the Internet is also provided."

UPCOMING DX CONVENTIONS

The Pacific Northwest DX Convention will be held on July 30, 31 and August 1 at the Monarch Hotel in Portland, Oregon and will be sponsored by the Willamette Valley DX Club. For more information about this DX convention see

*3025 Hobbs Rd
Glenwood, MD 21738-9728
howsdx@dailydx.com

IRCs "By the Book"

IRCs are not very common to the average US postal customer or postal employee. The following text is directly from the United States Postal Service's International Mail Manual (IMM) issue # 20 dated July 2, 1998.

392 International Reply Coupons

392.1 Description

a. The sender of a letter may prepay a reply by purchasing reply coupons, which are sold and exchangeable for postage stamps at post offices in member countries of the Universal Postal Union. The period of exchange of international reply coupons issued by the Universal Postal Union on or after January 1, 1975 is unlimited.

b. International reply coupons (in French, Coupons-Reponse Internationaux) are printed in blue ink on paper that has the letters "UPU" in large characters in the watermark. The front of each coupon is printed in French. The reverse side of the coupon shows the text relating to its use in German, English, Arabic, Chinese, Spanish and Russian.

c. Coupons sold in the United States have the selling price printed on them, while coupons in other countries may not.

392.2 Availability

a. Reply coupons may be requisitioned by post offices in the same manner as postage stamps. The coupons should be stocked at post offices that have a demand for them.

392.3 Selling Price and Rate of Exchange

a. The selling price of a reply coupon in the United States is \$1.05. One coupon is exchangeable in any other member country for a stamp or stamps representing the minimum postage on an unregistered air letter. Unused U.S. coupons (that is, those with the U.S. selling price stamped on them) may be exchanged only for United States postage stamps by the original purchaser at a discount of 1 cent below the purchase price.

b. International reply coupons purchased in foreign countries are exchangeable at U.S. post offices toward the purchase of postage stamps, postage meter stamps, postage validation

imprinter (PVI) labels and embossed stamped envelopes (including aerogrammes) at the rate of \$.60 per coupon, irrespective of the country where they were purchased.

392.4 Processing Requests

a. When an international reply coupon is sold, the USPS clerk must place a postmark in the block which is headed control stamp of the country of origin.

b. Under Universal Postal Union's regulations, member countries are not required to place a control stamp or postmark on the international reply coupons that they sell. Therefore, some foreign issue reply coupons, which are tendered for redemption, may bear the name of the issuing country (generally in French), rather than the optional control stamp or postmark. Such coupons are exchangeable for U.S. postage, as specified in 392.3b.

c. A post office redeeming an unused U.S. coupon must postmark it in the unpostmarked circle. A post office exchanging a foreign reply coupon must postmark it in the right circle. Post offices must not accept foreign coupons that already bear a USPS postmark.

d. Reply coupons issued by foreign countries prior to January 1, 1975; are no longer redeemable at U.S. post offices. These old-style coupons are distinguishable from the newer coupons printed by the International Bureau of the Universal Postal Union because the name of the country is always present on the old-style coupons. Customers processing pre-1975 coupons of foreign origin should be advised to return them to their correspondents in the country of issue for replacement or redemption through the selling post office.

e. Reply coupons formerly issued by the Postal Union of the Americas and Spain are no longer valid. These coupons are printed in green ink and bear the caption Cupon Respuesta America-Espanol. Customers possessing any of these coupons should return them to their correspondents in the country of issue for redemption through the selling post office.

f. Postmasters must process exchanged foreign and redeemed U.S. coupons as prescribed in 426.9 International Reply Coupons (IRCs) Handbook F-1, Post Office Accounting Procedures.

the Willamette Valley DX Club home page at <http://www.qsl.net/wvdx>.

The 8th Annual New Orleans International DX Convention will be held on Friday and Saturday, August 27-28, at the renowned Royal Sonesta Hotel on Bourbon Street in the scenic and historic French Quarter of New Orleans. For more information contact Michael Mayer, W5ZPA, 5836 Marcia Ave, New Orleans, LA 70124, or visit their Web page at http://www.gnofn.org/~w5ru/DX_Cnex.htm.

The 47th W9DXCC DX Convention and Banquet, sponsored by the Northern Illinois DX Association and the Greater Milwaukee DX Association will be held on September 18 at the Holiday Inn "Holidome" in Rolling Meadows, Illinois. Contact Bill Smith, W9VA, by e-mail at w9va@aol.com or on the Web at <http://www.qth.com/w9dxcc/>.

IOTA DXPEDITION

Steve Pall, VK2PS, reports that a group of five amateurs will visit Imperieuse Reef in the Rowley Shoals between September 21 and 26. This reef is located at 17°35' south latitude and 118°55' east longitude approximately 379 kilometers west of Broome, Western Australia. It will be assigned a new IOTA (Islands On The Air) reference number after the operation. The operators include Steve, VK2PS, Jim, K9PPY, Sam, CT1EEN, Dave, VK6DLB, and group leader and organizer Mal, VK6LC. They plan to depart Broome, with some 2,000 kg of equipment, on September 20 aboard the *King Fisher III*. Look for them to be active 24 hours a day on 10, 15, 20, 40 and 80 meters, CW and SSB. This

DXCC Entities Belonging to the Universal Postal Union

3A, 3B8, 3C, 3DA0, 3D2, 3V, 3W, 3X, 4J, 4L, 4S, 4X, 5A, 5B, 5H, 5N, 5R, 5T, 5U, 5V, 5W, 5X, 5Z, 6W, 6Y, 7O, 7P, 7Q, 7X, 8P, 8Q, 8R, 9A, 9G, 9H, 9J, 9K, 9L, 9M, 9N, 9Q, 9U, 9V, 9X, 9Y, A2, A3, A4, A5, A6, A7, A9, AP, BY, C2, C5, C6, C9, CE, CM, CN, CP, CT, CX, D2, D4, D6, DL, DU, E3, EA, EI, EK, EL, EP, ER, ES, ET, EW, EX, EY, EZ, F, FG, FH, FK, FM, FO, FP, FR (all), FS, FT5 (all), FW, FY, G, GD, GI, GJ, GM, GU, GW, H4, HA, HB, HB0, HC, HH, HI, HK, HL, HP, HR, HS, HV, HZ, I (all), J2, J3, J5, J6, J7, J8, JA, JT, JY, K, KH0, KH2, KH6, KH8, KL7, KP2, KP4, LA, LU, LX, LY, LZ, OA, OD, OE, OH, OH0, OK, OL, ON, OX, OY, OZ, P2, P4, P5, PA, PJ2, PJ8, PY, PZ, S2, S5, S7, S9, SM, SP, ST, SU, SV (all), T2, T30, T31, T32, T33, T5, T7, T9, TA, TF, TG, TI, TJ, TL, TN, TR, TT, TU, TY, TZ, UA (all), UK, UN, UR, V2, V3, V5, V8, VE, VK, VK9N, VP2E, VP2K, VP2M, VP2V, VP5, VP8/F, VP8/G, VP8/Sand, VP9, VQ9, VR2, VP6, VU, XE, XT, XU, XW, XX9, XZ, YA, YB, YI, YJ, YK, YL, YO, YS, YU, YV, Z2, Z3, ZA, ZB, ZD7, ZD8, ZD9, ZF, ZK1 (all), ZK2, ZK3, ZL, ZP, ZS.

UPU Membership has not been completed by the following DXCC Entities
C3, T8, V6, V7, YB9/East Timor*

*East Timor is not a DXCC Country at this time but has applied for membership to the UPU.

IOTA DXpedition has been in the planning stages ever since Mal announced it at the Las Palmas IOTA Convention in May 1998. A special call sign will be announced as the DXpedition date nears.

The budget for this operation is \$12,000 Australian. Team members have made substantial personal contributions, but they are still need monetary support. If you can help please contact Malcolm K. Johnson, VK6LC, 9 Abinger Road, Lynwood 6147, Western Australia; vk6lc@iinet

[.net.au](http://www.net.au). For further information about this DXpedition check out their Web page at <http://www.425dxn.org/dxped/vk6lc/>.

WRAP UP

Thanks this month go out to Steve, VK2PS, Doug, N6RT, and the US Postal Service. If you have any DX news or pictures, please feel free to send them to me. Until **next month**, see you in the pileups!—Bernie, W3UR

Q57

Michigan Prepares for Y2K

By Debbie Kirkbride, KA8YKK
Michigan Section Emergency Coordinator

Opportunity knocks: the Michigan State Police Emergency Management Division contacted me with a problem they thought we could solve. Two major utilities had contacted the EMD about possible loss of communication among the various centers controlling the electrical power grid. The EMD referred them to Amateur Radio. The result: improved training, and relationships with new served agencies.

An emergency exercise design class was conducted by the state police for Michigan radio amateurs. In advance of the class, the utilities sent representatives to meet us. They feel that if communications fail, restoring gas and electric service will prove to be problematic. They were impressed with our statewide communications capabilities.

Emergency management officials also stated their own need for preparation for disruptions and we agreed to work with them to insure that our operators will be trained and equipped to address any communication problems. Throughout the year, we will be participating in various exercises, meetings and training programs.

We are also working with the American Red Cross, hospitals, and various public safety agencies throughout the state. Our Emergency Coordinators have done an excellent job of working for their county emergency management offices. Current plans call for most counties in the state to be either on standby alert or full activation status. The state emergency operations center will be activated and staffed throughout the day on December 31, 1999.

Our Section Traffic Manager Jim Wades, WB8SIW, and I are working together to organize our response and ensure that the NTS, ARES and RACES work as one unified organization. We feel that only close cooperation will result in a smooth operation.

If ARES and RACES members are to pass traffic correctly and nets are to be fully staffed, it will be necessary to conduct an extensive statewide training program. Assistant Section Manager (ASM) for Education and Training, John Freeman, N8ZE, is working with other section staff in implementing this program.

The ARRL Michigan State Convention on September 24 and 25, will feature addi-

Profiles in Public Service

Gerry Kagan, N1VNH, is a 14 year old Boy Scout who has just completed the requirements for Eagle Scout. Gerry became licensed at age 10. His Eagle project was to organize ARES coverage in the Boxboro, Massachusetts area. He accomplished this by working with his Emergency Coordinator, having the scout troop host a lunch at the regional training this past summer, organizing the establishment of an Amateur Radio club in town, and lastly by participating in a regional ARES/RACES drill featuring a simulated train wreck this past fall in Walpole. Gerry is continuing to assist in programs such as SKYWARN by having the club host and advertise a scheduled training program.

tional training opportunities, including search and rescue forums conducted by the Great Lakes Search and Rescue Team. Perhaps the most innovative training opportunity this year will be a training camp for ARES, RACES, and NTS members and newcomers. The camp will take place this summer in Gladwin, Michigan. (A free breakfast planned for Sunday morning, served by the Michigan Section staff with Section Manager Dick Mondro, W8FQT, chief pancake flipper, has been a powerful recruitment tool.)

Public information has not been overlooked. A TV station has already expressed interest in what Amateur Radio is doing. As the date approaches, we will work closely with the media to present a good image of our service.

Readers may be thinking, "those poor Michigan amateurs will be sitting in those cold EOCs while we're celebrating the New Year 2000." We will simply celebrate a little later than the rest of world, and we will have made some great contacts, strengthened our relationship with Emergency Management and many other served agencies, and will have more trained amateurs ready and waiting for the next event. Not a bad trade-off!

Y2K Exercise In Las Vegas a Success

Once again, amateur operators prove their value. Las Vegas ARES/RACES members were asked by the Department of Administrative Services, Office of Emergency Management, to participate in a Year 2000 exercise which would simulate an outage of cellular phones and the 911 system within Las Vegas valley.

On Tuesday morning, March 16, 1999, the Amateur Radio operators of Las Vegas

valley and the surrounding communities of Mesquite, Logandale and Overton, Nevada, and Laughlin/Bullhead City, Arizona, came together in a tremendous exercise in establishing emergency preparedness.

Glenn Hale, KB7REO, of the National Weather Service, a long time supporter of ARES/RACES, worked with Jamie Gorr, N3TOY, to set up a packet communications system. A local VHF voice communications net was set up between the Clark County Health District, Summerlin Hospital, Sunrise Hospital, Saguaro Home Health Center, McCarran Airport, and various Fire Departments. HF communications was established with Carson City, Nevada.

When Frank Everts, N7AML, in Bullhead City, Arizona, heard about the exercise, he immediately volunteered to help provide communications with the Clark County Sanitation Department in the Laughlin area. The Laughlin Water Reclamation Project set up a station in their conference room.

This was a massive and successful effort involving thousands of hours donated by more than 100 amateur operators, together with state, city and county departments in the states. It was an incredible event to take part in, and an experience I will never forget. The level of cooperation between the agency officials and the Amateur Radio community was awesome.

I wish to personally thank all the people who participated in this exercise. To many it meant taking time off from their regular jobs. They are far too numerous to name, but they know who they are and deserve to be proud of the work they performed in this event. This is carrying on the true traditions of the amateur service.—Cliff Ehry, AB7ZH

Q57-

Message Origination and Field Day

If your Amateur Radio club or group will be operating in this year's Field Day (June 26-27, 1999), now is the time to plan to take advantage of the bonus points available to each group. Check the Field Day Rules (see pp 95-96 of May QST), and you'll notice that there are several categories of bonus points including message origination.

According to Field Day Rule 7.4.3, "100 points for origination of a message by the club president or other Field Day leader, addressed to the SM (Section Manager) or SEC (Section Emergency Coordinator), stating the club name (or non-club group), number of operators, field location and number of ARES members participating. The message must be transmitted during the Field Day period, and a fully serviced copy of it must be in standard ARRL message form or no credit will be given."

What is the standard ARRL message format? Each message originated and handled should contain the following parts, and be sent in the order given:

1) Number; 2) Precedence; 3) Handling Instructions [optional]; 4) Station of origin; 5) Check; 6) Place of Origin; 7) Time Filed

[optional]; 8) Date; 9) Address; 10) Text; 11) Signature. Items 1 through 9 make up the *preamble* of the message.

1) You assign a sequential number to each message you originate.

2) There are four precedences that tell the stations relaying the message how important the message is: Routine, Emergency, Welfare, and Priority. Most messages take the Routine precedence. (See January 1999 QST, p 72 for further details.)

3) Handling instructions are optional cues to handle a message in a specific way. (See January 1999 QST, p 72, for a detailed description of all the handling instructions.)

4) The station of origin is the call of the station that originated the message and is never changed.

5) The check is the number of words of text in the message. Remember: The check is a count of the number of words in the text of the message (item 10) *only*. This excludes everything before the text and the signature. The receiving station will count the number of words he has written down in the text, and that number should equal the number in the check

that you sent. (See March 1999 QST, p 80.)

6) Place of origin is usually the city and state of the originating station. It can also be the location of the third party wishing to initiate a message through the originating station.

7) The filing time is optional and is the time in UTC the message was filed at the originating station.

8) The date is the month and day (year is not needed) that the message was filed at the originating station.

9) The address is the name, street and number, city and state of the party to whom the message is being sent. The telephone number of the person who is to get the message should also be part of the address.

10) The text is the message itself.

11) The signature. Remember that words like "sincerely" or other complementary closings are part of the text.

See page 12 of any recent QST for the name, address, and phone number of your ARRL Section Manager. To send your participation message, consider checking into your section's traffic net during Field Day.

Field Organization Reports

Public Service Honor Roll March 1999

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

906	219	KA2GJV	W6IVV	KF4TQX
NM1K	KA4FZI	177	WA7EES	145
616	216	N5OUJ	157	K3JL
KB8ZYY	N5NAV	K4SCL	N2VQA	KA2CQX
393	215	174	156	W7NWP
K7BDU	N2LTC	WX8Y	WB2GTG	KC5OZT
365	211	172	155	144
WB8SIW	WB5NKC	K7VVC	KG0IV	KC4ZHF
344	208	KR4MU	154	K4RBR
K9RTB	WB2UVB	170	KC2AHS	143
331	205	W4EAT	N0KJ	K4DPG
W9RCW	AF9FA	AD4DO	153	K2BCL
310	204	K6YR	W00A	N1LKJ
K4FQU	W4CAC	169	KF1L	K5AO
290	202	KU4IJ	AF4GF	142
N5JZ	WA4GQS	168	152	N2WDS
270	KE4OAV	WB5NKD	KC6SKK	KA4UIV
KA2ZNZ	200	N2JBA	W6QZ	N2XJ
262	N2WFN	167	151	WB0ZNY
W7TVA	WB5ZED	K4IWW	WA4QXT	KB5YAM
257	195	KD4GR	150	KA4UIV
NZ4O	N2YJZ	164	N2XOJ	141
247	193	N8FPN	AA0OM	N8FWA
W4PIM	N2OPJ	163	149	KB2VVD
244	191	W5YQZ	KB5W	NN2H
WB4GM	KE0K	N2RPI	148	N4ORZ
233	W6DOB	WA1TBY	W4ZJY	140
W0OYH	KK3F	161	AC4CS	W0LAW
226	188	KB2VVB	NY2V	W5GKH
WA9VND	K9FHI	159	WA1FNM	W2MTA
221	178	KC2ACL	146	WB2ZCM
WD8V	N5IKN	158	W2EAG	
		N2CCN	K2CSS	

139	KA4LRM	N5JUU	100	N1SGL
N1VXP	126	KB0DTI	KC4VNO	86
W7ZIW	W1ALE	113	WA2GUP	K1SEC
KB5TCH	W5CDX	W2MTO	KD1LE	KD5AHW
138	K0IBS	W2AKT	99	85
KA8FCC	KG2D	W5MEN	N3ZKP	KA1VAX
W3YYV	125	112	KB2ETO	WR8F
W7GB	W5ZX	K5UCQ	AA8SN	84
KB2KLH	N9KHD	N2GJ	98	AE4NW
N9BDL	K8GA	WA4EIC	KB8ROA	82
KT6A	124	111	W1JTH	WB9GIU
136	N5JCG	KG5GE	AD6HR	81
WD4JJ	KB2RTZ	KO4OL	KE4WBI	KB2UQZ
N5XGI	WD0GUF	N3RB	N4JAQ	80
135	123	KC5VLW	97	W7EP
AB7NK	WA2UKX	110	WA4GLS	KB2HJJ
N2AKZ	WA8EYQ	KC4RNF	N3WAV	WB7VYH
KA0KPY	122	KC4PZA	KD7ME	WA1QAA
133	K5IQZ	N4GMU	96	K2PB
AA3GV	KB3AMO	N7AIK	AF4CD	W2CC
KJ3E	K5VY	109	KB4WBY	
KA1GWE	W1JX	W4RRX	KD4HGU	79
K06RZ	121	NR9K	KJ4N	KF4HJW
K2BTP	N7YSS	W2PII	95	WB4PAM
AD4BL	120	108	K8HTP	78
WA1JVV	KD5P	W2FR	WA5FXQ	K5DMC
N3WK	N2MSM	K8AI	KA1VEC	N5HK
KL7Q	W7GHT	107	94	N5LF
W2RJL	K5MC	W4XI	WB4ZNB	K2VX
K2DN	KOPIZ	AA2ED	WB4UHC	K8SH
WX4H	K9GBR	106	KB3JK	KOPY
131	K7GXZ	K10JO	W2JUH	77
KA4JHH	KF6OIF	KA1OTN	W0YCB	76
AA2SV	119	WB4TVY	93	AC5Z
AB5RV	KG6TU	K5MXQ	92	76
KI4YV	144	92	NN7H	W5XX
K6AGD	105	105	KC5VOG	KA1VE
WB2FGL	N1CPX	W4CC	91	KK1A
130	118	K8VFZ	W4DGH	75
WA0TFC	WB5WBZ	104	N9PF	AA8PI
W4CKS	W4CKS	KF5A	KD6YJB	74
129	KA8WNO	K8IG	90	KK5GY
K4YVZ	K7MQF	WA8SSI	W2AZ	W4ET
KA5KLU	KE4IFD	K8QIP	N2FHJ	73
KE1AI	WA8DHB	W1QU	KA2CDB	AD7N
AF2K	117	W7VSE	KD4PWK	N1LH
KB2WII	AG9G	WD9FLJ	K3UWO	KD4JMV
W7LG	116	103	89	WA4EYU
128	W2ACUW	KF4NFP	K4BW	71
KC4TLG	W1G2	102	W3JK	WB1GXM
N3DRM	115	KA0DBK	88	KA7TTY
W3OKN	KL5T	K8LEN	AA4YW	70
WB2QIX	N8DD	AA4HT	K5WOD	KT4XA
KJ7SI	W3BBQ	W18K	KE3OX	N3KB
WN0Y	WA6ODQ	W9ZY	KC8GMT	101
127	W2JHO	N2ZMI	87	K9FVX
KC7ZZB	114	KC3Y	KU4LY	
	KO4A			

The following stations qualified for PSHR in February, 1999, but the results did not appear last month: NN7H 140, KE3OX 100, KC7ZZB 89, AC5Z 72. (January) NN7H 129, W3OKN 118.

Section Traffic Manager Reports March 1999

The following ARRL section traffic managers reported: AL, AZ, CT, CO, DE, EMA, ENY, EPA, EWA, IA, ID, IL, IN, KS, KY, LA, MDC, ME, MI, MN, NC, ND, NFL, NH, NLI, NM, NNJ, NV, OH, OK, OR, ORG, SB, SC, SD, SDG, SFL, SNJ, STX, TN, VA, WI, WMA, WNY, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports March 1999

The following ARRL section emergency coordinators reported: AL, AZ, CT, EWA, IN, KY, MDC, MI, MN, MO, SD, SFL, TN, VA, VT, WMA, WPA.

Brass Pounders League March 1999

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	Orig	Rcvd	Sent	Dlvd	Total
WX4H	3	868	1737	10	2608
NM1K	799	253	871	15	1938
N2LTC	0	787	816	27	1630
K7BDU	149	638	763	76	1626
KE4DNO	7	578	675	12	1272
W1FYR	1	565	587	2	1155
W1PEX	0	836	146	18	1000
WA9VND	34	486	382	24	926
K9JPS	1	519	46	343	909
KT6A	0	471	402	0	873
K4DOR	246	187	433	0	866
W7AMM	332	106	394	23	855
K7VVC	10	384	429	4	827
KK3F	27	399	363	36	825
KA2ZNF	18	372	309	114	813
W3KOD	14	384	337	4	739
W6DOB	1	304	368	42	715
KA4FZI	21	300	343	40	704
W9RCV	0	399	39	260	698
KF5A	0	336	342	2	680
W6IVV	0	325	344	0	669
K10JO	0	290	375	3	668
WB5ZED	20	302	304	22	648
K9RTB	0	395	63	186	644
K4FQU	215	115	295	7	632
W5YQZ	0	288	326	5	619
W9IHW	1	333	68	196	597
N2YJZ	—	—	—	—	594
WB5NKC	63	130	364	10	567
WB9YYP	0	270	281	0	551
N3DCG	8	324	198	12	542
W4EAT	0	263	288	2	553
N5IKN	0	201	104	197	502

BPL for 100 or more originations plus deliveries: K9GU 189, NZ4O 187, WB8SIW 177, K8LJG 146, W3HK 144, N5JZ 132. The following station qualified for BPL in December 1998, but was not listed in this column: NN7H 504. **QST**

Washington Mailbox

Prepared by **John C. Hennessee, N1KB** • Regulatory Information Specialist

Tall Towers, Antennas Near Airports and FCC Registration

In November 1995 the FCC adopted rules requiring tower owners to register with the FCC each antenna structure for which Federal Aviation Administration (FAA) notification is required. Generally, this includes all structures *more than 200 feet above ground or certain towers located near or on a public use airport*. FCC may assess stiff fines to tower owners who do not comply and the fines, which can range up to \$10,000, appear in Section 1.80 of FCC rules. **All tower owners, including amateurs, must register their towers with the FCC if FAA approval is needed and they are required to do so immediately.** A copy of Part 17 is available from ARRL for a self-addressed envelope and two units of postage, or from the FCC Web page at <http://www.fcc.gov/wtb/rules.html>.

Fortunately, the vast majority of amateurs are exempt from the federal tower registration process, but amateurs must still abide by *local government zoning ordinances*.

Q: How do I know if I am required to register my tower?

A: Most antenna structures that are higher than 200 feet above ground level, or that may interfere with the flight path of a nearby airport, must be cleared by the FAA and registered with the FCC.

Unless specifically exempted, FAA notification and FCC registration are required...

1. For any construction or alteration of more than 200 feet in height above ground level at its site.

2. For any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the following slopes (which represent the ratio of the distance from the longest runway to the antenna height in feet):

a) 100:1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each Specified Airport with at least one runway *longer than* 3,200 feet in actual length;

b) 50:1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each Specified Airport with its longest runway *shorter than* 3,200 feet in actual length; and,

c) 25:1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport at a Specified Airport.

3. When requested by the FAA if it is determined that the antenna structure might exceed an obstruction standard of the FAA.

Q: I live near an airport. If I do not exceed the slope of 100:1, do I have to register my tower?

A: No, because you are exempt.

Q: What is a "Specified Airport"?

A: Specified Airport refers to:

- A public use airport listed in the *Airport Directory* of the current *Aeronautical Information Manual* or in either the *Alaska* or *Pacific Airman's Guide and Chart Supplement*;

- An airport under construction, that is the subject of a notice or proposal on file with the FAA, and except for military airports, it is clearly indicated that the airport will be available for public use; or

- An airport that is operated by an armed force of the United States.

Q: Which towers are exempt from these requirements?

A: The following types of antenna structures are specifically *exempted* from the FAA notification requirements and FCC registration requirements by Section 17.14 of FCC rules:

1. Any antenna structure that would be shielded by existing structures of a permanent and substantial character, or by natural terrain or topographic features of equal or greater height, and would be located in the congested area where it is shielded and will not adversely affect safety in air navigation.

2. Any antenna structure of 20 feet or less in height.

3. An antenna which is not near an antenna and is less than 200 feet in height.

Q: I am still unsure whether my tower needs to be registered. How can I find more information?

A: You can call the FCC at 1-888 CALL FCC, contact them by e-mail at mayday@fcc.gov, or you may use on-line *TOWAIR* software, which is available on the FCC's Web site at: <http://www.fcc.gov/wtb/antenna/towair.html>.

Q: I've found that my tower must be registered. What must I do?

A: If you are required to register your tower with the FCC, check this FCC Web site for complete information: <http://www.fcc.gov/wtb/antenna>. Owners of antenna structures required to be registered pursuant to Section 17.4 of the Commission's rules must first file FAA Form 7460-1 and obtain a final determination of "no hazard"

for the structure. The FAA form is available from the Web at <http://www.faa.gov/arp/ace/faaforms.htm>. Second, tower owners must file FCC Form 854 with the Commission either manually or electronically to register the antenna structure. The FCC form is available from <http://www.fcc.gov/formpage.html>. Both forms are available from ARRL HQ for a self-addressed, stamped envelope.

Q: I missed the filing deadline. Will the FCC fine me if I register now?

A: No, not unless you have been notified by the FCC of your failure to register but the tower owner must register the antenna structure *immediately*. Check the sources above.

Q: Our club repeater antenna is located on the local TV station's tower. I think the tower has not been registered, but I believe it should be. What should I do?

A: If you believe that the owner is not carrying out his or her antenna structure registration responsibilities (1) notify the owner; (2) notify the site management company (if applicable); and (3) notify the FCC. The FCC will provide additional instructions to the tower owner based on the specifics of the case.

If the tower owner is unable to fulfill the Part 17 requirements for painting and lighting due to negligence, bankruptcy or whatever, the tenants (amateurs, in this case) may be required to carry out these duties *if specifically asked by the FCC*. Amateurs who rent or are given space on tall towers should have a signed legal document addressing maintenance concerns as well as tower access. An ARRL Volunteer Counsel member can help with this. See the ARRL Web page for a list of local lawyers. Q57-

Strays

TARA PSK31 REFLECTOR

♦ The Troy ARA (TARA) sponsors a very active PSK31 e-mail reflector. They invite all hams to come and join them in discussing this exciting new mode. For more information on how to subscribe to the TARA PSK31 reflector, see their Web site at <http://www.n2ty.org>, or e-mail MRBILL1953@aol.com.

WANTED-IC-290 MOBILE BRACKET

♦ Howard Burkhart, KB6MYE, PO Box 1064, San Pedro CA 90733-1064; kb6mye@arll.net.
Next Stray

The World Above 50 MHz

Emil Pocock, W3EP*

Is That Sporadic E?

By early June, strong six-meter signals from 1000 to 2300 km distance should be booming in every other day or so. There is little doubt that these spring and summer openings are due to sporadic-E (E_s) propagation, sometimes called E-skip or short skip by the HF crowd. It is one of the most popular propagation modes at 50 MHz, and it's among the easiest to identify, even if its causes are still poorly understood.

Sporadic E commonly affects frequencies from 20 to 100 MHz, but it appears as high as 144 MHz several times each summer somewhere across North America. Signals propagated by sporadic-E are typically strong and clear, but are often accompanied by deep short-term fading. Openings may come and go quickly. During intense openings, low-powered stations with simple antennas can do quite well. It is not essential to have a high location to use sporadic-E when conditions are good.

Times and Seasons

Sporadic E can appear at any time of day or night in any month of the year, but there are favored times. The primary sporadic-E season runs from May to August in the Northern Hemisphere, with a minor season from mid-December to mid-January. The favored times during all seasons are late mornings and late afternoons through early evenings. Sporadic-E events often come and go quickly and may last just a few minutes or several hours. There is no way to predict how any opening will behave.

Frequency Range

Sporadic E typically affects lower frequencies first and then rises. The maximum useable frequency (MUF) of any particular event may be reached quite quickly—often within a 30-minute period from the time that it is first noticed. This characteristic makes it possible to monitor 28 MHz for signs of short skip and then follow the MUF upwards, in hopes that it will reach 50 MHz. Sometimes it just does not get that high.

It is also possible to gauge the MUF by noting the skip distance. The maximum single-hop distance at the MUF is about 2300 km. For this reason, the first stations heard in any opening are often in the 2000-km range, indicating the MUF is just above the operating frequency. Shorter distances indicate that the MUF is consider-

ably higher. Skip distances as short as 500 km on 50 MHz, for example, strongly point to an MUF close to 144 MHz. When the MUF just reaches 144 MHz, any signals heard are likely to be in the 2000-km range, with a path midpoint the same as the midpoint of the 500-km path on 50 MHz. Ironically, if the opening intensifies further, the distances will actually shorten up.

It is possible to link two or more sporadic-E hops to make even more-distant contacts. This often happens at 50 MHz, where coast-to-coast contacts in the 4000-km range are common during the summer. Even longer 50-MHz contacts can be made between North America and Europe using multiple-hop sporadic E. The longest multiple hop 50-MHz contacts reported are over 9500 km, but these are quite rare. Signal strengths of multiple-hop E_s contacts vary considerably from very strong to just above the noise.

220 MHz Sporadic E?

At least two contacts on 220 MHz reported in recent years were attributed to sporadic E, including the current distance record of 1500 km. Nevertheless, these contacts are problematic, because they do not quite fit the expected profile for sporadic-E. They suggest some of the uncertainties inherent in identifying any propagation mode and particularly the gaps in understanding sporadic E.

The 220-MHz contacts were made during unusually intense and widespread sporadic-E episodes on 144 MHz. Distances had shortened to less than 1500 km on 144 MHz, suggesting that the MUF was approaching 200 MHz. In both cases, alert pairs of stations already in contact on 144 MHz switched over to 220 or 222 MHz, and both were rewarded with immediate QSOs. Signals were reasonably strong with considerable fading, as might be expected for propagation near the apparent MUF.

These unusual contacts were clearly related to the sporadic-E conditions that existed at the time, but two further observations cast doubt on whether they were truly made via sporadic E. First, the distances were wrong. Contacts made via sporadic E near the MUF would be expected in the maximum 2000 to 2300-km range. These

220 MHz contacts were considerably shorter—about 1500 km—and made over the same path that simultaneously supported propagation at 144 MHz. The accepted model of normal E_s propagation just does not fit this situation.

Second, there was the expected fading, but the 220 MHz signals also had a rough and distorted quality, which is unusual for sporadic E. This suggests that some other propagation mode related to sporadic E, but distinctly different, may have been responsible. Field-aligned irregularities (FAI), which also appear in association with intense sporadic-E episodes, is an example of such a linked phenomenon, but clearly this was not FAI.

It seems more likely that these two 220-MHz contacts were made via an E-layer scattering mechanism previously unreported, perhaps due to the unusually high frequency involved and the scarcity of observations. In the absence of further reports or explanations, they will continue to be labeled sporadic-E contacts, but they do remain something of an enigma.

Possible Confusion

Sporadic-E can be confused with other well known propagation modes, especially tropospheric ducting. In both cases, signals may be strong out to 2000 km, but signals propagated by ducting show no evident skip distance. Ducting also affects the microwave frequencies first and then moves downward, just the opposite of sporadic E. Tropospheric ducting rarely affects 50 MHz, but when it happens, signals at 144 MHz and higher will already be extraordinarily strong and widespread.

Sporadic E can more easily be confounded with auroral E, a close propagation relative. Auroral E may sound very similar to sporadic E, be propagated over comparable distances and affect the same range of frequencies. The main difference is that auroral E is a common nighttime phenomenon of the auroral zone, and so is normally limited to very northern latitudes, typically from the Canadian border regions to the Arctic Circle. During intense geomagnetic storms, when the auroral zone expands southward, auroral E may be appear over the US midsection.

FAI is closely associated with sporadic E, but is easy to distinguish by its weak, distorted signals and northerly skewed paths. Meteor-scattered signals at 50 and 144 MHz are often strong and appear over the same distances as sporadic E, but they

*Send reports to Emil Pocock, Box 100, Lebanon, CT 06249. Leave voice messages at 860-642-4347, or fax 860-594-0259 or e-mail w3ep@arrl.org.

This Month

June 7 Artied Meteor Shower Peaks
June 12-14 ARRL June VHF QSO Party
June 19-20 SMIRK Contest

usually persist for only a few seconds at a time. During meteor showers, the number of individual meteors may be so great as to create nearly continuous propagation and mimic sporadic E.

Ordinary F-layer propagation may be confused with sporadic E at 50 MHz, especially at the peak of the solar cycle. The two can usually be separated by noting distance, solar indices, season and time of day. F-layer propagation has not been observed higher than 70 MHz and rarely propagates 50 MHz signals over paths shorter than 2500 km, somewhat further than the single-hop maximum for E_s. F-layer backscatter, which may appear over much shorter distances, is often over skewed paths and signals take on a characteristic hollow sound.

ON THE BANDS

It was a slow March. No one reported tropospheric openings, even though there are usually several days with good conditions across the Gulf of Mexico in early spring. Only two days with sporadic E appeared in the reports. Aurora and auroral E made appearances on five evenings, but they were rather ordinary events. Six-meter DX provided the only real interest during the month, despite generally low solar activity. Dates and times are UTC.

Six Meter DX

Contacts along north-south paths and adjacent to the equator dominated activity during March. South Americans continued to work into southern Europe, North Africa and across the Pacific to Japan. The Japanese found stations as widely scattered as South America to the east and west to the Indian Ocean and Africa. Many stations throughout the US, as indicated by the number of reports received, joined in the fun by working into Central and South America. Thanks to AJ4Y, K4SUS, KF4KSN, KK4XO, N4VHF, W4UDH, W4WXE, K5AM, K15GF, N5HYV, W5UWB, WA5IYX, N6CA, W6AOL, K7ON, W7CS, N0JK, WP4O and G4ICD, editor of the *Internet Six News*, who all contributed to these summaries.

Activity from Africa

Some new excitement was generated along the reliable Africa-Europe path by 5H3US (Tanzania), who found SV1VS, 9H1EL, OD5SX, A61AH and 4X1UH among the eager Europeans. Europeans also reported activity from 5U7DG (Niger), C91RF (Mozambique), EL2V (Liberia), TR8KPJ (Gabon), VQ9DX and VQ9QM (Chagos) and ZD8VHF (Ascension Island).

US to Central and South America

Stations from Southern California to Florida worked into Argentina, Uruguay and Brazil during the afternoons of at least half the days of the month. Other stations logged by US operators included XQ6ET (Chile), CP1/N6XQ (Bolivia), HC5K and HC2FG (Ecuador), HK3YH (Columbia), HP2CWB (Panama), TG9AJR (Guatemala), several TI (Costa Rica) and W1LP/mm in the Caribbean.

On several days, openings spread north of the southern-tier states. NS1Z (FN44) and other New Englanders worked Argentina after 2245 on March 12. WB8XX (EM79) found the Argentines as early as 2155 the next day. On March 15, stations over a wide area, from WA1T (FN43) to N9BJG (EM57) and as far west as Montana had an opportunity to work some of the many LUS. Midwesterners also reported the HC2FG beacon on March 15, 19 and 21.

The best day for the Americans was probably



Six-meter operators from five continents pose during a recent UK Six Metre Group conference. From left to right, they are PA7FF, JA1VOK, A45ZN, JA6TEW, 8P6CV, W6BYA, MW0BNM (JA6IDJ) and EA7KW.

March 25. W7CS (DM42) logged TI, CP, CX, PY and HP stations between 2155 and 0000. N0LL caught TI and CP, after making his first F2 contact of the cycle on March 18 with HK3YH. W7XU/0 and N0QJM (both EN13) in South Dakota nabbed TI and heard HC2FG/b. W6AOL/0 in Colorado was happy to work TI, LU and CX.

From Central America and the Caribbean

In addition to working into the southern US, HP3XUG, HP3CWB, TI5KD, TG9AJR and other Central Americans logged LU, CX, PY, CE, along with ZD8PC and ZD8C on Ascension Island. On March 29, TI5KD worked S07UN (newly active in Western Sahara) and CN2UN (Morocco).

Clint Walker, W1LP/mm, captain of the *Marine Chemist Global*, made his regular run from the West Coast, through the Panama Canal and back to Texas and Louisiana oil ports during the month. His range of contacts on 50 MHz was extensive, as might be imagined. On March 10-11, for example, while steaming through EK93 and EK94, Clint made many contacts with PY, CX and LU in South America, but also with ZL2, 3 and 4 and VK1, 2 and 4 across the Pacific.

From South America

Argentines, Brazilians and other South Americans collectively logged an impressive array of stations and countries in all continents, including CP, HC, HP, KG4GC, KP2, KP4, TI, V31PC, VE, VP5JM, W, ZF and ZP6CW in the Americas; CT, EH, I and 9H in Europe; CN, EH9, TR8CA and EH8BPX in Africa; and HL5XF, KH6, KH7L, JR6, VK and ZL across the Pacific.

LU6DRV and LW5EJU also had a busy month. In addition to the nearly daily openings into the southern tier of states, LW5EJU worked as far north as Virginia, North Carolina and Oklahoma over the evening of March 8-9. On March 12, Nestor logged stations across the entire US from Massachusetts to Ohio, Indiana, Kansas, Missouri and Washington. On the 15th, LW5EJU found several New Englanders and added VE1ZZ (FN84), perhaps the northernmost station so far this cycle.

Jack Henry, N6XQ, operated 6 meters from two locations in Bolivia as CP1/N6XQ from March 15 to March 28. He used an IC-706 Mk II, a 500-W amplifier and a Yagi with about 10-dB gain. Power came from a locally supplied generator. Jack made over 300 contacts in 20 countries, including AH6TM and other Hawaiians, TR8XX and ZD8PC. Jack chatted with N4VHF and AE4RO almost daily, beginning around 1800 and worked widely from Florida to Southern California. His most northerly contacts into the states were with W4WRL (SC), K0FF (MO), N0LL (KS) and K6QXY (San Francisco Bay area).

Bolivia has had little 6-meter activity in recent years, so Jack provided a new country for many operators. Daily accounts of his expedition and an impressive array of photographs can be found at <http://www.ham-radio.com/n6xq>. Also on the air about the same time was CP1FQ, who had just been on the band for two months and expects to keep 6-meters active during the coming years. He is the only known resident 6 meter operator in Bolivia.

Across the Pacific

A few US stations from Texas to Southern California made contacts with New Zealand and Australia on the afternoons of March 4, 10, 16 and 20. N6CA found ZL2TPY on the 4th. K15GF (EL09) heard VK2QA and worked ZL2KT on March 10. K6QXY (CM88) found ZL2KT on March 16. On March 20, Bob made two ZL contacts. K7ICW (DM26) worked ZL2KT and NI6G (DM06) worked two ZL stations that day for a new country.

Eric Jamieson, VK5LP, editor of "VHF/UHF—An Expanding World" in *Amateur Radio*, provides news of some interesting contacts in the Pacific region and beyond. March 3: HL5XF (Korea) to VK2QF, PP5HOT and LW5BHN; JR2HCB heard LW5BHN; March 8: 9M2NK (West Malaysia) heard VQ9DX; P29KFS (Papua New Guinea) to BG7OH (China) and V63CV (Micronesia) heard 457YSG (Sri Lanka) to YC1EHR (Indonesia), VR2ZGK (Hong Kong) and A61AH (United Arab Emirates). Eric believes this is the first time since 1982 that a station has been active from Sri Lanka.

From Japan

Hatsuo Yoshida, JA1VOK, provided much of the news from Japan via e-mail. In addition to the now nearly routine contacts to Australia, Japanese operators logged many other interesting countries. JA6VSP and other JA6/JR6 stations in the Ryukyus of southern Japan worked several PY and LU stations, 7Q7RM (for the first time this cycle), A61AH with loud signals and five VQ9s. Others in central Japan logged 3D2TC (Fiji), 5W1SA (Western Samoa), 9M6CT (East Malaysia), several DU (Philippines), P29PL, T33RD (Banaba), V63AO, V63CP, V63CV, YB0ARA/9 and YJ8UU.

Sporadic E

Sporadic E was reported only on March 4 and 9. Arliss Thompson, W7XU/0 (EN13) found many stations from Connecticut to North Carolina early on March 4. Others also reported activity across the Midwest. Ken Neubeck, WB2AMU (FN30), noted some brief activity to Florida about the same time. Conditions on March 9 were poor, but Midwestern stations were able to work into Florida and Cuba in the morning.

Aurora

Aurora was evident on February 28-March 1, March 1-2, 7, 9-10 and 30, but none of the sessions were especially noteworthy. Ron Majewski, W8RU (EN82), worked from Maine to Pennsylvania to the east and west to Wisconsin from his Michigan location on 50 MHz after 0220 on March 1. K1TOL copied OX3VHF/b via auroral-E on 50 MHz about the same time. Mark Dzuban, KB3IT (FN20), found 144 MHz stations as far west as Wisconsin and southwest to N0PB (EM39) as early as 2300 on February 28. Mark runs 500 W to two 13-element Yagis. W7XU/0 nabbed KE8FD (EM89) and K2YAZ (EN74) on 222 MHz.

Conditions the next evening (March 1-2) were similar. W7XU added KA9CFD (EN40) and K8EB (EN73) on 222 MHz, along with KA0PQW (EN33) and W9ZIH (EN51) on 432 MHz. The March 9 and 10 events did not seem to get going until after 0400, which may

144-MHz Standings

The 2-meter standings are compiled each April 1 for publication in June. You must have worked at least 10 states to be included. To ensure that the standings reflect recent activity, information must be submitted within the previous two years. Stations dropped for lack of recent reports will be reinstated with a current update. You need not work additional stations to remain in the standings, but please confirm your continued interest at least every two years by sending a report. You can obtain a VHF/UHF report form by sending a self-addressed, stamped envelope to: World Above 50 MHz, ARRL, 225 Main St, Newington, CT 06111. Reports can also be submitted by e-mail to standings@arrl.org.

Call	QTH	States	DXCC	Grids	Best DX (km)†	Call	QTH	States	DXCC	Grids	Best DX (km)†	Call	QTH	States	DXCC	Grids	Best DX (km)†
AF1T*	NH	50	28	—	2240	N4MM	VA	34	5	143	—	N0AKC*	WI	48	26	222	2350
W1JR*	MA	50	23	201	2304	KC4QWZ	TN	34	3	154	—	W9UD	IL	47	3	204	1508
W1A1M*	VT	48	13	181	2092	K4RTS	VA	34	2	111	2023	W9JJ	WI	43	3	—	2560
K2LME1*	CT	42	25	145	2462	AA4H	TN	32	2	141	1949	W0UC	WI	41	2	180	2052
WA1OUB*	NH	41	14	190	2501	WB5APD	GA	29	2	97	1856	W9JN	WI	40	2	197	2261
W21V	CT	38	9	257	2700	W4EUH	VA	28	2	104	2175	W9EME	WI	38	3	—	2500
K1UHF*	CT	36	10	184	2344	W4KXY	GA	28	2	101	—	K9SM	IL	37	2	119	1791
W1REZ	ME	36	6	176	2491	AD4DG	VA	22	2	49	1379	KF9WM	IN	33	2	104	1560
K1TEO	CT	36	4	203	2265	WD4FMN	AL	19	—	50	1146	N9LAG	IL	31	4	91	—
W3EP/1	CT	33	3	160	2450	K4SW	VA	13	1	35	858	WA9PWP	WI	30	2	127	1900
K1ZE	RI	31	3	104	2282							K9KL	WI	26	2	118	1350
W1LP	MA	30	4	94	2335	W5ZN*	AR	50	37	305	2850	KA9UZW	WI	25	2	95	1678
N1RWY	ME	27	2	78	1947	WD5AGO*	OK	50	32	—	2088	WA1MKE	IN	24	2	83	1800
WA1LOU	CT	26	3	46	2219	W5UWB*	TX	50	29	—	2166	N9ISN	WI	20	2	92	2021
K1MAP	MA	22	2	59	2095	W5RCI*	MS	50	23	259	—	WD9BGA	WI	20	1	65	2400
K1WVX	CT	15	2	40	1093	W5FF*	NM	50	—	149	—						
KA1EKR	MA	13	2	32	985	W5LUA*	TX	50	—	—	—	W0HP*	MN	50	75	—	—
						K5SW	OK	47	5	280	2269	W0LD*	CO	50	—	156	2378
W2CNS*	NY	50	22	125	2367	W5VY	TX	44	6	225	3070	K0FF*	MO	49	26	230	2185
N2WK*	NY	45	25	261	2298	W5AL	TX	42	4	276	2450	W7XU	SD	48	2	243	2180
NB2T	NY	41	2	70	2720	W5SXD	TX	41	—	—	—	KM0A*	MO	47	9	376	2780
W2UAD	NY	39	3	140	2315	AA5C	TX	34	2	169	2202	N0LL	KS	46	2	372	2378
K1NY	NY	38	4	151	2735	K5LLL	TX	34	2	135	2442	K0GJX	MN	46	3	240	2804
WB2CUT	NJ	37	2	145	—	W5DFU	OK	32	2	133	2132	N0QJM	SD	46	2	195	2180
W2MPK*	NY	36	8	—	—	WA5IYX	TX	32	2	110	2243	WA0BWE	MN	46	2	167	2570
K2OVS	NY	36	4	105	2812	K5TN	OK	32	1	128	2025	W0OHU	MN	45	2	137	2040
N2DKP	NY	34	2	108	—	N5HYV	LA	28	1	105	—	W0VD*	MO	44	26	263	—
WV2C	NY	33	4	133	2450	WA5TKU	TX	27	—	80	—	KW0A	MO	44	2	231	2300
WA2BAH	NY	32	3	102	2010	W5OZI	TX	24	2	138	2268	W0DFK	MO	44	3	226	1450
K2WKA	NJ	32	2	128	—	N5QGH	TX	19	—	81	—	N0HJZ	MN	44	2	211	2400
N2DXP	NY	26	—	89	—							K0CJ*	MN	44	2	—	2330
W3HHN/2	NY	25	2	69	2024	WA6PEV*	CA	50	52	—	—	K0GU*	CO	41	37	255	2161
KA2MCU	NY	24	2	63	2010	K6AAW*	CA	49	26	221	2831	W0JRP	MO	41	3	208	2150
W2FCA	NY	21	2	59	1472	K6QXY*	CA	23	8	—	3794	KD0PY	IA	41	2	205	2174
WA2ZFH	NY	18	3	38	1970	N6ZE	CA	22	10	75	—	N0KQY	KS	41	2	187	2310
						N6YM	CA	20	4	131	3822	NJOM	MN	40	2	147	1963
K13W*	PA	50	61	337	—	N6RMJ	CA	18	4	149	4017	NT0V*	ND	39	7	165	2120
KB3PD*	DE	50	15	162	—	N7STU	CA	16	3	103	2118	W0ZQ	MN	38	2	176	2610
W3ZZ*	MD	38	6	235	2538							N0NZ	NE	38	2	153	2224
AE3T	PA	37	3	—	2510	W7CS*	AZ	50	90	410	3776	N0KE*	CO	35	6	219	2200
W3BO	PA	35	3	113	2090	W7HAH*	MT	50	80	454	—	N0UK*	MN	33	3	121	2053
K3KEL	PA	35	2	121	2120	N7WS	AZ	39	18	120	2100	KB0IKP	MN	33	2	133	1400
WA3DMF	MD	32	4	55	2050	K7XC*	NV	31	16	162	4056	KA0RYT*	MN	31	3	123	2200
N03I	PA	30	1	103	—	WA7GSK	ID	27	—	170	3032	W0PHD	MN	31	2	116	—
K3UA	PA	24	3	90	1650	N7MWW	WA	12	3	80	4321	KA0PQW	MN	30	2	—	2122
W3SZ*	PA	19	18	80	2110							WA2HFI	MN	27	2	116	2057
N3JNX	PA	15	3	42	975	K8BHZ*	MI	50	41	352	2255	WA2HFI/0	MN	26	2	106	2057
						K8Y*	MI	50	23	269	1891	K0RZ*	CO	25	2	89	2390
W4MW*	NC	50	36	—	—	N8XA	OH	45	11	161	—	KA0ZYD	MN	24	2	99	2160
WA4MVI*	SC	50	30	—	2498	N8DJB	OH	41	5	251	—	KB0VUK	MN	20	2	97	1870
W4UE*	FL	41	11	150	2735	KE8FD	OH	41	5	249	2275	KB0IXC	MN	17	1	62	1396
K4MRW	AL	41	5	249	—	K8MD	MI	40	3	191	1362	N0SWV	CO	16	1	67	1200
WB4JEM	FL	40	7	188	2226	WA8EOJ	OH	39	3	194	2198	WA2VOI/0	MN	16	—	56	—
K4RF	GA	40	4	212	2147	KB8JVH*	OH	37	6	127	2160						
W4DEX	NC	40	—	—	—	W2CE	WV	37	3	—	1290						
W4HHK	TN	40	—	—	—	WA8NPX	OH	36	3	150	—	VE3KH*	ON	49	42	300	1985
N4CH	VA	39	6	191	2600	K2YAZ	MI	36	2	156	2070	VE3AX*	ON	48	27	—	2225
K4CKS	GA	38	5	217	2400	W8QXO	OH	36	1	—	2092	VE3FKX*	ON	41	7	—	—
NA4I	GA	38	3	160	2413	N8KOL	OH	33	2	131	1867	VE3TMG	ON	30	1	121	1973
WD4AHZ	FL	37	7	214	2485	WB8XX	OH	32	2	117	1759	VE9AA	NB	27	2	99	1537
K4ZOO	VA	36	4	173	2158	N8NQS	MI	31	2	129	2042						
WD4MGB	FL	34	8	148	2180	KB8RJS	MI	27	2	98	—						
WB2QLP	FL	34	6	209	2050	K3DMG	OH	26	2	88	1672						
N4UK	SC	34	6	140	—	N8PUM	MI	20	2	69	2188						

—Information not provided
*Includes some EME (moonbounce) contacts
†Terrestrial

account for the small number of reports. Auroral-E was also widespread across Canada during the March 10 aurora.

VHF/UHF/MICROWAVE NEWS

SMIRK Contest

The annual Six Meter International Radio Klub 6-meter contest runs 48 hours from 0000 June 19 to 2400 June 20. Get the contest rules from <http://www.smirk.org> or send a self-addressed stamped envelope to Pat Rose, W5OZI, Box 393, Junction, TX 76849.

Western States Weak-Signal Society Conference

The annual WSWSS conference is set for July 24-25 in Flagstaff, Arizona. For more information, contact NU8I at nu8i@home.com or check

the society's Web page at <http://www.wswss.org>.

EME Symposium 99

Dave Halliday, K2DH, has announced that Symposium 99—A Beginner's Workshop for EME activity will be held August 20-21 at the Syracuse Marriott in East Syracuse, NY. Dave is still looking for speakers, especially on topics for newcomers. Call Dave at 716-728-9517 or e-mail him at k2dh@frontiernet.net for more information and check the conference Web site at <http://www.geocities.com/~kb2ah/symposium99.html>.

All About Lasers in CQ VHF

Eric Stroud, KB2TCQ, has written a comprehensive and informative two-part article about lasers, which appears in *CQ VHF* for March and

April. He especially notes the safety hazards involved in using high-power devices. Although the FCC does not license operations outside radio frequencies, Stroud notes that laser operators may need to contact the Federal Aviation Administration (FAA), Center for Devices and Radiological Health (CDRH), Occupational Safety and Health Administration (OSHA) and any number of local agencies before operating.

FEEDBACK

The ICOM IC-970H should have been included among the microwave transceivers mentioned in the *March column*. The IC-970H is designed primarily for satellite operators and covers up to four VHF and UHF bands, including 1296 MHz (10 W) and 2304 MHz (1 W) with optional modules. **Q57**

What's the Status of License Restructuring?

The FCC has proposed changes to the Amateur Radio license structure. In their proposal, in WT Docket 98-143, they sought input from the amateur community on a variety of license qualification subjects covering the written exam elements. They also asked for input regarding the Morse code exam elements. The FCC's deadline for public comments was December 1, 1998, with a reply comment deadline (for comments filed in reply to others' comments) of January 15, 1999.

Now We Wait

As is the case with all rulemaking proceedings, the FCC does not offer a deadline for its final determinations, or even an estimate. While rumors had suggested an early May announcement, nothing had surfaced at press time and it seems an announcement will not come before July at the earliest. See *"It Seems to Us—Restructuring: The Next Step"* in the January 1999 *QST*, page 9.

Where Can You Find Late-Breaking Updates?

From the ARRL, of course! *QST*, ARRL bulletins, the *ARRL Letter* and the ARRL-Web will carry the news from the FCC as soon as it is available. ARRL bulletins and the *ARRL Letter* are both available on the ARRLWeb at <http://www.arrl.org/>. Or try the ARRL Audio News service at 1-860-594-0384 (or on the Web also at <http://www.arrl.org/arrlletter/audio/>).

What About Current Exam Updates?

As was publicized late last year, the National Conference of VECs Question Pool Committee (QPC) announced that all question pool updates (exam changes) are on hold until FCC completes their rulemaking proceeding. Once the FCC releases their determinations, the QPC will advise the amateur community on what changes should be expected in exams, and over what timeline.

And What About the Change from FCC Form 610 to the New FCC Form 605?

The FCC announced that the new Form 605 would not take effect until the amateur service data base is implemented under the FCC's new Universal Licensing System (ULS). Furthermore, FCC stated that the new form would not be mandated for use until six months have passed from the date the amateur service data base is implemented in ULS.

VECs in the Amateur Service

ARRL/VEC, 225 Main St, Newington, CT 06111; tel 860-594-0300; fax 860-594-0339; vec@arrl.org; <http://www.arrl.org/>

Anchorage AR Club, HC01 Box 6139-C, Palmer, AK 99645-9604; tel 907-746-3996; wa7usxmcl@aol.com

Central Alabama VEC, Inc, 1215 Dale Dr SE, Huntsville, AL 35801; tel 256-536-3904; dtunstil@advicom.net

Golden Empire AR Society, PO Box 508, Chico, CA 95927; tel 530-345-3515; wa6zrt@aol.com

Sandarc-Vec, PO Box 2446, La Mesa, CA 91943-2446; tel 619-465-3926

Greater L.A. AR Group, 9737 Noble Ave, North Hills, CA 91343; tel 818- 892-2068; glaarg@ibm.net

Sunnyvale VEC AR Club, Inc, PO Box 60307, Sunnyvale, CA 94088-0307; tel 408-255-9000 (24 hours); vec@amateur-radio.org; <http://www.amateur-radio.org>

Jefferson AR Club, PO Box 24368, New Orleans, LA 70184-4368

Laurel AR Club, Inc, PO Box 3039, Laurel, MD 20709-3039; tel 301-317-7819, 301-572-5124 (1800-2100Z); rbusch@erols.com

MO-KAN VE Coordinator, PO Box 11, Liberty, MO 64069-0011; tel 816-781-7313, 913-375-1177

W4VEC, 3504 Stonehurst Pl, High Point, NC 27265; tel 336-841-7576; w4vec@aol.com

W. Carolina AR Society/VEC, Inc, 6702 Matterhorn Ct, Knoxville, TN 37918; tel 423-687-5410; wcars@kornet.org; <http://www.kornet.org/wcars>

W5YI-VEC, PO Box 565101, Dallas, TX 75356-5101; tel 817-461-6443; w5yi@cwixmail.com

The Milwaukee RA Club, Inc, PO Box 25707, Milwaukee, WI 53225; tel 414-466-4267

For Volunteer Examiner Activities, Use of the Form 605 is Unclear

It is unclear at this time as to how Form 605 will meet all VE, VEC and FCC needs as it relates to examinations. Form 605 (and its two supplements) presently lacks a place for the three VEs to place their exam-certification signatures. It also does not provide a space to record the exam date and location information, or the indication of what new license class the applicant has qualified for. Until these matters are appropriately resolved, the form won't be ready for amateur examination use.

When the necessary forms or supplements are ready, VECs will announce how the process will work. Within a few weeks after the documentation requirements are known, the ARRL and other VECs will have the documentation available for applicants and VE teams.

ARRL Fall National Exam Days—September 25-26, 1999

It seems odd to be thinking about autumn in June, but the summer will be over before you know it. Start your preparations early for the Fall National Exam Days. If you are looking for information regarding exams to be held in your area, or if you want to know more about the exam question pools and other topics, see the ARRL/VEC Web site at <http://www.arrl.org/arrlvec/>, or call 860-594-0300. For instructors and club info, contact the ARRL at 860-594-0200. The ARRL can provide media kits for your use in publicizing the National Exam Days. Contact Jennifer Hagy, N1TDY, at ARRL HQ at 860-594-0328, or e-mail jhagy@arrl.org.



Amateur Satellites

Edited by **Steve Ford, WB8IMY** • Managing Editor

The Little Satellite that Could

How small can an amateur satellite be—really? You may have heard of microsats and even nanosats, but you are about to be introduced to the first amateur *picosat*. Incredible as it may seem, StenSat, which is scheduled to fly in just a few months, is only $4 \times 3 \times 1$ inches!

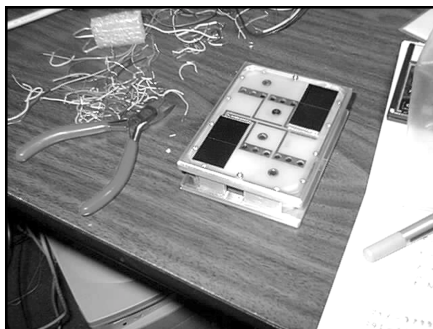
StenSat is the brainchild of a group of hams and communication engineers who live and work in the Washington, DC area. Much of the engineering development took place at the facilities of the TTC Corporation. The StenSat team consists of Hank Heidt, N4AFL; Carl Wick, N3MIM; Dan Schultz, N8FGV; Kevin Doherty, Jim McGuire, David Niemi, Chris Rogers and Steve Lim.

Why do they call it StenSat? The “Sten” is derived from “Stenhouse,” a home where several team members lived shortly after graduating from college. It was the focal point for many of their creative experiments, including such things as “sub-orbital” tennis ball launchers!

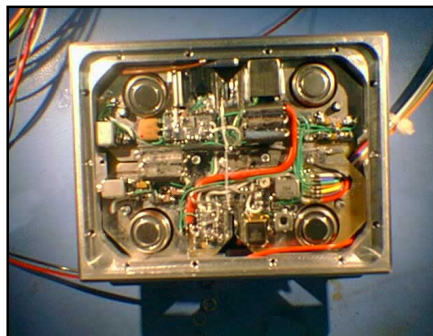
StenSat is primarily designed to function as an orbiting FM repeater, similar to AMRAD-OSCAR 27. The uplink will be at 145.84 MHz with a downlink at 436.625 MHz. The downlink transmitter will have a maximum output of 500 mW, which will make its signal comparable to OSCAR 27's. StenSat will also transmit bursts of packet telemetry at 1200 baud. Hams will be able to *ping* StenSat by sending a 6-digit DTMF string that will cause the satellite to send a packet burst on command.

StenSat will be riding to low-Earth orbit *inside* the Stanford University OPAL satellite. After OPAL separates from its booster rocket and is completely evaluated, it will jettison as many as three picosats—one of which will be StenSat. (Part of OPAL's mission is to test the feasibility of using one satellite to carry and launch numerous “daughter” satellites.) When StenSat reaches a safe distance from OPAL, and after its batteries are fully charged, it will deploy its 2-meter and 70-cm center-fed dipole antennas. The dipoles are made from sections of $\frac{1}{2}$ inch wide spring-steel measuring tape. They wrap around the perimeter of the satellite in a $\frac{1}{8}$ inch deep track and are held in place with fishing line. The antennas are released by shorting a nichrome wire (for 250 ms), which melts the fishing line.

OPAL is presently scheduled for launch from Vandenberg Air Force Base on September 15. If StenSat passes the necessary pre-flight tests, it will be on board. To learn



Can you believe that you're looking at a satellite? StenSat is hardly larger than a pair of wire cutters!



A peek inside StenSat.

more about StenSat, see their outstanding Web site at <http://www.erols.com/hheidt/>.

HAPPY BIRTHDAY, AMSAT-NA

I was fortunate to be able to attend the 30th anniversary celebration of AMSAT-NA on March 13 at the NASA/Goddard Space Flight Center in Greenbelt, Maryland. Many AMSAT veterans were there, including Perry Klein, W3PK; Tom Clark, W3IWI; Joe Kasser, G3ZCZ; Bill Tynan, W3XO; and Jan King, W3GEY, just to name a few.

After a delicious steak dinner, and a slice of birthday cake, the “show” was under way. On behalf of NASA/Goddard, Frank Bauer, KA3HDO, presented a plaque to AMSAT-NA president Keith Baker, KB1SF (take a look at “Up Front” in this issue). Jan King gave a well-deserved award to Marie Marr, one of the unsung heroes of the amateur satellite program. Marie was the person who assembled and checked the complicated wiring harnesses that went into several of our most popular satellites. It was a mind-numbingly tedious job, yet absolutely critical. Finally, Dick



Martha presents the AMSAT-NA 30th anniversary cake.



Cruising beneath the sprinkler pipes we have Phase 3D—or at least a 1/20 scale model. You can have one of these beauties for your very own. All it takes is a \$17 donation to AMSAT-NA (see text).

Daniels presented a slide show that encompassed the history of AMSAT-NA. (It's astonishing how some people have changed over the years. And those '70s fashions! Did we really wear that stuff?)

At the party I ran into Steve Thompson, K5PK. Steve has developed beautifully designed card-stock models of the Phase 3D satellite. These detailed model kits are available for a \$17 donation to the AMSAT-NA Phase 3D fund. Just send a check or money order to:

AMSAT-NA (Phase-3D kit)

850 Sligo Ave

Silver Spring, MD 20910-4703



60 Years of YLRL

A letter appeared in the July 1939 issue of *QST* from Ethel Smith, W7FWB. She wanted to know "How many YL key twitchers are out there?" Ethel asked YLs to send information about themselves and how they became interested in Amateur Radio. She felt that ham radio was a male-dominated hobby and thought that YLs should band together and "get noticed." She was especially interested in whether YLs were "key twitchers" or "tensil busters."

I don't know the breakdown of male vs female hams in 1939, let alone CW vs SSB ops, but 12 ladies answered her letter. They became the core of a new organization called the Young Ladies Radio League, or YLRL. Ethel became their first president and dues were set at 25 cents a year. They started a bimonthly newsletter called *Harmonics* and in 1940 a YLRL member originated the YL signature "33," which means "love sealed with friendship between one YL and another."

60th Anniversary YLRL Convention

This year marks the 60th anniversary of YLRL and they are celebrating with a special convention onboard the *Queen Mary* in Long Beach, California from July 30th to August 1st. Whenever YLs get together, it's always

a fun event. With YLs from Japan, New Zealand, Australia, Italy, France, Germany, Luxembourg, Sweden, Norway, Canada and most of the 50 states scheduled to attend, this convention should be spectacular! The YLRL convention is being hosted by the Ladies Amateur Radio Association of Orange County, California, assisted by the YL Club of Los Angeles.

YLRL conventions are a little different from your usual ham gatherings. There are no vendors, flea markets or technical sessions. The conventions are mostly social events with many opportunities for YLs to compare notes and share experiences. One of the main events will be a DX-YL get-together Friday night, where many of the YLs bring small gifts to exchange with one another.

Saturday morning there will be a YL forum with YLRL President Nancy Rabel Hall, KC4IYD, Kay Eymann, WA0WOF, editor of "YLs on the Air" in *WorldRadio* magazine, Sandra Heyn, WA6WZN, past president of YLRL, and myself. The luncheon on Saturday will feature Janet Margelli, W0MF. She and her husband Chip, K7JA, have traveled the globe on several DXpeditions. Janet was the first YL granted operating privileges from the People's Republic of China.

Dave Bell, W6AQ, will be the master of ceremonies at the banquet on Saturday night, and the speaker will be Cynthia Wall, KA7ITT, the author of the popular Amateur Radio adventure series books for children.



Assisting with the YLRL convention is the Young Ladies Radio Club of Los Angeles. From left to right, Vi Barrett, W6CBA; Midge Hasper, K6BUS; Joan McDonnell, WA6QKC; and Irma Weber, K6KCI.

At the DX Breakfast on Sunday morning, Ann Santos, WA1S, will speak about her DXpedition to Willis Island.


Many other activities have been scheduled, including a trip to Universal Studios and some special events to keep the OMs busy (a tour of a Russian submarine and a visit to the TRW ham radio/computer swapmeet). Of course, there is the historic wireless room and museum on the *Queen Mary* where attendees will be able to operate from W6RO.

The last YLRL convention was held in Albany, New York in July 1996. I wasn't able to attend that event, but was able to go to the Canadian Ladies Amateur Radio Association convention a few years ago. It was my first YL convention and it was wonderful meeting YL hams from all over the world, sharing our hobbies, stories and cultural experiences. No doubt this gala will be just as enjoyable.

Sixty years ago YLRL started with 12 brave ladies who wanted to share their interest in ham radio. The organization they started has over 1500 members today, including over 250 DX YLs. I think those founding ladies would be very proud. The YLRL is an international women's Amateur Radio organization that does indeed "get noticed!"

For more information, and to register for the YLRL convention, contact convention chairwoman Martha Barron, KA6TYO, 8225 Devenir Ave, Downey, CA 90242-4222; marthabar@aol.com. Information is also available on the Buckeye Belle's Web site at <http://www.geocities.com/CapeCanaveral/Lab/3376/index.html>.

YL-OM Contest Winners

Congratulations to Uschi Falk, DF9YY, and Sandra Hanson, K2RUE, who placed 1st in the recent YL-OM contest (SSB and CW respectively). And speaking of on-air events, I'll be listening for you on Field Day, June 26-27!—33, *Diane K2DO* 

*PO Box 296
Bellport, NY 11713
hamyl@aol.com



The Ladies Amateur Radio Association of Orange County, California is hosting the 60th anniversary YLRL convention. The LARA convention committee consists of (back row, left to right) Liz Willett, N6FBT; Martha Barron, KA6TYO; Vi Barrett, W6CBA; (front row, left to right) Edna Toll, KC6TXB; Jeri Haines, KB6USX; and Bobbi Raymond, KA6JDO.

Silent Keys

—By Kathy Capodicasa, N1GZO

It is with deep regret that we record the passing of these amateurs:

W1CJN, Joseph J. Schaffhouser, Norwich, CT
K1JBL, Roland H. Gibson, Pawlet, VT
W1JMT, Francis W. Jenard, Saundertown, RI
W1MKX, Francis M. McGrath, Lowell, MA
W1PLA, Ira J. Dilts, Lynnfield, MA
K1WGR, Robert V. Fiero, Assonet, MA
W2AFL, Mahlon W. Straub, Valley View, PA
KA2DMR, Virginia L. VanBuren, Walton, NY
W3HEJ, Houghton T. Stevens, Rochester, NY
K2HYO, Robert Winhaber, Honeoye, NY
KS2I, Cornelius C. Unruh, Pittsford, NY
W2JRO, George R. Strimple, Eatontown, NJ
K2KMO, Jose A. Alvarez, Mount Laurel, NJ
W2PEE, Elston H. Swanson, Stuart, FL
W2PWN, George A. Decker, Binghamton, NY
W2PY, John J. Orson, Clifton, NJ
W2RYI, Mack Seybold, West Caldwell, NJ
W2SYM, Wilbur F. Ganzhorn, Niagara Falls, NY
K2UHI, Joseph W. Hart, Albany, NY
WB2VBS, Mike Incorvaia, Wayne, NJ
WA2YMT, Richard E. Church, Central Square, NY
WA2ZVI, Lewis Jeep Dunwell, East Quogue, NY
KA3DEF, Dwayne W. Jensen, Downingtown, PA
N3HIK, Robert E. Moore, York, PA
W3HVS, Robert B. Blackwell, Port Saint Lucie, FL
K3IX, M. C. Whiffen, Marietta, GA
KA3LWJ, Harry A. Becker, Rehoboth Beach, DE
W3TES, J. R. Baugher, Waynesboro, PA
N3TWT, Raymond H. Rowand, Carlisle, PA
W4AWN, Janet F. Jones, Fort Myers, FL
WA4AYI, Myrtle H. Hinds, Winchester, KY
N4CBC, John H. De Witt, Nashville, TN
WD4CCF, Roger W. Payne, Columbus, GA
W4DTO, Anthony A. Sariti, Palm Beach Gardens, FL
KD4EJK, Jacqueline Paye, Columbus, GA
KD4HPK, Carl F. Luckey, Killen, AL
K14JG, Carl Bott, Macon, GA
W4JOF, Andrew T. Jones, Portsmouth, VA
N4KEF, Clyde C. Albert, Pulaski, VA
KA4KO, Ben T. Metcalfe, Augusta, KY
K4MGL, Robert W. Patrick, Atlanta, GA
W4MWL, James Patterson, Gastonia, NC
W4NWL, Billy W. Dale, Hickory, NC
KD4NY, William D. Largent, Goldsboro, NC

W4OUH, James M. Comer, Stone Mountain, GA
WB4PAU, Ronald A. Stiles, Mary Esther, FL
WA4QHA, Leslie L. Weller, Fort Lauderdale, FL
WA4RVG, William Ulshafer, Highland Heights, KY
W4TJJ, Delton W. Hinesley, Waco, GA
KU4TS, Ronnie E. Napier, Essie, KY
W4UQO, Johnnie A. Leverette, Montgomery, AL
KD4UUH, Ronald W. Peter, Colonial Beach, VA
WA4VDE, William J. Dunbar, Canton, GA
*WB4YQY, Robert H. VanOuter, Lexington, KY
KA5ASH, Bill C. Kendrick, Rockwall, TX
K5AWZ, Leonard Buettner, Las Vegas, NV
N5BCL, Billy C. Thomas, North Little Rock, AR
KG5DL, Harry G. Nimtz, Longview, TX
N5EKV, Joy S. Mathis, Clarkston, MI
WB5FGC, Robert K. Formsma, Blue Mountain, MS
N5FKL, George A. Davis, Denton, TX
KA5IBF, William Fraser, Hincley, MN
N5JFF, Burford A. Fields, Oxford, MS
W5LL, Cail Eldo Gibbs, Pine Bluff, AR
N5MAN, LeRoy J. Boudreau, Corpus Christi, TX
W5MSK, Herbert D. McAdams, Groves, TX
N5NN, Reagan L. Mathis, Clarkston, MI
*K5PO, Florence M. Laceyfield, Metairie, LA
K5RVK, Philip J. Shedd, Houston, TX
K5TEY, Nina R. Wallis, Tulsa, OK
*WB5VWX, Duane M. Price, San Antonio, TX
N5WWA, William W. Henrich, Omaha, AR
WA5YLN, James R. Freeman, Seguin, TX
KC5YWQ, William J. Home, Jacksonville, AR
KF6BB, Tommy L. Burns, Newport, NC
KE6BEM, Richard F. Carlsen, Clearlake Oaks, CA
W6KB, Orrin H. Brown, San Luis Obispo, CA
W6KZV, Stanley R. Harvey, Gig Harbor, WA
*W6LCS, John V. Juelson, Monrovia, CA
W6OOX, Thurman D. Beach, San Diego, CA
W6PKK, George R. Cooper, Woodland Hills, CA
KQ6WF, Roger W. Long, Aliso Viejo, CA
W6ZNX, G. G. Daggett, Madera, CA
N7AJL, G. R. Rector, Phoenix, AZ
W7ANC, John Crofford, Lakeside, AZ
W7BQG, Ellis K. Hamer, Auburn, WA
*W7EDT, Delmar W. Rowe, Bloomington, IL
W7FL, Geoffrey A. Woodhouse, Lewiston, ID
W7GT, Paul S. Morris, Port Ludlow, WA
W7IGC, Ronald E. Smith, Olympia, WA
N7IQL, Asger Mikkelsen, Bozeman, MT
AA7JZ, George L. Anderson, Las Vegas, NV
K7KPI, Merle Marshall, Yakima, WA
NK7R, William L. Faull, Tucson, AZ
WE7X, Arden C. Hawn, Suwanee, GA
W8AUA, Arthur R. Bonnet, Covina, CA
W8BGH, Carl J. Ludwig, Birmingham, MI
KC8BRA, Robert C. Key, Royal Oak, MI
KC8FD, Abe Moore, North Ridgeville, OH
*W8GSR, Richard G. Carnes, Medina, OH
WB8HUA, Thomas E. Sweet, Royal Oak, MI
W8HYQ, Jack Watt, Ontonagon, MI

W8KRM, Thomas E. Nisbet, Dayton, OH
W8LJP, Walter W. Tait, Howell, MI
KC8LL, Marvin I. Vallad, North Ft Meyers, FL
K8MDC, Frederick A. Jones, Olmsted Falls, OH
W8PMJ, Lloyd W. Frohning, Newbury, OH
KB8QXZ, James O. Branson, Midland, MI
WB8SSN, Walter D. Wolbert, Bonita Springs, FL
W8SWW, Donald W. King, Fenton, MI
*WB8UUX, Ray S. Allen, Waynesville, OH
WA9CCB, Louis J. Forster, Durand, WI
KB9FOQ, Philip S. Lehmann, Milwaukee, WI
KA9IHA, John R. Capin, Fort Wayne, IN
W9KCM, James Jarvis, De Kalb, IL
W9LFL, Donald C. Mattison, Tomahawk, WI
W9LVG, William R. Margetts, Springfield, IL
*W9MRB, William E. Ticen, Goleta, CA
W9NUA, Thomas J. Fitzgerald, Bloomington, IN
*W9PWG, Edward F. Wille, Milwaukee, WI
W9RNX, Russell O. Morris, Madison, WI
K9TKB, Thomas H. King, Evansville, IN
W9VQG, Robert E. Hetzel, South Milwaukee, WI
W9YJH, J. M. Pemberton, Henderson, KY
W0ELU, James A. Jensen, Boone, IA
W0GYV, Gail C. Allen, Grand Junction, CO
KB0JSR, Eugene J. Potthoff, Richfield, MN
W0SPF, Desmond G. Stanton, Wichita, KS
N0YXW, Donald R. Sondergeld, Dudley, NC
KA0ZSK, Harry J. Girsch, Gardner, KS
GM3JFG, Rev Iain McHardy, Ross-shire, Great Britain
I4SN, Marino Miceli, Bologna, Italy
LU7BD, Julio R. Ahumada, Henrietta, NY
VK2WCB, William Cowie, Franches Forest, NSW, Australia

*Life Member, ARRL

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. **QST**

75, 50 and 25 Years Ago

June 1924

◊ The cover photo shows a receiver, with the banner, "Beginning in this issue: a series of constructional articles on the superheterodyne." The editorial first discusses "Standard Time for Quiet Hours," because of the confusion brought about by the new "Daylight Saving Time in many parts of the country." The editorial goes on to address the issue of "Expansion of Silent Period During Summer," "Mutual Aid" (which urges amateurs to buy new equipment and apparatus to improve their stations during the summer doldrums), and "The Radio Tax Is Eliminated" (reporting that the suggested 10% excise tax on all radio apparatus and parts has been thrown out by the Senate!)

Technical Editor S. Kruse presents "Building Superheterodynes That Work—Part I." "Canadian Amateur Radio Gains More Niches in the Hall of Fame" tells how a number of Canadian amateurs handled transatlantic traffic during a period that the undersea cable was out of service. E. A. Lappet, ex-1CBO, discusses "Practical Master Oscillator Sets." Philip Laskowitz, 9DHI, tells about "A Good Break-In System"—Bloemer, 6QC, illustrates the article with a cartoon of someone who has "broken in" the plate-glass window of the "Radio Supplies" store (we can only hope it wasn't an amateur!). Traffic Manager Schnell, 1MO, is shown in a photo wear-

ing the brown derby that he won for the first two-way transatlantic amateur contact. The front of the derby is suitably adorned with "crossed French and U.S.A. flags ... [and] the A.R.R.L. device," and, across the back of the hat, an inscription that records the details of the record-setting contact between 1MO and (French) 8AB on November 26, 1923.

June 1949

◊ The cover cartoon by Gil, W1CJD, shows the Podunk Hollow gang, all smiles and rosy cheeks, heading out for FD. Gil's June cover always makes us wonder—for a month—what changes the post-FD July cover will show! The editorial discusses the latest "F.C.C.'s Amateur Rules Proposals." The editorial makes the point that the FCC proposals had been worked out with no consultation with the ARRL, because of "... the demonstrated inability of amateur radio to settle its differences within its own ranks," and observes that "... in the long run [hams'] best interests will be served by speaking with one voice before our government authorities."

Ben Roberts, W9IEU, describes "VFOs for 'Phone or C.W.," telling how to build your VFO to suit your own requirements. "What! No Antenna?"—a compendium of ideas by W2ALO, W2HZY, W2PLR, W0EVW, W2BRC, VE3PB and W1DX—tells how each of those hams got on the air with indoor antennas. The newly proposed FCC rules changes are published in their entirety, so hams can see what the Commission has cooked up. In the search for rapid bandchanging, Vern Chambers, W1JEQ, tells about "Multiple-Circuit Tuners from Grid to Feeder," which he has built into a dandy little rig with a push-pull 807 amplifier. Ed

Tilton, W1HDQ, with his eyes as always turned toward the higher bands, describes "The V.H.F. Sandwich," with a stacked 2-meter array as the filling between two slices of 6-meter beam. The obituary for Clinton B. DeSoto, W2IU, is published this month. His 1936 book *Two Hundred Meters & Down* is and will always remain a classic history of Amateur Radio. Loren Windom, W8GZ, tells about "Modernizing the Prewar HRO."

June 1974

◊ The cover photo shows HQ illustrator Barbara Dirrigl designing the graphics for W1CER's article on receiver design. The editorial, entitled "More Rules?," reports on and discusses the ramifications of the FCC's rules on an Amateur-Satellite Service, and opines that the FCC is proposing new regulations where none are needed.

The lead article, by George Hatherell, K6LK, tells about "Putting the G Line to Work"; that single-wire microwave transmission line (with horn launcher and horn collector), named for inventor Gorbau, has some interesting properties—and is certainly inexpensive! Part III of "Learning to Work with Semiconductors," by Doug De Maw, W1CER, and Lew McCoy, W1ICP, gets into oscillator circuits. De Maw also publishes "More Receiver Design Notes" in this issue. Dennis Rasmussen, W6MCG, tells about "A Tuning Control for Digital Frequency Synthesizers." Stewart Johnson, W1UVE, addresses the topic, "Repeaters are Public Service Machines," telling how the Minuteman Repeater Association's machine served well in the Great Chelsea (Massachusetts) Fire of 1973.—Al Brogdon, W1AB **QST**

Coming Conventions

Edited by **Gail Iannone** • Convention Program Manager

GEORGIA SECTION CONVENTION

June 11-12, 1999, Albany

The Georgia Section Convention (17th Annual Albany Hamfest), sponsored by the Albany ARC, will be held at the Hasan Temple, 1822 Palmyra Rd. Doors are open Friday 5-9 PM, Saturday 9 AM to 4 PM. Features include VE sessions (Friday, 6 PM, walk-ins only), outdoor flea market (Saturday only, \$10), vendors, forums (SKYWARN, ARES, MARS), free parking. Talk-in on 146.82. Admission is \$5. Tables are \$15 (8 ft, includes electricity; first-come, first-served). Contact Ricky McCrary, KD4OZR, 1703 Gail Ave, Albany, GA 31707, 912-438-9714; rmccrary@planttel.net; <http://www.isoa.net/aarc/hamfest.htm>.

WEST GULF DIVISION CONVENTION

June 11-13, 1999, Arlington, TX

The West Gulf Division Convention, sponsored by HamCom '99, will be held at the Arlington Convention Center, 1200 Ball Park Way, midway between Dallas and Ft Worth, I-80. Doors are open Friday 1 PM with festivities continuing throughout the weekend. Features include indoor/outdoor flea market, vendors, major exhibitors, electronics, computers and accessories, VE sessions, programs, forums, SKYWARN School, QSL card checking (by Bill Kennamer, K5FUV, ARRL Membership Services Department Manager), many speakers including special guest Riley Hollingsworth, K4ZDH, (from the FCC's Enforcement Division; see the May issue of *QST*, page 70). Talk-in on 147.14. Admission is \$9. Tables are \$25 (electricity available, additional \$40); outside flea market spaces are \$10 per day or \$25 for all three days. Contact Jim Haynie, W5JBP, Box 780942, Dallas, TX 75378, 214-351-2385, fax 214-352-1608; chairman@hamcom.org; <http://www.hamcom.org>.

EASTERN PENNSYLVANIA SECTION CONVENTION

June 12, 1999, Bloomsburg

The Eastern Pennsylvania Section Convention, sponsored by the Columbia-Montour ARC, will be held at the Bloomsburg Fairgrounds, I-80 to Exit 34, Rte 42 S to Rte 11 N, Fairgrounds on right. Doors are open for setup Friday 6-10 PM, Saturday 6-8 AM; public 8 AM to 3 PM. Features include convention/computer show, tailgating (free spaces), VE sessions (10 AM, no advanced registration), special guests (Kay Craigie, WT3P, ARRL Atlantic Division Director; and Al Breiner, W3TI, ARRL EPA Section Manager), refreshments. Talk-in on 147.225, 146.52. Admission is \$5, under 12 free. Tables are \$10 (8 ft, includes electricity, bring your own extension cords and power strips). Contact Dave Schack, WC3A, c/o CMARC, Box 90, Mifflinville, PA 18631, 570-752-6851; wc3a@arrl.net; <http://www.bafn.org/~cmarc>.

TENNESSEE STATE CONVENTION

June 13, 1999, Knoxville

The Tennessee State Convention, sponsored by the RAC of Knoxville, will be held at the National Guard Armory, 3330 Sutherland Ave; I-40, Exit 383 (Papermill Rd); adjacent to West High School, between I-40 and Kingston Pike. Doors are open 9 AM to 4 PM. Features include convention/electronics flea market ("Ham Radio in the Next Century"), dealers, manufacturers, forums, clinics, exhibits, demonstrations, tailgating (free space with paid admission), CW contests, VE sessions (registration must be completed before 1:30 PM, exams begin 2 PM), handicapped accessible, free parking, refreshments. Talk-in on 147.3, 224.5, 444.575. Admission is \$5. Contact David Bower, K4PZT, Box 50514, Knoxville, TN 37950-0514, 423-974-5064 (days) or 423-670-1503 (eves), rack@kornet.org; <http://www.kornet.org/rack>.

1999

May 22-23
Washington State, Yakima*

May 29-30
Wyoming State, Casper*

June 4-5
Iowa State, South Sioux City, NE*

June 4-6
Atlantic Division/New York State, Rochester*

June 4-6
Northwestern Division, Seaside, OR*

June 5-6
Georgia State, Marietta/Atlanta*

July 16-18
Montana State, East Glacier

July 23-25
Arizona State, Flagstaff

July 30-August 1
Pacific Northwest DX, Portland, OR

August 6-7
Texas State, Austin

August 6-8
Dakota Division, Watertown, SD

August 7-8
Eastern Washington Section, Spokane

* See May *QST* for details.

CENTRAL DIVISION CONVENTION

July 10, 1999, Indianapolis, IN

The Central Division Convention, sponsored by the Indianapolis Hamfest Association, will be held at the Marion County Fairgrounds. Doors are open 6 AM to 7 PM. Features include forums, VE sessions. Admission is \$5 in advance, \$7 at the door. Contact Rick Ogan, N9LRR, 5329 Lester, Indianapolis, IN 46208, 317-257-4050; oganr@in.net; <http://www.indyhamfest.com>.

MIDWEST DIVISION CONVENTION

July 10, 1999, Kansas City, MO

The Midwest Division Convention, sponsored by the PHD ARA, will be held at the KC Market Center, 1775 N Universal Ave; I-435 to Front St (Exit 57), W on Front St, N on Universal. Doors are open for setup Friday 2:30-8 PM, Saturday 7-9 AM; public 9 AM to 3 PM. Features include giant flea market, vendors, distributors, forums and seminars (ARRL, HF digital for RVs, Amateur Television, QRP rig building roundtable, packet radio, improved microphones from Heil Sound, chasing DX, and more), VE sessions (pre-registered only, Pete Williams, WD0FL, 816-453-8028), free test bench, handicapped accessible, acres of parking. Talk-in on 146.94. Admission is \$5. Tables are \$15 (flea market), \$25 (vendor, you cover), \$45 (vendor, skirted and covered); electrical outlet \$40. Contact Bob Roske, WA0CLR, 7504 N Brooklyn Ave, Gladstone, MO 64118, 816-436-0069; wa0clr@worldnet.att.net; <http://members.tripod.com/~PHDARA/>.

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

Strays

WORKED ALL PARISHES

◇ Louisiana is the only state that uses parishes as its primary political subdivision rather than counties. So, it seems natural to have a *Worked All Parishes* award! The award is sponsored by the Baton Rouge Amateur Radio Club and it can be yours if you can prove contact with at least one station in each of Louisiana's 64 parishes. You must send QSLs (or legible photocopies) for contacts made on any HF band (160 through 10 meters) and mode. Only direct contacts (no repeaters or satellites) made after September 1, 1996 are eligible. In addition to your QSLs or photocopies, enclose \$2—check or money order—for the mailing cost of your award certificate. Include extra funds if you want your QSLs returned. Send your application to: Baton Rouge Amateur Radio Club, Awards Committee, PO Box 4004, Baton Rouge, LA 70821.

I would like to get in touch with...

◇...anyone who has used the AEA Hamlink or Radiolink with a Kenwood or ICOM transceiver. Contact Gary Holland, W5QG, 44 Bay Water Dr, Abilene, TX 79602; garyh@camalott.com.

CY6 IN JULY

◇ The special prefix CY6 has been released to Calgary area amateurs from July 1-14, 1999 to celebrate the world famous Calgary Stampede. This will also be a great chance to work toward your Stampede City Award. All details can be found on the Web at <http://www.cara.ampr.org/stampede.html>. Look for VE6NQ on July 1st for a two-point contact.

Hamfest Calendar

Edited by Gail Iannone • Convention Program Manager

Attention: The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **June 1** to be listed in the **August** 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.)

Alberta (Red Deer)—Jun 18-20. Bob King, VE6BLD, 403-782-3438.

British Columbia (Kelowna)—Jun 19. OCARC, 250-766-2179.x

†**California (Santa Maria/Orcutt)**—Jun 20; set up 7:30 AM; public 9 AM to 2 PM. *Spr*: Satellite ARC. Newlove Picnic Grounds, just S of Orcutt off Hwy 101; 1.7 miles S of Clark Ave, 4.5 miles N of Palmer Rd. Vendors, tailgating (\$10 per space), T-hunts, QLF contest, displays of ARES and government communications vans, ATV demos, Santa Maria-style beef or chicken BBQ (11 AM, adults \$8, under 12 \$4), handicapped accessible, free parking, refreshments. *TI*: 145.14. *Adm*: \$1, under 12 free (credited against meal). Tables: \$10 (advance reservations recommended). Eric Lemmon, WB6FLY, c/o Santa Maria Radio Swapfest, Box 2067, Orcutt, CA 93457, 805-733-4416; wb6fly@impulse.net.

†**Connecticut (Goshen)**—Jun 12; set up 6 AM; public 8 AM to 1 PM. *Spr*: Southern Berkshire ARC. Goshen Fairgrounds, Rte 63, 1/2 mile S of Rte 4 traffic circle; 6 miles N of Litchfield, 6 miles W of Torrington. Vendors (bring your own tables at \$5 per table space), tailgating (\$5 per vehicle, includes 1 admission), VE sessions, free parking, refreshments. *TI*: 147.285. *Adm*: \$3, under 12 free with adult. Tables: \$10 (first 12-ft table, \$5 each additional, power \$2; send advance payment by Jun 1 to SBARC, c/o Hennie Horvay, KAIJVN, 43 Breguet Rd, Goshen, CT 06756; 860-491-3129). Lee Collins, K1LEE, 5 White Hollow Rd, Lakeville, CT 06039, 860-435-0051; collins@discovernet.net.

Florida (Ft McCoy)—Jun 5. Tom Bench, KS4ZI, 352-546-3967.

Georgia (Albany)—Jun 11-12, Georgia Section Convention. See "Coming Conventions."

†**Georgia (Gainesville)**—Jul 10, 8:30 AM to 3 PM. *Spr*: Lanierland ARC. Georgia Mountain Center, corner of Jesse Jewell and Main St in downtown Gainesville. New equipment dealers, covered tailgating, VE sessions. *TI*: 146.67. *Adm*: \$6. Tables: \$12. Ken Parrish, KN4UO, 23 Woodland Rd, Auburn, GA 30011, 770-867-9833, kn4uo@mindspring.com; <http://www.qsl.net/kc40xp/index.htm>.

†**Idaho (Rathdrum)**—Jun 12. *Spr*: Kootenai ARS. Lions Club, Hwy 53. Computer and Electronics Flea Market, VE sessions (11 AM, all classes), RV parking, refreshments. *TI*: 146.98. Info: 208-667-4915; jmonroe@dmf.net.

Illinois (Granite City)—Jun 13. Tod West, KB9AIL, 618-667-4592.

†**Illinois (Wheaton)**—Jun 13; gates open 7 AM, buildings open 8 AM. *Spr*: Six Meter Club of Chicago. DuPage County Fairgrounds, 2015 Manchester Rd, N of Roosevelt Rd (Rte 38), E of County Farm Rd. Ham Radio/Electronics Flea Market, antique and vintage radios, ARRL and dealer displays, VE sessions (9-11 AM; preregister), limited overnight RV parking with electrical hookup (\$10, advance registration required), free parking, handicapped parking (use E gate), refreshments. *TI*: 146.97 (107.2 Hz), 146.52. *Adm*:

advance \$5, door \$6. Tables: \$15 (8-ft commercial with 110 V, Main Bldg, air-conditioned), \$10 (8-ft, indoor flea market, no electric). Joseph Gutwein, WA9RIJ, 7109 Blackburn Ave, Downers Grove, IL 60516-3925, 630-963-4922; 24-hr InfoLine 708-442-4961; wa9rij@mc.net; <http://cyberconnect.com/orion/smcc.html>.

†**Indiana (Crown Point)**—Jun 20; set up 6 AM; public 8 AM to noon. *Spr*: Lake County ARC. Lake County Fairgrounds, Greenwood to Court St, SW side of Crown Point. Hamfest/Computer Show, commercial vendors, software and hardware, indoor flea market, VE sessions (walk-ins accepted), refreshments. *TI*: 147.0, 146.52, 442.075. *Adm*: \$5. Tables: \$6. Malcolm Lunsford, W9MAL, 6721 Harrison Ct, Merrillville, IN 46410-3323, 219-769-3925; w9mal@cris.com.

Indiana (Indianapolis)—Jul 10, Central Division Convention. See "Coming Conventions."

†**Kentucky (Independence)**—Jun 13; set up 6 AM; public 8 AM to 3 PM. *Spr*: Northern Kentucky ARC. Summit View Middle School, 5002 Madison Pike; 5 1/4 miles S of I-275 on KY Rte 17; from I-75 go E on I-275 to Exit 80 (Covington/Independence, KY 17), go S on Rte 17. Flea market (\$2 per space plus adm, bring table and chair), major vendors, computers, forums, ARRL booth, N KY disaster response vehicles, refreshments. *TI*: 147.255, 147.375. *Adm*: advance \$4, door \$5, under 14 free. Tables: \$15. Robert Blocher, N8JMV, Box 1062, Covington, KY 41012, 513-797-7252; nkarc@juno.com.

Kentucky (Tompkinsville)—Jul 3. David Welch, K4PL, 502-678-5784.

†**Maine (Union)**—Jul 10; set up 6 AM; public 8 AM. *Spr*: Pen-Bay ARC. Union Fairgrounds, Common Rd, Rte 17. Tailgating (\$2), vendors, VE sessions. *TI*: 147.06, 145.49. *Adm*: \$5. Tables: \$4. Will Chadwick, WC1W, Box 547, Union, ME 04862-0547, 207-785-2739; wilchad@tidewater.net.

†**Maryland (Frederick)**—Jun 20, 8 AM to 3 PM. *Spr*: Frederick ARC. Frederick County Fairgrounds, 797 E Patrick St. Giant outdoor flea market, indoor commercial area, vendors, tailgating (\$5 per space, plus admission), electronics, computers, VE sessions, refreshments. *TI*: 146.64, 147.06, 146.52. *Adm*: \$5. Tables: advance \$10 (prepaid by Jun 1), door \$15 (after Jun 1). Carolyn Moroney, N3VOK, 13597 Old Annapolis Ct, Mt Airy, MD 21771, 301-831-5060 or 301-695-2633 code 6393; n3vok@erols.com.

Massachusetts (Cambridge)—Jun 20. Nick Allenbernd, KA1MQX, 617-253-3776.

†**Massachusetts (Falmouth)**—Jun 12; set up 7-9 AM; public 9 AM to 2 PM. *Spr*: Falmouth ARA. Barnstable County Fairgrounds, Rte 151, East Falmouth. Flea market, vendors (8-ft space; advance \$7, make checks payable and send to FARA, Box 815, W Falmouth, MA 02574; door \$8), Amateur Radio display table, VE sessions (9:30 AM, \$6.45 fee). *TI*: 146.655. *Adm*: \$3. Ralph Swenson, N1YHS, 99 Fox Run Ln, East Falmouth, MA 02536, 508-548-6405; depsher911@aol.com; <http://www.falara.org>.

†**Michigan (Chelsea)**—Jun 6. 7 AM to 1 PM. *Spr*: Chelsea ARC. Chelsea Fairgrounds, old US 12 and M 52; take I-94 W from Ann Arbor, Exit 159, go N on M 52, turn left at old US 12. *TI*: 146.98. *Adm*: \$4. Tables: \$8. Don Wilke, WW8M, 4725 Sylvan Rd, Grass Lake, MI 49240, 734-475-2359.

†**Michigan (Midland)**—Jun 19; set up 6 AM; public 8 AM to 1 PM. *Spr*: Midland ARC. Gerstacker Fair Center on Midland County Fairgrounds, 6905 Eastman Ave; US-10 to Eastman Rd Exit, enter Fairgrounds from Airport Rd entrance. New and used amateur electronics and computer equipment, trunk sales (\$5 per space plus admission), VE sessions, Friday night camping (\$8, includes electricity), free parking, refreshments. *TI*: 147.0. *Adm*: \$4. Tables: advance \$6 (8-ft, plus admission), door \$10 (plus admission). Send SASE to MARC Hamfest, Box 1049, Midland, MI 48641-1049; Del

Lafavor, WB8FYR, 517-636-5097 (days) or 517-689-3477 (eves); lafevordel@aol.com; <http://www.qsl.net/w8kea/MARCSWAP.htm>.

†**Michigan (Monroe)**—Jun 20; set up 6 AM; public 7:30 AM to 1 PM. *Spr*: Monroe County Radio Communications Assn. Monroe County Fairgrounds, 2 miles W of Monroe on M-50, at Raisinville Rd. Hamfest/Computer Show, trunk sales (\$6, 8-ft space), indoor vendors, distributors, DX forum, QLF contest, overnight camping (\$15, electricity included), free parking, refreshments. *TI*: 146.72. *Adm*: advance \$6 (with 2 stubs), door \$6 (with 1 stub). Tables: \$15 (8-ft, with 1 ticket); additional tables \$10 each. Fred VanDaele, KA8EBI, 4 Carl Dr, Monroe, MI 48162-9319; 734-242-9487 after 5 PM.

†**Michigan (Petoskey)**—Jul 10, 8 AM to 1 PM. *Spr*: Straits Area ARC. Emmet County Fairgrounds, US 31, 2 blocks W of 131. Swap and Shop, commercial displays, VE sessions (1 PM, American Red Cross Building; Floyd, K8GCS, 616-385-5503), refreshments. *TI*: 146.68. *Adm*: \$3. Tables: \$5. Tom Sorrick, W8I2S, 616-539-8459.

Missouri (Kansas City)—Jul 10, Midwest Division Convention. See "Coming Conventions."

†**Missouri (Macon)**—Jul 12, 9 AM to 2 PM. *Spr*: Macon County ARC, Tri-County ARC, and NEMO ARC. Macon R-I Vo-Tech School, Hwy 63, 5 blocks S of US Hwy 36. Commercial exhibitors, ARES presentation, technical forums, radio tower demo, NWS, VE sessions (10 AM, limited number of walk-ins), free parking, refreshments. *TI*: 146.805. *Adm*: advance \$2 each or 3 for \$5; door \$3 each or 2 for \$5. Tables: \$10 each for first 2 tables, \$15 each additional (limited electricity). Dale Bagley, K0KY, Box 13, Macon, MO 63552, 660-385-3629, dbagley1@istmacon.net; <http://www.istmacon.net/~kfoster/hamfest.htm>.

New Hampshire (Lancaster)—Jun 12-13. Russ Boyce, N1YZE, 603-922-5514.

†**New Jersey (Dunellen)**—Jun 19, 7 AM to 2 PM. *Spr*: Raritan Valley RC. Columbia Park, near intersection of Rtes 529 and 28. *TI*: 146.625 (141.3 Hz), 442.25, 146.52. *Adm*: buyers \$5, sellers \$10. Fred Werner, KB2HZO, 20 Woodcrest Ln, Greenbrook, NJ 08812, 732-968-7789; <http://www.w2qwg.org>.

†**New York (Batavia)**—Jul 10, 6 AM to 4 PM. *Spr*: Genesee Radio Amateurs. Genesee County Fairgrounds, E Main St; I-90, Exit 48. Flea market, ARRL forum, chicken barbeque. *TI*: 147.285. *Adm*: advance \$4, door \$5. Tables: \$2. Harold Hay, WA2ABQ, 5066 Clinton St Rd, Batavia, NY 14020, 716-343-2844; wa2abq@aol.com.

†**New York (Bethpage)**—Jun 13; set up 6:30 AM; public 8:30 AM to 2 PM. *Spr*: Long Island Mobile ARC. Briarcliffe College, 1055 Stewart Ave; Seaford Oyster Bay Expressway (Rte 135) to Exit 9. Ham Radio/Computer Flea Market, Amateur Radio equipment, computers, commercial dealers, vendors (\$15 per space; each space admits 1 person), dealers, tailgating, ARRL and LIMARC information, VE sessions (10 AM sharp), VHF tune-up clinic, free parking, refreshments. *TI*: 146.85 (136.5 Hz). *Adm*: \$6, children and sweethearts free. Richie Selzer, N2WJL, Box 392, Levittown, NY 11756-0392, 516-520-9311; hamfest@limarc.org; <http://www.limarc.org>.

†**New York (Cortland)**—Jun 12, 7 AM to 2 PM. *Spr*: Skyline ARC. Cortland County Fairgrounds, I-81 to Exit 12, Rte 281S to Fisher Ave to Fairgrounds Dr. VE sessions. *TI*: 147.18. *Adm*: advance \$4, door \$5. Andrew Slough, KB2LUV, 1134 Old Stage Rd, Cortland, NY 13045-9007, 607-753-0597; kb2luv@odyssey.net.

†**North Carolina (Salisbury)**—Jul 3, 8 AM to 1 PM. *Spr*: Rowan ARS. Salisbury Civic Center, 315 S Boundary St; I-85, Exit 76 to Salisbury, E Innes St to S Boundary St, turn left. Flea market, VE sessions (walk-ins). *TI*: 146.73. *Adm*: advance \$3, door \$4. Tables: \$5. Ralph Brown, WB4AQK, Box 593,

†ARRL Hamfest

Salisbury, NC 28145, 704-636-5902, rbrown@salisbury.net; <http://home.interpath.net/kk4lh/hamfest>.

†**North Carolina (Winston-Salem)—Jun 12**; set up 6-8 AM; public 8 AM to 1 PM. *Spr*: Forsyth ARC. Dixie Classic Fairgrounds, Deacon Blvd, Gate 5; US Hwy 52 to Akron Dr, left on Reynolds Blvd, left on Shorefair, right on Deacon Blvd, left into Gate 5. Covered flea market, tailgating (\$3, unlimited space), dealers, overnight RV parking (Friday, \$15 per night with full hookups), refreshments. *TI*: 146.64, 145.47. *Adm*: \$5. Tables: \$10 (call for electricity, multi-table, and dealer info); sheltered booths \$20 (includes 12 ft of counter space, with space for additional tables). Tom Gallagher, N4IOZ, Box 11361, Winston-Salem, NC 27116-1361, 336-723-7388; n4ioz@ibm.net; <http://members.xoom.com/w4nc/Hamfest.htm>.

†**North Dakota (Dunseith/Boissevain, Manitoba)—Jul 9-11**. Dave Snyder, VE4XN, 204-728-2463.

†**Ohio (Akron)—Jun 13**, 8 AM to 4 PM. *Spr*: Goodyear ARC. Wingfoot Lake Park, near Suffield, 10 miles E of Akron; entrance is from State Rte 43, 1 mile S of Rte 224. Hamfest/Family Picnic, flea market (advance \$8, door \$10 per space), vendors (Pavilion, advance \$8, door \$10), VE sessions. *TI*: 146.985, 146.52. *Adm*: advance \$4, door \$5 (1 ticket admits ham, spouse, and children). Tables: \$10. Make checks payable to Goodyear ARC and mail to Dave White, KA8KNP, 719 Notre Dame Ave, Cuyahoga Falls, OH 44221; 330-928-7625; or call Robert Taylor, KB8ZEC, 330-836-3282; rtaylor@akron.infi.net.

†**Ohio (Macedonia)—Jun 20**, 8 AM to 1 PM. *Spr*: Cuyahoga ARS. Nordon High School, State Rte 8 to State Rte 82 E, turn S onto S Bedford Rd. *TI*: 146.82. *Adm*: advance \$3 for 1, \$2.50 for 2 or more; door \$5. Rich James, N8FIL, 7620 Crestwood Ln, Northfield Ctr, OH 44067, 800-404-2282; <http://www.cars.org>.

†**Ohio (Milford)—Jun 19**. *Spr*: Milford ARC. Live

Oaks Vocational School, Buckwheat Rd; I-275 to Rte 28, right on Buckwheat Rd. Commercial vendors, tailgating, VE sessions, refreshments. *TI*: 147.345. *Adm*: \$5. Tables: \$5. Chris Reinfelder, KB8SNH, 3691 Charter Oak, Amelia, OH 45102, 513-753-5066; RAC_Reinfelder@fuse.net.

†**Ontario (Fergus)—Jun 12**. Bill Smith, VE3WHS, 519-821-6642.

†**Ontario (Marmora)—Jun 19**. Paul Davidson, VE3UUM, 613-472-3449.

†**Ontario (Milton)—Jul 10**. Alan Montgomery, VE3FCJ, 905-332-5282.

†**Pennsylvania (Bloomsburg)—Jun 12**, Eastern Pennsylvania Section Convention. See "Coming Conventions."

†**Pennsylvania (Bressler)—Jul 4**; set up 6 AM; public 8 AM. *Spr*: Harrisburg RAC. Emerick Cibort Park. Hamfest/Computer Show, vendors, tailgating (\$5 per space), VE sessions (9 AM, Friendship Fire Hall, walk-ins only), refreshments. *TI*: 146.76, 146.52. *Adm*: \$5 (XYL, YL, and kids free). Tables: advance \$15 each for first 3 tables, \$12 each additional table (before Jun 15), door \$18 each (after Jun 15). Richard Bordner, W3NJB, 2501 S 2nd St, Steelton, PA 17113-3009, 717-939-4825; n3njb@aol.com.

†**Pennsylvania (Wilkes-Barre)—Jul 3**; set up 6 AM; public 8 AM to 3 PM. *Spr*: Murgas ARC. Luzerne County Fairgrounds, from I-81 take Exit 47B to Rte 309 N to Rte 415 to Rte 118 W. Hamfest/Computer Flea Market, dealers, equipment, computer hardware and software, tailgating (1 free space), VE sessions. *TI*: 146.61, 146.52. *Adm*: advance \$4, door \$5. Tables: \$14 (8 ft, with electricity). Make check or money order payable to Murgas ARC and send to Stan Perry, KE3TC, 51 W Grand St, Nanticoke, PA 18634-3101, 570-735-2385; slperry@epix.net.

†**Tennessee (Knoxville)—Jun 13**, Tennessee State Convention. See "Coming Conventions."

†**Texas (Arlington)—Jun 11-13**, West Gulf Division

Convention. See "Coming Conventions."

†**Texas (Texas City)—Jul 10**. *Spr*: Tidelands ARS. Nessler Center, 2010 5th Ave N; from Houston on I-45 take Exit 16 to Texas City, go 7.1 miles, turn right on 21st St, turn left on 5th Ave N. VE sessions. *TI*: 147.14. *Adm*: advance \$3, door \$4. Tables: \$5. Joe Wileman, AA5OP, 1010-24th Ave N, Texas City, TX 77590, 409-945-6794.

†**Washington (Dryden/Wenatchee)—Jun 11-13**; Friday noon, Saturday and Sunday 9 AM. *Spr*: Apple City ARC. Dryden Gun Club; from WWA, Blewett Pass Hwy 97-2 junction, follow signs; from EWA go to Wenatchee, take 2-97 toward Seattle. Tailgating, exhibits, VE sessions, Saturday breakfast and dinner, free RV camping. *TI*: 146.68 (156.7 Hz). *Adm*: \$5. Tables: Free (limited amount). Roger Eckhardt, WB7SHL, Box 456, Dryden, WA 98821, 509-782-4977; dmeckhardt@juno.com; <http://www.qsl.net/w7dt>.

†**West Virginia (Bluefield)—Jun 19**, 8 AM to 2 PM. *Spr*: East River ARC. Brushfork Armory, 1½ miles N of Bluefield on US 52. VE sessions (noon). *TI*: 145.49. *Adm*: \$5. Don Williams, WA4K, 412 Ridgeway Dr, Bluefield, VA 24605-1630, 540-326-3338, <http://www.inetone.net/erarc/hamfest/>.

†**Wisconsin (Eau Claire)—Jul 10**. Jim Staatz, KG9MV, 715-838-9108.

Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as free prizes, handouts, and other support.

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to giannone@arrrl.org.



Contest Corral

Edited by George Fremin III, K5TR*

Feedback

N0UGY should have been listed with 239 QSOs, 29,781 distance points and a total score of 30, 881 in the **1998 10 GHz and Up Cumulative Contest**.

In the **1998 September VHF QSO party**, KK6LKL should have been listed as a QRP entry. N5XU was incorrectly listed as K5XU in the STX limited multi-op category.

In the **1998 160 Meter Contest Results**, K9DX's score in the High Power, Single Op, IL section should have been reported as 1085 QSOs, 87 mults and a score of 186,876 points. KE0FT was listed as QRP but should have been listed as Low Power.

OT8T (op DL2CC) should have been listed in the **1998 IARU HF World Championships** with a checked score of 2432 QSOs, 198 Mults and 1,993,068 points for a 4th place finish in Mixed Mode World.

June

5

QRP TACTical Contest, sponsored by QRP Society of Central Pennsylvania and the EPA QRP Club, 1800-2400Z June 5. CW. QRP. 160 80 40 20 15 10.

W1AW Qualifying Runs are 10 PM EDT Tuesday, June 1, and 7 PM EDT Wednesday, June 16. The **West Coast Qualifying Run** will be at 9 PM PDT on Wednesday, June 16 (10-40 WPM). Check the W1AW schedule for details.

*RRI, Box 322
Johnson City, TX 78636
k5tr@arrrl.org

Exchange call, RST, name and TAC (Telephone Area Code) or country. DX countries may use their prefix. Pennsylvania stations will send an X after the prefix. There are five categories. QRP, 5 W or less; QRPp, less than 1 W; portable using temporary antennas; homebrew; or newbie (if this is your first contest). Score 5 pts/per QSO 10 pts/per QSO with Pennsylvania stations. The same station may be worked on different bands. Score equals QSO points × TACs and Countries plus 1000 pts for every category entered. Certificates. Send logs by July 15 to Ronald J Polityka WB3AAL, 1155 Robeson St, 2nd Floor, Reading, PA 19604-2151; http://www.kpsnet.com/wb3aal/Start_Page.htm.

12-14

ARRL June VHF QSO Party. See *May QST* page 94.

TOEC WW Grid Contest, sponsored by the Top of Europe Contesters. SSB 1200Z June 12, 1998 to 1200Z June 13. (CW 1200Z August 28, 1998 to 1200Z August 29.) Work any station once per band, 160 80 40 20 15 10 meters. Mobiles may be worked again if in another grid field (EM, FN, etc). Exchange signal report + grid field. Classes: Single operator (no packet)—All Band, Single band, Low Power (100 W, all band only); Multi-operator—all band only; Single transmitter (10-minute band change rule applies); Multi transmitter; Mobile Single operator (all band only), may contact stations once per grid field operated from and must show grid fields operated from in log. /M and /MM stations permitted. Scoring: Fixed-station QSOs with other continents = 3 points; QSOs with your

continent (and country) = 1 point. All mobile QSOs (and contacts with mobiles) = 3 points. Multipliers: Each grid field worked per band. Multiply QSO points × grid fields for total score. Send entries with a signed summary sheet to TOEC, Box 2063, S-831 02, Ostersund, Sweden. Logs may also be submitted via e-mail to TOEC.contest@pobox.com. All submissions must be e-mailed or postmarked within 30 days of the contest. For additional info see <http://www.qsl.net/toec/grid.htm>.

ANARTS WW RTTY / Digital Contest, sponsored by Australian National Amateur Radio Teleprinter Society. All digital modes. 0000Z June 12 to 2400Z June 13 (48 hours), 80 40 20 15 10 meters. Classes: Single Operator one transmitter; Multi operator one transmitter and SWL. Single op and SWL may only operate 30 hours. Exchange RST, CQ zone and time (UTC). Multipliers are each ARRL DXCC country, and each Australian call district (1-8). JA, VE, and W count as separate countries on each band. Each continent counts only once as an additional multiplier. Contacts with one's own country or call area count for QSO points, but not for multiplier credit. Final score is total QSO points × total multipliers × number of continents worked. Awards. Send logs by Sept 1 to Contest Manager, VK2BQS, Jim Swan, PO Box 93, Toongabbie, NSW 2146, Australia.

Portugal Day DX Contest, phone only, 80 40 20 15 10 meters, single operator only. Exchange RST and serial number (Portuguese stations send RST and district letters). Work stations once per band. Count 6 points per QSO. Multipliers are Portuguese districts per band. Final score is total QSO points × total multipliers. Awards. Send logs by August 31 to Rede dos Emissores Portugueses, Award/Contest Man-

ager, PO Box 2483, 1112 Lisboa Codex, Portugal.

19-20

Kid's Day Operating Event. See the [announcement](#) elsewhere in this issue.

All-Asian DX Contest. CW, sponsored by the Japan Amateur Radio League, from 0000Z Jun 19 until 2400Z Jun 20 (phone contest will be Sep 4-5). 160 80 40 20 15 10 meters. Single op single/multi band; multi-op multi-band. Work Asian stations only. No crossband QSOs. Single ops may have only one transmitted signal at any given time. Multiops may have a maximum of one signal per band. Send RS(T) and a two digit number denoting the operator's age. YL stations may send 00. Score 1 pt/QSO w/Asian stations on 7 through 28 MHz, 2 pts on 3.5 MHz and 3 pts on 1.8 MHz.

Final score is QSO pts \times different Asian prefixes (WPX rules) worked per band. Awards. Mail logs to arrive by Sep 30 (Nov 30 for phone) to JARL, All-Asian DX Contest, PO Box 377, Tokyo Central, Japan.

SMIRK QSO Party, sponsored by the Six Meter International Radio Klub, from 0000Z Jun 19 until 2400Z Jun 20. 6 meters only. All phone contacts within the lower 48 states and Canada must be made above 50.125 MHz; only DX QSOs may be made between 50.100-50.125 MHz. Exchange SMIRK number and grid square. Score 2 pts/QSO w/SMIRK member and 1 pt/QSO w/nonmember. Awards. Send entries by Aug 1 to Pat Rose, W5OZI, PO Box 393, Junction, TX 76849-0393. For more information see <http://www.smirk.org/>.

West Virginia QSO Party, sponsored by the West Virginia State ARC, from 1800-2400Z Jun 19. Work stations once/band/mode, no repeater QSOs. 160 80 40 20 15 10 6 2 meters. WV stations send RS(T) and county; others send RS(T) and state/province/DXCC country. Score 1 pt phone, 2 pts/CW QSO, and 50 bonus pts for working W8WVA. Final score is QSO pts \times WV counties (max 55); WV stations use WV counties + states/provinces/DXCC countries. Add bonus pts to final score. Awards. Mail logs by Jul 20 to WV QSO Party, Richard Fowler N8FMD, RT 3 Box 52, Clarksburg, WV 26301; n8fmd@neumedia.net.

26-27

Field Day. See [May QST](#) page 95.

QST

Special Events

*Edited by George Fremin III, K5TR**

Ste Marie du Mont, France: Réseau Des Emetteurs Francais Union Francaise Des Radio Amateurs, TM6JUN, **June 1-11**, operating in commemoration of the 55th anniversary of the D-Day landing on Utah Beach in 1944. 3.775 14.244 21.344 28.444. Certificate. Eugene Roptin, 8 rue Bellevue, 50620 Le Dezert, France.

Ann Arbor, MI: ARROW Communications Association, W8PGW, 2100-2300Z **June 4**, operating from the Northside Elementary School Ice Cream Social. 7.215 21.285 146.96. Certificate. Ralph Katz, KB8ZOY, 605 Skydale Dr, Ann Arbor, MI 48105-1138.

Bowling Green, KY: Western Kentucky DX Association, KB4ALC, 0001Z **June 4** to 2359Z **June 5** for the National Corvette Homecoming. 7.245 14.275 21.345 28.345. Certificate. Kenneth Newman, 505 Emmett Ave, Bowling Green, KY 42101.

Tuckerton, NJ: Old Barney Amateur Radio Club and the Tuckerton Wireless Amateur Radio Club, W2WSC, 1400Z **June 5**, operating from the Tuckerton Historical Society Museum in honor of Roberto Clemens Galletti's 120th birthday. 14.290 21.390 28.490. QSL. Tuckerton Wireless ARC W2WSC, PO Box 531, Tuckerton, NJ 08087.

Montrose, PA: Warren Lodge 240 F&AM, K3VKN, 1100-2300Z **June 5**, celebrating 150th anniversary of the lodge. 7.265 14.265. Certificate. Warren Lodge 240 F&AM, c/o Jeff Kerr, 50 Church St, PO Box 244, Montrose, PA 18801.

Woronoco, MA: Pioneer Valley Council, BSA, W1W, 1200-2400Z **June 5**, Cub Scout Webelos Woods Weekend Ham Demo. 14.290 28.350 21.360 146.55. Certificate. John J. Pise Jr, KX1X, 195 Williamsett St, South Hadley, MA 01075.

Fairview, KY: Pennyroyal ARS, K4DMW, 1300-2100Z **June 5**, Jefferson Davis birthday. 3.900 7.227 14.290 28.360. Certificate. PARS, PO Box 381, Hopkinsville, KY 42241.

Fort Ripley, MN: Brainerd Area Amateur Radio Club, K2BSA/O, 1300-2200Z **June 5**, Boy Scout "Gateway to the Future" Camp Ripley Rendezvous. 7.250 14.250 21.350 28.450. Certificate. BAARC, PO Box 801, Brainerd, MN 56401.

Hastings, NE: Hastings Amateur Radio Club, W0WVW, 1300Z **June 5** to 2100Z **June 6**, Amateur Radio display at Pioneer Village, Minden, NE. 3.950 7.250 14.250 28.350. QSL. Hastings Amateur Radio Club, 907 Jefferson, Hastings, NE 68901.

Mississauga, ON: Mississauga Amateur Radio Club, VE3MIS, 1400Z **June 5** to 2000Z **June 6**, operating from the 27th Streetsville Founders Bread and Honey Festival. 7.230 14.240 28.340. QSL. MARC c/o Michael Brickell, 2801 Bucklepost Crescent, Mississauga, ON L5N 1X6 Canada.

Orofino, ID: Lewis & Clark Trail Hilltop DX Society, KD7ALJ, 1800Z **June 5** to 0600Z **June 6** for Springtime On the Lewis & Clark Trail DN-16 VN-

Clearwater River Drainage. 80 20 15 10 meters. QSL. Elmer Robertson, KJ7XK, PO Box 1484, Ororino, ID 83544.

Virgin Islands: American Archives Amateur Radio, K8C, 1200Z **June 6** to 2400Z **June 12**, remembering the adventures of the pirates of the Caribbean (operating from a sailboat in the Caribbean near the Virgin Islands). 7.040 7.270 14.040 14.270. Certificate. Robert Laundra, N8RGF, Box 4, Northville, MI 48167.

Le Mans, France: Réseau des Emetteurs Francais—Union Francaise des Radioamateurs, TM6ACO, 0000Z **June 5** to 2400Z **June 13**, operating from the 24 hours of Le Mans Race. QSL. ARAS-REF 72, BP 88, 72002 Le Mans, France.

Washington, TX: Naturist Amateur Radio Club, NU5DE, 1700Z **June 10** to 1700Z **June 13**, for the Southwest Naturist Gathering at Live Oak Ranch. 7.265 14.265. QSL. Naturist ARC, PO Box 200812, Austin, TX 78720-0812.

East Meadow, NY: Nassau Amateur Radio Club, K2VN, 1300-2100Z **June 12**, for the Nassau County centennial celebration. 7.250 14.250 21.250 146.25. Certificate. Jim Mezey, W2KFV, 38 Appletree Lane, Carle Pl, NY 11514.

Memphis, TN: Delta Amateur Radio Club, W4BS, 1400-2000Z **June 12**, Navy Mid South Family Appreciation Day. 14.250 21.320 28.125 28.325. QSL. Ed Trammell, 4502 Hunters Glen East, Memphis, TN 38128.

Peterboro, NY: Madison-Oneida ARC, W2MO, 1400-2000Z **June 12**, 7th Annual Civil War Reenactment Weekend. 7.275 14.275 28.375 144.55. Certificate. MOARC, Box 241, Verona, NY 13478.

Rondout, IL: Lake County Illinois RACES, W9R, 1400-2300Z **June 12**, commemorating the 75th anniversary of the Great Rondout Train Robbery. 7.283 14.283 28.383 146.490. Certificate. Lake County RACES, 1303 N Milwaukee Ave, Libertyville, IL 60048.

Derby, KS: Boeing Employees Amateur Radio Society, KCOAHN, 1500-2100Z **June 12**, celebrating the Kansas Aviation Museum's "Thunder in the Heartland" open house, 14.270. Certificate. Boeing Employees Amateur Radio Society, KCOAHN, 912 Ridgcrest Rd, Derby, KS 67037.

Nacogdoches, TX: Nacogdoches Amateur Radio Club, W5N, 1300-2100Z **June 13**, Nacogdoches Blueberry Festival. 7.150 14.350 28.400. QSL. Amy Curtis, AE5P, 3907 Trailwood Dr, Nacogdoches, TX 75961.

Greenville, TX: Sabine Valley Amateur Radio and Hunt County RACES, W5A, 0000Z **June 15** to 2400Z **June 30**, SVARA Field Day. 7.240 14.250 21.350 28.450. QSL. SVARA, PO Box 8122, Greenville, TX 75404.

Toledo, WA: Rebels ARC, K7R, 1900Z **June 18** to 1900Z **June 20**, Rebels ARC 35th anniversary. 3.975 7.268 28.440 146.500. Certificate. Rebels ARC, c/o Brian Lange, PO Box 1058, Eatonville, WA 98328.

Chaco Canyon, NM: N5C, 1600Z **June 19** to 2400Z **June 20**, operating from Chaco Canyon National Historical Park. 40-2 meters. QSL. Jay Miller,

WA5WHN, PO Box 6552, Albuquerque, NM 87197-6552.

La Crosse, WI: Riverland Amateur Radio Club, KA9BKK, 1400Z **June 19** to 1900Z **June 20**, operating from the "Deke Slayton" AirFest '99. 14.240 21.350 28.340. Certificate. Roger Reader, KA9BKK, 526 13th Ave North, Onalaska, WI 54650.

Concord, NC: Cabarrus Amateur Radio Society, N4G, 1400Z **June 19** to 2200Z **June 20**, celebrating the discovery of gold in Cabarrus at Reed Goldmine. 14.260 28.360. Certificate. Bobby Wentz Jr, AE4ZQ, 1105 Lee Ave, Kannapolis, NC 28081.

Cleveland, OH: NASA Glenn Amateur Radio Club, NA8SA, 1400Z **June 19** to 2200Z **June 20**, commemorating the name change from NASA Lewis to NASA Glenn. 7.270 14.270 21.300 28.425. QSL. NASA Glenn Amateur Radio Club, 21000 Brookpark Rd, MS 8-1, Cleveland, OH 44135.

Mt. Union, PA: Creation Festival ARS, W3C, 1200Z **June 22** to 0800Z **June 27**, operating from the 20th annual Christian Rock Music Festival. 146.400. QSL. Roger Stuart, 804 Finch Dr, Bensalem, PA 19020.

Charlottesville, VA: Albemarle Amateur Radio Club, K4C, 1800Z **June 26** to 1800Z **June 27**, Classic Boatanchor Field Day. 3.880 7.290 14.286. QSL. Paul Dean, WB9HGZ, 4300 Sylvan Lane, Charlottesville, VA 22911.

Philadelphia, PA: Holmesburg Amateur Radio Club, W3P, 1800Z **June 26** to 1800Z **July 4**, Welcome America/Independence Day celebration. 7.240 14.240 146.685. Certificate. Holmesburg ARC, PO Box 6253, Philadelphia, PA 19136.

Charlton, MA: Melha Shriners Radio Club, W1GLM, 1500-1900Z **June 27**, Massachusetts Masons Grand Masters Fair at the Masonic Home. 3.860 7.225 14.255 28.365. QSL. Melha Radio Club, 24 Allen Ct, Hampden, MA 01036.

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 \times 12 inch self-addressed, stamped envelope to address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

Special Events Announcements: For items to be listed in this column, you must be an Amateur Radio club, and use the ARRL Special Events Listing Form. Copies of this form are available via Internet (info@arrl.org), or for a SASE (send to Special Requests, ARRL, 225 Main St, Newtonington, CT 06111, and write "Special Requests Form" in the lower left-hand corner. You can also submit your special event information on-line at <http://www.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; ie, a special event listing for **Aug QST** would have to be received by **Jun 1**. Submissions may be mailed to George Fremin III, K5TR, RR1, Box 322, Johnson City, TX 78636; faxed to ARRL HQ at 860-594-0259; or e-mailed to events@arrl.org.

QST

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Section News

Edited by **Steve Ewald, WV1X** • Assistant Field Services Manager

The ARRL Field Organization Forum

Field Organization Abbreviations

ACC	Affiliated Club Coordinator
ARES	Amateur Radio Emergency Service
ASM	Assistant Section Manager
BM	Bulletin Manager
BPL	Brass Pounders League
DEC	District Emergency Coordinator
DXFR	DX Field Representative
EC	Emergency Coordinator
LGL	Local Government Liaison
NCS	Net Control Station
NM	Net Manager
NTS	National Traffic System
OBS	Official Bulletin Station
OES	Official Emergency Station
ORS	Official Relay Station
OO	Official Observer
OOO	Official Observer Coordinator
PBBS	Packet Bulletin Board Station
PIC	Public Information Coordinator
PIO	Public Information Officer
PSHR	Public Service Honor Roll
SGL	State Government Liaison
SEC	Section Emergency Coordinator
SM	Section Manager
STM	Section Traffic Manager
TCC	Transcontinental Corps
TA	Technical Advisor
TC	Technical Coordinator
TS	Technical Specialist
VC	Volunteer Counsel
VCE	Volunteer Consulting Engineer
VE	Volunteer Examiner

ATLANTIC DIVISION

DELAWARE: SM, Randall K. Carlson, WB0JJX, e-mail: wb0jjx@arrl.org—The section Web Page has a new URL. It is <http://gographics.com/RANDALL/secpage.htm>. Please update your links and bookmarks accordingly. The Atlantic Division cabinet meeting was held on April 10. One of the topics discussed was the recruitment and retention of new members to ARRL and Amateur Radio. It's up to each of us to do what we can to help new members find and enjoy this thing called Amateur Radio. This will mean different things to different people, but in the end it just means we all want to feel welcome, needed and appreciated. As we approach the year 2000, give some thoughts as to where you would like to see Amateur Radio be by the year 2010. Feel free to drop me a line or e-mail and share your thoughts on the new directions that we might go. I will certainly pass your thoughts up the line. Traffic (Mar): DTN QNI 126 in 20 sess, DEPN. QNI 23 QTC 2 in 4 sess. KCARC QNI 45 QTC 0 in 4 sess K3JL 35, 73, Randall.

EASTERN PENNSYLVANIA: SM, Allen R. Breiner, W3TI—SEC: Eric Olena, WB3FPL. STM: Harry Thomas, W3KOD. SGL: Max Peters, K16NJ. TC: Cully Phillips, N3HTZ. OOC: Alan Maslin, W3DJZ. ASMs: Dave Heller, K3TX, Bill Dale, WY3K, J. Yogi Bear, WB3FQY. George Law, N3KYZ. N3SIN has earned his ORS and N3KCR is now LGL. The Eastern Pennsylvania ARRL Convention has been notified Mr Riley Hollingsworth, K4ZDH, from the FCC, will be part of the program on July 12. Should the name of the American Radio Relay League be kept for the sake of nostalgia or changed in keeping with the state of the art? What do you think? When you attend the Marple Newtown ARC meetings, you are treated with cookies by WB3HUD and Mrs KD3OK. If your club is looking for a different kind of after meeting program, ex K3OQF/TF, Mogadishu, Somalia and VQ9TD, Diego Garcia, who is now K3OQF, and one of our experienced Technical Specialist from Jim Thorpe, is available as a guest speaker. Among the Chester Co ARES/RACES participants in the statewide PEMA weather exercise were: W3QT, KD3OK, N3LRA, KE3RJ, WB3ITC, KE3MN, KB3DIX, N3JCN, N3AO, KB3DU, W3RWE, KV3XL. The possibility of a Y2K catastrophe has us all on the edge thinking of numerous disasters that could happen to our world and close surroundings on that first day of January 2000. We know anything is possible that is a computer controlled unit could be susceptible to crash, and as of this date, no one knows for certain just what will really happen. As amateur operators, we should have the foresight to prepare ourselves for the worst, and if push comes to shove be ready as volunteers to lend a hand.

Using the Boy Scout Motto, "Be Prepared," let us think positive. Emergency Coordinators and ARES groups should gear-up with training programs so we don't end up running around looking and acting like a Chinese fire drill. One thing is certain, our mobile units and HTs will not be affected. But the 911 emergency systems might be the first on a long list to go haywire. Power companies claim we will have electricity and on the next line they tell us, "there could be an hour or two blackout until they update their computers." Two meter repeaters can be powered by portable generators, providing a supply of fuel is available which must come from a computerized gas pump. Be innovative with your training, and expect the unexpected. Tlc: W3KOD 739, N3DPM 542, W3HK 297, N3SIN 167, W3IVS 165, N3JSI 95, NR9K 60, W3IPX 51, WA3EHD 40, N3EFW 37, W3JKX 37, N3HR 27, W3QZN 26, WB3JOE 26, AD3X 25, K3ARR 21, W3DP 18, N3AT 12, N3AS 11, N3AO 11, N3DCG 10, KA3LVP 9, W3T19, W3TWV 8, N3IRN 6, W3NNL 6, WA3CKA 5, W3BNR 2, K3TX 2. Net reports: EPA 329, PTTN 164, EPA&T 145, PFN 66, WAREC 74, MARCTN 23, D6ARES 16, SEPTN 9, EPAS 6, LCARES 6.

MARYLAND/DC: SM, Bill Howard, WB3V, 410-551-6775, wb3v@arrl.org—MDC Section Web Home Page <http://www.erols.com/wb3v/mdc/>. CARR EC N3JIA reports 20 members, 4 net sessions on 145.41 with liaison to MEPN, MDD, and MSN by KE3FL and liaison to MEPN, BTN, DTN, WVA, Central Region and Western Region nets by KG6TU. OES reports received from: KE3FL WX3F N3JIA N3TOT N3SOK KG6TU. An ARES meeting was held at the Carroll County Fire Training Center. Seven members attended the meeting. The topic of discussion was Emergency Go-Kits. The ARES group intends to continue having monthly meetings at the Fire Training Center on the fourth Wednesday of each month for the rest of the year. W3JUH has designed a charging circuit and provided the schematics and parts list. He is working on a circuit card and N3JIA is working on acquiring components. The kits will be built as a group effort so that all ARES members will have a reliable charging source. An innovation incorporated into the circuit is that they will be able to cascade the chargers as necessary for individual requirements with only the power supply requirements changing. FRED EC N8AAV reports 20 members and 5 nets on 147.06. ALLE EC KO4UU reports 13 members, 4 nets on 146.88. Mike has a new RACES Web page <http://www.qsl.net/ko4uu/>. It was good to see and meet the ECs and ROs at Timonium. Hope we follow up on the awards ideas. MARC and Montgomery County Emergency Management co-hosted the SKYWARN "Basics I" training course. Successful completion of this course certified attendees as SKYWARN weather spotters and makes them eligible to take the other five optional SKYWARN training courses. Ordinarily, this course is taught at the NOAA facility in Sterling, Virginia. The SKYWARN/NoStar, Virginia Web page is located at <http://tgs5.nws.noaa.gov/rlw/skywarn/skywarn.htm>. Information about other upcoming courses and registration information is provided on this page as new course schedules are made. With the Nets: Net/Net Mgr/ QNI/QTC/QNI: MSN/KC3V/31/63/365, MEPN/KE3OX/31/72/708, MDD/WJ3K/62/244/481, MDD TOP BRASS/62/244/481, MDD TOP BRASS/KJ3E/534/K3JL/310/A3G5V/302, BTN/A3ALN/31/42/383, SMN/KE3OX/0/0/0, FEBRUARY SMN/KE3OX/0/0, Feb MEPN/KE3OX/28/60/568, Tlc: KK3F 825, KJ3E 180, AA3GV 127, KO4A 85, W3YVO 84, KB3AMO 64, WJ3K 62, KC3Y 57, N3WVK 52, N3DE 40, KE3OX 39, N3ZKP 21, KB3JK 20, N3EGF 16, WA1QAA 13, W3YD 11, WA3WRT 6, WA3GYW 6, KG6TU 5, Feb KE3OX 48, PSHR: KK3F 191, W3YVO 138, AA3GV 133, KJ3E 133, N3WVK 132, KB3AMO 122, KG6TU 119, KO4A 114, N3ZKP 99, WJ3K 89, KE3OX 88, KC3Y 87, WA1QAA 80, (Feb) KE3OX 100.

NORTHERN NEW JERSEY: SM, Les Schmacher, WA2AEA—ASMs: KD2AJ, WB2KLD, N2ZMS, WA2RLW. ACC: WZ2T. BM: KA2JXI. OOC: N2MX. PICs: N2SZK, WA2RXO. SEC: KF2GC. STM: N2ZGN. TC: N2JKG. Website: <http://www.northnet.org/nnyham>. March BBS Reports: B/P/T: KA2JXI 1943/341/34, KD2AJ 1560/393/54. Net Reports, QNI/QTC/QND: Bill's Geritol 291/23/23, Carrier 509/52/26, CVARCCPN 401/17, CVARCSN 47/0/4, CVARES 35/2/5, MVARC 27/0/4, NNYARES 298/4/31, NNYESN 238/4/31, Q NET 540/3/31, SIRR 764/36/31. All Div Cabinet met in WPA Apr 10. More info at upcoming club meetings and/or thru my club newsletter columns. Flea market at Rochester has expanded to include Fri, June 4, as well as Sat & Sun. Hope to see more at the club forum Fri PM; good opportunity to meet folks, ask questions, and get some fresh ideas for club meetings. 73, Les, WA2AEA.

SOUTHERN NEW JERSEY: SM, Sean Priestley, KA2YKN—(@K2AA) e-mail: ka2ykn@arrl.org ASM: W2BE, K2WB, W2OB, N2OO, KB2TME. SEC: KB2TME. STM: WB2UVB. ACC: KB2ADL. TC: W2EKB, SGL: KB2WKY. OOC: K2PSC. PIC: N2YAJ. TS: W2PAU, W2BE, AB2Y, K2JF, WB2MNF, KD4HZW, WA2NBL. NEW HAMFEST!! by the Shore. Presented by the Jersey Shore Amateur Radio Society at the Bayville Fire House on Rt 9 in Bayville, NJ. Send questions to JSARSFEST@aol.com or write to JSARS PO Box 295, Toms River, NJ 08754. This is their first Hamfest and they are meeting weekly to make it a good one for you. All tables

are indoor. NO WORRY ABOUT RAIN. It's air-conditioned. Talk-in: W2DOR/R 146.910 out & 146.310 in PL 127.3. SEE YOU THERE. With summer upon us and looking toward vacations, I would like to ask everyone to please think twice and act once to prevent tragic accidents. Children are very prone to do the unexpected. Also please remember to take radios with you. An HT is especially desirable if camping or hiking. Traffic for March 1999: AA2SV 168, WB2UVB 167, WA2CUW 102, N2VOA 49, N2WFN 28, KA2CQX 23, KB2RTZ 15, N2NY 4, W2AZ 4, N2ZMI 3, 1 each: KB2VSD N2MSM N2FHJ N2FHK N2SOE KB2YJD KB2CDB KB2HJJ KB2ETU KB2BYM KB2VSR N2AYK. Don't forget to start preparing for Field Day now.

WESTERN NEW YORK: SM, William Thompson, W2MTA—See clubs info <http://www.dreamscape.com/phaedrus/WNY>. CLUB NEWS: Section clubs' years of affiliation are: 1920 RAWN; 1930 ARAST & NCARC; 1931 RARA; 1934 ROME & UTICA; 1935 BARA; 1946 NIAGARA; 1948 RDXA; 1949 LOCKPORT; 1950 CORNELL; 1955 ARATS & AUBURN; 1957 RAGS; 1959 ORLEANS; 1962 WALTON; 1963 FULTON; 1963 GRAM & SIARC; 1968 STARS; 1972 IBM 204; 1974 CCFMA; 1977 ONEONTA & RIT & TIGAR; 1978 OTSEGO & FHARC & GENESEE; 1979 AHARC & KLARA; 1980 BOONVILLE. The ARATS recently honored KG2ON and N2WUT for their services. W2FXU paints a wicked picture in TCARC's Hilltoppers that mangles possibility with probability while buried in a hose that's 326 meters long, 80 meters wide and 6 feet down. CLUB OFFICERS: CVAWA WA2EYH KB2KIR KC2BKD KC2BXO; KLARA KB2WVX KG2HA KV2W N2VEB; LIVERPOOL W2JST W2SWN KB2SWB N2TAI KC2BXY KB2VYS; RAWN WA2FKV N2ENY KM2L KA2ORB. HAMFESTS: Owego May 1, Rochester Division Convention June 4-6, Cortland June 12, Batavia July 10, Utica July 17, New York State Traffic Handlers' Picnic July 31, Auburn Aug 7, Rome Aug 14, Depew Aug 15, Finger Lakes at Tompkins County Airport Aug 21, WNY Section Convention at Hamburg Sep 18, Elmira International at Horseheads Sep 25. NTS Eastern Area Traffic Handlers Picnic at Annapolis MD Oct 1-2. Radio Amateurs of Greater Syracuse at Pompey Hills Oct 2. APPOINTMENTS: (TS) K2CEC, (EC) N2HOW Yates County. SILENT KEYS: The RDXA lost its great W2OMV this month. I lost a Novice Days QSO partner W2JWZ; all shall miss a true spirit of ham radio public service with Western District's KB2TIY, and Central New York Finger Lakes "Dixie" K2DXE having joined the Silent Keys.

Net	QNI	QSP	QND	Net	QNI	QSP	QND
Early Bird Net-FM	571	000	23	ISTAR-FM	485	032	31
NYS RACES-SSB	059	007	04	W4DNV-FM	548	123	31
NYS RACES-CW	021	004	04	INYSV-CW	367	180	31
INYSV-CW 3677	262	111	31	TIGARDS-FM	030	004	04
CHN-SSB 3925	194	041	31	BRVSN-FM	307	006	31
W4DNV-FM	570	069	31	STTHN-FM	053	010	09
NY PHONE-SSB	248	459	31	HCNTN-FM	489	069	31
NYPON-SSB	390	273	31	OCTENL-FM	611	249	31
ESS-CW 3590	318	150	31	W4DNV-FM	544	050	31
NYSPTEN-SSB	369	044	31	INYSV-CW	283	233	31
VHF THIN-FM	011	000	01	OARC-FM	035	006	05
OCTEN-FM	1409	305	31	[# NTS net]			

ARES (Mar): OMEN 024-001-03. [* Public Service Honor Roll] Traffic (Mar): N2LTC*1630, KA2ZNZ*813, W2MTA *443, KF1L*410, K2BCL*379, KA2GJV*378, WB2JH*347, NN2H*267, W12G*177, KB2VW*128, NY2V*125, W2PIL *116, WB2QIX*109, AF2K*103, W2FR*90, N2CCN*83, KG2D*57, WA2GUP*40, KB2WIL*37, KB2UQZ*33, N2WDS *23, AA2ED*20, K2DN*17, KG2OY*17, KA2BDB*12, KB2ETO*12, WA2UKX*8, (Feb.) KA2GJV 296. DATALINK (Mar.): NY2V R3/T3, N2LTC R494/T281. BPL (Mar) KA2ZNZ, N2LTC. This is 50th anniversary year of the National Traffic System, which began operation in October 1949 after lots of nationwide digging and promoting by George Hart, W1NJM. 73 to you all. w2mta@junio.com

WESTERN PENNSYLVANIA: SM, Bill Edgar, N3LLR—ASM: N3MSE. ACC: N3SRJ. ASM-ARES: WB3KGT. SEC: N3SRJ. ASM-Packet: KE3ED. ASM-Youth & Education: KE3EE. PIC: W3CG. STM: N3WAV. TC/OOC: WR4W. DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVJ. DEC-S1: KA3HUK. DEC-S2: KB3AQA. DEC-Rapid Response: N3HJY. A big round of applause goes to Riley Hollingsworth, "Point man" for the FCC's new enforcement activities. Riley was the keynote speaker for the WPA Official Observer's Conference and the WPA Club President's Conference. It was refreshing to see that the FCC is truly working on cleaning up the bands on the serious types of offenses. He also gave the Official Observers a needed shot in the arm, by encouraging them to continue their work, and praised them for their diligence. He gave us good news on wanting to clean the bands up, but not just going out and taking licenses away. He felt that most offenders were generally good operators who were frustrated at the lack of enforcement, and once corrected, would become good operators again. Riley did mention that for those that didn't correct their ways, the FCC has a long memory. Rick Palm, K1CE, Field Service Manager for the ARRL HQ, pre-

Continued on page 106.

See Us At Dayton Hamvention – Booths 21, 22, 23!

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Marv, K6VIV, Mgr.
Victory Blvd. at Buena Vista
1 mi. west I-5

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Mark, W17YN, Mgr.
I-880 at 23rd Ave. ramp

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FT-840

- 100W • 12V DC • DDS
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- Optional Ext. Auto • Tuners Available

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- Enhanced Digital Signal Processing
- Dual RX
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FT-100 HF/6M/2M/70CM Transceiver

- Compact Transceiver w/detachable front panel
- Rx 100kHz to 970mHz (cell blocked)
- Tx 100W 160-6M, 50w 2M, 20W 70CM
- Built-in DSP, Vox, CW keyer
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50/2M/440HT

- Wideband RX, 6M-2M-440TX
- 5W output
- 220 mems, opt. barometer unit
- Alpha Numeric Display
- CTCSS/DCS built-in
- Li-Ion Battery

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VX-1R

2M/440 Sub-Mini HT

- 290 Memory Channels
- 5W output
- Receives 76-999mHz plus AM BCB (Cell Band Blocked)
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2M/440mHz Compact HT

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 - CTCSS encode/decode
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IC-2100H 2M Mobile Transceiver

- Cool dual display
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- PC programmable
- Superior intermod rejection
- Backlit remote control mic
- Mil Spec 810, C/D/E for shock & vibration



IC-207H Dual Band Mobile Transceiver

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- CTCSS encode/decode
- 4 power settings per band



IC-2800 Dual Band Mobile Transceiver 2M-440MHz

- 9600 baud ready
- Band scope
- CTCSS encode/decode
- Selectable squelch attenuator
- 232 memories



IC-746 All Mode 160M-2M

- Great HF Performance**
- 100W output for all bands
 - IF-DSP+ twin pass band tuning (PBT)
 - Large, multi-function LCD with band scope
 - Versatile filter combinations (3 filter slots)
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- FREE Alkaline Battery Case!**
- IC-T8A includes BP-200
- 6M/2M/440MHz
 - Easy intuitive operation
 - 123 Memories (incl. 10 scan edges and 1 call for each band)
 - Tone Squelch with Pocket Beep

IC-R2 AM, FM, WFM Receiver

- Wide band coverage: .5-1300 MHz
- Excellent audio
- 400 memory channels
- High scan speed (30 channels/sec)
- Small - compact design
- Uses 2 AA alkaline or Ni-Cd batteries
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IC-T81A 4 Band Transceiver

- Amazingly compact 4-bander**
- AM, FM, WFM
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- Wide band receiver - 30 to 1300 MHz
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- Ultra compact
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- Large built-in speaker, 100 mW audio
- Tone squelch with pocket beep
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IC-T7H 6W, Dual Band Transceiver

- Designed for Easy Operation!
- 2 M/440 MHz
- 9 DTMF memories
- 70 memories
- Great audio
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- Auto repeater

IC-W32A Dual Band Transceiver

- 2M/440 MHz
- 5W @ 13.5 V
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- Wide receive 130-180 MHz
- Built-in CTCSS enc./dec.
- Full-sized, backlit keypad
- 5 watts RF output

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- Wide receive from 100-174, 340-480, and 850-985 MHz (cellular blocked)
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- 3 select. pwr. settings (5/10/50w)
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- Built-in Duplexer
- 9600 Baud ready
- 50 Memory channels
- RX Range 136-174MHz/420-470MHz
- CTCSS built in

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SMA-501 Dual Band

Dual band "Miracle Baby" style antenna, with a male SMA connector.

Shown on the popular FT-50R by Yaesu. The antenna is only 1.75 inches tall, and exhibits surprising performance.



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440 Tiny HT 2Mtr Tiny HT

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- Less than 5" high and 2 1/4" wide (DJ-S41T)

(DJ-S41T shown)



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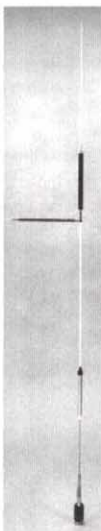
40"/20"/17/15/10/6/2M/70cm
* optional coils

A 6M/2M/70cm whip that accepts 1,2 or 3 HF coils for up to 6 band operation. Simply screw on any combination of HF coils you choose.

Standard PL-259 connector allows easy mounting. Convenient fold-over hinge for entering garages, parking structures, etc...

HF/VHF/UHF on a single antenna!! Contact any Ham Radio Outlet store for duplexer/triplexer options.

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Length: 39 inches
Max Pwr: 150W
Conn: PL-259

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- APRS Compatible
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- 200 Mems., CTCSS
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- Computer Programmable • 9600 Baud Ready
- Cool-blue Reversible LCD • Backlit Mic

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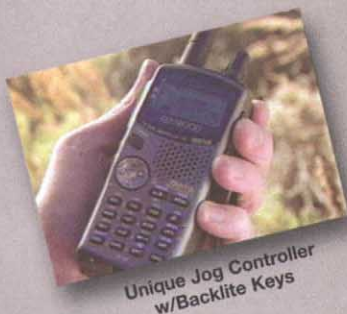
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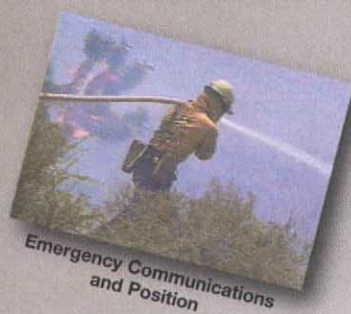
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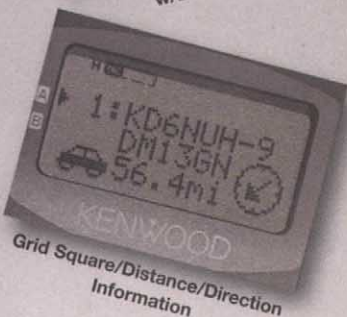
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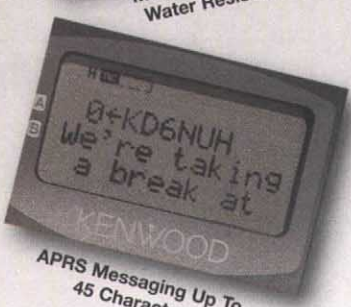
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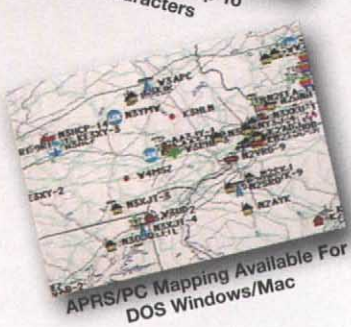
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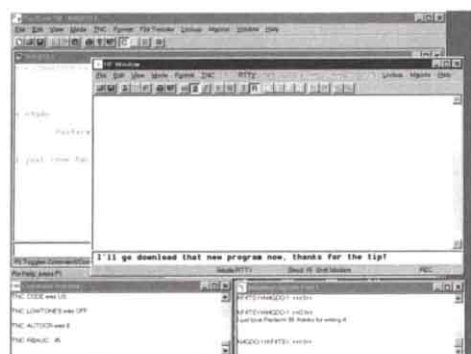
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sented certificates of appreciation to members of a Local Interference Committee that spent many long hours investigating and documenting a malicious interference problem within our Section that resulted in a number of warning messages sent by Riley's office. Congratulations on recent WPA Section ARRL Field appointments to: KA3UVC - DEC-N2; N3HJY - DEC-Rapid Response; KB3DAK - EC Mercer County; KA3YCB - EC Jefferson County and KB3WG - Technical Specialist. 73.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QHB. SGL: WA9AQ. ACC: N9KP. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. DEC-Central: N9FNP. EC KA9Z reports he attended the 3rd annual Central Illinois Severe Weather Seminar in Bloomington, and later attended a Severe Weather Observer Training Seminar at Richland Community College. EC WB9PPK reports they have had two weather drills. Many of those who checked-in are trained in weather spotting. EC WA9RUM reports he served as net control for a drill on behalf of the St Louis WX Bureau. 19 of the 20 check-ins were trained in weather spotting. Assistant EC, N9SNE conducted the yearly state tornado drill this year. Information about the Metro ARC is now on the Internet at www.qsl.net/mac. Wheaton Community Radio Amateurs provided communications for the Oakbrook "Tackle the Tower" event. The activity is sponsored by over 20 local and national organizations, and almost 200 entrants participated. This was the 11th year that WCRA assisted with the event. The Western Illinois ARC started a license class earlier this year. York RC started a new ham class in March. The Radio Hill Gazette, newsletter of the Schaumburg ARC, reports their club provided assistance for the St Patrick's Day Parade, and is preparing to help with the MS Walk-a-thon, the Hike for Life, and the Fourth of July parade. If you've never participated in a public service event, give it a try. As the SARC editor mentioned, it's a great chance to be part of the behind the scenes action. The SARC has a new ham program that allows members to rent a HF station at a very reasonable cost. Through the program, members with the proper license class can rent a rig, antenna, power supply and tuner for \$15 a month plus deposit. This will give new hams a chance to try HF and find out what they want before breaking the piggy bank to invest in their own equipment. March traffic: K9CNP 150, W9HLX 120, N9DT 38, WB9TVD 32, NC9T 24, WA9RUM 7, W9FIF 6. ISN de WB9TVD QTC-270, QNI-122, Sessions-29. D9RN Cycle 1&2 Report De AF9FA Cycle 1 25 Sessions QTC 57, QNI 22, QTR 392. Average 2.3, Rate 0.15 6%. Cycle 2 27 Sessions, QTC 95, QNI 28, QTR 341. Average 3.5, Rate 0.28 8%. ISN via WB9TVD QTC 122 in 29 sessions, ILN via K9CNP QEC 29 in 31 sessions, ITN via KF9ME no report. NCPN via W9OUF. QTC 41 in 27 sessions. IPN via KA9CYJ QTC 31 in 27 sessions. IEN via K9HEZ QTC 4 in 4 sessions. Ninth region C4 report for March—tfc 301—sessions 62—time 455min—avg 4.85—rate .676—percent rep 96%—QNI—ILN K9CNP NS9F KF9ME. W9VEY Memorial Net de K9AXS 7 with 263 check-ins.

INDIANA: SM, Peggy Coulter, W9JUU—SEC: K9ZBM. ASEC: WA9ZCE. STM: AA9HN. OOC: KA9RNY. SGL: WA9VQO. TC: W9MWW. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys: 3/9 James A. Green, W9YDP, was EC for Decatur Co., Buttrville; 3/15 Charles R. Lewis, N8BYI, Fort Wayne; 3/20 Ralph Waldo, K9STX, Evansville; 3/21 Ellsworth L. Kirkham, N9BQS, Muncie; 3/30 Roger L. Harned, W9ZSW, West Terre Haute; 3/30 Mary E. Goller, KA9QMK, Fort Wayne. They will be missed. Hancock ARC at Greenfield will be having a hamfest this year. They did not have one last year but it will be held Dec. 5th at a new site. Put it on your calendar. The Tri State ARS furnished communications for a Soccer Tournament. A great job was done by N9RAH, WB9ONU, KB9GNI, KB9NVI, N9JWV, AA9VW, N9QVQ, KB9GNI, N9FMO, KB9MZH, K9HVI, N9NYF, WB9FHA, KB9PAE, K5LPS, W9FHA, N9YAI, N9YAH, KF9DL and KB9RBO who did a magnificent job of putting it all together. Newly appointed EC for Decatur County is KB9NZE also appointed as an OES was K9EX in Huntington. Congrats to Jack Reynolds, AA9BO who recently received an award certificate from the "FIST" group nr. 3 for having had 100, 30 min or longer CW contacts. Gary Wheeler, K9ERE, recipient of the Brentlinger Award presented to him by the Wabash Valley ARA. The Clark Co ARC at their awards banquet presented Bud Schuster, N9RMR the Amateur of the Year Award and Amanda Harl, KB9THQ the Elmer of the Year Award. Congratulations to all. During the Annual Test of the Central IN SKYWARN activated by the NWS at 1:45 PM a total of 99 fixed stations and 45 mobiles from 11 area counties checked into this net. Again at 7:15 PM another net was activated with 149 fixed and 75 mobiles checking in from 14 counties. NMs ITN/W9ZY, QIN/N9PF, ICN/AA9HN, WN/AB9AA, VHF/AA9HN.

Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	1330/2130/2300	3042	1690	491	93
QIN	3656	1430/0000	178	105	636	46
IWN	3910	1310	2212	—	—	31
IWN VHF Bloomington			484	—	—	31
IWN VHF Kokomo			666	—	—	31
IWN VHF Northeast			929	—	—	31
Hoosier VHF nets (10 nets)			478	55	737	49

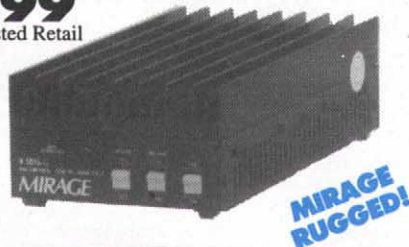
D9RN in 52 sessions QTC 152 IN represented by K9GBR, W9UEM, WB9QPA, KB9NPU, WB9HII, KA9DIG, AB9A and N9ZZD. 9RN in 62 sessions QTC 301 IN represented by K9PUI, N9PF, WA9QCF, KO9D, AA9HN, WB9UYU and W9FC. Tfc: W9FC 394, KO9D 150, K9PUI 134, K9GBR 126, WA9QCF 116, W9ZY 115, WB9QPA 87, N9ZZD 73, AB9AA 57, W9UEM 53, N9PF 53, W9JUU 41, KA9EIV 31, K9RPZ 28, W9KT 23, KA9QWC 22, AA9HN 20, WB9RW 16, KB9NPU 12, W9WNH 12, W9CSJ 11, W9EHY 10, K9DIY 8, AB9A 7, W9RTH 5, K8LEN 5, K9CUN 4, N9JAI 2, WB9NCE 2.

WISCONSIN: SM, Roy A. Pedersen, K9FHI—BWN 3985 0600 W9RCW. BEN 3985 1200 KE9VU W9BN 3985 1730 WB9WHQ WNN 3723 KB9OCZ WSSN 3645 1830 N9BDL

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Power Curve -- typical B-5016-G output power

Watts Out	130	135	140	145	150	155	160	165
Watts In	20	25	30	35	40	45	50	55

The MIRAGE B-5016-G gives you 160 watts of brute power for 50 watts input on all modes -- FM, SSB or CW!

Ideal for 20 to 60 watt 2 Meter mobile or base. Power Curve chart shows typical output power.

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. We know of one that has been in constant use since 1979!

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's Therm-O-Guard™.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive

switching with remote external keying.

RC-1B, \$45, Remote Control. On/Off, pre-amp On/Off, selects SSB/FM. With 18-ft cable.

Draws 17-22 amps at 13.8 VDC. 12x3x5 1/2 in.

More 160 Watt, 2 Meter Amplifiers...

B-2516-G, \$299. For 10 to 35 watt mobile or base stations. 160 watts out for 25 watts in.

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BD-35
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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/35W on 440 MHz
- Auto Band Selection
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- 5x1 1/2 x 5 inches
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- Works with all FM handhelds to 7 watts
- One year MIRAGE warranty

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100 Watts for 2 Meter HTs

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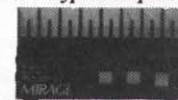
Watts Out	25	50	75	95	100	100+	100+
Watts In	1/4	1/2	1	2	4	6	8

- 100 Watts out with all handhelds up to 8 watts
- All modes: FM, SSB, CW
- Great for ICOM IC-706
- 15 dB low noise GaAsFET preamp
- Reverse polarity protection/SWR Protection
- FREE mobile bracket
- Auto T/R switch
- FREE handheld BNC to B-310-G cable
- Ultra-compact 4 1/2 x 1 3/4 x 7 1/4 inches, 2 1/2 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!

6 Meter Amplifier

FCC Type Accepted



The A-1015-G, \$389, is the world's most popular all mode FM/SSB/CW 6 Meter amplifier. 150 watts out for 10 in. For 1 to 15 watt transceivers.

70cm Amplifiers (420-450 MHz)



D-3010-N, \$365, -- 100 W out/30 in. For 5 to 45 watt mobile/base. D-1010-N, \$395, 100 W out/10 in. Dual

purpose -- for handhelds or mobile/base. D-26-N, \$269, 60 W out/2 in, for handhelds.

Amateur TV Amps



Industry standard ATV amps -- D-1010-ATVN, \$414, 82 watts PEP out / 10 in. D-100-ATVN, \$414, 82 watts PEP out/2 in. (without sync compression).

Remote Control Head for Amps



RC-1, \$45, remote controls most MIRAGE amps. Power On/Off, preamp On/Off, switch for SSB/FM. 18 foot cable (longer available). 1 3/4 x 3 3/4 x 2 1/2 inches.

35 Watts for 2 Meter HTs

B-34-G
\$89.95
Suggested Retail



Power Curve -- typical B-34-G output power

Watts Out	18	30	33	35+	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7	8

- 35 Watts Output on 2 Meters
- All modes: FM, SSB, CW
- 18 dB GaAsFET preamp
- Reverse polarity protection
- Includes mobile bracket
- Auto RF sense T/R switch
- Custom heatsink, runs cool
- Works with handhelds up to 8 watts
- One year MIRAGE warranty

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. 1 3/8 x 1 3/4 x 4 1/4 inches.

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Low noise GaAsFET preamps

High gain ultra low noise GaAsFET preamps for receiving weak signals. Selectable gain prevents receiver intermod. 15 to 22 dB gain. Less than 0.8 dB noise figure. Automatic RF switching up to 160 Watts. Choose In-Shack model or Mast-Mount (includes remote control) model to reduce loss. Rugged die-cast enclosure.

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144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

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Vertically Speaking THE BEST!

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• HF9V

Offering 2, 6 and 9 Band Verticals with optional 160 Meters. Butternut's unique, patented design solves traditional problems that are associated with vertical antennas. Many verticals rely on lossy traps to offer multiband performance - which causes narrowed bandwidth. The Butternut trap-free design offers superior bandwidth and much greater radiation efficiency.

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HF9V - 6, 10, 12, 15, 17, 20, 30, 40, 80M
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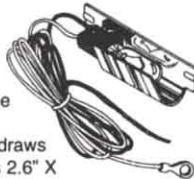
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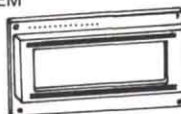
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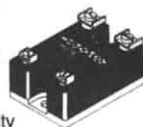
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WIN-E 3662 1900 WB9ICH WIN-L 3662 2200 W9UW. KB9QHU has a call change as W9WIS. I regret to report the following Silent Keys. K9CBU, N9AXW, WB9TOZ, W9VHA, W9DIA (founder of AES), and K8GXV a regular check in of BWN. It is good to see the FCC is monitoring the bands, so it's a good idea that we operate properly. I had a list of 20 new hams in Wisconsin as reported to me from ARRL. KB9UAP is now W9JEN. (The Feedline). April 22 will be Amateur Radio operation recognition day by Governor Thompson. EC for LaCrosse County is WB9BJQ. How about K9VSO's XYL KB9SOZ has Tech license, congratulations Kris. Did you all have fun on the Wisconsin QSO party? Makes me wonder with all those stations on for that, why don't they check the Wisconsin Nets. We sure would love to have you represent your area. KB9JQV is EC for Green County. KA9BHL is now W9BHL. Sorry to report W9CBE is in hospital. Hope you get out of there soon, and report in the nets. WD9HXC's XYL passed her tech license (Short Circuit). New hams Eau Claire area, KB9UHR, KB9UHQ, KB9HAS, KB9UIH, KB9UHT, KB9UHW, KB9UHX, KB9UIB, KB9UIK, KB9UII, KB9UHU, KB9UHV, KB9UHZ, KB9UHY, KB9UIJ, KB9UIH, KB9UHO, KB9UIF, KB9UDN, KB9UIC, KB9TPT, KB9UHP, KB9UID, and KB9UIE, congratulations to all. Effective July 1, 1999, I will be resigning as SM for Wisconsin, please give the new SM your full support as you have given me over the years. I will still be active in the nets, but will be spending more time for family affairs and other hobbies. Thought for the day: Money can't buy sunsets, songs of birds, and the music of the wind in the trees, these are free as the air we breathe. Tlc: K9JPS 909, W9RCW 698, K9RTB 644, W9IHW 597, WB9VPY 551, K9GU 492, AF9FA 189, N9KHD 147, W9YCV 136, N9BDL 116, AG9G 86, K9FHI 78, N9IAI 56, KE9VU 53, KA9FVX 51, W9UW 49, W9BHL 38, AA9BB 32, K9HDF 32, WB9ICH 25, K9GB 23, N9JIY 19, WD9FLJ 16, W9ODV 13, K9UTQ 11, W9PVD 1.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, N0FKU—As we enter into summer we begin plans for Field Day, remember you can receive bonus points for sending a Field Day report to the Section Manager. These reports can be sent on the ARRL MN Section Phone Net on Saturday of Field Day at 5:15 PM on 3870 kc. I hope you have active Field Day plans this year. ARES has a few new faces that will be announced next month. We still seek candidate ARES EC appointees in several Minnesota counties as well as a District EC for 320 area code. Please contact me if interested. Reminder: All ARES ECs must submit regular reports to your DEC. These reports are compiled and represent MN ARES status, which is also sent monthly to ARRL. This is an EC requirement. ARES continues to look at plans for Y2K assistance in Minnesota, in addition to the wide-area HF Y2K net being held every week. My thanks to the ECs and ARES participants who have been supporting these nets, not to mention the weekly Minnesota ARES HF net. Judy Mortensen, WB0WNJ, is moving into an apt in Marshall and will no longer be on HF. Judy served over the years as NM and was very active with NTS as well as Handi-Ham traffic. The Minnesota ARRL Field Organization still seeks candidates to serve as bulletin stations, public information officers, tech specialists, official emergency stations, Affiliated Club Coordinator, Official Observer Coordinator as well as Technical Coordinator. Contact me (p. 12) for info. The following stations reported their ARRL Section Net activities for March 1999: Tlc: W0LAW, WA0TFC, W0OQ, KOPIZ, W0HPD, KN9U, KB0AI, W0YCB, K0WPK, W3FAF, KA0AIJ, W0WVO, N0BM, KB0OHI, W0D0UF, K0OGI, N0JP.

NORTH DAKOTA: SM, Bill Kurti, WCOM—PHRA Picnic at Wilson Park in Stanley June 13. 36th Peace Garden Hamfest July 9-11, large swap meet, meetings, lots of visiting with your Ham friends while enjoying the activities or just lounging around. Fargo Hamfest went well with record attendance and good weather. The W0LHS Packet BBS in Fargo has been shut down. Bill's BBS was the 1st Packet BBS in ND. Tnx for getting ball rolling on Packet Bill. New Packet Node N0DRO K0LN-1 sponsored by K0LN at Butte is providing good coverage into Minot. Dickinson area Hams attended their annual training & refresher SKYWARN meeting with N0QAU heading the program & NOELA providing the lunch. Also TRARC is close to getting their 9600 baud Packet network in the air. Grand Forks, Fargo & Pembina Hams are providing support for this spring's rising Red again. Appears there will be problems, but nothing like in 1997 when the entire town had to be evacuated when the river topped the dikes. Sess/QNI/QTC/mgr: Goose River, 4/68 1/KE0XT. DATA 30/764/KE0XT. WX Nets 53/1032/58 KE0XT.

SOUTH DAKOTA: SM, R. L. Cory, W0YMB—Don't forget to schedule vacation time to attend the Dakota Division convention at Watertown on Aug 6-8. The Red Cross presented a program to the Pierre ARC on communications and how radio amateurs can be involved. Sioux Empire ARC at Sioux Falls V Pres Dale Bower, KE0RJ, and his wife Sue, N0PEJ, are proud parents of twins born Jan 8. Watertown City Council passed an ordinance restricting antenna towers; however, Amateur Radio antennas are exempt. Watertown club LARK has a new club call sign —W0WTN— replacing the old call, KB0TAH, that they had for the past several years. Until further notice, hams are to use FCC Form 610. LARK club at Watertown voted to disassociate from the SD SKYWARN net as it has expanded to cover the entire state. March traffic: 624.

DELTA DIVISION

ARKANSAS: SM, Roger Gray, N5QS, e-mail n5qs@arrrl.org—First I would like to announce Philip, N5URB, as the new Net Manager for the OZK CW Net. I want to take this opportunity to thank all the traffic net managers for the good job they are doing. The disaster response in my area continues with the cleanup in many areas around me and the interest from local organizations and hospitals. We just completed the installation of the radio station at White County Medical Center that we started several years ago, and it took a near miss to get the interest in completing it. We also have classes scheduled where we have had no interest in the hobby for the last couple of years. Between the increas-



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MA-550	55'	22'1"	3	435	3'sq.	6"	\$1521
MA-550MDP*	55'	22'1"	3	620	3'sq.	6"	\$3258
MA-770	71'	22'10"	4	645	3'sq.	8"	\$2810
MA-770MDP*	71'	22'10"	4	830	3'sq.	8"	\$4445
MA-850MDP*	85'	23'6"	5	1128	3'sq.	10"	\$5991

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TX-438	38'	21'6"	2	355	12 1/2"	15"	\$1269
TX-455	55'	22'	3	670	12 1/2"	18"	\$1710
TX-472	72'	22'8"	4	1040	12 1/2"	21 5/8"	\$3147
TX-472MDP*	72'	22'8"	4	1210	12 1/2"	21 5/8"	\$3799
TX-489	89'	23'4"	5	1590	12 1/2"	25 5/8"	\$5475
TX-489MDPL*	89'	23'4"	5	1800	12 1/2"	25 5/8"	\$8212

* TX-472MDP includes heavy duty motor drive with positive pull down.

TX-489MDPL comes with heavy duty motor drive with dual level wind and positive pull down.

MDPL models include fully operational limit switch packages.

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MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.	SUGGESTED HAM PRICE
HDX-538	38'	21'6"	2	600	15"	18"	\$1642
HDX-555	55'	22'	3	870	15"	21 5/8"	\$2874
HDX-572	72'	22'8"	4	1420	15"	25 5/8"	\$4927
HDX-572MDPL*	72'	22'8"	4	1600	15"	25 5/8"	\$7528
HDX-589MDPL*	89'	23'8"	5	2440	15"	30 5/8"	\$9855
HDX-689MDPL*	89'	23'8"	5	3450	18"	37 1/8"	\$19,039
HDX-5106MDPL*	106'	24'8"	6	3700	15"	37 1/8"	\$20,719

* Includes heavy-duty motor drives with dual level wind and positive pull down. MDPL models include fully operational limit switch packages.

* HDX-689MDPL rated at 60 sq. ft. of antenna at 50 mph winds. * HDX-5106MDPL rated at 35 sq. ft. of antenna at 50 mph winds.

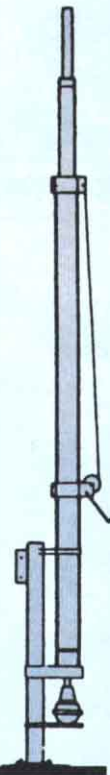
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TMM-433SS*	33'	11'4"	4	315	10"	18"	\$1355
TMM-433HD*	33'	11'4"	4	400	12 1/2"	20 7/8"	\$1642
TMM-541SS*	41'	12'	5	430	10"	20 7/8"	\$1779

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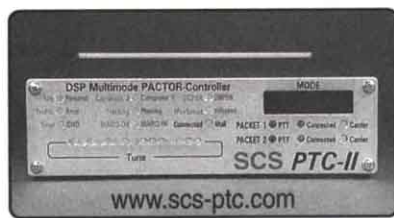
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ing HF activity and the disaster response and the high profile media coverage some of the Amateur Radio groups received earlier this year we are getting some new blood into the hobby. We are continually working on our ARES/RACES organization around the state. Look on the Section Web page at <http://www.ualr.edu/~ham2ec/> for the leaders of the organization in your area and help them improve the organization. Tfc: W9YCE 52, K5BOC 51, K7ZQR 43, AB5AU 12, KA5MGL 8, N5SAN 7, K5YSL 4, KC5UEW 2.

LOUISIANA: SM, Lionel A "Al" Oubre, K5DPG, e-mail k5dpg@arrl.org, Web Page www.aisp.net/k5dpg. As we move from the grips of a long winter into what is shaping up to be a hot summer, we pause to focus on what lies ahead. Tornadoes, severe thunderstorms, flooding, and hurricanes are on the horizon. In the event Louisiana is faced with a major disaster, we will use the following frequencies: Day 7285 Official Traffic 7290 H&W traffic. Night: 3887 Official Traffic 3935 H&W Traffic. During actual emergencies, the FCC will be asked to declare these frequencies as emergency frequencies. This frequency set will also be used in TX and MS. By combining resources we are able to better serve during emergencies. Coming Hamfests: Baton Rouge April 30-May 1; Slidell July 17; Shreveport August 7; August 27-28 New Orleans International DX Convention. Go out and support our area hamfest events. Don't forget to update your club records on the ARRL Web site. Louisiana Section Net schedule: LTN 6:30 PM, local, 3910 kHz, nightly, WB5ZED, mgr; LCW 6:45 PM, local 3673 kHz, nightly, W4DLZ, mgr. Reports for March 1999: LTN QNI 344 QTC 345 in 31 sessions. LCW QNI 186, QTC 55 in 28 sessions. PSRR: K5WOD 88, KG5GE 111, WB5WBZ 118, K5MC 120, K5IQZ 122, W5CDX 126, K5DPG 143, WB5ZED 200. Tfc: NOKWA 3, K5WOD 6, WA5WBZ 10, KB5IEJ 21, KG5GE 27, K5DPG 28, W5CDX 31, K5MC 95, K5IQZ 125, WB5ZED 648 BPL.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Don't forget the "ARRL Day in the Park" hosted by the Vicksburg ARC at Riverfront Park on Memorial Day (May 31). Contact N5JGK or W5XX for info. Welcome to WD5IMP as EC for Wayne County and K5DMC for Hancock County. The Jackson Co ARC held another great Hamfest chaired by N5XGI with over 450 in attendance. Thanks for help go to K5SVVWZ, KC5RID, WD5HAZ, AC5GX, N5RPV, N5HXS, KC5LCW, N4KMH, KC5UEC, KC5VGN, KF4WNK, KD5AXD, KD5CQT, KB5NNG, K5TPR, KC5RRG, NN5AF, KC5TPR, KD5FEQ, KB5CID, and the VEC Team: N5SP, W9NZ, K5LDA, KD5CQT, and AB5RS. EC Report: WB5OCD. OO Report: K5XQ. Net Reports: sessions/QNI/ QTC. MSPN: 31/2889/71, MTN: 31/187/64, MSN: 31/1199/8, PBRA: 31/980/31, Jackson Co ARES/RACES: 31/583/30, MSSN: 23/159/5, MBHN: 4/23/0, Stone Co ARES 4/56/0, JARCE: 4/118/0, MCARAN 4/69/0, Hancock Co ARES 10/46/2. PSRR: KB5W 149, N5XGI 136, N5JCG 124, KD5P 120, K5VV 118, K5DMC 88, W5XX 76. Tfc: KB5W 423, KD5P 106, N5XGI 53, K5DMC 28, N5JCG 26, K5VV 21, W5XX 16.

TENNESSEE: SM, O. D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU. OOC: AD4LO. TC: KB4LJV. SPARKS listed a long time friend, Dave Goggio, WA0GG, as speaker at the March meeting. His topic: "NTS Traffic Handling." Dave is a very capable speaker on that subject. I know all enjoyed it, and now there should be more traffic handlers from Memphis showing up on the TN traffic nets. DARC is fortunate to have ARRL Vice Director Henry Leggett, WD4Q, and James Butler, KB4LJV, TC, as active club members. RACK members are always there for civic duties like assisting the Smoky Mountain Marathon. Those were: KF4BTO, KD4LDL, KE4HID, KD6FBT, KE4JOA and KF4VMJ. Milo, WB4DYJ, reported in this month's CW Net Bulletin that some positive progress has been made in QNI, but still needs more personnel for NCS and alt NCS. Many thanks to those out-of-state stations that are helping out. BARC is having some very interesting programs at its regular meetings. All those who can should attend and learn what is going on in the East TN area. CARC is deeply involved in emergency preparedness. More volunteers are needed to fill the incomplete vacancies in operational program. DRN-5 report: 830 msg, 62 sess, TN rep 92% by WB4GILJ and W4OGG. Net Sess/QTC/QNI: TPN 31/42/2489; TCWN 26/56/281; TEMPN 23/39/786; TEPN 27/148/3071; TSCWN 21/4/130. Tfc: NZ40 384, WB4GILJ 190, WA4HKU 84, N4LA 78, W4SQE 37, KA5KDB 22, W4SYE 20, WA4GLS 15, W4IV 12, WD4JJ 11, WA4GZZ 7, W4IKK 4, W4PSN 4.

GREAT LAKES DIVISION

KENTUCKY: SM, Bill Uschan, K4MIS—ASM: Tom Lykins, K4LID. SEC: Ron Dodson, K4MAP. STM: John Farler, K4AVX. PIC: Steve McCallum, W2ZBY. ACC: vacant. SGL: Bill Burger, WB4KY. BM: Ernie Pridemore, TC: Scotty Thompson, K14AT. It is with deep regret that we mention that Charles Busick, WB4DWX, and Bill Drayer, WA4VUA, became SKs during March, 1999. Hamfests crowds seem down a bit from what I have seen so far this year. Remember the Central KY Hamfest will be held on August 22 at a new location. The Northern KY Hamfest will be held on June 12, 1999, at a new location in Independence, KY. The Bowling Green Hamfest will be on July 31 at a new location. Also the Greater Louisville Hamfest will be held on September 11-12 at a new location. We need to welcome Ron Dodson to the Section Cabinet. He replaces Craig Still who resigned at the end of his term. Craig did an excellent job: Net QNI/QTC/Sess/Mgr. KRN/819/23/23NAFF; MKPN/1237/31/23/K4LID KTN/135/31/31/K4LID; KSN/248/85/31/K4AVX; CARN/382/28/29/KD4SS; TSMN/471/31/31/WB8GWL. 4ARES/543/33/31/WA4RRR. Tfc: K4AVX 45, AE4NW 22, KO4OL77, KD4PWK 5, KF4RBK 59, KU4UO 29. K4YK1 29.

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV, (wb8wvjv@centuryinter.net). ASM: John Freeman, N8ZE (n8ze@arrl.net). SEC: Deborah Kirkbride, K8YKK (ka8ykk@concentric.net). STM: James Wades, WB8SIW (wb8siw@aol.com). ACC: Sandra Mondro, K8G8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, K8BRJ (dcolangelo@ameritech.net). SGL: Ed Hude, WA8QJE (edhude@juno.com). TC: Dave Smith (DSmith@smithassoc.com). QRV Bulletin Editor: Mike

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Pearsall, N8MP (n8mp@concentric.net). When you think of the phrase "Amateur Radio" what comes to mind? If you're a Technician, it could be talking to friends or family on the repeater, maybe discovering the thrill of packet, or working on getting that upgrade to General. For those having HF privileges, it could be getting that DX station you so badly want (and need?), working one of the contests, or just plain "rag chewing" with stations around the globe. When I think of Amateur Radio, I look at the learning experiences that are available to each and every one of us. The very nature of Amateur Radio itself is learning and increasing our database every single day. This knowledge is not a "closely guarded secret," available only to those who hold a license but to anyone we come in contact with and we should be sharing this information with others. This month my hat comes off to those who work with "The Future Generations" of Hams who are out there waiting to learn more about this world of "Amateur Radio". People like Greg, N8CJ and Ray, KB8ZY—losco Co. They had a group of Boy Scouts over to Greg's to have a "Hands on" demonstration of Amateur Radio. Greg's DX Log was searched through and a map was used to locate where all of these places were. Information on JOTA was handed out. Long range plans are to place a working station at the East Tawas High School, courtesy of the I.C.A.R.E. Radio Club in Tawas. People like Gerry Crawford, K8GER, who gives his time to working with the Boy Scouts in the Oscoda Co. area and spends a Saturday afternoon putting a Special Event Call sign on the air for JOTA (and has as many Girl Scouts there as Boy Scouts!) There are teachers who use Amateur Radio in the classroom, Hams who give their time to schools to participate in the SAREX and upcoming ARISS programs. These folks are giving back to Amateur Radio a portion of the pleasure and experiences that they have received. If you do not have any children at home, how about your grandchildren; none? How about that kid next door or down the street who really may not be as bad as you think he/she is. They are just looking for something new and interesting to occupy their time. Don't have a "Dennis" next door? Check with your local Boy Scout or Girl Scout troop. They are always looking for someone to help them out with new learning ideas and experiences. When all is said and done, there is one big side benefit to all of this; you as a person and an operator will improve and you will become excited about this great and wonderful world that we call "Amateur Radio". 73. John Freeman, N8ZE, ASM Education and Training Michigan Section Traffic reports for March 1999: (Thanks to K8FE, Karl) KB8ZY 488, N8FPN 205, K8LJG 173, WX8Y 166, W8RTN 128, K8GA 120, K8AI 92, W8BSIW 89, AA8PI 82, K8AE 82, W8IK. WA8DHB 51, K3UWO 41, W8RNO 38, K8AEI 38, AA8SN 36, K8GTM 33, K8UPE 31, N8OSC 29, W8RF 26, W8YIQ 24, W8RFB 22, N8JGS 15, K8ZJU 7, W8YZ 3.

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me and other Cabinet members, see page 12)—ASM-NE Ohio: Bob Winston, W2THU, Cleveland. ASM-NW Ohio: Ron Griffin, N8AEH, Findlay. ASM-Central Ohio: Mary Carpenter, N8OAM, Columbus. ASM-SW Ohio: John Haungs, W8STX, Cincinnati. ASM-SE Ohio: Bill Creighton, K8TUT, Athens. SEC: Larry Solak, W8BMPV, Mantua. STM: Jack Wagoner, W8FSV, Hilliard. ACC: Joanne Solak, KJ30, Mantua. TC: Mike Brown, W8DJY, Middletown. PIC: Beverly Priest, N8VZV, Dayton. OOC: Carl Morgan, K8CM, Middletown. SGL: Jeff Ferriell, K8ZDA, Columbus. Before we start, remember this is Field Day month. More on this later. If there was any ARRL appointment you found interesting in the last issue of the Ohio Section Journal, let me know. Don't know what the Ohio Section Journal is? Let me know immediately. First, I need to thank ASM John Haungs, W8STX, for continuing to compile our monthly traffic reports always at the end of this section. Thanks also to the Tri-State Amateur Traffic Net (Dennis Fox, KB8ROA, net manager) which serves as the official SM traffic net... Ohio Section Congratulations to the following (a) Mike Koonitz, K8FUG, for being named Lucas County ARES (Toledo) Man of the Year; (b) Dallas Vanselow, K8HQS (Young Ham of the Year) and Eric Neiheisel, N8YCL (Ham of the Year) by the OHKYINARS of Cincinnati; (c) Jim Farris, WA8GXM, named Stark County Red Cross Volunteer of the quarter (Massillon); (d) Mary Ann Royer, KB8IVS, named Ham of the Year from the Alliance ARC; (e) Ohio's own Alphonso R. Torres, KP4AQI, of Huber Heights for winning the 1999 Dayton Hamvention Technical Excellence Award; and (f) to Milford ARC for its 25 years - they gave themselves a quarter-century birthday party in Milford. Now to Field Day which is June 26-27 weekend. It is the one time we ham operators have on public display the skills which define our public image - the ability to send and receive messages under extreme (no public power and operating in the field) emergency conditions. But we must all participate and make sure each Field Day Operation is truly on public display. Send out the press releases; invite the media; invite those who live close to your Field Day effort. Yes, you'll have to answer a lot of simple questions asked over and over. That's the point of having it on public display. Mark your calendars for the following dates - August 28 when All Ohio ECs meet with the SEC at the Franklin County (Columbus) Red Cross Center and September 18 for the Annual Ohio Section Conference at the State EMA Center (Columbus). All are invited to participate at our Section Conference. Ham Radio's responsibilities during the Y2K situation will be Topic Number One at both sessions. June Ohio hamfests are; Medina 2Meter Group (Medina) June 6; Goodyear ARC (Akron) June 13; Milford ARC (Milford) June 19; Cuyahoga ARC (Macedonia) June 20; de K8QOE. Now for our March traffic reports.

Net	QNI	QTC	QTR	Sess	Time	Freq	Mgr.
BN (E)	214	94	268	31	1845	3.577	W8DKFN
BN (L)	235	96	329	31	2200	3.577	N8VB
BNR	148	42	959	29	1800	3.605	W8LDO
OSN	135	49	512	31	1810	3.708	W8BKJQ
OSSBN	2125	594	2599	93	1030,1615,1845	3.9725	K8BDO
OH Section ARES Net					1700 Sun	3.875	W8BMPV

Tfc: W8PBX 173, W8DMIO 161, W8HFN 151, K8BDO 135, N8FWA 118, W8STX 112, WA8EYQ 107, N8DD 84, K8FCC 81, K8HB 81, W8RG 77, NS8C 73, WA8SSI 68,

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EASTERN NEW YORK: SM, Rob Leiden, KR2L—STM: Pete Cecere, N2YJZ. SEC: Ken Akasofu, KL7JQC. ACC: Shirley Dahlgren, N2SKP. SGL: Phil Bradley, KB2HQ. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Elmer Sharp, WA2YSM. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTT. ASM: Richard Sandell, WK6R. Net Reports (Mar 1999) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 40/10 CDN 362/124 CGESN 51/10 ESS 318/300 HVN 595/269 NYPHON 248/923 NYPON 390/546 NYS/E 367/378 NYS/M 262/124 NYS/L 283/477 SDN 326/176. Section News: June is AGAIN Amateur Radio Month in New York State! Congrats to John WA2QCY! N2YJZ for BPL again! PSRR: N2YJZ 195, N2JBA 168, K2CSS 146, WB2ZCM 140, K2CSS 146, K2BTP 133, W2JHO 115, W2AKT 113. Tlc: N2YJZ 594, N2JBA 92, N2TWN 91, W2JHO 61, K2CSS 57, K2BTP 52, WB2ZCM 50, W2CJO 25, KC2DAA 21, KB2YUR 20, N2AWI 20, W2AKT 18, KC2BUV 14, N2YK 10, NM2M 6, N2MCS 5, WA2WMJ 5, KC2CPO 4, KC2DMB 3, KL7JQC 3, K2CCY 1.

NEW YORK CITY / LONG ISLAND: SM, George Tranos, N2GA—ASM: KA2D, N1XL, K2EY, W2FX, KB2SCS. SGL: N2TX. SEC: KA2D. ACC: K2EJ. PIC-East: N2RBU. PIC-West: K2DO. TC: K2LJH. BM: KG2M. OOC: N1XL. STM: WA2YOW. The big event this month is Field Day. Contact your local PIO for help with publicity. If you don't know who that is contact Roberta, N2RBU, or Diane K2DO. If you've never been to a Field Day, it is the most fun you can have in ham radio in one weekend! Join one of our local clubs - for more info on a location near you check the section Web page at www.arrl-hudson.org/nli or call me at 516-286-7562. Let me know about your club's Field Day site so my ARRL staff can visit. Mark your calendar for Sunday, July 18 for the NLI section picnic from 8 AM until late afternoon at Bethpage State Park. Come join the many participating radio clubs for a great social event! Call Rob, N1XL, at 718-763-5021 for more information. NYC/LI VE exam list follows: Islip ARES, 1st Sat 9 AM, Slip Town Hall West 401 Main St. Slip, Addison Levi, KD2YA, 516-234-0589. Bears VE: ABC Bldg Cafeteria, 125 West End Ave at 66th St. Call Hotline 212-456-5224 for exact dates & times. Jerry Cudmore, K2JRC. Grumman ARC (W5YI) 2nd Tues 5 PM. Northrop-Grumman Plant 5 S Oyster Bay Rd via, Hazel St Bethpage, NY. Bob Wexelbaum, W2ILP, 516-499-2214, LIMARC, 2nd Sat 9 AM NY Inst of Tech, 400 Bldg Rm 409, Northern Blvd. Old Westbury, Al Bender, W2QZ, 516-623-6449. East Village ARC, 2nd Friday 7 PM, Laguardia HS, Amsterdam Ave and West 65 Street, Manhattan. Robina Asti, KD2IZ, 212-838-5995. Great South Bay ARC, 4th Sun 12 PM, Babylon Town Hall, ARES/RACES Rm 200 E Sunrise Hwy N Lindenhurst, Michael Grant, N2OX, 516-736-9126. Hellenic ARA: 4th Tues 6:30 PM; Pontion Society, 31-25 23rd Ave, Astoria, NY, George Anastasiadis, KF2PG, 516-937-0775. Larkfield ARC: 3rd Sat 9 AM, Huntington Town Hall, 100 Main St, Huntington, NY, Joe Coffield, W2DDZ, 516-266-3192. Columbia U VE Team: 3rd Mon 6:30 PM, Watson Lab 6th floor 612 W 115th St NY, Alan Crosswell, N2YK, 212-854-3754. PARC: exams held every three months at Southold School Oaklawn Ave, Southold, NY, on next to last Friday of the month. 6:30 PM all classes of licenses. For info contact Ralph Williams/ N3BT 516-323-3646. Mid-Island ARC, Last Tue. 7 PM, Brookhaven Rec Ctr, 20 Wireless Rd, Centereach, NY. Mike Christopher, KG2M, 516-736-9126. Tlc: WB2GTG 488, N2AKZ 240, W2RJL 147, KC2ACL 83, KB2KLH 53, N2XOJ 34, WA2YOW 23.

NORTHERN NEW JERSEY: SM, Jeffrey Friedman, K3JF—First, I would like to say that I am looking forward to representing the Northern New Jersey Section over the next two years. As such, I am looking towards our members' participation by communicating their concerns and wishes. I am also looking for a "Few Good Hams" who would like to volunteer for several of the open positions within the Section. If you are available or know someone who has specific talent and expertise in emergency communication services, or public relations and is willing to spend some time volunteering for the betterment of the Northern New Jersey Section please let me know. Now for section business! This being my first month, I have not received a significant amount of information from the various participating clubs. That which I have obtained follows: Item #1 If you are interested in having a presentation on the NNJ OO program, Marty Goldfarb, KB2JSG, will be happy to attend one of your meetings and address the OO program. He can be reached by e-mail at magjsg@junco.com. He is looking forward to your contact. Now that we have Mr Hollingsworth in the FCC, I see this program gaining a great deal of strength. Item #2. The Radio Amateur Civil Service of the Chathams conducted their cross training on May 5. The goals of this session were 2 fold: Demonstrate to Chatham emergency responders RACES' unique emergency communications capabilities. Provide RACES members a better understanding of emergency communications needs. Representatives from 3 fire depts. Chatham Borough, Chatham Twp, and Green Village were invited to participate. Item #3: Finally, don't forget Field Day this June 26 and 27. I am planning to attend several of the section's Field Day locations. There is only so much time and so many locations. Please let me know where you are so I may plan my activities accordingly. That's it for this month. Please forward your most significant "Goings On" within the Section at least 2 months in advance. Look forward to meeting many of you over the next few months.

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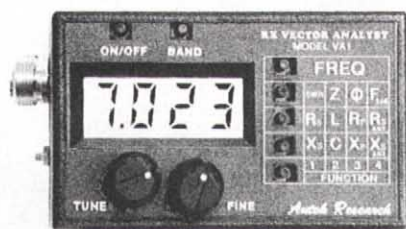
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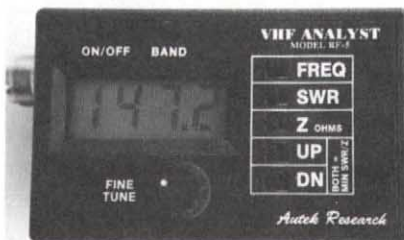
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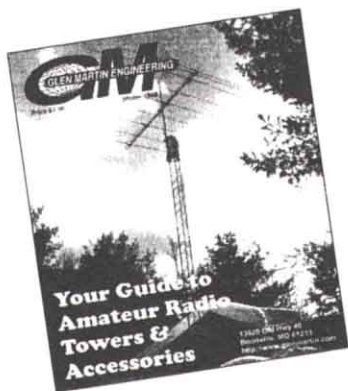
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NJPN	W2CC	35	194	44	37	
NJSN	K2PB	28	120	11	11	
NJN/E	AG2R	31	225	109	94	407
NJN/L	AG2R	31	128	71	59	257
CJTN	N3RB	31	286	64	50	268
NJVN/E	N2RPI	30	300	36	29	255
NJVN/L	N2OPJ	31	245	49	41	

Tfc: N2XJ 210, W2MTQ 117 KC2AHS 74, N2OPJ 50, K2PB 46, N2RPI 34, N3RB 31, KB2VVB 23, K2VX 23, N2GJ 16, W2CC 16, N2QAE 14, N2TTT.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL @ KE0BX—ASM: N0LDD. SEC: NA0R. ACC: N0JP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. TC: W0DIA. EIDX printed very nice pictures of W0DX and W0IZ. Better get a copy of DXer and have a look! FMARC noted upcoming testing in their area. How is the testing going in your community? II ARC is doing their homework for Y2K. How can you help your area. I have some plans for myself - but no funds. I have seen several mentions of storm spotter training. Hope you have gotten to one. Looks like April at DMRAA. TSARC is still pluggin' in the northland. They are adding TV and PCs to the van and doing a bike-a-thon. CAARC is mentioning FD already. Guess it is time to get started. CAARC published several pages of info on severe storm preparedness. Thanks. SEITS did a short Q&A on Linux. W0DIA has now worked 100 with QRP. He says he will probably never confirm them. Working them was the fun part! I regret to note the passing of W0L0, K0BYDY, WA0LME. NEIRAA officers for 99 are K8YWT, K10IH, K0CAKJ, and K0BOCI. CVARC is preparing for both FD and their hamfest. I'm looking forward to both. It is that time of year to rebuild and add to our stations in an effort to improve utility and efficiency. This year we need to also think of service with Y2K added to the mix of storms and other public service activities. Newsletters were received from EIDX, FMARC, IIAARC, CIRAS, DMRAA, CAARC, SEITS, NIARC, OARC, NEIRAA. Traffic: W0SS 137, N0JL 74, NR0E 25, 73 de N0JL.

KANSAS: SM, Orlan Q. Cook, W0OYH—ASM/ACC/OCC: Robert Summers, K0BXF. SEC Joseph Plankinton, WD0DMV. SGL: Marshall Reese, AA0GL. Hi gang, August 22 is the ARRL state convention at Salina. Please mark your calendars and plan on attending. Vote yes for future conventions with your presence. I am looking for someone to manage a Kansas Y2K Net on HF. Let me know if interested and for further info. Please welcome two new ECs: Tyler, KBOPQP, in Crawford, and Cherokee counties and Tom, AA0ND, in Norton and Phillips counties. We have 2 new ORSs, Jim, K0NK, and Dan, N0ZIZ, who will be active with EC June, K0BWEQ, moving her 2 meter ARES tlc out into the outside world of the NTS. Our ARES reports show that more ECs reporting their activities and that of their group. This is good and I hope to see more. Thanks to all net members and all ARES members for giving Kansas so much fine team work. Feb. Kansas Nets: sessions/QNI/ QTC, KSNB 28/1062/69 KPN 20/274/10 KMWN 28/613/ 537, KWN 28/910/641, CSTN 24/1888/86 QKS 55/301/67 QKS-SS 7/18/1 SEC 8/973/24 with K0BAMY WD0DDG WD0DMV AA0IQ N0LJR KF4LM W0PBV WA0SSR, W0UXG, K0BWEQ, K0BYQV TEN 56/7/251 Ks 80% with AC0E, AA0FO, KX0I, K0PY, NB0Z, W0BZNY. BBS reports: W1AW Bulletins/Personal/NTS 52/478/6. Tfc: N0KJ 300, AA0OM 98, W0BZNY 94, K0PY 87, W0OYH 67, KB0DNT 25, KX0I 16, NB0Z 10, AC0E 9, W0WWR 9, K0BJ 6, KB0NT 6 KB0GUS 4, N0L 2.

MISSOURI: SM, Charles Boyd, KE0K—Don't know much about computers, and even less about the Internet. With Y2K coming, as I think this through, I cannot believe the government, nor technology will leave us in the dark, hungry, without water, or even more without telephone communications. Well maybe, especially if there is something for big business. It seems like whenever something becomes a crisis or something is going to happen, the consumer pays. Be prepared for Y2K even though it may never happen. TEN for March 414/ 62 M0 90% W2RRX, K10PH W0WFF W0OX, St. Louis repeater 62 QNI 30. Nets: AUDRAIN ARC 6/51/1 W0BSEN. QCWA#35 4/91/0 K0YML, HARC 4/189/N0YLF, Paul Reverse 4/44/70, N0IWA, WARRCI 4/119/0 K0B0ZP, HAMBUTCHERS 23/ 1052/65 KDANK, MOTN 31/723/245 K0IPM, CHARL ARC 4/ 47/0 KCOMV, MOM 1&2 60/164/43 W0WFF, SWMO SKYWARN 5/106/7 N0UAM, ROLLABILLBOARD 30/326/ 8 NAOV, 1880 GOB NEW 331/570/33/ WL7YM. Tfc: K10JO 668, KE0K 190, KGOIV 109, WA0YJX 95.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASMs: W0KVM, N0MT, W0BULH, WY0F & W0BYWO. It is with deep regret to inform you of the passing off John Cotter, KA0QFW. He was a member of the Lincoln ARC. The NWS has been conducting spotter-training classes throughout the state. Are you trained yet? Being involved with ARES and SKYWARN is a way you can give your community something back. The FCC has issued W0NWS to the SKYWARN Amateur Radio Association. This will be used at the NWS office in Valley. K0EOC has been issued to the Lincoln Lancaster Co Emergency Communications Club. Midlands and Sarpy County ARES organizations participated in the annual siren test held on April 3. Douglas and Sarpy County officials appreciate this service we provide. Net Reports: NE CW Net: QNI 141, QTC 21 and 21 sessions. NESN: QNI 868, QTC 37 and 31 sessions. NCHN: QNI 377, QTC 24 & 31 sessions. NE 40 Meter Net: QNI 643, QTC 30 & 31 sessions. NMPN: QNI 1566, QTC 11 & 30 sessions. Tfc: K0PTK 130, W0AP 42, KE0XQ 36, W0UJI 22, W0RWA 8, WY0F 8, K0OAL 3, KA0DOC 2, PSRR: KA0DBK 102, K0BYTM 18.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsy Doane, K1EIC—QCWA reports that Robert York Chapman, W1QV, will be receiving a 75-year award as a retired Director of the Acoustical Research and Development Division of the US Naval Submarine Base in Groton. This award will be presented at the QCWA Nutmeg Chapter Luncheon in Niantic on May 8.

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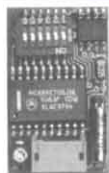
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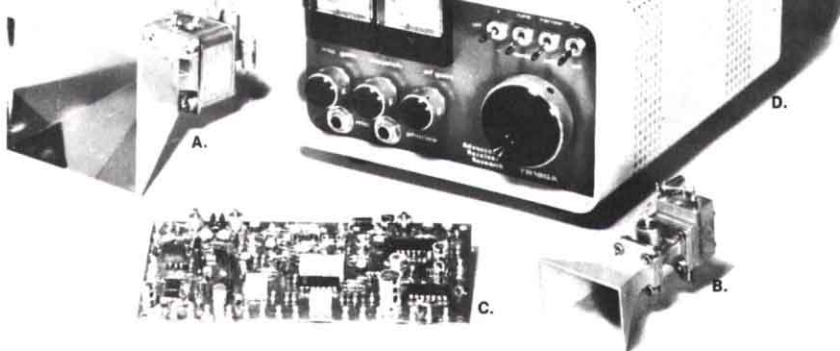


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Robert was the chief technical consultant for acoustic training for submarines and destroyers for 25 years. He was the recipient of the Navy's Superior Civilian Service Award. N1QV is a former NE Division Director, presently Honorary VP ARRL, the Candlewood ARA once again sponsored the CT QSO Party May 1-2 with N8WXQ as chair. That same weekend, the club ran a special events station at the Danbury Railway Museum to help celebrate the museum's 50th anniversary. Thanks to N1OCM for coordinating that event. Amateur Radio received nice PR in the April 9 edition of *The CT Post*—front page story! Students from the Bethel Education Amateur Radio Society were shown at the station. KA1QN, ASM KZ1Z, K1ZZ and N1MZA were among those interviewed. The CT Spectrum Management Association is being organized again. Mark, K1MAP, is coordinating this effort. A group of 16 repeater owners met at the Southington Flea Market and formed a steering committee. Those interested in repeater coordination and other issues regarding spectrum management should attend a meeting at the NARL Flea Market at Newington High School June 6 at 11:00. Officers will be elected at this meeting. For more info, contact Mark by e-mail: map@map.com. March and April were busy months for ARES. Bob, KA1BB, and others conducted a very well-received communications workshop for the American Red Cross in New London. This event was also supported by several ARES members who reported that it was very well done. About seven ops in Area 2 participated in a drill with the American Red Cross at Tweed New Haven Airport under the direction of N1HAX. Thanks to you all. Net/sess/ QNI/QTC/NM: WESCON 31/345/162/KA1GE; ECTN 31/222/71/WA4QXT; NVTN 31/240/179/K1STM. CPN 31/202/106/N1DIO; CN 29/94/52/N1AEH. Tfc: NM1K 1938, K1VEC 460, KA1GWE 245, K1STM 192, WA4QXT 132, N1VXP 120, KE1AI 80, W1GPS 9.

EASTERN MASSACHUSETTS: Traffic report submitted by STM WA1TBY:

Net	Sess	QTC	QNI	NM
EMRI	62	219	235	518
EMRIPN	31	141	166	463
EM2MN	31	134	322	424
HTN	31	70	207	400
HTN	31	83	309	527
NARPSN	4	11	73	na
VEEPN	4	4	10	na
CHN	31	41	194	434
OSTN	27	16	52	108
RI/EM2MTN	23	23	168	na

Tfc: WA1TBY 427, W2EAG 312, NZ1D 249, WA1FNM 112, N1LPM 96, N1LKJ 92, K1SEC 69, N1LAH 60, N1SGL 45, K1EB 44, N1TDF 43, K1BZD 43, N1AJJ 38, N1TAT 36, K8SH 34, N1IST 33, KA1VAX 31, KD1LE 28, NG1A 26, N1ZFF 13, N1VUX 2.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, K1TKS. STM: NX1A. BM: W1JTH. SGL: W1AO. ACC: K1RFD. OOC: KA1WRC. PIC: KD1OW. SEC: N1KGS. Asst Dirs: W1KX, K1TKS, K1NIT. Web Site: N1WFO. Congratulations to the Androscoggin ARC for an outstanding ARRL Maine State Convention. A great time was had by all. And a very special thanks to Ivan, N1OXA, and Rick, N1WFO, for coordinating the event. Would also like to thank all the guest speakers who gave talks on a variety of topics. Thanks go to AA1KF, K1TOL, N1XRK, N1RWY, K1NI, NX1G, WN1I, KD1OW and W9WBA. The speaker from CMP and the National Weather Service should also be thanked for providing a chance for so great many to experience their first SKYWARN training seminar. Now that better weather is here, there will be many opportunities to get involved with public events and put Amateur Radio in the spotlight. So make the effort to participate, 73, Bill, N1KAT. Traffic: W1KX 86, AF1L 61, W1QU 54, W1JX 53, W1JTH 30, N1JBD 23, KA1RFD 22, KA2ZKM 15, WA1YNZ 9.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (ashuman@arrl.org)—NH Web site (www.nh.arrl.org) ASMs: W1NH, N3CLZ, N1FIL, K7CTW, N1KIM. TC: WA1HOG. STM: WA1JVV. PIC: KA1GOZ. OOC: W1GTA. SGL: K1KM. BM: K6GR. ACC: NA1E. SEC: N3CLZ. This will be my last column as your Section Manager as my term ends on 6/30. Mike Graham, K7CTW of Merrimack, will succeed me. Mike has been appointed an ASM during the transition period. His contact information will appear on page 12 of the July QST available mid-June. It has been an exciting 7 yrs, hosting 2 NE Div Conventions, wins on 3 major pieces of NH Legislation in support of Amateur's privileges and being on call through the years for all types of issues. Thanks to the many NH Amateurs for your tireless support of the NH Field Organization and its objectives. Congrats to the Contoocook Valley ARC, winner of the 1999 NH QSO Party in the Large Club category. This year, we had over 70 logs submitted, up substantially over last year. Full results can be found on www.nh.arrl.org. Finally, I intend to keep my hand in NH Amateur Radio affairs by working on behalf of the New Hampshire Amateur Radio Association. Feel free to contact me there after 6/30 at NHARA@nhradio.org -73 Al. Net mgr/sess/QNI/QTC: 3SFM N1RCQ/226/53; GSPN K1ZO 35/145/53/309; ISEN N1VFM/5/2/3; VTNH WA1JVV/31/184/155. Tfc: N1FYR 1155, W1PEX 1000, K1TOY 266, WA1JVV 130, N1CPX 90, W1ALE 50, N1NH 49, K1ZO 42, KA1OTN 22, NB1GXM 15.

RHODE ISLAND: SM, Rick Fairweather, K1KYI, e-mail: rkyi@juno.com—STM: KA1JXH. SEC: N1JMA. OOC: N1AOM. TC: KA1EGY. BM: KA1BNO. SGL: NN1K. Ocean State ARG had presentations in March by N1PWU about kits and kit building and in May by K1CR about repeaters and their operation featuring the group's own repeaters. The group provided comms for the annual white water race in Burrillville in March. OSARG plans being made for Field Day at CCR1 again this year. N1SMK looking for RI hams to help with comms for the RI Red Cross as needed. Maybe some of the clubs could lend him a hand as a public service project. Pawtuxet Valley ARC's speaker at the May meeting was WB1GTK who owns Ocean State Electronics in Westerly who gave the group an overview of the operation

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RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz	34/FT	32/FT	30/FT
RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS @ 30MHz	15/FT	13/FT	12/FT
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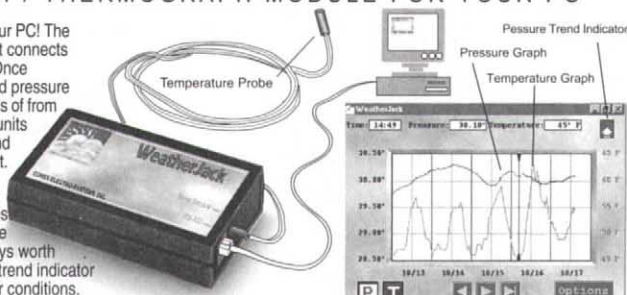
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and what goodies he stocks for the deserving RI hams. The club also provided comms for the annual West Warwick St Patrick's Day parade. Be sure to get out and enjoy Field Day this year. Hopefully the weather will be better than last year. RI traffic handlers had 100% representation on FRN again in Feb. Congratulations and thanks for your dedication. Tfc: K1KYI 6.

VERMONT: SM, Bob Vydareny, WE1U—Jack, WA1DLA, thanks for the kind words about Ed. I hope I got it all right. With sorrow, I report the passing of Ed Bort, KT1Q, on March 15, 1999. Ed had been our Section Traffic Manager for 12 years. Ed passed on following a sudden illness. He was a graduate of the University of Vermont, after which he served in the US Army from 1957 to 1975, retiring as a full Colonel. He was very active in his church, serving as a Deacon and on the Board of Trustees at various times. He was also a member of Rotary Club International. Ed was an accomplished woodworker, respected traffic handler, and wonderful husband and father. He touched many lives through his musical talents and charitable nature. He was also an Elmer in the finest tradition. Ed will be sorely missed by all who knew him. Also, many thanks to Joe Frank, W1SOV, for 15 years as Volunteer Counselor. He retired effective March 1st. It was a pleasure working with you, Joe. Vy 73 de WE1U.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@juno.com—ASM: N1LZC. ASM (digital) KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1W. All section clubs have plans to go into the field for Field Day. If you are not a member of any club and would like to operate, make your desire known. All clubs will welcome you with open arms and especially if you are a proficient CW operator. Each contact you make counts twice as much as a phone contact. There are a number of logging programs out there, but one has been written just for Field Day. If you can not find it on the Web, let me know by e-mail and I'll give you the download address. It works great and is free! Our section is ready for any emergency. Remember the call in frequency of 3943 kHz. A net will be established on that frequency to coordinate all area repeater traffic. Designate one member of your group to be the liaison station. Tfc: W1ZPB 100, KD1SM 9, W1SJV 22, W1UD 192.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, K17EB—OOC: K17IKX. SEC: N17DL. DEC: K17JBV. DEC: W17GK. TC: AL7CE. TS: K17CC. ASM: W17BJ. ASM: K15T. Snipers Net 3920, daily, 1900 AST, Bush Net 7087, daily, 2000 AST, Motley Group 3933, 2100 AST, and Alaska Pacific Net 14.292 M-F, 0830 AST. Arctic ARC on June 5 is doing the communications for Tour D'cure bike-a-thon. Motley Group picnic and Field Day is the third weekend in June. Kent, K15T, and Jim, K17CC, deserve congratulations for helping the Red Cross find the snow machines buried in Turnagain Pass. Jim Larson, AL7FS, is keeping QRP alive in Alaska with his talks at local club meetings. Check out the Alaska QRP at www.ptialaska.net/bhopkins/akqrp. PSHR points: AL7N 73, K15T 115.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—The Central WA ARC was contacted by the Salvation Army regarding emergency communications. Also the Ephrata hospital administrator contacted the club regarding Y2K emergency communications with Moses Lake, Wenatchee, and Spokane. Sorry to report Dee, WB7NVX, of Ione, is a Silent Key. She is the daughter of Herb, W7RHX. Six OO activity reports were received for March. Your SM & XYL Sue, KA7PZW, with Don, W7ZNN, and XYL, Andrea, and Dick W7IFO, and XYL Beulah, KA7BXZ, vacationed in 6-Land in April and got to see the Worldradio publication facility. Hamfests: Wenatchee is June 11-12, and KARS in Rathdrum, ID, is June 12. Remember that Field Day is this month. Net Activity (for Mar): WSN: QNI 914, tlc 248; Noontime Net: QNI 8901, tlc 379; WARTS: QNI 3411, tlc 166. Tfc: K7GXZ 225, W7GB 223, KA7EKL 64, K7BFL 64, KK7T 63. PSHR: W7GB 138, K7GXZ 120.

IDAHO: SM, M.P. Elliott, KF7ZQ — OOC: N7GHV. SEC: AA7VR. STM: W7GHT. NW Division Director Greg Milnes, W7OZ, made a visit to the VOI club on May 14. He also visited the Idaho Falls hamfest on April 17. This was his first visit to Idaho since taking over for the late Mary Lou Brown, NM7N. Greg, hope you will come back soon and visit other areas within our section too! The 1999 Caldwell hamfest was a great success again this year. On the club front, the Pocatello club has announced that their Field Day activities will be held at the Bannock County fairgrounds. They have 35 acres with — quite a site! Be sure to make your own Field Day plans early — get involved! 73, Mike, KF7ZQ. Tfc: W7GHT 213, WB7VYH 51, N7MPS 46, and KB7GZU 66. PSHR: W7GHT 120, WB7VYH 80, and N7MPS 60. Net (SESS/QNI/QTC Mgr.): FARM - 31/2450/21/ W7WJH; NWTN - 31/1794/70/ K7CRNT; IDACD 23/ 634/21/ K7UBC; IMN 31/460/130/ N7MPS.

MONTANA: SM, Darrell Thomas, N7KOR—The Capital City Amateur Radio Club of Helena, Montana has been asked to demonstrate Amateur Radio during the Montana Boy Scout Camporee at White Sulphur Springs Montana on June 12. They will be taking their new emergency communications trailer to the site on demonstrating Amateur Radio on HF, VHF, UHF, Packet and possibly ATV. Many of the scouts attending will be working on the radio merit badge and the group will assist them in that effort. QSL cards will be available from the club for contacts made. As spring progresses, many other clubs in the section will be called on to help with special events in their communities. I will report on these as I receive the information. Net/QNI/QTC/NM MSN 113/1 W7OW; MTN 2046/71 N7AIK; IMN 460/130 N7MPS. PSHR: N7AIK 110 Cat 1/60 2/9 3/21 4/ 6 5/4 6/10. Tfc: WA7PRD 5.

OREGON: SM, Bill Sawdors, K7ZM—ASM: KK7CW, ASM: KG7OK. SEC: WB7NML. STM: WA7EES. SGL: N7RFM. OOC: NB7J. STC: AB7HB. ACC: K7SQ. Welcome to the "Summer months!" With summer approaching, and so many things to do, the Saturday morning Section Management Net has been cancelled...maybe another time. I hope you have your reservations in for Seapac, June 4-6. The annual Seaside convention is the Northwest's largest ARRL sponsored event, and will feature ARRL Northwest Division Director, Greg Milnes (now W7OZ) as the MC for the Saturday night banquet. The "retired judge" is now known as the "Wizard of Oz" of the Northwest! Field Day is June 26 and



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(not pictured)

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IC-T2H



IC-T8A/HP



IC-Q7ABC



IC-W32A

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Other ICOMs not Pictured

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27. More Oregon clubs than ever, got involved last year!! No wonder, it's the "funest" weekend of the year. Whether you're a member of the local club or not, here's your chance to get to know the "real hams!" Join an "active club" that has family fun together. By the way, during Field Day, don't forget to get a message to the ARRL Section Manager for those "bonus points." You'll find the Central Oregon DX Club on every band using the club call K7ZZZ, including 144.565 FM/SSB simplex, where he'll be operating! Next month, it's the annual ARRL Northwest DX Convention. This year, in Portland, July 30 through August 1. For details, contact Jim, K9JF at k9jf@arri.org. Let's all have a great summer, and keep in touch! Bill, K7ZM.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—While many ARES groups are busy having sessions on how to handle traffic, George Thomas, K7BDU, is on the air just doing it. His traffic report for March indicates a total of 1626 messages sent, received, and delivered. Official Observers for Western Washington report some 224 hours monitoring the bands with 9 advisory cards sent and one good operator card sent. Let's see an increase in those good op reports. SEC N7NVP reports that the State Emergency Operations Center (EOC) recently hosted about 50 of the state's ARES/RACES leadership with a tour of the new "Earthquake proof" facility at Camp Murray. Presentations were given on the State RACES Plan by Allan Josue, K7CGBP, and the Emergency Alert System by Clay Freinwald, K7CR. Those that attended were very impressed by the facility and found the presentations to be very informative. In Whatcom Co, EC Don Deadrick, W7FQ, and RO John Rogstad, K87PKL, manned the RACES/ARES Comm van for 3.5 hours while CERTS members searched for "earthquake" victims. Randy Greeley, NU7D, and his team in Cowitz Co participated in an evidence search for the Sheriff, Public Service Honor Roll anyone? W7LG 129, K7DME 97, K7MQF 118, W7NWP 145, K7JSI 126, W7TVA 262, K7TTY 71, N7YSS 121, W7JWJ 139. These listed amateurs help justify our existence to use the airways. Traffic totals: N7AJ 69, K7BDU 1626, K7JML 12, W7LG 103, K7DME 74, K7MQF 305, W7NWP 169, N7PIP 10, K7JSI 139, K7SUQ 16, K7TTY 8, K7YOH 25, W7TVA 280, N7YSS 138, W7ZIW 156.

PACIFIC DIVISION

EAST BAY: SM, Bob Vallio, W6RGG—ASM: KF6RCO. SEC: K6NVU. DECS: WA6TGF/Alameda County, K06JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, K6UOW/Training, KE6HCL/Administration, W6CPO/Technical Services. STM: K6APW. OOC: W6NKF. TS: KF6NY. Check out the EB WWW Page at <http://www.pdarri.org/ebsec/>. Webmaster is KB6MP. ORCA members participated in a table-top net simulation exercise under the leadership of N6RCG. An 11-page net operation instruction guide was provided to the 19 participants. EBARC welcomes new members Read Heath and Mirna Morales-Heath; and congratulates upgrades KQ6ZL, Advanced, and W6DEI, General. VVRC's VE team, W6ROY, WB6FIF, and AB6LT, report John Aurelius, Tammy Salzman, and James Dooley are waiting for their Technician licenses, and K6HEW upgraded to Advanced. LARK welcomes new member Tim Doerner. Twenty-eight members and guests toured SLAC, under the guidance of N6FQQ. NALCO's new officers are WA2UNP/Pres, W6WXX/VP, K6WZY/Secy, KF6JRM/Treas, and W6WTI/EC. CCCC welcomes new members KF6NIB, K6USW, and KE6FSU. The club mourns the loss of long-time member KB6KVI. MDARC membership stands at 378. March tlc: W6DOB 715, WB6UZX 16. PSHR: W6DOB. BPL: W6DOB. Tlc 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.

NEVADA: SM, Bob Davis, K7IY—ASM: Jan Welsh, NK7N. SEC: N7JEH. TC: NW7O. ACC: N7FFP. STM/SLG: N7CPP. PIC: WW7E. OOC: N7ELV. Greetings to the Nevada Section. Summer, at last! Seems as though it took an awful long time to get rid of winter this year. Please note that thanks to Bill, K7JLS, and Bruce, N7CPP, doing some ram-rod work, the State of Nevada now has an official resolution passed by the Assembly and the Senate, declaring the third week of June as "Nevada Amateur Radio Week." It was a privilege to be part of the ceremony, and it should help in getting the Hams a little more recognition throughout Nevada. Neil, WA7KCD, reports it's "all ahead full" for the Reno Hamfest coming up July 31. Grand prize is a Yaesu FT-847 Super HF rig, antenna, and power supply package \$5 tickets. Info call 775-972-8373. Hope to have a report in soon from Jim, NW7O, on the success of the Nevada QSO Party that was sponsored by FARS in May. A reminder that my mailing address has changed about 6 months ago. Please check QST page 12. Hi to Ed, W2EFE. Thanks and 73, Bob, K7IY.

PACIFIC: SM, Ron Phillips, AH6HN—ASMs: Harry Nishiyama, KH6FKG; Lee Wical, KH6BZF; Jim Reid, KH7M; George Heloca, Sr., KH6ANA; Mel Fukunaga, KH6H. SEC: Dennis Carvalho, KH7H. TC: Chuck Cartwright, AH7Y. PIC: Russ Roberts, KH6JRM. ACC: Bob Schneider, AH6J. The Maui ARC met on 10 March with noted DX openings to Europe. DX is looking up for Hawaii. Lee Wical, KH6BZF, recently completed an "Emergency/Disaster Planning Workshop" sponsored by the State of Hawaii Dept of Labor. The course consisted of emergency/disaster planning for hurricanes, tsunamis, floods, fires and Y2K. This is excellent training and all members are encouraged to get involved. Adrian DiTucci, KH7GK, reports EARC provided communications in the Aloha Run from club members. BIARC will provide amateur license testing monthly following the club meeting on the 2nd Saturday of the month. Please continue to let me know how QSTs are being delivered (timely, good condition). Aloha, Mahalo, Ron, AH6HN.

SACRAMENTO VALLEY: SM, Jettie Hill, W6RFF—As we approach summer, we must think about the fire season and contacting your county EC to let him/her know you can help. Field Day gives some training in setting up emergency communications. Join your local club and ARES group. Yolo ARS involved in providing 20 hr. communications for the Davis Double Century bike ride (200 miles). Nevada County ARC planning for FD and Nev. City Fair. They also had KJ6UI speak on submarine service during

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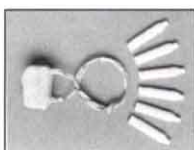
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WWII. Don't forget the North Hills RC swap meet May 23 at Bella Vista HS in Fair Oaks. Call Bob at 729-7117 for info. K6MCI displayed his version of the DK3 Mobile HF antenna to the Yuba-Sutter ARC. A demonstration of "Canine Companions for Independence" was given before the Sierra Foothills ARC by Sally Simcoe. W6SUP gives exams at his home, usually twice a month or on special arrangements. Call Bob at 783-7610. W6REC spoke to the River City ARCS on HF propagation, very interesting. N6DHN wrote a nice article on "Elmers" for the El Dorado County ARC's bulletin. W6YM spoke on 6 meters before the Mother Lode DXCC. The Golden Empire ARS (GEARS) is in high gear planning for their 60th anniversary and Hamfest to be held August 7 in Chico. GEARS was also involved in the Silver Dollar Fair with a booth and helped with the Chico Velo Wildflower Bike tour. Several clubs helped during the annual MS walks. PLEASE send me information on your activities, new equipment, trips, etc. Send by e-mail. 73.

SAN FRANCISCO: SM, John Wallace, W6TLK—ASMs: N6KM, KE6EAO. OOC: K6BVD. PIC: N6BWS. SEC: WB6TMS. TC: N1AL. I'm sad to report that W6JCG, ORS, Willits ARS, and K6BFR, Del Norte ARC, are Silent Keys. N6OJ, Redwood Empire DXA, has started the Redwood Empire AM Net every Thursday at 8 PM on the first clear frequency above 3.870 MHz with W6AIR as net controller. All are welcome to check in. N6YBO reports that 8 Anchor Bay ARC members participated in a live structure burn exercise by working as shadows relying messages by radio between the fire chief and his staff. WB6NYF reports that the Far West Repeater Assoc is building a new 2-meter repeater to replace the old one on Humboldt Hill. KQ6XA will be traveling to a remote mountainous region of northern Peru in July and will be operating 10-meter QRP DX at 14,000ft elevation! An OA2 reciprocal license in progress. Check out www.qsl.net/kq6xa for more info. Remember 2 major operating events are the VHF Contest June 12-13 and Field Day June 26-27. Two great ways to get the summer season off to a fun start with friends and family.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN—ASM: Mike Siegel, K16PR. ASM: John Lee, K6YK. ASM: Pat Fennacy, W6YEP. SEC: Kent LeBarts, K6IN. ACC: Chuck McConnell, W6DPD. OOC: Victor Magana, N1VM. During early April, Chet Jenkins, W6XK was QRV from the American Virgin Islands as WP2Z. Chet is one of SJV's devoted DXers, and I hope many of you had the opportunity to work him. Speaking of DX, I would like to remind all in the SJV Section that if you're interested in DXing you should join the Central California DX Club. Fred Moore, W6UA, is at the helm this year as president of the club this year. If you would like more info you can reach Fred Moore at 661-589-3991. The DX net meets every Wednesday night on 147.09 at 8:00 PM and all are welcome. I am writing this Section News in April, and I am just now home from the International DX Convention, this year held in Fresno. The DX convention went very well and I am pleased that SJV Section is the location every year for this event. The year 2000 DX convention will take place in Visalia, and I hope to see you there. Enforcement of the Amateur Radio Rules is on the rise at the FCC and new emphasis is being placed on role of the Amateur Auxiliary to the FCC. Please observe the rules and work the bands with gentlemanly conduct because you never know who is listening.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W—Hello again. As many of you know, I've been asked to complete Geoffrey's term as SM when he needed to step down. I worked for Geoff in my capacity as ASM and was impressed by the way he "hit the ground running" when he took office. I was previously SM/SCV, from 1984 through 1990, so I knew the job was dangerous when I took it! My most immediate goal is to get the SCV Section News out every month. To do that, I'll need your assistance. The only way I can report on activities in YOUR group is if you tell me about them, so I'd appreciate copies of your club newsletter. My address is on page 12 of this QST. If you'd like, save the postage and e-mail them to me at wb6w@arll.org. 73 de Glenn, WB6W.

ROANOKE DIVISION

NORTH CAROLINA: SM, W. Reed Whitten, AB4W—SEC: K4MPJ. STM: K4IWW. TC: K4ITL. SGL: K4IAN. OOC: W4ZRA. PIC: KN4AQ. ACC: W4CC. BM: KD4YTU. North Carolina Senate Bill 390, an "Act to Eliminate the Additional Fee for Special Registration Plates for Amateur Radio Operators," has been introduced by Senator Rucho with a bi-partisan list of co-sponsors. Your ARRL Field Organization and the Senator's office are working together to get the bill passed. Check the Section Web site <http://www.ncarrrl.org> for the latest information on how you can help. Your club officers and ECs will also be helping get information to all the Amateurs in the section. Your letters, e-mail, and phone calls - to the right person, with the right information, and at the right time are needed. We had two meetings at the Raleigh Hamfest with very good attendance. Encouraging more NTS participation on VHF and HF was discussed at the NTS meeting. Why should you check into an NTS net? Mainly because it is fun! It is also daily practice for emergency communications. We still need VHF NTS nets in western and in northeastern NC, help start one. Contact your STM, K4IWW. The ARES/Club meeting was moderated by ACC W4CC and SEC K4MPJ. John discussed Special Service Clubs and Charles led an extensive discussion of preparations for severe spring weather. I reported on a meeting I attended that included all NWS offices covering NC counties. Although this meeting was not about Amateur Radio, the value of our SKYWARN nets was mentioned often. This is an important ARES function. I encourage everyone to attend the training sessions, LISTEN to the SKYWARN nets, and transmit ONLY if you have the information that is requested. The same day that I met with Senator Rucho, I met with several Emergency Management officials at the State EOC. We discussed the role of Amateur Radio as backup for the "Forward SERT" and the need for a common HF digital mode for Amateurs. Cary Swapfest Saturday, Jul 17. Tfc: W4EAT 553 (BPL), AB4E 249, K4IWW 182, AA4YW 119, K4YV 118, KE4JHJ 106, W3HL 90, AC4DV 77, W2CS 77, K4AIF 66, KF4VDW 61, W4IRE 47, KE4AHC 35, AB4W 32, KF4OZF 19, WD4MRD 18, W4CC 14, NT4K 11, WA4SRD 11, W4DYW 9,



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DFK-3B	9' cable kit; TM-733A	29⁹⁵	SC-34	Case; TH-28A/48A/PB17/18	19⁹⁵
DFK-4B	13' cable kit; TM-733A	39⁹⁵	SC-41	Soft case; PB-32	9⁹⁵
DFK-7B	22' cable kit; TM-733A	59⁹⁵	SC-43	Soft case; TH-79/PB-33/34	9⁹⁵
DTU-2	Digital paging; TM-541A	19⁹⁵	VP-1	Bumper mount, spring	19⁹⁵
IF-232C	Level trans.; TS-50/950	99⁹⁵	YG-455CN-1	250Hz CW filter; TS-950SDX	99⁹⁵
MB-13	Mobile mt; TS-50S	29⁹⁵	YK-455C-1	500Hz CW filter; TS-140S	99⁹⁵
MB-14	Mobile mt; TM-742AD	29⁹⁵	YK-88A-1	AM filter; R-5000	99⁹⁵
ME-1	Mem. expand; TH-28A/TM-251A	9⁹⁵	YK-88C-1	270Hz CW filter; R-5000	69⁹⁵
PB-36	7.2V batt; TH-235	19⁹⁵	YK-88S-1	2.4kHz SSB filter; TS-450	99⁹⁵
PB-37	12V 5w batt; TH-235	19⁹⁵			

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SOUTH CAROLINA: SM, Les Shattuck, K4NK—Greetings South Carolina amateurs. At this time, I have still heard nothing about any license structure changes. I had a great time at the breakfast and picnic in Myrtle Beach on March 27th. The Grand Strand club really put on a great feed and I sure enjoyed visiting with all my old friends. I will be speaking on April 20 to the Salkahatchie Club and attending the Hamfest there. Also the Greenville (upstate) hamfest will be history by the time you read this so my best wishes to them. I still need to encourage you to report news to me to put in this column. How about this: I will take a poll. How many of you have six or two meter SSB stations here in our section? Send me an e-mail (K4NK@aol.com) or drop me a post card. I'm looking for skeds on these two bands. Give me a ring. I'll post the results here in the next column. I want to again encourage you to QNI (check-in) with our QCWA net on Sat morning at 9:00 AM on 3.930 and the South Carolina SSB Net each evening at 7 PM on 3.915. If you don't yet have license for HF work get a receiver and tune in and listen. It will encourage you to study and get upgraded. We look forward to hearing you check in soon. Tfc (Mar): KA4UIV 120, W4DRF 116, KA4LRM 100, WA4UGD 23, W4CQB 7, K4QSY 6, KT4SJ 3. PSRR (Mar): KA4UIV 142, KA4UIV 127.

VIRGINIA: SM, Lynn Gahagan, AF4CD—ASM: W4TLM. SEC: K4EC. SGL: KK4IY. TC: W4IN. OOC: KR4UQ. PIC: W2MG. STM: AF4CD. March 23 was proclaimed by Governor Jim Gilmore as "Tornado Preparedness Day." The purpose of the drill was to provide businesses, schools, families and public safety organizations a means to practice their safety plans. The drill was kicked off with a simulated warning put out by the NWS NOAA Weather Radio statewide at 10:00 AM that Tuesday morning. Prior to the exercise, Mr. Claude Webster, the EM of Franklin Co requested that the ARES/RACES group headed up by W4TLM, EC Franklin Co, provide a communications link to the EOC in Richmond. Plans were put together by the EC to use all possible amateur modes available to them to get a test message through and returned. The communications by the Franklin Co group were successful. There was also activity between Roanoke and Franklin Co EOCs. A special thanks to W4YE, KC4DPY, W4HJ, W4BOT and many others for supporting this event. I ask all ECs to take the time to contact your EM in your area to let them know you can provide a service like this to them. This is very important. You cannot wait until an emergency happens and expect them to ask you to help out. You have to train with them to be effective. Does your Emergency Manager in your City or County area know that we can provide this service? There are plans to have a training session in the deep southwestern part of our section. K4EC and I are working out the details with DEC14. We plan to have this take place sometime in August. Do not forget about the event that is going to take place in Blacksburg at the NWS on July 24th. For more information, contact DEC 13, Bob Ham, KK4IY. Bob is putting together quite a large event with many speakers and subjects including tours of the NWS and the Earthquake monitoring site. Field Day is just around the corner. Get out and invite your neighbors and family members. Make a picnic or camping event out of it. I am pleased to report that in the month of March, 50 new hams joined our hobby in our section. That is up 150% over the previous 2 months. It's up to the rest of us to make sure they get off on the right foot. Do your part to make them feel welcomed to our hobby. 73, AF4CD. Tfc: K4DOR 866, KR4MU 302, N4ABM 262, K4MTX 258, WA4DOX 254, K4YVX 222, W4CAC 185, W3BBQ 110, W4UQ 73, W4HDW 56, WB4ZND 54, W4JFW 42, W4YE 38, AF4CD 32, K0IBS 29, K4ISM 24, KE4NYY 16, WB2KQG 14, KD4AXR 14, KE4PAP 10, K4JIM 9, W4JLS 9, KF4HJW 8, KE4HFX 6, KB4CAU 5, W4MWC 3, W4TZC 3, N4FNT 2.

WEST VIRGINIA: SM, O.N. (Olie) Rinehart, WD8V—STM: W8IMX. SEC: W8XF. ASEC-KA8ZOO: SGL: K8BS. TC: K8LG. OOC: N8OYY. ACC: WD8MKS. APRSC: W8XF. Well, we are going to make the deadline this month. We lost one full hour of our lives and my very valuable time with such a busy schedule. Daylight savings time is here, so I guess with what I save, I'll catch up. It is with very deep regret that I recognize the passing of one of the real stalwarts of Amateur Radio in the soul of K8QEW, George Puzzuole. George was among other things "State Emergency Coordinator" for 20 continuous years ending December 31, 1999, after he had been told that he a terminal illness. He was an exemplary gentleman, kind, considerate and helpful in all of his life's activities and a real role model as an Amateur Radio operator. "K8QEW SK" If any of you have not heard about "SWATCH", the program to use a communication satellite to download time and commercial messages on the 2-meter band, please check your QST, the Internet ARRL pages or get in with one of your ARRL officials (me), and help us fight this thing. 73. Tfc: K8MHR 350, KA8WNO 259, W8JWX 178, WD8V 130, KC8FTE 66, WD8DHC 65, W8FZP 49, W8WWF 36, PSRR: WD8V 221. KA8WNO 118. WVFN 1335/139/31 N8OYY. WYMDN 892/26/31 WD8DHC. WVNE 175/85/31 W8WWF. WVN L 127/56/31 W8WWF. Digital 326 K8MHR.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Tim Armagost, WB0TUB—ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0JLR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MYX. Tim, WB0TUB, and Eileen WD0DGL traveled to New Mexico and visited with SM Joe Knight, W5PDY, and many of the local Albuquerque hams. They were treated to a tour of the hub for the fabulous NM linked repeater system. Tim reports, "Wow!" Sounds like he was pretty impressed at the home-made controller consisting of dozens of homemade boards. A real class setup. Joe is looking forward to linking into Colorado as soon as he can find a partner here. Governor Bill Owens has proclaimed June 26 (Field Day) as Amateur Radio Day in Colorado. Thanks Mark, KG0PA, for

WARNING!

Save your life or an injury

Base plates, flat roof mounts, hinged bases, hinged sections, etc., are not intended to support the weight of a single man. Accidents have occurred because individuals assume situations are safe when they are not.

Installation and dismantling of towers is dangerous and temporary steel guys of sufficient strength and size should be used at all times when individuals are climbing towers during all types of installations or dismantlings. Temporary steel guys should be used on the first 10' of a tower during erection or dismantling. Dismantling can even be more dangerous since the condition of the tower, guys, anchors and/or roof in many cases is unknown.

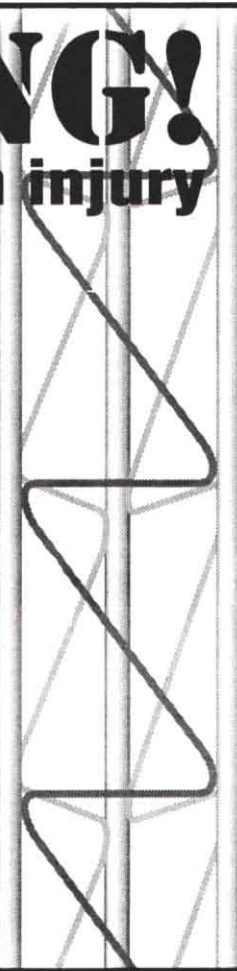
The dismantling of some towers should be done with the use of a crane in order to minimize the possibility of member, guy, anchor or base failures. Used towers are not as inexpensive as you may think if you are injured or killed.

Get professional, experienced help and read your Rohn catalog or other tower manufacturers' catalogs before erecting or dismantling any tower. A consultation with your local professional tower erector would be very inexpensive insurance.

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0503G	1-5	10-50	6	15/0.7	LPA	204
0508G	1	170	28	15/0.7	Standard	359
0510G	10	170	25	15/0.7	Standard	314
0550G	5-10	375	59	15/0.7	HPA	503
0552G	25-40	375	54	15/0.7	HPA	463

144 MHz						
1403G	1-5	10-50	6	15/0.7	LPA	160
1405G	1-2	100	14	15/0.7	Standard	291
1410G	5-10	160-200	28	15/0.7	Standard	323
1412G	25-45	160-200	22	15/0.7	Standard	283
1450G	5-10	350+	56	15/0.7	HPA	563
1452G	10-25	350+	50	15/0.7	HPA	516

220 MHz						
2203G	1-5	8-35	5	14/0.8	LPA	166
2210G	5-10	130	20	14/0.8	Standard	341
2212G	25-45	130	16	14/0.8	Standard	313
2250G	5-10	225	40	14/0.8	HPA	574
2252G	10-25	225	36	14/0.8	HPA	531
2254	75	225	32		HPA	489

440MHz						
4405G	1-5	15-50	9	12/1.2	LPA	305
4410G	10	100	19	12/1.2	Standard	362
4412G	15-30	100	19	12/1.2	Standard	352
4448G	1-5	75-100	25	12/1.2	HPA	423
4450G	5-10	185	35	12/1.2	HPA	579
4452G	25	185	30	12/1.2	HPA	539

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Standard=Mobile/Base 3x6x11 6lbs UHF or N
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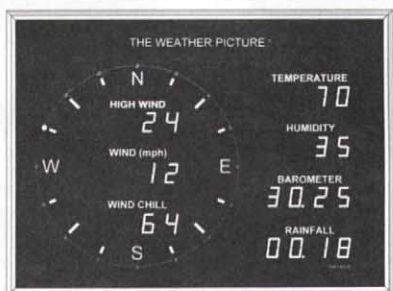
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making it happen. The MS-150 bike tour has dozens of hams helping throughout the course from Highlands Ranch to the Royal Gorge. This event spans multiple counties and ARES districts, runs multiple nets and uses different modes. This is a great opportunity to test multi-jurisdictional capabilities. If you wish to participate in this two-day public service event on July 10 & 11, contact Jerry, N0MY. You can usually catch him on the ARES VHF net, Sunday mornings at 8:30 AM on the Colorado connection series of repeaters. Hope everyone has a great Field Day! 73 de N0WPA. NTS Traffic: W5JCV 335, K0TER 122, N0UOD 50. CAWN: W0WPD 935, N0DKK 691, W0GGP 563, K0HBZ 550, A0AOZ 423, N0JUS 387, W0BOVET 345, K10ND 235, W0LVI 213, N0NMP 211, N7EQ 122.

NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5BIS & N5ART. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. New Mexico Roadrunner Net handled 134 msgs with 1271 checkins. New Mexico Breakfast Club handled 231 msgs with 1101 checkins. Yucca Net handled 18 msgs with 698 checkins. Caravan Club Net handled 5 msgs with 59 checkins. SCAT Net handled 40 msgs with 694 checkins. Four Corners Net handled 21 msgs with 419 checkins. GARS Net handled 5 msgs with 38 checkins. Rusty's Net handled 102 msgs with 744 checkins. Valencia County Net handled 6 msgs with 35 checkins. Looking forward to ABQ swapfest on April 24 and to the Mesilla Valley "Bean & Chili Feed" on April 25. Received the fliers for the Ft Tuthill (Flagstaff) Hamfest on July 23-25. W6ROD, WA6WZO, KD6XH and W1RFI will be present for this annual gala. Hope to see a lot of you there. The New Mexico ARRL State Convention will be held August 21-22 in ABQ (Rio Rancho Armory) with details to follow. The Alamogordo Hamfest to be held on Sept 4. I believe the Mega-Munch will be held June 5 at Conchas Lake State Park. The International Hamfest (El Paso) will be held Sept 18-19. The Socorro Hamfest is planned for Nov 13. Very sorry to report the passing of AG5H, W5QMR, W5SUU. Vy best 73, W5PDY.

UTAH: SM, Jim Rudnicki, N2Z7T—Greetings. Once again, we are saddened by a Silent Key. Ralph Frasier, W7CRU, passed away on March 17. Ralph was active in Utah Amateur Radio for many years. He was a charter member of the DCARC along with being the State Director for MARS. He was an invaluable asset to our community in many ways besides radio and will be greatly missed. In other news, by the time you read this the election for Utah's SM will be completed. Be sure to get your ballot in on time. If you want a say in who is the next SM, you better vote! Many thanks and best wishes to both candidates, Mel Parkes, N5UVP, and Tom Schaeffer, N4Y4. Both of these gentlemen have previously held club prez positions, and each of them would bring unique talents to the SM position. May the best man win! Not much else to report. It's been a quiet month. 73 de N2Z7T.

WYOMING: SM, Bob Williams, N7LKH—With the concerns about the approach of Y2K, it seems a good time to review the WY Section staffing of ARES. There are a number of DEC and EC vacancies that could profitably be filled. Area 1 needs a DEC. Area 2 needs a DEC and an EC for Goshen County. Area 3 needs a DEC and ECs for Crook County and Weston County. Area 5 needs a DEC and ECs for Teton County and Sublette County. There are also RACES vacancies in each of the areas. Your Section Staff is seeking volunteers to fill all of these vacancies. Anyone interested can contact me or John Cochrane, WA7H, the Section SEC, or any of the Section ECs to make your interest known. No experience is necessary. There are some new NTS appointments announced and among them is the announcement that Duane Shillinger, NN7H, has been appointed Member at Large of the Pacific Area Staff. Congratulations to Duane! Duane also scored 140 points for the PSHR for the month of February. Net QNI/QTC/ Sess: Wyoming Cowboy Net 920/0/23; Wyoming Pony Express 196/4/4. Hercules VHF Net 101/0/3.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ—ASMs: N4ZNO N4YQQ W4XI KT4XA KB4QY K74JW K4APKB. STM: WB4GM. BM: KA4ZXL. OOC: WB4GM. SGL: KU4PY. ACC: K4LI. SEC: AF4HE. In June, the public schools will be out for summer break, and scores of children will be eagerly looking for something to do. Let's take advantage of this opportunity to educate them about our hobby. One good way is to demonstrate our hobby during Field Day, which is June 26-27. Lawrence Thompson, KE4RPX, stepped down from being Section Government Liaison (SGL). Lawrence did an excellent job, and was responsible for the creation of the Amateur Radio Car Tag Design that we all enjoy today. AL Section will miss him, and we wish him well. Richard "Rik" Doll (KU4PY) stepped in as the new SGL. Other changes in the section cabinet are Walter Verney (AF4HE) is the new SEC and Gene McGlaughn (WB4GM) is the new OOC. Let's thank them for helping. 73, Bill, KR4TZ.

GEORGIA: SM, Sandy Donahue, W4RU—ASM/So Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. SEC: Tom Rogers, KR4OL. STM: Dick Baxter, K5TF. SGL: Charles Griffin, WB4UWV. TC: Eddie Kosobucki, K4JNL. ACC: Jud Whitley, W4NZJ. OOC: Monroe Gaines, KF4NXD. PIC: Chuck Calmbacher, AD4JUJ. I have news that local clubs can make a difference in their community. In Gainesville, the Lanierland ARC managed to get a county tower ordinance to completely exempt ham towers from restrictions. Pres Terry Jones, W4TL, credits club member N4HGO with leading this effort. In Albany, the new owners of a tower that was part of the Albany ARC repeater system slapped on hefty rental fees the club could not afford. The club went to the local paper and an Albany TV station with the ham story, and before too long were offered new sites at no cost. Clubs are the backbone of our hobby. June hamfests: Atlanta, June 5-6, Albany, June 11-12, and Rome, June 12. Don't forget the Gainesville hamfest is July 10. Nearly 100 avid VHF-UHF enthusiasts from all over the country attended the 3rd annual Conference sponsored by the Southeastern VHF Society. N2CEI was awarded the prestigious K4VHF award. K1ZZ, from ARRL HQ, was the last minute banquet speaker. I had a good time at the Ga Phone nets picnic. Contesters mark your calendar. The new Georgia QSO party is Aug 28. It is sponsored by the South-

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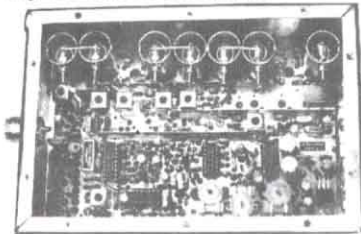
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eastern Contest Club. Once again, your SM will make a culinary tour of some Field Day sites in North Ga. Feb: K4BEH 195, WB4GGS 173, KA4HHE 117, W4AET 85, AF4NS 74, K1FP 44, K4BAI 8. Tfc March: W4AET 212, WB4GGS 193, AF4NS 179, K4BEH 150, KA4HHE 120, K1FP 105, K4BAI 13. 73, Sandy

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—ASM-APRS: WY80. ASM-Youth: KO4TT. ACC: WA4B, BM: N4GMU. OCC: WB4GHU. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. PACKETT: N4GMU. The National Hurricane Conference was held in Orlando, and the Amateur Radio forum was attended by several local hams on March 30. Their attendance was greatly appreciated. Some of the speakers were not present due to illness. Steve Richbourg, KO4TT, made a good presentation on how the West Panhandle District was operated during disasters. The theme for this meeting was the handling of emergency communications during Georges. Presentations by Rick Palm, ARRL, on the role of HQ in supporting Amateur Radio disaster operations, John McHugh, Amateur Radio operations in support of the NHC, Steve Hailey, American Red Cross, and Jerry Herman, role of Hurricane Watch Net during the 1998 season. John Fleming, SEOC, presented comments as to where Amateur Radio will be in the next 5 to 10 years. The point was well made as to we should get our act together stop the bickering and back biting and become unified. His remarks were very direct and, in fact, a warning to the radio operators to become more active or lose our frequencies. Yours truly tried to speak, but due to severe virus could hardly talk. I am sorry I could not have made a better presentation, but time was short. The Governors' Hurricane Conference will be in Tampa, June 1. The NFL Section lost a dedicated Amateur Radio operator, namely, Darrell, AD4CL, who became a SK. Darrell will be missed as he gave his best as DEC of the W Central District. A meeting will be held at the SEOC May 15, 1999. This will be by invitation because of space limitations. The ARRL staff and appointees are invited, but RSVP to Nils, WA4NDA, to assure we do not break any fire restrictions. 73, de Rudy. Tfc: KE4OAV 467, KF4PRB 271, NO2O 192, NR2F 184, KF4TQX 142, N4ORZ 141, WB8NER 98, W5MEN 93, AD4DO 83, AF4GF 76, KF4GUA 70, WB2FGL 70, W4KIX 56, KF4TM 42, N4JAQ 35, WB2IMO 34, KC4FL 22, WA4EYU 22, N4GMU 22, KJ4HS 20, KU4LY 18, KM4WC 10, AB4PG 8, W8IM 5, KF4YK 5, N1RT 4, N9MM 4, WB9GIU 4.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St Croix—ASM: Drew, NP2E, St Thomas. ASM: Mal, NP2L, St John. SEC: Vic, WP2P, St Croix. PIC: Lou, KV4JC, St Croix. ACC: Debbie, NP2DJ, St Thomas. NM: Bob, VP2VI/W0DX, Tortola. St Croix ARC planning to assist in America's Paradise Triathlon again this year. This is a world-class event, bringing a lot of visitors and good publicity to the islands. 147.25 repeater on St Croix still with it's hurricane rated antenna which never got changed to the high performance unit. As it is so close to "season," the antenna will remain as is. Paul Jordan, NP2JF, will be Field Day chairman for KP2SJ (St John) this year. Tentative plan is to use his property atop Giffett Hill as the site. Work party also on St John, Saturday 4/10, to take down tower at the clinic. No longer needed after move of repeater to Bordeaux Mountain. Plans in the works for St Croix ARC to have Field Day at the east end fire station. That's it, all hoping for an uneventful hurricane season. 73, John, NP2B.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—The DX convention in Fresno was excellent. Vendors displayed various new products and the different talks/classes on the hows and ways of DXing were very well done and informative even to a newcomer like me. Art Phillips, NN7A, gave a talk with pictures on his trip to Turneffe Island, as V31JZ, in Belize Central America. His idea of a DX-expedition is the correct way, an air-conditioned room with cold liquids. If you missed this event, plan to attend next year at the Holiday Inn in Visalia, April 7-9, 2000. Ned Stearns, AA7A, and Frank Smith, NH0W, were on a DX-expedition to Rodriguez Island from April 1-12. I hope they enjoyed themselves and made many contacts. The FCC has done away with the FCC 610-A form, Reciprocal Operating Permits. This means that visitors to our country may operate in the US without submitting any FCC paperwork-provided that a reciprocal operating agreement is in effect between the two (2) countries. The only documentation required is proof of citizenship and an Amateur Radio license by the country of citizenship. Also the ARRL has informed the US State Department that it plans to go forward with arrangements to issue international Amateur Radio Permits to US hams in accordance with the CITEL Amateur Radio convention. This new rule will not change the regular procedures for US hams wishing to operate overseas in countries that are not CEPT members. Public service events have started. Is your club or organization helping with these community events? If not, call and I can help you get started. We need to be involved with our community. Yuma County has a new District Emergency Coordinator, Robert Dahl, KA6LSL. 73, Clifford Hauser; KD6XH. Net QNI/QTC/secs: ATEN 1004/192/31; ACN 1099/95/31. Tfc: K7VVC 827, AB7NK 198, W7EP 93, W7UQC 56.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., WB6F—Our ASM, ADOA, Jerry is acting Southern California Net (SCN) manager and he wants you to know that the net activity is growing, thanks to K6GZ, Bill in Hesperia. We now have coverage into the Victor Valley and Palmdale areas. The SCN group meets M-F at 7:15 PM on 3598 kHz and visitors are most welcome. The net will accommodate your speed differential as needed. So don't be bashful, just check in and join the fun. ADOA, Jerry also reports a traffic total of 132. KA6GSE, Dennis, our super active DEC/SEC assistant, has provided another great speech on "Cell Phone Technology Today" to the San Gabriel Valley Radio Club, according to Jami Smith, KK6CU, club secretary. Andy Romanisky, WA6WDX, has given his outstanding slide show on Hams in Russia, China, Brazil and elsewhere at the 50 Club and the San Fernando Valley ARS, in the Northridge Hospital most recently. Andy is a Sheriff's Deputy, living in the Northridge area. Art Goltz, N6ZZF, needs volunteers to teach Amateur Radio to the sight

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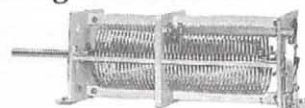


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ORANGE: SM, Joe H. Brown, W6UBQ—The folks at BCWS remind us "FIELD DAY IS COMING SOON. CONTACT YOUR CLUB'S FIELD DAY CHAIRMAN." But, Citrus Belt ARC's Modulator said it best: "We would like to invite you to the last Field Day for this Century!" Hats off to all the WARA members who supported the Leona Divide 50-mile Foot Race, to CNARC members who supported the Corona Classic Lions' Club Bike Ride, and to the dozens of clubs and amateur organizations who supported the annual law enforcement Baker-to-Vegas Challenge Cup Race—all happening in April. W6UBQ mentioned that new officers for Concordia ARS are Pres, Carol Rodrigues, KF6FNS and VP Brian Surridge. IECARO will hold a raffle drawing in either May or July for an HF station or a nice, comparably priced, 2M station. Contact Chairman, Fred Roberts, W6TKV@arri.org for information. Several Y2K websites of interest: State of CA OES at www.oes.ca.gov — Co of San Bernardino www.rco.sanbernardino.ca.us/y2k - Am Red Cross brochure at www.redcross.org/disaster/safety/y2.html Lee De-Forrest's KF6ABO reports, "The City of Hemet is considering activating the city EOC, including Hemet RACES, on 12/31/1999 so the city will be ready if there are any widespread problems when 1/1/2000 hits. If you're interested in SKYWARN, contact Ed Clark at edwin.clark@noaa.gov or call him at 619-675-8700, and he will be happy to come and give your group a talk on it as well as on the national Weather Service. From ARA, "Volunteers needed for Orange County Fair," July 9 thru 25. If interested, contact Marcia Bruno, N6ISW, 714-775-6095. Fullerton RC had the following members support the Fullerton Junior Tennis Tournament: KB6CMO, KE6TZU, AC6LC, W6ZJE, KE6TZR, AC6MV, K2OHH, N6WJ, K6HXO, KE6IPY, KE6STZ, K4TAT, KC6HYM, KD6FID, W6ZKZ, WA6OPS, N6OXG, N3IVO, K6SM, KF6SLP, K6MHD, and KE6UQQ. Fine business, all! STM N6GIW reports for March 99: Tfc totals: KO6RZ 248, K6GSKK 220, W6QZ 114, KD6EY1 23, AD6HR 20, KJ6NK 15, KA6TND 6. PSRR: W6QZ 152, K6GSKK 152, KO6RZ 133, AD6HR 98. Dig tlc: W6QZ NTS BBS 310, N6GIW NTS Mailbox 310. SCN/V Mgr KO6RZ reports 30 sess, QNI 257, QTC 187. Vy 73, KE6JOF for W6UBQ.

SAN DIEGO: SM, Tuck Miller, K6ZEC, 619-475-7333—It was like a kid in a candy shop. I had the opportunity of going to Newington, Connecticut, and visiting ARRL HQ on April 5. While there, I had the pleasure of meeting for the first time, several folks of whom I have worked with over the last few years. Jo-Ann Arel, Steve Ewald, John Hennessee, Ed Hare, W1RF1, Jon Bloom, the folks in the DX department, Kathy Capodicasa, Bob Inderbitzen, Tom Hogerty, Penny Harts, Dave Sumner, Rick Palm, Rosalie White and many other folks of which I got to meet briefly. After a morning of doing some video taping, I walked over to W1AW and worked the radio station on 20 meters, and made a few contacts back here to Southern California. Fried, WA6WZO, Harry, WA6YOO, and Howard, KR6AH, were able to make it through the pile-ups and make contact with the station. During the visit, I attended the Newington Amateur Radio League club meeting, and met some great folks there. For Easter Sunday, Betsey Doane, K1EIC, had me over for dinner, and what did we have? Ham, of course. If you would like me to show the video I took, let me know. Field Day is fast approaching. Please let me know where your club is operating, as once again, I would like to visit briefly at each site. DX convention was great, looking forward to Visalia next year. Tfc: KT6A 873, KD6YJB 356, WA6ODQ 208, KD4WMI 17, KD6IVF 12, KO6BU 6. PSRR: KT6A 138, WA6ODQ 128, KD6YJB 91. 73, Tuck, K6ZEC.

SANTA BARBARA: SM & STM, Rob Griffin, K6YR 805-543-3346 & k6yr@arri.org—SEC: Jack Hunter, KD6HHG. AAC: Michael Atmore, KE6DKU. OOC: Howard Coleman, W6HQA. PIC: Jeff Reinhardt, AA6JR. TC: Warren Glenn, KM6RZ. ASM: Don Milbury, W6YN. DECS: SB- Dave Lamb, WA6BRW. SLO- Bill Peirce, KE6FKS & Ven- Dave Gilmore, AA6VH & Webmaster, Jack Bankston, AD6AD. The Santa Barbara Section Web Site address is <http://www.qsl.net/arri/b/> Jerry VerDuft, AD0A, is the new Net Manager for the So Cal Net/CW, replacing SK, W6ZRJ. SCN/CW meets Mon thru Fri on 3598 kHz at 1915 local. SCN/CW is THE PLACE to improve both your code speed and skills, and practice traffic handling. YOU set the net code speed. SW Div Vice Dir, Art, W6XD & your SM are frequent net participants. QNI Tonight! August 15 has been set for the 99 SBARC ARRL Hamfest in Goleta. The Amateur Radio Spectrum Protection Act of 1999 has been introduced in Congress as HR 783. I will be contacting the US Reps serving our Section to broaden sponsorship. Your support letter will help. Check into our Section traffic net SCN/5B, held on most evenings at 2100 local on 147.000 + (131.8), 224.90 - (131.8) & 448.875 - (100). PSRR/Tlc: K6YR 170/187 KF6OIF 122/- & KM6RZ -/8. That's 30, Rob, K6YR.

WEST GULF DIVISION

NORTH TEXAS: SM, Don Thomas, KA1CWM—SEC: K5UPN, STM: KC5OZT. TC: W5CWO. BM: KB5YAM. SGL: N5GAR. OOC: W5UDJA. ASMs: KK5K, K5RE, W5FB, KK5QA, KK5NA, KC5ECM, AD5X, W5GPO. We recommend that section hams visit the section Web page often at (<http://www.lsic.net/net/ntexas.html>) Tom Blackwell, N5GAR, the Section's SGL recently participated as a judge for the Dallas Morning News/Toyota Regional Science fair and awarded prizes to Katy Burton, Senior Division, and David Strauss, Junior Division, for the best projects in depicting "Topics in the ARRL Handbook." Congratulations to the winners, and to Tom for his participation in this worthwhile science fair. Each year the biggest Ham gathering in the West Gulf Division and in the North Texas Section is Ham-Com that is scheduled for Friday, Saturday and Sunday June 11, 12 & 13, 1999. This year they have come up with a group of outstanding speakers. Don't forget to attend the ARRL Forum scheduled to be held beginning at 1:00 PM on Saturday, with Riley Hollingsworth, K4ZDH, from the FCC as the guest speaker. I think you will find this program very interesting and informative. I would like to see all Section appointee's at this year's forum. In addition to Hollingsworth, ARRL General Counsel Chris Imlay, W3KD, and Joe Bottiglieri,

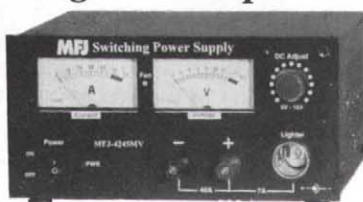
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QST's Product Review Editor will also present programs at this year's event. The Annual SKYWARN Class put on by the National Weather Service will be held on Sunday Morning. We are looking forward to visiting with a great number of you there. Field Day is just around the corner, and this gives everyone an opportunity to try your skills setting up and operating under emergency conditions. Remember to make it a fun event. I hope to visit as many Field Day Sites as possible this year. The D/FW and Coppell Clubs recently had a very interesting and informative program put on by Larry Lloyd, N5TDG, on the Y2K situation and personal preparation in the event of problems. Other clubs may want to hold a similar program before year's end. March traffic: N5JZ 282, K5AO 263, K5VLW 154, K5OZT 141, K5EIV 83, KB5TCH 80, WA5I 77, K5MXQ 76, KB5YAM 55, AC5Z 19, KD5AHW 10, KD5FBJ 7, K5SMC 6. Congratulations also go to N5JZ, James Dye, who qualified for Brass Pounders' League with 132 original deliveries.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, K5CPZ. SEC: W5ZTN. STM: AB5RV. ACC: KB5BOB. PIC: WA9AFM. OOC: K5WG. SGL: W5NZS. TC: KB5RV. Green Country hamfest was another great success. The testing session produced 18 new hams and upgrades. Enjoyed seeing and meeting a lot of new faces. There is a new group forming to support the NWS in OK are planning on using GPS trackers and APRS while in the field to provide more accurate information while spotting. There was a terrific workshop held at Philbrook on APRS/GPS with about 40 in attendance. Rogers County Wireless has a new club call WR5CWA. SCARS/OUARC has a new SKYWARN Coord. N5UWY has moved to Chicago, we'll miss you Pete! Steve Pierce, W5BIV, has moved to Edmond, vacating his VP office with SCARS. Tom Miller, KD5ENL, has been elected to fill the vacancy left by Steve. Steve plans to become active in EARS. Reports are that AO-27 is working great into OK. Stillwater will have its FD at the new RC club station. The Ada club will be held FD at the municipal airport. TRO will be at Zink Park. TARC will be moving to the Skiatook Lake Overlook. Send me information on your FD event. I'll be touring the state, and will see if I can make it by your site. Check the Web for additional OK news and events. <http://www.buaprod.com/k5ttt> 73, Charlie. Tfc: KF5A 680, WB5NKC 567, N5IKN 502, K5GBN 345, WA5OUV 89, WB5NKC 73, AB5RV 58, KE5JE 56, KC5VOG 44, K5GY 44, W5REC 40.

SOUTH TEXAS: SM, E. Ray Taylor, N5NAV—ASMs: NR5ED, N5WSW, W5GKH, K5DG, N5LYG, WA5U2B, K5SCA, WA5TUM, KB5AWM, WA5JYK, K5PFE, and K5SBU. STM: W5GKH. SEC: K5DG. ACC: N5WSW. PIC: KA5WSS. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: KM5HY. June is the month for Field Day. I've heard some reports of the preparation that is already underway. One thing I would like to see is for some of the groups to set up in some of the different EOCs. You will have to make previous arrangements with the Emergency Management Office in your area. The real purpose of Field Day is to see how fast you can respond to a site, set up your equipment and be operational for an emergency, should one arise in your area. Then the contest begins to check your endurance for long operating hours. Don't forget to send an ARRL Radiogram to your Section Manager. It's worth 100 points, and teaches you the art of traffic handling. You can send your message through one of the traffic nets. This will acquaint you with the traffic nets, and also get them involved in the Field Day activities. I will be monitoring them most of the day and night. I'll either be mobile or visiting one of the sites like I did last year. I like the location that Alan Cross, WA5U2B, chose. Note the possibility of someday setting up in a location such as that for flooding, etc. Alan, if you're close enough to the water's edge, you might have a fresh fish fry. Hi. Plan on taking would-be Hams on your Field Day event. This would help to encourage them to get their license. This will be the last Field Day for this century, so let's make this the best yet. I would like to hear from the Valley, Laredo, and Del Rio this Field Day. It seems that a month doesn't go by lately without a disaster here in South Texas. On March 12 and 13, we had 9 tornadoes touch down over a 500-mile area. The National Weather Station called me early to advise me of pending danger. Then at 9:30, they called and asked me to bring up the net. I want to take this opportunity to thank all of you who gave of your time so readily. I don't have space to list all the call signs. Corpus Christi Weather also activated and assisted. Houston Weather Station is now getting HF installed, so they will be able to join in with their assistance. For those who have a complaint as to the why I activate an emergency net, or the way I run it, I have never activated a net without a request from one of the served agencies. I also don't close a net until all the personnel in the field are accounted for. Case in point, when the offices closed, as the flood of 1999 subsided, the Red Cross, Salvation Army, and Baptist Men's Kitchens, in the field, ask if I would hold the net open until hard line phone service could be installed at their sites. Cell phones had failed, so we remained operational for another 18 hours. Have a good month and God Bless. Tfc: W5YQZ 619, NR5ED 303, W5EGK 191, W5KLV 182, KA5KLU 117, W4RRX 99, W5GKH 92, N5NAV 87, WA5FXQ 75, K5UCQ 60, N5OUJ 49, W5ZX 42, KD5GM 23, N5LF 20, K5VY 16, N5HK 14, N5JUU 3.

WEST TEXAS: SM, Charlie Royall, WB5T, 915-944-0469, cnroyall@wcc.net—ASMs: Cley, K5TRW; Ron, KB5HGM; Jerome, K5IS; Fred, W6VPI; Sandy, W5MVJ. SEC: Alex, N5LRH. OOC: John, KO5D. OBM: Frank, N5WT. Despite rumors, Mike Smith, W5MLS, is NOT a Silent Key! Congrats: Dr. L. Nickey, KB5BDY, El Paso, appointed to US-Mexico Health Commission by President Clinton; also to Bill Richards, WB5ZAM, San Angelo, for DXCC Honor Roll-318 confirmed & 324 worked. Took 19 years of dedication! March ARRL membership WTX-825. Sun City ARC, El Paso, voted for ARRL affiliation; glad to have a back! Welcome 18 new hams: 13 Lubbock area; 1 Midland; 1 Odessa; 2 San Angelo. Midland Hamfest was another good effort. Tnx to the Harwoods and staff for their hard work! Field Day events being planned all over the section. Good luck to all. It's good prep for Y2K! Big Bend & San Angelo ARCs performed to usual high standards during Big Bend annual off-road bike races over some of the most rugged ground in TX. SKs: Hugh Curtis, WA6H0I, San Angelo, also Jim Underwood, WB5NTJ, Andrews, from injuries in crash of his ultra-lite aircraft. CUL, WB5T.

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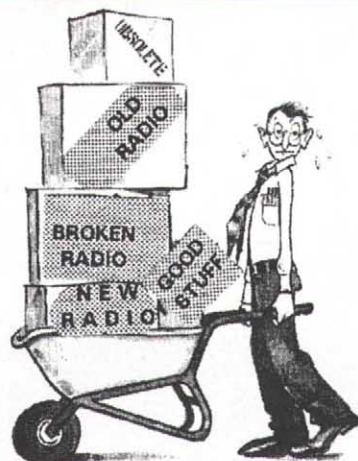


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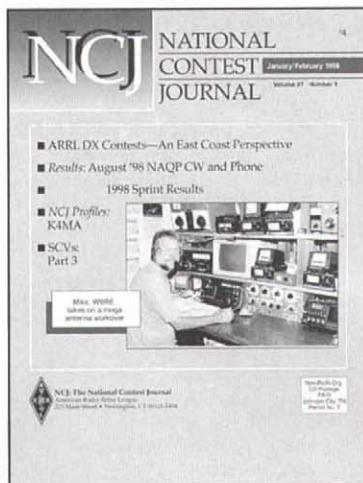
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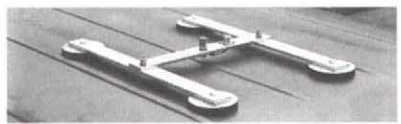
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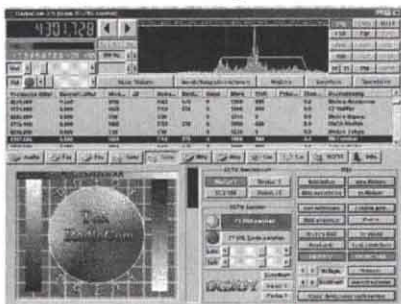
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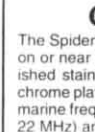
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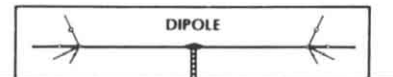


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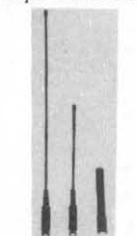
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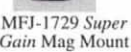
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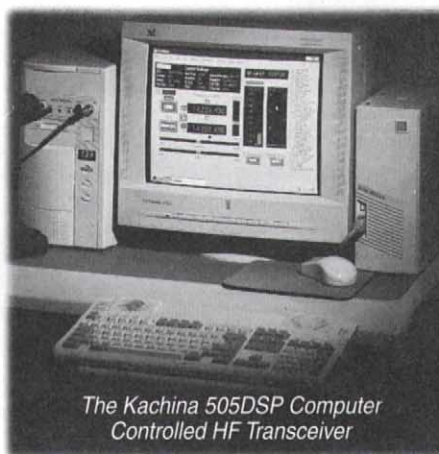
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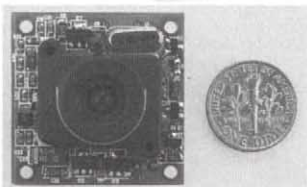
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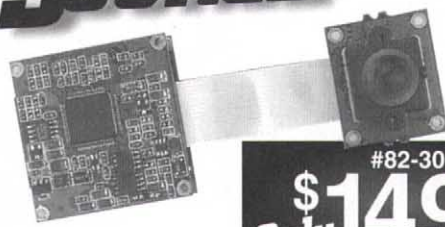
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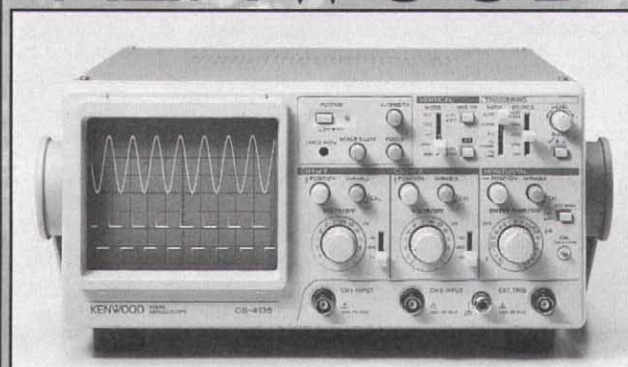
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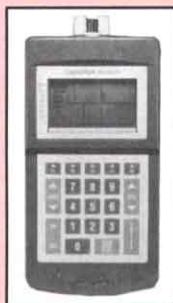
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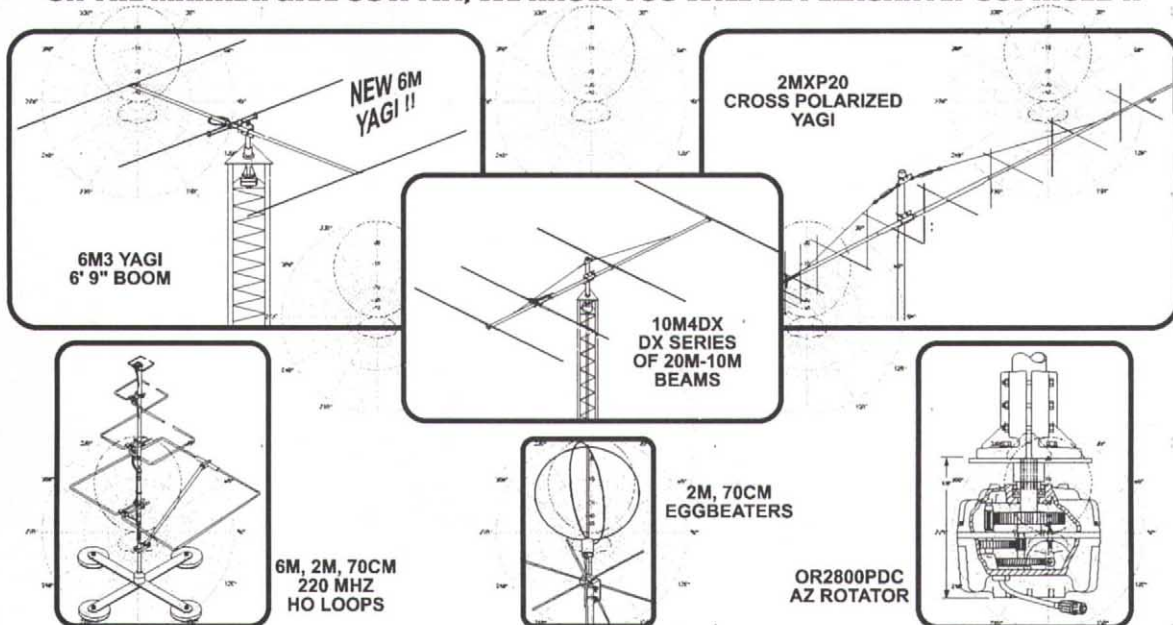
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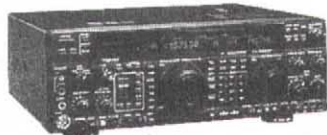
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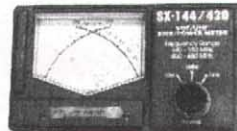
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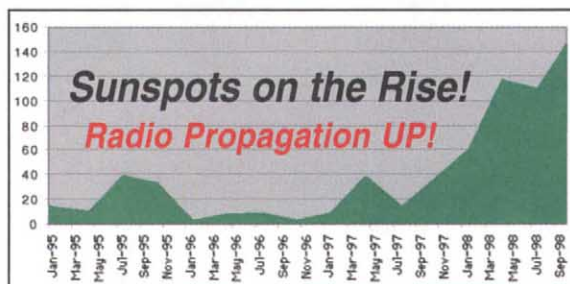
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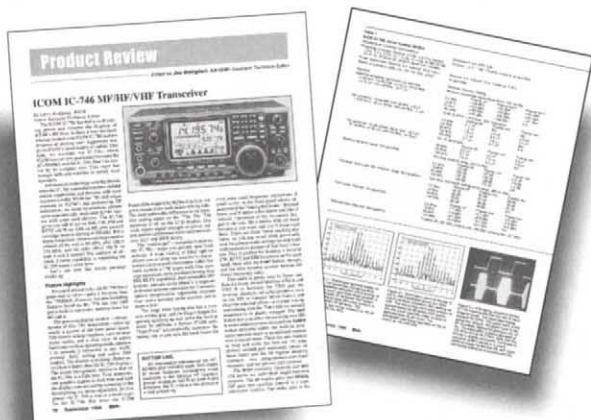


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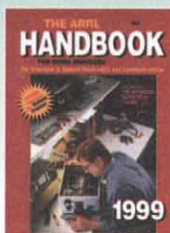
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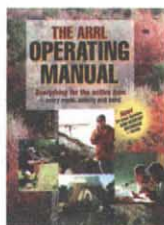
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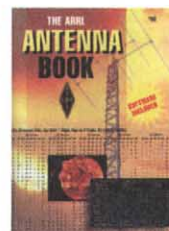
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