Official Journal of
ARRL
The national association for AMATEUR RADIO

# QST

devoted entirely to
# AMATEUR RADIO

February 2001

## QST reviews

- ICOM IC-R3 communications scanner with TV
- ICOM IC-PW1 HF/6-meter amplifier

## FOØAAA Clipperton Island

## Maximize your receiver's selectivity

## Build the world's smallest CW practice oscillator


$4.99 U.S. $6.99 Can.


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

- K5K member, Bob Allphin, K4UEE


# 3 OF THE TOP 6 DX'PEDITIONS IN HISTORY!

**Three of the top six DX'peditions in history!**
**Three remote locations!**
**38 operators!**
**The radios?**

## IC-756PRO

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

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

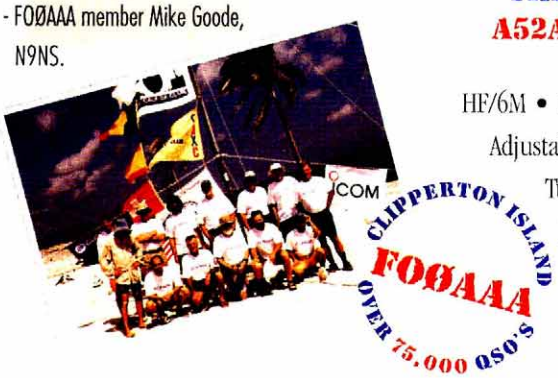
- A52A member Glenn Johnson, WØGJ

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

- FOØAAA member Mike Goode, N9NS.


**THE EXCLUSIVE RIG OF FOØAAA-CLIPPERTON ISLAND, A52A-BHUTAN, AND K5K-KINGMAN REEF DX'PEDITIONS.**

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

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*CQ, January 01*

"The ICOM IC-718 offers a nice collection of the more desirable features that are typically absent from transceivers in its price class."
*QST, July 00*

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*Digital Signal Processing (DSP). With the optional UT-106 installed, you can enhance the superior receiver performance. The IC-718 is the only rig in its price range to offer you the choice!*

## IC-718 features

- Simple Operation
  - One Touch Band Switching
  - Direct Frequency Input via 10 Button Keypad
  - Auto Tuning Steps (TS). Senses the rate the knob is turned
- Easy to Use Front Panel Controls
- Microphone Compressor
- IF Shift
- 100w of Output Power (40w on AM)
- Meter Functions (Output Power, ALC, VSWR)
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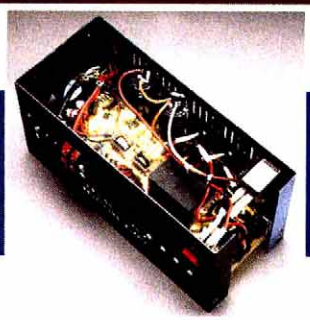
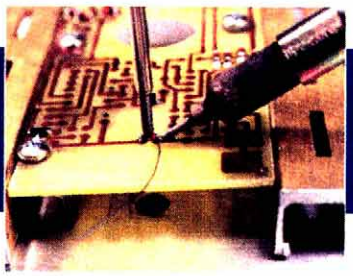
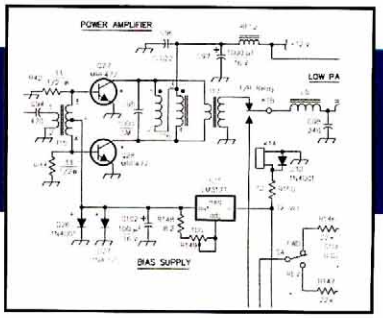
**Use it, and you'll tackle Amateur Radio state of the art.**





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This latest edition features up to date discussions and explanations in applied electronics and communications. The contents are enhanced by more than a thousand drawings, photos, and tables. Learn how to put new technology to work. Explore a new chapter on digital signal processing.

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- New material on computer hardware
- Computer connector pinouts
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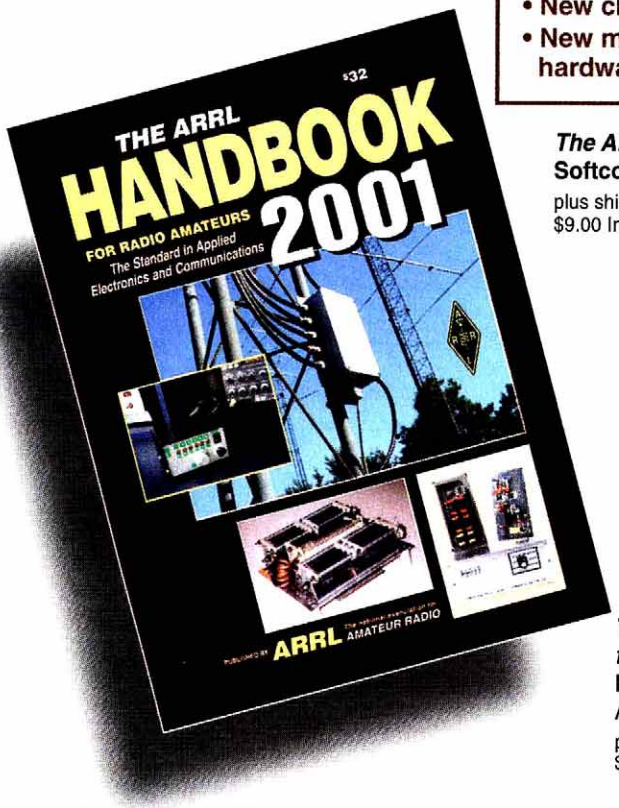


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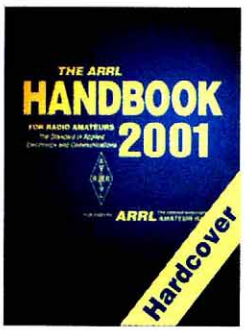


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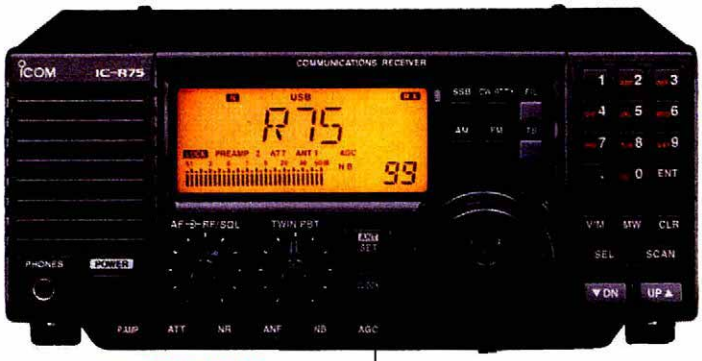
QST 2/2001




## IC-R75 *SAVE $200*

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Commercial grade • synchronous AM detection (S-AM) • optional DSP with auto notch filter • all mode • triple conversion • twin passband tuning (PBT) • front mounted speaker • large display • well spaced keys and dials • 1000 memory channels • up to two optional filters • PC remote control with ICOM software for Windows®.

*"A versatile HF/6-meter receiver that offers a good measure of performance in a compact package. All mode capability for the ham and utility listeners and synchronous AM for the SWLs should make the IC-R75 a popular choice for a wide variety of radio enthusiasts."*—QST, 1/00

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See page 10 for detailed contact information.

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## Technical




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## News and Features



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# QST Workbench



60

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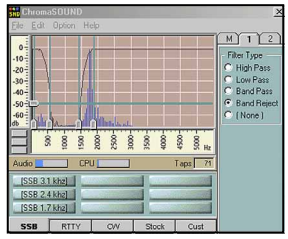

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# Departments




**Our Cover:** Clipperton Island was one of the most-worked DXpeditions of 2000. The FO0AAA crew consisted of (standing, l-r) Renato Ruesch; James Brooks, 9V1YC; Jim Mornar, N9TK; Mark Demeuleneere, ON4WW; Bob Allphin, K4UEE; John Kennon, N7CQQ; Charlie Hansen, N0TT; Mike Goode, N9NS; (kneeling l-r) Eddie Stark, EA3NY; Doug Renwick, VE5RA; Doug Faunt, N6TQS; Willy Ruesch, HB9AHL and Koji Fukui, JK7TKE. Read their story beginning on page 54.


**US & Possessions:** Membership in the ARRL, including a one year subscription to *QST*, is available to individuals at $34. Age 65 and over, with proof of age, $28. Licensed radio amateurs age 21 and under and the eldest licensee in the household may qualify for the following rates: Age 12 and under, $8.50 and age 13 through 21, $16.00. Life Membership, in-cluding a subscription to *QST* is available at $850.* Age 65 and over, $700.* Membership and *QST* cannot be separated. Fifty percent of dues is allocated to *QST*, the balance for membership. Subscription rate for libraries and institutions is $34 per year. Single copies $5.

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To compensate for additional postage for mailing outside the US, the following rates apply:

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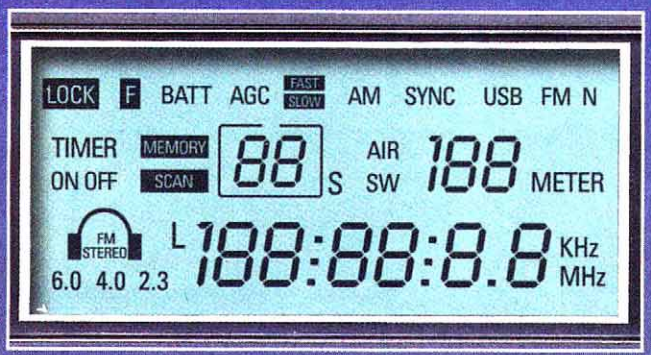
# GRUNDIG The Ultimate in




**The LCD**
Big! Bold! Brightly Illuminated 6" by 3½". Liquid Crystal Display shows all important data: Frequency, Meter band, Memory position, Time, LSB/USB, Synchronous Detector and more.


Ultra fine-tuning of 50Hz on LSB/USB, 100Hz in SW, AM and Aircraft Band and 20 KHz in FM.

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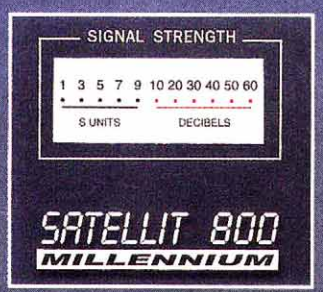
Elegant in its traditional Analog design, like the gauges in the world's finest sports cars. Large. Well Lit. Easy to read.




**The Frequency Coverage**
Longwave, AM and shortwave: continuous 100-30,000 KHz. FM: 87-108 MHz VHF Aircraft Band: 118-137 MHz.

**The Tuning Controls**

- For the traditionalist: a smooth, precise tuning knob, produces no audio muting during use.

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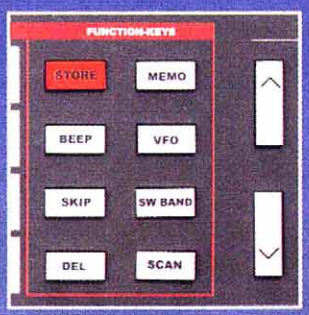
# Digital Technology


**The Operational Controls**
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**The Technology**
Today's latest engineering:
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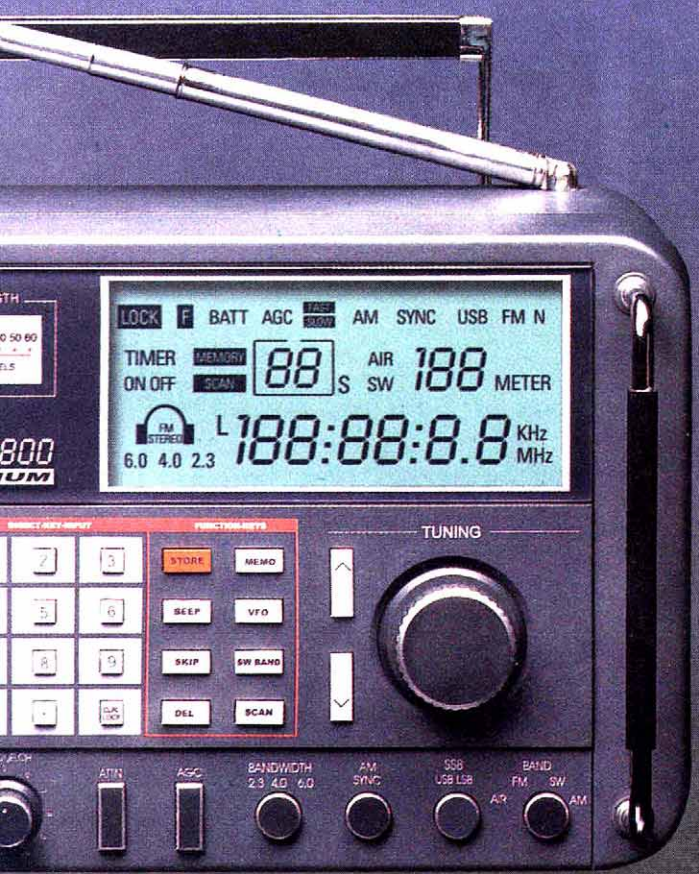


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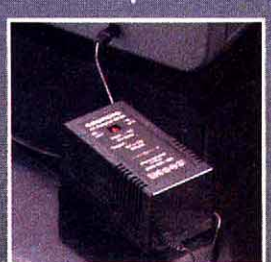

**Dimensions:** 20.5" L × 9" H × 8" W

**Weight:** 14.50 lbs.

by GRUNDIG

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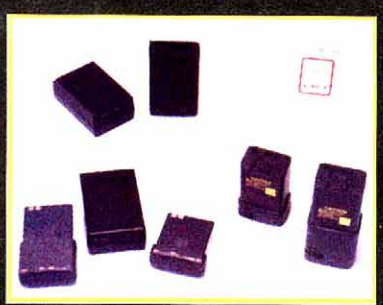

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As low as
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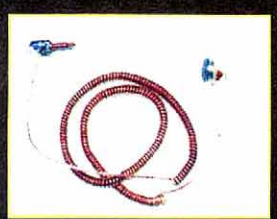
Suggested Retail

**PMC-200 Advanced Desk Mic:** This desktop microphone features adjustable compression with a built-in analog meter to make adjustments easy! It has both locking and momentary PTT, and a graphic equalizer so you can tailor your on the air audio to your own personal tastes!



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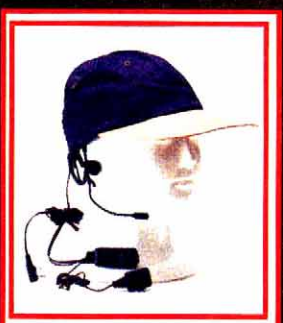

**SPM-400 Series mini boom microphones:** The SPM-400 series headsets include an in-the-ear speaker and a patented rubber-covered earloop design that adjusts to comfortably fit either the right or left ear of any user. The unit features an in-line Push-To-Talk switch that can be clipped to the user's lapel or belt, or the unit can be keyed remotely using an optional remote cord. The SPM-400 is available wired to fit most of today's popular handheld radios.

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As low as
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## *MANY* more accessory models are available!

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# "IT SEEMS TO US..."

## More Than *QST*

Most ARRL members think of *QST* as the primary benefit of membership. This is gratifying to the staff, column conductors and authors who work hard to bring you your membership journal each month. Since 1915 *QST* has been the principal chronicle of Amateur Radio accomplishment. While there are many fine Amateur Radio periodicals produced by IARU member-societies and commercial publishers around the world, we like to think of *QST* as the standard of comparison.

But the ARRL is much more than just a magazine publisher. It is the national association for Amateur Radio. You get a lot more than *QST* for your membership dues and other financial support.

To many ARRL members the need for an effective national voice for Amateur Radio is so self-evident that it requires no justification or explanation. It is a function the ARRL has been performing since 1914, predating even *QST*, and so it is only natural to take it somewhat for granted. But the environment in which Amateur Radio exists is increasingly complex and dangerous. Not long ago it was rare to see a story in the mainstream media about a proposed new use for the radio spectrum; now they appear almost daily.

In response to this trend, a large and growing proportion of our organizational resources must be devoted to advocacy on behalf of Amateur Radio. We maintain an office in the Washington, DC, area with four full-time staff, devoted to interfacing with the federal government on technical issues such as ITU conference preparations. While the ARRL is but one of his law firm's clients, General Counsel Chris Imlay, W3KD, spends much of his time on our behalf. We retain a legislative relations firm to support our efforts on Capitol Hill and to monitor legislation in the 50 states that could affect Amateur Radio.

Our Legislative and Public Affairs Manager, Steve Mansfield, N1MZA, is based in Newington and is supported by Media Relations Manager Jennifer Hagy, N1TDY, other staff and a host of volunteers. Every business day our Regulatory Information Branch provides assistance, with the help of Volunteer Counsel and Volunteer Consulting Engineers, to members who are seeking permission to install antennas or are dealing with other regulatory problems at the local level. In addition, the ARRL serves the International Amateur Radio Union as its International Secretariat, ensuring that Amateur Radio is represented effectively to the ITU and other world bodies.

The work of the ARRL Laboratory is most visible to members in the form of the Product Reviews that appear in *QST*, but in recent years we have had to expand the capabilities of the Lab in response to new regulatory challenges. Proposals for the sharing of popular ham bands by Little LEOs and Earth-exploration-satellite radars have required professional evaluations of their incompatibility with ongoing amateur operations. We have had to assess the interference potential of new high-speed digital services delivered to homes via unshielded power and telephone lines, efficient lighting systems using RF and myriad unlicensed radiocommunication devices.

In round numbers the ARRL is spending about $1 million per year advocating the cause of Amateur Radio. We're grateful to every member who supports these efforts through their dues and especially to the thousands of members who go above and beyond their basic dues commitment to support the Fund for the Defense of Amateur Radio Frequencies. Your dues represent far more than a "subscription to *QST*"!

And what of the radio amateurs who are not presently members of the ARRL? Alas, writing *QST* editorials is a bit like preaching to the choir; the ones most in need of the message aren't there to hear it. ARRL members and contributors to the Defense Fund shoulder the entire burden of representing Amateur Radio in the United States but share their operating privileges with all licensees, members or not. How do we reach the nonmembers with the message that their privileges are worth more to them than the dime a day that ARRL membership costs, and that membership means more than just a magazine subscription?

Once again, dear member, this is where you come in. You know hams who have never been ARRL members, or whose memberships have lapsed. We ply them with direct mail and with other opportunities to join, but it's much more difficult to resist a personal appeal. So, ask them! (If you feel the need to be subtle, just loan them this month's *QST* and bookmark this page.)

With more than 164,000 members, the ARRL is the largest organization of radio amateurs in the world. In Japan, where there are nearly twice as many amateur licensees as in the United States, the national association, JARL, has about 120,000 members. So, we're doing all right. But we could do better. If just one ARRL member in four succeeded in recruiting another member to help shoulder the burden, we would have more than 200,000 members—and that would give ARRL President Jim Haynie, W5JBP, a smile as wide as his home state of Texas!—*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. Call **toll free** to join the ARRL or order ARRL products: **1-888-277-5289** (US), M-F only, 8 AM to 8 PM Eastern Time.

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

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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!

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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!

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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 **www.arrl.org/qst/aguide/**.)

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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.

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| | |
|---|---|
| *Arizona* | Clifford Hauser, KD6XH, 8741 N Hollybrook Ave, Tucson, AZ 85742 (520-744-9095); **kd6xh@arrl.org** |
| *Los Angeles* | Phineas J. Icenbice Jr, W6BF, 19323 Halsted St, Northridge, CA 91324 (818-349-3186); **w6bf@arrl.org** |
| *Orange* | Joe H. Brown, W6UBQ, 5444 La Sierra, Riverside, CA 92505 (909-687-8394); **w6ubq@arrl.org** |
| *San Diego* | Tuck Miller, NZ6T, 3122 E 2nd St, National City, CA 91950 (619-475-7333); **nz6t@arrl.org** |
| *Santa Barbara* | Robert Griffin, K6YR, 1436 Johnson Ave, San Luis Obispo, CA 93401-3734 (805-543-3346); **k6yr@arrl.org** |

### West Gulf Division

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| *Oklahoma* | Charlie Calhoun, K5TTT, 16101 E 98th St N, Owasso, OK 74055 (918-272-9872); **k5ttt@arrl.org** |
| *South Texas* | E. Ray Taylor, N5NAV, 688 Comal Ave, New Braunfels, TX 78130 (830-625-1683); **n5nav@arrl.org** |
| *West Texas* | Clay Emert, K5TRW, 109 Pasodale Rd, El Paso, TX 79907-6009 (915-859-5502); **k5trw@arrl.org** |

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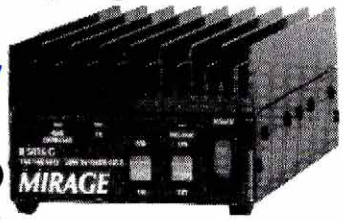
*MIRAGE RUGGED!*



B-5016-G
**$299**
Suggested Retail

***The MIRAGE B-5016-G gives you 160 Watts of brute power for 50 Watts input on all modes -- FM, SSB, or CW!***

**Ideal** for 20 to 60 Watt 2 Meter mobile or base. *Power Curve* chart shows typical output power.

**Hear** weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

**B-5016-G** has legendary ruggedness. *We know of one that has been in constant use since 1979!*

**Heavy-duty** heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's *Therm-O-Guard*™.

**Fully** protected from high SWR and excessive input power. Has warning LED.

**Has** smooth adjustable Transmit/Receive switching with remote external keying.

**Draws** 17-22 Amps at 13.8 VDC. 12x3x5½ in.

**RC-1B, $45.** Remote Control. On/Off, preamp On/Off, selects SSB/FM. With 18 foot cable.

*Power Curve -- typical B-5016-G output power*

| Watts Out | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 |
|---|---|---|---|---|---|---|---|---|
| Watts In | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 |

*More 160 Watt, 2 Meter Amplifiers . . .*

**B-2516-G, $299.** For 10 to 35 Watt mobile or base stations. 160 Watts out for 25 Watts in.

**B-1016-G, $379.** MIRAGE's most popular *dual purpose* HT or mobile/base amplifier. 160 Watts out for 10 Watts in. For 0.2-15 Watt transceivers.

*B-1016-G Great for ICOM IC-706!*

**B-215-G, $379.** MIRAGE's most popular *handheld* amp. 150 Watts out with 2 watts in; 160 watts out with 3½ Watts in. For 0.25 to 5 Watt handhelds radios.

## 100 Watts for 2 Meter HTs

B-310-G
**$199**
Suggested Retail
**MIRAGE RUGGED!**

*Power Curve -- typical B-310-G output power*

| Watts Out | 25 | 50 | 75 | 95 | 100 | 100 | 100 | 100 |
|---|---|---|---|---|---|---|---|---|
| Watts In | ¼ | ½ | 1 | 2 | 4 | 6 | 7 | 8 |

- ***100 Watts out with all handhelds up to 8 Watts***
- ***All modes: FM, SSB, CW***
- ***Great for ICOM IC-706***
- ***15 dB low noise GaAsFET preamp***
- ***Reverse polarity protection***
- ***SWR Protection***
- ***FREE mobile bracket***
- ***Auto T/R Switch***
- ***FREE handheld BNC to B-310-G patch cable***
- ***Ultra-compact 4¾x1¾x7¾ inches, 2½ pounds***
- ***One year MIRAGE warranty***

***Boost** your 2 Meter handheld to 100 Watts!* Ultra-compact all mode B-310-G amp is perfect for all handhelds up to 8 Watts and multimode SSB/CW /FM 2 Meter rigs. *Great for ICOM IC-706!*

## 35 Watts for 2 Meter HTs

B-34-G
**$89.95**
Suggested Retail

*Power Curve -- typical B-34-G output power*

| Watts Out | 18 | 30 | 33 | 35 | 35 | 35 | 35+ |
|---|---|---|---|---|---|---|---|
| Watts In | 1 | 2 | 3 | 4 | 5 | 6 | 8 |

- ***35 Watts Output on 2 Meters***
- ***All modes: FM, SSB, CW***
- ***18 dB GaAsFET preamp***
- ***Reverse polarity protection***
- ***Includes mobile bracket***
- ***Auto RF sense T/R switch***
- ***Custom heatsink, runs cool***
- ***Works with handhelds up to 8 Watts***
- ***One year MIRAGE warranty***

***MIRAGE RUGGED!***

*35 Watts, FM only . . . $69.95*

**B-34, $69.95.** 35 Watts out for 2 Watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3⅛x1¾x4¼ inches.

## MIRAGE Dual Band 144/440 MHz Amp

BD-35
**$159.95**
Suggested Retail

*Power Curve -- typical BD-35 output power*

| Watts Out 2 Meters | 30 | 40 | 45 | 45 | 45 | 45 | 45+ |
|---|---|---|---|---|---|---|---|
| Watts Out 440 MHz | 16 | 26 | 32 | 35 | 35 | 35 | 35+ |
| Watts In | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- ***45 Watts on 2 Meters/35 Watts on 440 MHz***
- ***Auto Band Selection***
- ***Auto T/R Switch***
- ***Full Duplex Operation***
- ***5x1¾x5 inches***
- ***FREE mobile bracket***
- ***"On Air" LEDs***
- ***Single Connector for dual band radios and antennas***
- ***Reverse polarity protection***
- ***Works with all FM handhelds to 7 Watts***
- ***One year MIRAGE warranty***

**Add** this Mirage dual band amp and boost your handheld to a powerful mobile or base -- 45 Watts on 2 Meters or 35 Watts on 440 MHz! Mirage's exclusive *FullDuplexAmp*™ lets you talk on one band and listen on the other band at the same time -- just like a telephone conversation. *(Requires compatible HT).*

## 6 Meter Amplifier

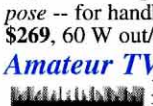
*FCC Type Accepted*

**The A-1015-G, $389**, is the *world's most popular* all mode FM/SSB/CW 6 Meter amplifier. 150 Watts out for 10 in. For 1 to 15 Watt transceivers.

## 70 cm Amplifiers (420-450 MHz)

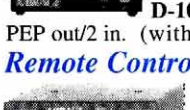
**D-3010-N, $365** -- 100 W out/30 in. For 5 to 45 Watt *mobile/base*. **D-1010-N, $395**, 100 W out/10 in. *Dual purpose* -- for handhelds or mobile/base. **D-26-N, $269**, 60 W out/2 in, for *handhelds*.

## Amateur TV Amps

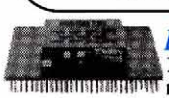


**Industry** standard ATV amps -- **D-1010-ATVN, $414**, 82 Watts PEP out / 10 in.
**D-100-ATVN, $414**, 82 Watts PEP out/2 in. (without sync compression).

## Remote Control Head for Amps



**RC-1, $45**, remote controls most MIRAGE amps. Check with Mirage for compatibility. Power On/Off, preamp On/Off, switch for SSB/FM. 18 foot cable (longer available). Tiny 1¾x3¾x2½ inches.



## Repeater Amps

**11 models** -- continuous duty all mode FM/SSB/CW repeater amps for 6, 2, 1¼ Meters, 70 cm, 450 MHz, ATV.

## Low noise GaAsFET preamps

KP-1

KP-2

**High** gain ultra low noise GaAsFET preamps for receiving weak signals. Selectable gain prevents receiver intermod. 15 to 22 dB gain. Less than 0.8 dB noise figure. Automatic RF switching up to 100 Watts.

**Choose** *In-Shack* model or *Mast Mount* (includes remote control) model to reduce loss. Rugged die-cast enclosure.

| *Frequency (MHz)* | *In Shack $139* | *Mast Mount $195* |
|---|---|---|
| 28-30 | KP-1/10M | KP-2/10M |
| 50-54 | KP-1/6M | KP-2/6M |
| 144-148 | KP-1/2M | KP-2/2M |
| 220-225 | KP-1/220 | KP-2/220 |
| 430-450 | KP-1/440 | KP-2/440 |

## 1¼ Meter Amps (223-225 MHz)

**Choose** from 10 models -- 20 to 220 Watts out for 2 to 50 Watts in, $129 to $655.

## Commercial Amps ($199 to $395)

*FCC Type Accepted*

**Commercial** Amps for 150-174, 450-470 MHz and VHF marine bands, 70-130 Watts out.

## Accurate SWR/Wattmeters

**Read** SWR directly and Forward/Reverse, Peak/Average power. Remote coupler. 1.8-30, 50-200, 420-450, 1260-1300 MHz band models.

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|---|---|---|---|---|
| IF-DSP | YES | NO | NO | YES |
| # of stock RX filters | 34 | 2 | 11 | 4 |
| Variable SSB transmit B/W | YES | NO | YES | NO |
| Band sweep scope | YES | NO | NO | YES |
| Entire radio PC-controllable | YES | NO | NO | NO |
| Logic updates via Internet | YES | NO | NO | NO |
| Remote knob available | YES | NO | NO | NO |
| 1 Hz frequency display | YES | NO | NO | YES |
| QSK amp keying loop | YES | YES | NO | NO |
| 30-day, risk-free trial | YES | NO | NO | NO |
| Retail price* | 1189 | 1389 | 1319 | 1369 |

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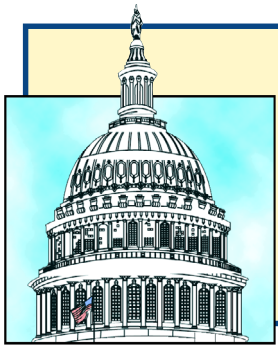

# DC Currents

**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.

## Spectrum Protection Act Makes an Impact on The Hill and Sponsors Promise Reintroduction

A bit of a long shot from the start, the Amateur Radio Spectrum Protection Act failed to pass the House or Senate in the 106th Congress. Even so, the legislation provided a calling card for ARRL to tell the Amateur Radio story in virtually every Congressional office on The Hill, and garnered an impressive number of cosponsors, thanks to the calls and letters of ARRL members to their Representatives. So successful was it in building goodwill that by the time you read this, it may be

### The Amateur Radio Spectrum Protection Act

*Congressman Michael Bilirakis (R-FL-9th)*

♦ The radio spectrum is a limited and valuable resource. The use of radio spectrum was once an engineering issue, but today, it is a financial one as well due to the growing demand for all wireless services. In recent years, the federal government has used auctions to distribute commercial spectrum licenses, instead of providing them for free.

In fact, the Balanced Budget Act of 1997 requires the Federal Communications Commission (FCC) to conduct spectrum auctions to raise new revenues. While amateur radio has traditionally enjoyed the support of the United States government, amateur radio frequencies may be at risk in the world of spectrum auctions. There is nothing in the federal statutes requiring the FCC to protect the Amateur Radio Service's spectrum when reallocating spectrum for auctions or any other purpose.

For that reason, I introduced the Amateur Radio Spectrum Protection Act in the 106th Congress. My bill, H.R. 783, requires the FCC to provide the Amateur Radio Service with equivalent replacement spectrum if it needs to reallocate any of the Service's current spectrum. H.R. 783 provides some measure of protection, while maintaining the flexibility the FCC requires to manage the nation's telecommunications infrastructure effectively.

My bill received strong bipartisan support in the U.S. House of Representatives with 167 cosponsors. I am pleased to report that a companion bill (S. 2183) was also introduced in the U.S. Senate. Unfortunately, other telecommunications issues, such as satellite television, broadband Internet technologies, Internet taxation, spamming, low-power FM radio, and e-commerce, consumed much of the Congress' time in the 106th Congress. Despite the strong support for amateur radio, no action was taken on either bill.

As the "telecommunications revolution" continues, we must ensure that the distinguished record of service by amateur operators is not pushed aside by short-term interests.Consequently, I intend to reintroduce the Amateur Radio Spectrum Protection Act in the new Congress which convenes in January 2001. I will continue working with my colleagues and American Radio Relay League members to protect the Amateur Radio Service.

### The Amateur Radio Spectrum Protection Act

*Senator Michael Crapo (R-ID)*

♦ On March 6, 2000, I introduced S.2183, Amateur Radio Spectrum Protection Act, which would preserve the amount of radio spectrum allocated to the Amateur Radio Service during this era of dramatic change in our telecommunications system. S.2183 garnered eleven co-sponsors, representing both political parties and differing geographic regions. This bi-partisan support illustrates the contributions that amateur radio provides to our nation and communities.

Organized radio amateurs, through agreements with FEMA, National Weather Service, Red Cross, Salvation Army, and other relief services, provide communication when regular channels are disrupted by disaster. They do so using their own equipment and without compensation, and also give personal time to organized training exercises. Ham operators have played important roles in disasters in Idaho and across the country.

In addition to emergency communication, amateur radio enthusiasts experiment with new circuitry and techniques for increasing the efficiency of radio spectrum. Much of the technology we take for granted is rooted in amateur radio experimentation. Amateur radio has long provided the first technical training for youngsters who grow up to be America's scientists and engineers.

The Balanced Budget Act of 1997 requires the FCC to conduct spectrum auctions to raise revenues. Some of that may come from auction of current amateur spectrum. The Amateur Radio Spectrum Protection Act will require the FCC to provide equivalent replacement spectrum if it reallocates and auctions any of the Service's current spectrum. The bill will protect these functions while maintaining the flexibility of the FCC to manage the nation's telecommunications infrastructure effectively. It will not interfere with the ability of commercial telecommunications services to seek necessary spectrum allocations.

Although we did not pass S.2183 in the 106th Congress, I anticipate that in the 107th Congress, the universal appeal of this legislation will engender additional bi-partisan support. My colleagues and I hope that the 107th Congress will see this bill enacted and the ability of amateur radio operators to access spectrum is preserved for future generations. With the help of the more than 670,000 US licensed radio amateurs, we will continue to work for passage of this important legislation.

back in the hopper for the next Congress, which convened in January!

The original sponsor, Representative Michael Bilirakis (R-FL-9th), has declared his commitment to reintroducing the bill in the 107th Congress, and Senator Crapo (R-ID) sponsor of the Senate version, has also indicated his support. The Congressman's and Senator's comments appear in the accompanying sidebar articles.

H.R. 783/S. 2183 would have required the Federal Communications Commission to provide "equivalent replacement spectrum" for frequencies reallocated from the Amateur Service to other services. In effect, the bill locked in the spectrum available to Amateur Radio without compromising the FCC's ability to make reasonable reallocations in the national interest.

Last session of Congress, the bill hit heavy legislative weather, along with many others. There was a total of about 6910 bills in the House and 3882 bills in the Senate, not including several thousand floor amendments. Of all those bills, however, only 541 made it through the whole process and were signed by the President to become Public Laws, plus an additional two dozen "private" bills that address the concerns of individual citizens. The President vetoed only about a dozen bills.

Despite the sound and fury on the telecommunications front, both the House Telecommunications Subcommittee and the Senate Communications Subcommittee didn't make much of a dent in their work load. On the House subcommittee side, there were 180 bills on the slate (that committee's jurisdiction includes finance and consumer protection). In the Senate Communications Subcommittee there were about 58 bills. All those bills represented hundreds of extremely complex issues demanding countless hours of study and debate. While many were referred to other committees and some incorporated into other legislation, only a handful of significant bills seemed to have passed "intact." Those included S. 761, which is intended to "regulate interstate commerce by electronic means and encouraging free market forces in electronic commerce," and S. 800, which mandates universal wireless 911 emergency calling nation wide and encourages development of a more robust wireless network. H.R.2346, a seemingly small technical bill which authorizes enforcement by State and local governments of FCC regulations against illegal use of CB equipment (see DC Currents January 2001) passed, as did the large and complex S.376, which amended the Communications Satellite Act of 1962 to promote competition and privatization in satellite communications.

Because of the slow pace of telecommunications legislation over the past several years and a growing sense of urgency over the issues involved, staff members on The Hill confide that their bosses are talking about the prospect of moving telecommunications to the forefront of the agenda for the 107th Congress. It's a trend we'll be monitoring here.

## Changes in Washington with the New Administration

♦ While the new Bush administration's change of roster in telecommunications was not entirely clear when we went to press, several major shifts are anticipated. By the time you read this, it is likely that FCC Commissioner Michael Powell will be FCC Chairman. The current Chairman, William Kennard, a Democratic appointment will be gone, but Commissioner Susan Ness stays on. The impact this will have at the staff level is not yet determined, but the departure of Dale Hatfield, W0IFO, Chief of FCC's Office of Engineering and Technology means the loss of a very sympathetic ear deep within the workings of the Commission.

Some "personnel" changes on The Hill are also being watched with great interest. For example, Representative Billy Tauzin (R-LA-3rd), is likely to step up from Chairman of the Telecommunications Subcommittee to become Chairman of full Commerce Committee. However, watch for possible changes in the actual committee functions, which may be divided among other committees. For example, there is talk of integrating some of the financial areas of Commerce with the functions of the House Banking Committee to create a new committee under the Chairmanship of Ohio Congressman Michael Oxley (R-OH-4th). Oxley has been a long time Amateur Radio supporter. The Telecommunications Subcommittee is likely to remain a subcommittee of Commerce, but with far more streamlined jurisdiction, focusing just on telecommunications and dropping the "trade and consumer protection" from its title. Speculation on the likely new Subcommittee Chairman is split between Cliff Stearns (R-FL-6th) and Paul Gillmor (R-OH-5th). Both are long time members of the subcommittee and have been supportive of Amateur Radio. Rumor also has it that Massachusetts Congressman Edward Markey (D-MA-7th), Ranking Member of the committee and regarded by many to be one of the telecommunications mavens on The Hill, may leave the subcommittee to consolidate his position on the Natural Resources Committee. If he does that, Representative Rick Boucher (D-VA-9th) appears well placed to become the new Ranking Member.

# Media Hits

- Colby, Kansas members of the Trojan Amateur Radio Club were cited in the *Colby Free Press* for participation in a special event in conjunction with the National Weather Service. Names mentioned included Mike Spottswood, KC0IWH, Jim Robison, KG0PI, Jeff Scholtz, KC0JAO, Gregg Lindberg, KB0MBT, Mike Albers K0FJ, and ARRL Midwest Division Vice Director Bruce Frahm, K0BJ.
- Tuscaloosa, Alabama's Amateur Radio community got great coverage in the *Tuscaloosa News* for high quality response to predictions of "tornado friendly" conditions. The group was cited by the director Tuscaloosa County Emergency Management agency as "our eyes and ears out in the county." The group was put to the real test in December
- Rich Range, WB9SFG, has been a ham operator since 1964 and is proud of it. An article in the *Warrenville* (Illinois) *Post* mentions some of Rich's participation in health and welfare traffic, as well as local volunteer emergency communication traffic.
- An article in *Home Power* magazine by writers Roy Butler, KC2FSW and Debbi Koehler, KB2WEY, featured an in-depth look at the use of "alternative" power sources in an ARRL Field Day site, with focus on solar power. Author Butler called it the "perfect opportunity to demonstrate what solar energy could really do!"
- Flagler Palm Coast, Florida Amateur Radio Club President Jay Musiker, AF2C, scored a good PR hit in the *Flagler Palm Coast News Tribune* when the club donated five Amateur Radio books to the local library and told the media about it. The books help the community, and the article gives a contact number for more information.
- Boston, Massachusetts area hams underwent a simulated earthquake strike and their efforts were reported favorably in the *Worcester Sunday Telegram*. While the area has no recent quake history, some geologists believe the potential is there, and local ARES and RACES groups are coordinating their efforts to ensure adequate communication if things start shaking.

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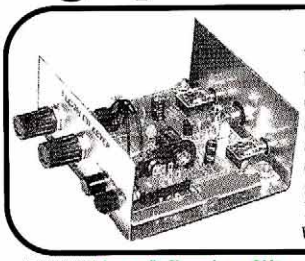

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*VEC-201K shown in optional case (vinyl cover top not shown), VEC-201KC, $14.95*

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**20/30/40/80 Meter Receiver Kits** give high performance! Covers entire band or tailor to cover desired portion. Copy CW/SSB/AM. NE602/ 612 mixer-oscillator, LM386 high gain audio amplifier. 1¾x4¾x5¼ in. *Moderate skill level.* Order **VEC-1120K** (20 Meters),**VEC-1130K**(30 Meters),**VEC-1140K** (40 Meters), **VEC-1180K** (80 Meters), **$29.95 ea.**

**20/30/40/80 Meter QRP CW transmitter Kits** have variable crystal oscillator tuning, front panel switch selects 1 of 2 crystals. 1 crystal included. Transmit and Receive switch. Connect receiver. 1¾x4x3½ in. *Intermediate skill level.* Order **VEC-1220K** (20 Meters), **VEC-1230K** (30 Meters), **VEC-1240K** (40 Meters), **VEC-1280K** (80 Meters), **$29.95 ea.**

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**Super CW filter/amplifier Kit** has powerful 1 watt audio amplifier to drive speaker. 8 poles active IC filtering uses cascaded low-Q stages. 3 bandwidths: 80,110, 180 Hz. Center frequency: 750 Hz. Up to 15 dB. Use 9-18VDC, 300 mA max. 1¾x4 x3½ in. *Simple skill level.* Order **VEC-821K, $29.95.**

**Super SSB Audio Filter Kit** improves readability with 8 poles, optimizes audio bandwidth, reduces SSB splatter, low, hi-pitched interference, hiss, static crashes, background noise. Use 9V battery. 1¾x4x 3½ in. *Simple skill level.* Order **VEC-830K, $19.95.**

**144/220/440 MHz Low-Noise Preamp Kits** soup up your antenna system. Helps pull in weak signals. Works wonders for scanner or ham-band receiver. Gives great low-noise performance and immunity from damaging electrostatic discharge. 1x1½ in. *Simple skill level.* Order **VEC-1402K** (144 MHz),**VEC-1422K** (220 MHz), **VEC-1444K** (440 MHz). **$17.95.**

**CW Memory Keyer Kit** stores 512 characters in four 128 character non-volatile EEPROM message memories. *Carry on entire QSOs by just pressing memory message buttons.* True sinewave sidetone with soft rise and fall time eliminates harsh keyclicks. Has all features of VEC-201K CW Keyer Kit. 1¾x 6¾x5¼ in. *Simple skill level.* Order **VEC-221K, $69.95.**

**High-performance 2 Meter Preamp Kit** pulls weak signals out of noise. Solves three reception problems -- boosts signals using a 1-dB noise figure microwave transistor, provides razor-sharp bandpass filtering, eliminates unwanted electrical noises with built-in balun. Uses 9-14 volts DC. Tiny 1½ x3x1 in. fits in any size box. *Intermediate skill level.* Order **VEC-1402DK, $59.95.**

**2/6/10 Meter FM Receiver Kits** let you tune into the world of ham radio. Catch all the action! Each covers the entire FM sub-band and runs off your 9 volt battery. Plug in speaker or headphones for loud clear reception. 1¾x4x3½ in. *Intermediate skill level.* Order **VEC-1002K** (2 Meters), **VEC-1006K** (6 Meters), **VEC-1010K** (10 Meters). **$34.95 each.**

**2 Meter Monitor Kit** receives 144-148 MHz. Low noise, high gain RF preamp gives you excellent 0.1 uV sensitivity. Air variable tuning capacitor has 8:1 reduction. Dual conversion superhet provides selectivity and stability. Automatically eliminates squelch tails. Built-in speaker, squelch, tone, volume controls. 19¼ in. telescopic whip. 9V battery. 2x4¼x4 in. *Intermediate skill level.* Order **VEC-104K, $79.95.**

**5 Watt 2 Meter FM transmitter Kit** lets you transmit voice and data -- AFSK data (up to 1200 baud) and FSK data (up to 9600 baud). Jumper select reactance or direct FM modulators. Reliable Motorola NBFM transmitter IC and PA transistor. Crystal controlled (x8 frequency multiplication). -60 dBc spurs and harmonics. Use 12-14 VDC, 1.5 amps. 5-pin DIN microphone jack. 1¾x4¾x5¼ in. *Difficult skill level.* Order **VEC-1202K, $99.95.**

**Ni-Cad/Ni-MH Battery Charger Kit** safely quick charges expensive batteries -- no overcharging -- many in less than an hour. HTs, cell phones, camcorders, lap top computers. Handles 1 to 12 cells. Charging status LEDs. Discharge before charge function reconditions batteries. Also removes memory effect. Runs on 12-15 VDC. 1¾x4¾x5¼ inches. *Moderate skill level.* Order **VEC-412K, $49.95.**

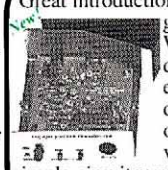
**Shortwave Converter Kit** converts AM or AM/FM radios to shortwave receivers at a push of a button. Choose two 1 MHz bands between 3 and 22 MHz. Popular 13, 16, 19, 25, 31, 41, 49 and 60 Meters international broadcast bands. On/off bypass. NE-602/612 mixer-oscillator IC and tuned input circuit. Use 9 V battery. 1¾x4x3½ in. *Intermediate skill level.* Order **VEC-101K, $27.95.**

**Crystal radio set Kit** lets you relive the experience of early radio pioneers. This baby really works! Wind your own inductor, wire up the earliest radio circuit without soldering a thing and listen to the magic of radio that needs no power. Put up an antenna, connect a ground. Stations come in amazingly loud and clear. Includes antenna wire, sensitive earphone. 1¾x5x6½ in. *Simple skill level.* Order **VEC-121K, $19.95.**

**Shortwave Receiver Kit** lets you listen to the world! Covers 75/80, 49, 40, 30, 31, 20, 25, 22, 19, 17, 16, 15 and 13 Meter bands. Explore AM, SSB, CW, WWV, RTTY and Packet signals. Vernier reduction drive, smooth regeneration control, RF stage. *Includes all metal cabinet.* 2 earphone jacks. Use 9V battery. 2½x7x6 in. *Intermediate skill level.* **VEC-102K, $59.95.**

*QRP Transceiver Kits for 80/40/30/20 Meters*

Great introduction to QRP, the hottest and fastest growing activities in ham radio. With this tiny *transceiver*, you'll discover what thousands of QRP enthusiasts already know -- you don't need a $1000 radio to get on the air and communicate worldwide. All it takes is some simple circuitry using less energy than a pen-light bulb! You get VXO frequency control, broad-banded transmitter circuitry, solid one Watt plus output, shaped keying, .3 uV sensitivity, direct conversion receiver. Includes crystal for popular QRP calling frequency. 1¾x4¾x5¼ in. *Intermediate skill level.* Order **VEC-1380K** (80 Meters), **VEC-1340K** (40 Meters), **VEC-1330K** (30 Meters), **VEC-1320K** (20 Meters) **$59.95 each.**




**Super CW Audio Filter Kit** gives you three bandwidths: 80, 110, 180 Hz. Eight poles gives super steep skirts with no ringing. Pull CW QSOs out of terrible QRM! Plugs into phone jack to drive phones. QRM down 60 dB one octave from center frequency (750 Hz) for 80 Hz bandwidth. Improves S/N ratio 15 dB. Use 9V battery. 1¾x4x 3½ in. *Simple skill level.* Order **VEC-820K, $19.95.**

**AM Radio Transmitter Kit** lets you set up your own AM station and broadcast crystal clear programming from your studio with *you* as the disc jockey or talk show host. Play music from CD player, tape deck or other source. Choose clear frequency from 530-1750 KHz. Standard line level or microphone input. Easy CD, tape deck or mike mixers connect. Audio level adjustment. 1¾x4x3½ inches. *Simple skill level.* Order **VEC-1290K, $29.95.**

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**The GIANT Book of Electronic Projects, Volume I**

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# Earn your new license or upgrade!

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## Step 1 TECHNICIAN

- 35-question test
- No Morse code exam


**#1 for Beginners!**

*Now You're Talking! All You Need For Your First Amateur Radio License*
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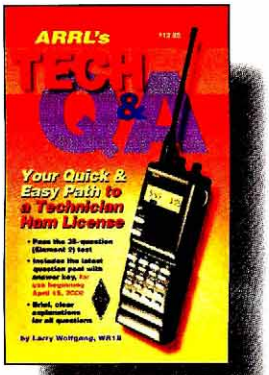


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## Step 2 GENERAL

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- 35-question test
- 5 words-per-minute Morse code test

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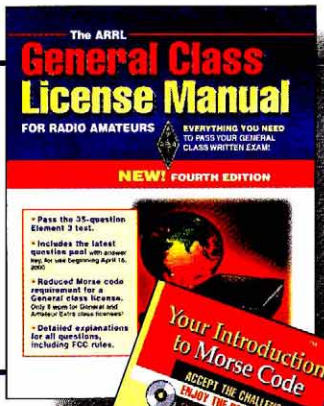


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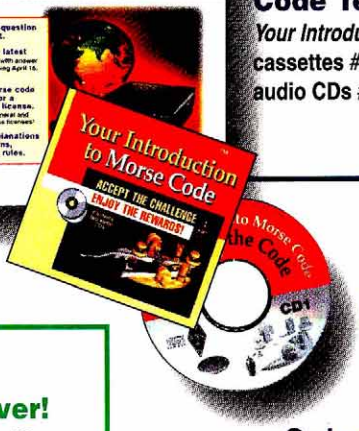
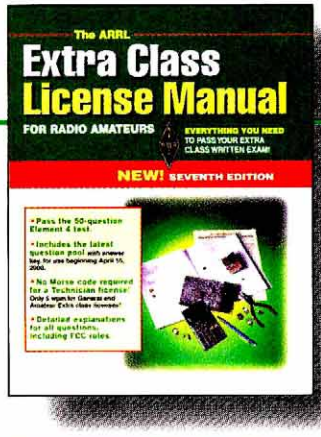



## Step 3 EXTRA

(Upgrade from General)

- 50-question test

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**"CQ UO-14!"** The Parks family decided to give UoSat-OSCAR 14 (the FM repeater satellite) a try while on a camping trip last summer in Fools Hollow State Park in Show Low, Arizona. They used two H-Ts, a mag-mount mobile antenna and a telescoping whip antenna with only 5 W on the uplink. In this photograph, father Ron, WB5DYG, is working the satellite while son David, KD7KEE, handles the logging. Future hams Matthew and Ashley watched as Ron and David talked with stations as far away as the US East Coast and Canada.

**HB9DOZ prefers satellite operating from his apartment balcony in Zurich, Switzerland.** With both a dual-band Yagi antenna and preamp clamped to his umbrella, Martin enjoys many conversations through Fuji-OSCAR 20 and UoSat-OSCAR 14.

**Something old, something new, something borrowed, something that radiates RF…** Patrice, KB2STI, and Frank, N2ZNF, Occidentale may have established a new wedding tradition. They followed the time-honored practice of keeping out of each other's sight until they arrived at the church, but no one said that they couldn't keep in touch by radio!

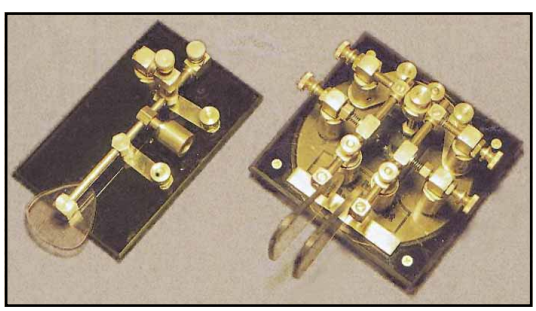

**An award befitting a "true ham."** Bob Wertz, NF7E, put together this unusual award of appreciation for his Elmer, Bill Schuchman, W7YS. The award was presented last year at a meeting of the Northern Arizona DX Association. According to Bob, Bill has helped more than 100 amateurs earn their tickets over the years.

**Ahoy matey!** Kristen Kametz, KC8NGI (age 12), of Stow, Ohio, contacts other "memorial submarines" from the radio room of the USS *Cod*, docked at Cleveland's lakefront. The operation commemorated the 100th anniversary of the US submarine service.

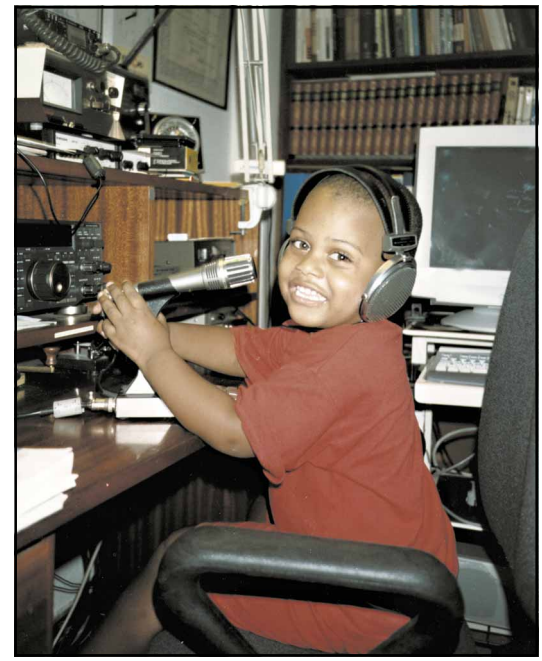
K7SZ

K7SZ

**Old military radios never die, they just wind up in the hands of collectors.** If you had attended the meeting last September of the Military Radio Collector's Association at the Tobyhanna Army Depot in eastern Pennsylvania, you would have seen a vast array of military rigs. Al Klase, N3FRQ (top), is shown operating an AN/GRC-9 (commonly called a "Jerk Nine"). On the table are a complete AN/GRC-109 CIA/Special Forces radio set (circa 1950) along with the replacement RS-6 Spy Radio set. Dale Gagnon, KW1I (above), is using the GRC-19. This rig covers 2-22 MHz with CW or AM.



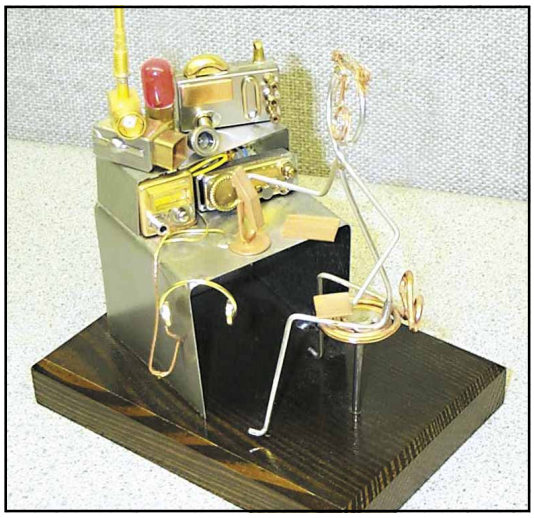
**What can you do with a load of surplus brass?** Kees Talen, K5BCQ, made these two beautiful CW keys. Kees crafted the keys from more than 30 pounds of brass pneumatic line control fittings and other parts that he had on hand.



**A most welcome "guest op."** Juan Lopez, EA8QJ, has a frequent visitor to his station in the Canary Islands. Three-year-old Alex drops by almost every day to listen to the phone conversations.

**Not only is it beautiful, it reflects radio signals!** This spectacular shot was captured by Kim Leer in central Manitoba. Kim often accompanies her husband Jeff Leer, KG0VL, on VHF DXpeditions to the subarctic auroral regions of Canada. See this month's "World Above 50 MHz" for more about VHF roving in the auroral zone.

**JOTA fun!** Austin Murphy is shown working N3UR on 17 meters while Rylan Campbell and control operator Bernie Ortmann, N6UBO, look on. Cub Scout Pack 175's Jamboree On The Air station operated from the parking lot of Booth Middle School last October in Peachtree City, Georgia.



**You can shape metal into *objets d' art*!** Chuck Beyer, WG2A, received this unusual creation as a Christmas gift from his wife.

MARY JOSEPH, N0TRK

**Last spring the Ak-Sar-Ben Amateur Radio Club in Omaha, Nebraska erected an interactive display in a local movie theater to capitalize on the renewed interest in Amateur Radio created by the movie *Frequency*.** The display set-up crew included (back row) Lou Canick, KA7BGL; Pat Joseph, N0HPP; Brian Behrens, AA0BB; Linda Newman, W0NSA; (front row) Steve Schmitz, KC0HMX; Eddie Edwards, K0IL; Bill Jackson, K9RZ and Bill Newman, K0NSA. Read more about their innovative promotion in "So People Still Do That?" in this month's *QST*.

Form 756

**APPLICATION FOR LICENSE AS RADIO OPERATOR**

DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE

(Before filling in this form the applicant should read the International Radiotelegraphic Convention, the act of August 13, 1912, and the Departmental regulations governing radio communication.)

NOTICE.

(This form must be submitted in duplicate to the radio inspector or examining officer in the applicant's district.)

_____, 191
(Date)

I, _____, born 18____, _____,
(Full name Write clearly) (Year) (Month)

at _____, _____,
(Place) (State, Territory, or Foreign Country)

present address: _____, _____,
(State) (County)

_____, _____, _____,
(City or Town) (Street) (Number)

apply for a license under the act of August 13, 1912, as—

1. Radio operator of the grade indicated below [place × before grade applied for]:

☐ Commercial extra first grade.
☐ Commercial first grade.
☐ Commercial second grade.
☐ Amateur first grade.
☐ Amateur second grade.
☐ Experiment and instruction grade.
☐ Cargo grade.

2. I already hold the Department of Commerce operator's license, number _____, _____
(Grade.)

*issued at _____, on _____,
(Place) (Date of license)

by _____, _____
(Name) (Title of examining officer)

3. My practical experience in radio communication has been _____

4. I have a practical knowledge of [place × before subjects studied and state other subjects, if so desired]—

☐ International Radiotelegraphic Convention and Regulations.
☐ Act of August 13, 1912, to regulate radio communication.
☐ Continental Morse Telegraph Code.
☐ American Morse Telegraph Code.
☐ United States Naval Radio Regulations.
☐ _____

5. I desire a license in order to operate a station of the following class or classes [mark with ×]:

☐ Ship station.
☐ Cargo ship station.
☐ Shore—public service.
☐ Shore—limited commercial.
☐ Technical experiment.
☐ Technical school.
☐ General amateur.
☐ Special amateur.

*Present certificate at examination. (OVER.)

**If you decide to take a time-travel DXpedition back to 1915, don't forget to take a copy of Form 756!** Al Alvareztorres, AA1DO, ARRL Technical Information Coordinator, was doing a bit of research in the Headquarters library when he found some very old documents tucked behind a shelf. Among the ancient papers was this "Application for License as Radio Operator" from 1915.

BRUCE FRAHM, K0BJ

**A skyhook in a latchhook?** You are looking at the home and antenna farm of John Stanesic, W0CEM, in Junction City, Kansas, as rendered by his wife in a latchhook rug design. Now *that's* devotion!

VX-150
Compact yet incredibly rugged 2-meter handheld is designed to perform under the most difficult operating conditions. And it's packed with the leading-edge features you've come to expect from a Yaesu product. Five Watt power-output, 209 memories, DCS/CTCSS, 7 digit alphanumeric display, automatic repeater shift and much more.

FT-50RD
This durable, multi-featured 5 Watt Dual Bander is manufactured to rigid MIL-810 standards. Featuring wideband frequency coverage,* CTCSS/DCS operation, Dual Watch, 112 memory channels, and Digital Voice Storage.

FT23RMKII/FT33R
These ultra-compact, 5 Watt VHF FM Handhelds feature rugged die-cast aluminum cases, 10 memory channels, optional CTCSS, and multiple scan modes. The FT23RMKII (2M) and the FT-33R (222 MHz) are easy to operate, and give outstanding performance.

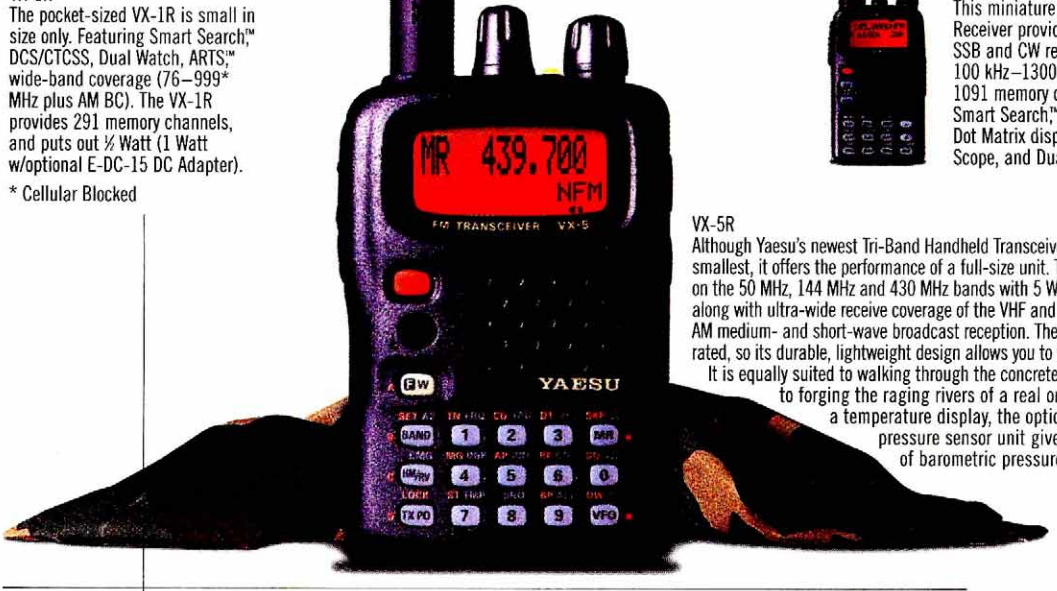
VX-110
This incredibly rugged 5 Watt VHF handheld features 209 memories, Smart Search,™ DCS/CTCSS, simple 8 key operation and Omni Glow™ display illumination for night time operation.

FT411MKII
The affordable FT411MKII is compact and durable. This 5 Watt VHF FM Handheld features a die-cast case, 40 memory channels, 10 DTMF memories, built-in VOX, and multiple scan modes.

VX-1R
The pocket-sized VX-1R is small in size only. Featuring Smart Search,™ DCS/CTCSS, Dual Watch, ARTS,™ wide-band coverage (76–999* MHz plus AM BC). The VX-1R provides 291 memory channels, and puts out ½ Watt (1 Watt w/optional E-DC-15 DC Adapter).

* Cellular Blocked

VR-500
This miniature Handheld Receiver provides FM, AM, SSB and CW reception on 100 kHz–1300 MHz, with 1091 memory channels, Smart Search,™ versatile Dot Matrix display, Band Scope, and Dual Watch.




VX-5R
Although Yaesu's newest Tri-Band Handheld Transceiver is the world's smallest, it offers the performance of a full-size unit. The VX-5R operates on the 50 MHz, 144 MHz and 430 MHz bands with 5 Watts of power output, along with ultra-wide receive coverage of the VHF and UHF spectrum, plus AM medium- and short-wave broadcast reception. The VX-5R is military rated, so its durable, lightweight design allows you to take it anywhere. It is equally suited to walking through the concrete jungle as it is to forging the raging rivers of a real one. Along with a temperature display, the optional barometer pressure sensor unit gives a read-out of barometric pressure and altitude.

# TOUGH GUYS.

When you're small, you get picked on. Isn't that how it goes? Well not in Yaesu territory, because not only do we design compact handhelds for efficiency, but we give these clever little guys plenty of muscle. Yaesu handheld transceivers have earned the bragging rights for being the smallest handhelds with the most durable water resistant casings ever created. And packed inside the brawn are engineering accomplishments in performance that are unmatched in the industry. Our high-tech handheld transceivers provide clean power output on the VHF and UHF bands and offer revolutionary features that allows these tough guys to continually outperform the competition. Learn more about Yaesu products on the web at www.yaesu.com

**YAESU** ...leading the way.

# "Brick-Wall" Selectivity

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

## I. IDBT: Interlocked Digital Bandwidth Tracking System

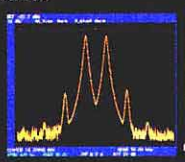
The IDBT feature greatly simplifies operation by matching the bandwidth of the DSP (Digital Signal Processing) system to the net bandwidth of the 8.2 MHz and 455 kHz IF stages. The IDBT system accounts for the settings of the IF WIDTH and SHIFT controls, and automatically sets a DSP bandwidth. which matches the analog IF bandwidth.

## II. VRF: Variable RF Front-End Filter

Protecting the MARK-V's receiver components from strong out-of-band signals, the VRF system acts as a high-Q "Preselector," located between the antenna and the main bandpass filter networks, providing additional RF selectivity on the 160-20 meter Amateur bands for multi-operator contest teams, DX-peditions, or for operation near MW/SW broadcast stations.

## III. 200 Watts of Transmitter Power Output

Utilizing two Philips® BLF147 Power MOSFETs in a 30-Volt, push-pull configuration, the MARK-V's transmitter puts out up to 200 Watts of clean output power, thanks to the conservative design of the PA section.



Class A 75 W PEP IMD

## IV. Class-A SSB Operation

Exclusively available on the MARK-V FT-1000MP , a press of a front-panel button engages Class-A SSB operation of the transmitter, at a power output level of 75 Watts. Class-A operation produces incredibly clean signal quality, with 3rd- order IMD suppressed 50 dB or more, and 5th- and higher-order products typically down 80 dB or more!

## V. Multi-Function Shuttle Jog Tuning/ Control Ring

The immensely-popular Shuttle Jog tuning ring, which is concentric with the Main Tuning Knob, has a new look in the MARK-V: it now includes the activation switches for the VRF (left side) and IDBT (right side) features, so you don't have to move your hand position to activate these important circuits during contest or pile-up situations!

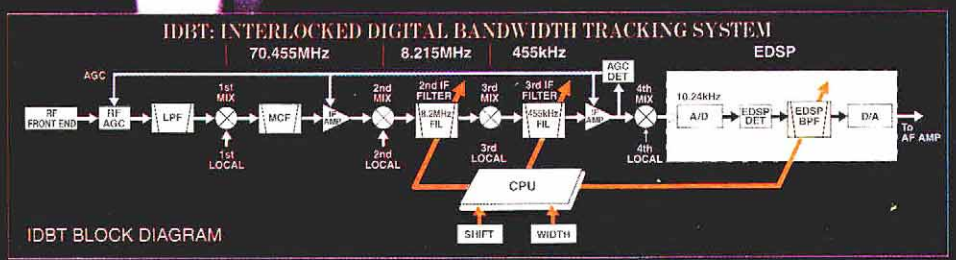
IDBT: A Breakthrough in Selectivity!


DC 30 V / 13.8 V Power Supply FP-29

Photo shows optional MD-100A8X Deluxe Desk Microphone

HF 200 W All-Mode Transceiver

# MARK-V FT-1000MP

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We read every letter received, but we can only publish a few each month. We reserve the right to edit your letter for clarity, and to fit the available page space. Of course, the publishers of *QST* assume no responsibility for statements made by correspondents.

## A REHEARSAL IS CRITICAL

♦ "Another Look at Tower Work" by Rod Peterson, K4QG, in the November *QST* was well done and had many valid points. Having worked on towers from 50 to 2000 feet, I have found one other procedure to be absolutely necessary when doing tower work. The entire job should be rehearsed before the first climber goes aloft. Each member of the crew should know exactly how each step of the job will be done. I have found that with careful planning, before we go up, we can avoid those surprises that can turn a routine job into a dangerous nightmare. So, perform the entire job mentally, from start to finish, before you leave the ground. You won't find yourself, say, 100 feet up a tower, in December, at dusk, with the wind blowing at 25 knots and hundreds of feet of coax that you can't quite get the rest of the way up because of an improperly rigged halyard.—*Wray Lemke, KI4XS, Mt Pleasant, South Carolina*

## EXCELLENT ARTICLES

♦ My congratulations on *QST's* excellent article series "A Beginner's Guide to Modeling with *NEC*" by L. B. Cebik, W4RNL. For several years now I've wanted to learn how to use *NEC*, but with my busy schedule I've been unsuccessful in the attempt. Thanks to these articles, I'm finally coming to grips with *NEC*, *EZNEC* and other antenna modeling programs.

The software industry needs to take a lesson from *QST* and provide their own "Beginners Guides" for their high-performance packages. After reading just the first installment of L. B. Cebik's guide, I've begun to model my inverted **V** and have even entered the data for a 3-element beam. Keep up the good work!—*Buddy R. Nighswonger, AD4CG, Madison, Virginia*

## AN UNFORTUNATE MISCOMMUNICATION

♦ I was dismayed by the miscommunication between K2GM and WB8SIW ("Correspondence," July and November 2000) on involving contesters in disaster communications. I don't believe that K2GM was knocking NTS and ARES, but instead pointing out the additional capability contesters can bring to disaster relief operations. Their well-equipped stations and skilled operators can add to existing capabilities, if they are properly integrated into relief efforts. I'm not persuaded that registering with the local Emergency Coordinator or NTS Net Manager will accomplish this. Perhaps something more is needed at the ARRL or IARU level.

As recent experience has demonstrated, ham involvement in relief or rescue efforts can be a huge public relations plus. Such efforts can also help make our case for maintaining and improving our frequency allocations at WRC-2003, particularly in the developing world where so many potential votes for our cause are to be found. Let's bring all our human resources to bear, rather than bickering among ourselves.—*Pete Smith, N4ZR, Kearneysville, West Virginia*

## WHERE IS COURTESY?

♦ I am disappointed to see that *QST* has published another article on "The Wonderful World of Contesting" (November 2000 *QST*). And, once again, there is no mention of following even the most elementary rules of common courtesy when operating during a contest.

As many hams have come to realize, contest weekends usually mean that noncontesters are subjected to another adventure in trying to operate. The best-case scenario is that we simply can't find a clear frequency; that is fair enough. Worst case is constant QRM and harassment from amateurs that apparently have lost their hearing except for other stations in the contest.

If the ARRL is really interested in promoting the many good qualities of contesting, the least they can do is support the notion that common courtesy is not a dying art in our hobby. Just a paragraph in contesting articles about operating procedure and courtesy could really make a difference in attitudes. For example, mention of the following points might be helpful:

• Calling "CQ Contest" does not qualify you for unrestricted use of a frequency, especially if already occupied.

• The question "Is the frequency in use?" is still required before calling CQ or tuning up.

• Operating a station that is over powered is not good procedure and does little, if anything, in the points battle.

• Automated voice keyers still require listening before keying.

• Amateur Radio contesting is a "hobby," not a matter of life-and-death.

There are plenty of outstanding contesters and I support them in their efforts. But, let's go the extra step and also emphasize that contesting demands courtesy and good operating procedures to be successful for all amateurs. Those of us who don't participate in contests will be much more likely to jump in and offer contacts if we are treated with respect in our pursuits within the hobby.—*Chuck Hodell, N8ADN, Silver Spring, Maryland*

## TOO NEGATIVE ABOUT DTV

♦ The negativeness of W4ANN's letter concerning digital broadcast television (DTV) in the November *QST* is not warranted. My experience with a recently purchased RCA F38310 HDTV and DirecTV HDTV channels 199 and 509 is that the new DTV formats produce razor sharp TV images and noise-free surround-sound five-channel audio. I have seen none of the technical problems W4ANN describes. The conversion to DTV will make more efficient use of the existing and future TV frequencies, and free up space for other services.—*Gene Preston, K5GP, Austin, Texas*

## A LACK OF ALTERNATIVES

♦ I'd like to respond to WB2WFJ's letter in the December "Correspondence" concerning restrictive covenants and amateur antennas. I agree with Art, that individual responsibility (something all too lacking in our society) is paramount when we willingly agree to purchase homes that have restrictive covenants.

But therein lies the rub: Are we willingly acquiescing to covenant restrictions? I've known too many people who looked for years for a decent place to live that would also permit antennas. The outlook is increasingly grim. Many prospective homebuyers are discovering that there are no alternatives to purchasing homes with prohibitions against ham antennas. As a consequence, the idea of *willingly* agreeing to such covenants no longer applies. The situation approaches one of extortion. Further, the convenant restrictions have become so obnoxious (not just regarding antennas) that the word "oppressive" comes to mind.

Since the assumption of willing acceptance of antenna restrictions is no longer valid, the FCC should weigh in—just like

they did for DSS dishes. The moral precedent is there, if not the same financial incentive.—*Jim Sanford, WB4GCS, Hampton, Virginia*

## TWO THINGS

♦ (1) Art Malatzsky makes a good point in the December "Correspondence" about studying deed restrictions in advance. But the other side of the coin is that we need to clue in the real estate industry that prohibiting antennas can make a house harder to sell, thus lowering its value. This is particularly true when the deed restrictions are ineptly constructed, such as one prohibiting "all radio-frequency generating apparatus" (even microwave ovens and cellphones?). Let's have a public relations campaign whose slogan is, "We're hams, and we buy houses!"

(2) Now that we have L.B. Cebik's antenna modeling tutorial in *QST*, maybe someone can answer the age-old question: Do Bullwinkle's antlers function as a broadband dipole? If so, at what frequencies?—*Michael Covington, N4TMI, Athens, Georgia*

## MY FIRST SWEEPSTAKES

♦ Although I have been licensed for 11 years, I still needed a reminder about the CW Sweepstakes last November 4. "If you want to earn a Worked All States award in one weekend, this is the contest to do it..." I remember being told.

Getting my gumption up to do this (I don't normally do contests), I figured it would be a great way to start picking up my speed on CW. I sat down Saturday night in front of the rig and gave it a whirl. Forty meters was my first band of choice, so I began hunting in the Technician segment above 7.100 MHz. I can copy pretty well at 10-12 WPM, but it gets sporadic after that. I listened to the signals below the Technician portion and just couldn't copy well enough because most operators were whizzing along at incredible speeds. I was able to catch one station at a comfortable speed, N5XU, a club station from the University of Texas. I had tried to use my PK-232 multimode processor aid in copying, but my ears and brain were much better. After a few repeats, I logged N5XU's exchange and moved on.

I went back to the Technician subband and starting calling CQ. After some persistent calling, I worked four stations. Two contacts were quick contest exchanges, but the other two were pleasant ragchews.

It felt good to be back on the key and shake off the rust, but I was disappointed in the lack of activity above 7.100 MHz. I challenge contesters to graze the Technician subbands from time to time. You may be able to give a bit of excitement to a station that might otherwise never know the fun of contesting.—*John M. Wilson, KC4LZN, Keyport, Washington*

## TOO MUCH POWER ON PSK

♦ How do we solicit the cooperation of those individuals who continually run excessive amounts of power in PSK31? Per the published information on PSK31 the recommended *maximum* power is about 30 W, not the 60 or 100, even 200 W that so many people run. (I copied one person who bragged he was running 300 W!)

There has yet to be created a receiver that will allow you to copy an S1 or S2 signal with an S9+10 signal 300 Hz away. What does that mean? It means that when some person intentionally adopts the "kilowatt alley" syndrome, they are interfering with the use of that segment of the band by others.—*Pat Lambert, W0IPL, Longmont, Colorado*

## IS NARROWER *REALLY* BETTER?

♦ As the originator of the current trend to using wide receiver IF bandwidths, as proposed in the June 2000 *QST* article, "A Panoramic Transceiving System for PSK31," I would like to qualify the findings of Robert Lewis, AA4PB, stated in the December "Correspondence."

Robert is quite correct in stating that using narrow IF filters will reduce the amount of noticeable QRM and AGC action caused by undesired strong stations in the receiver passband. However, using a more narrow filter will only reduce, but not eliminate, all those undesired signals, because any signals appearing within the passband of a 500-Hz wide IF filter will do the same thing, only less often.

Robert places the blame on the HF equipment manufacturers for not providing for the use of more narrow filters in SSB operation. Actually, they have already approached this problem in the best possible way, by providing tunable filters, in the form of passband tuning, IF shift and IF notch filters that can be used in addition to the SSB filter. This way, you can use a wideband filter for convenient point-and-click tuning, and switch in various tunable IF filters only when needed to attenuate undesired strong signals.

It is a commonly observed misconception by some PSK31 stations that "hearing" QRM means that there is QRM. With the exception of unwanted AGC action caused by a strong undesired station in the passband, most of the time, observation of the spectrum with a program like *DigiPan* will reveal that the supposedly interfering station is far from the QSO frequency.—*Howard (Skip) Teller, KH6TY, Mt Pleasant, South Carolina* QST

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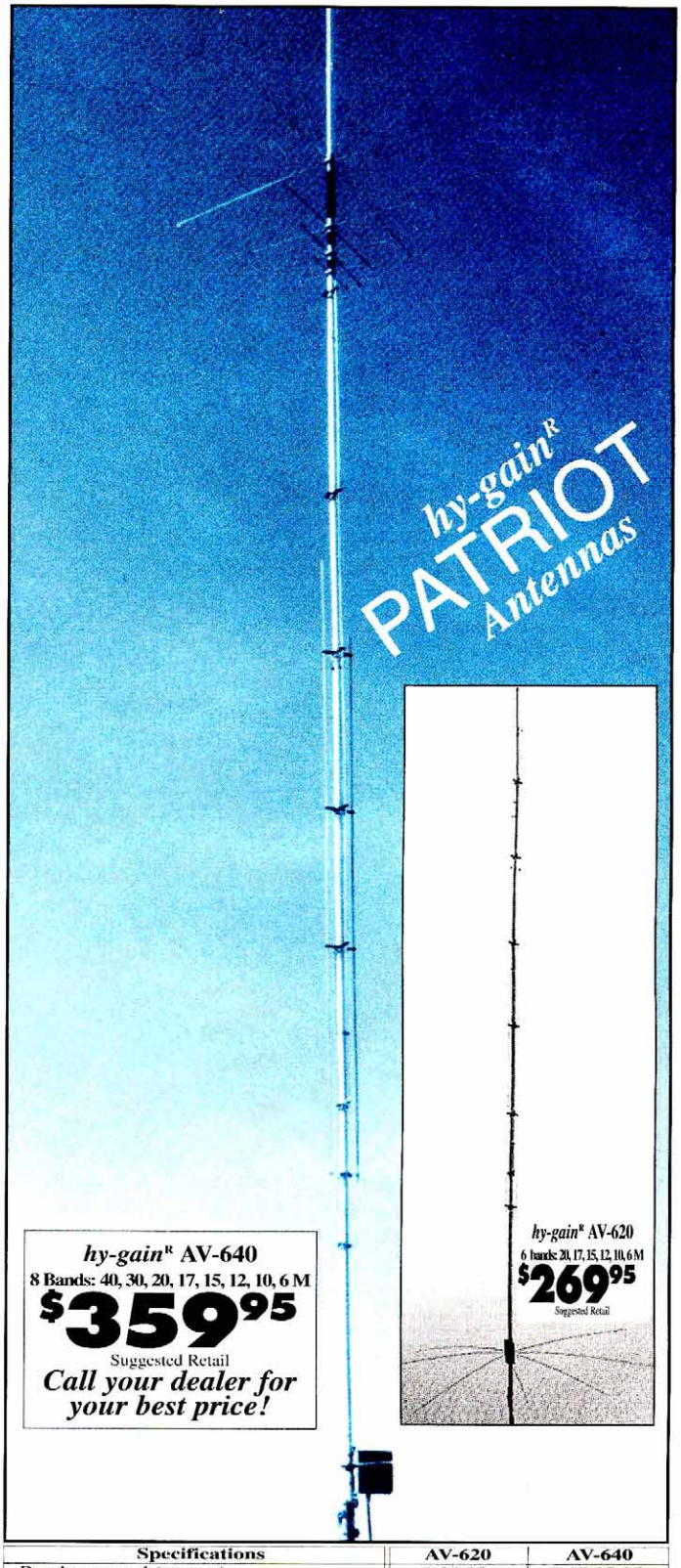
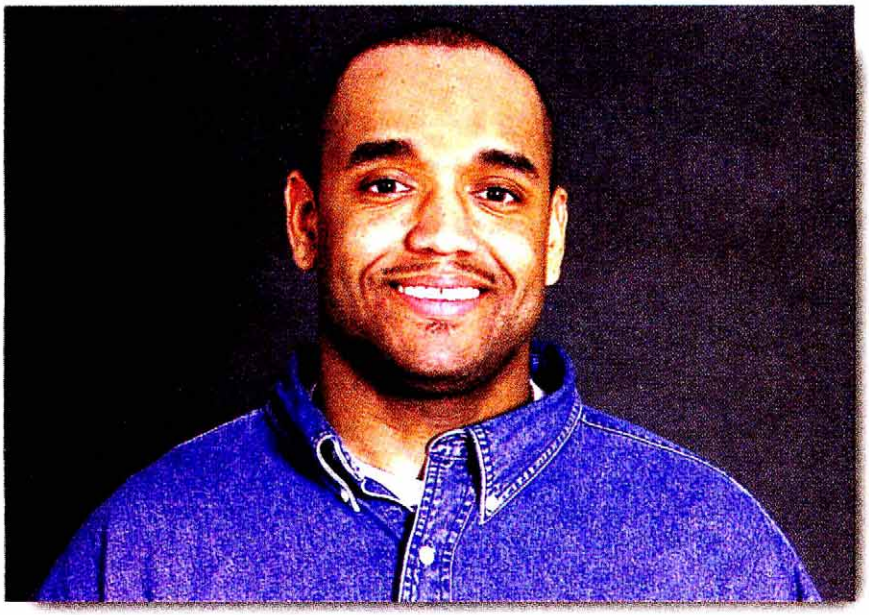



| Specifications | AV-620 | AV-640 |
|---|---|---|
| Bands covered (meters) | 6,10,12, 15,17,20 | 6,10,12,15, 17,20,30,40 |
| 2:1 VSWR Bandwidth (KHz) | | |
| 40M | N/A | 150 |
| 30M | N/A | 175 |
| 20M | 500 | 500 |
| 17M | 500 | 500 |
| 15M | 500 | 500 |
| 12M | 500 | 500 |
| 10M | 1500 | 1500 |
| 6M | 2000 | 1500 |
| VSWR at resonance (typical) | 1.5:1 | 1.5:1 |
| Power handling (watts output) key down 2 minutes | 1500 | 1500 |
| Vertical radiation angle (degrees) | 17 | 17 |
| Horizontal radiation angle (degrees) | 360 | 360 |
| Height (feet) | 22.5 | 25.5 |
| Weight (pounds) | 10.5 | 17.5 |
| Wind surface area (square feet) | 2.4 | 2.5 |
| Wind survival (mph) | 80 | 80 |



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By Donald Stark, N3HOW, and Peter Sturdivant, N1PS

# Tales of Sails

## Two Amateur Radio groups celebrate and assist OpSail 2000.

### NEW YORK CITY

*By Donald Stark, N3HOW*

It was the fireworks. It was the Fourth of July. It was the nation's 224th birthday. It was also Operation Sail—better known as OpSail 2000. More than 200 tall ships from more than 60 countries participated!

At 10 AM, the USCG Barque *Eagle* led the parade of sail beneath the Verrazano Narrows Bridge, as it proceeded up the Hudson River. The United States Power Squadrons Amateur Radio Net had set up special-event station N2B from July 1-4 to celebrate the event. Our station was at the US Army Corps of Engineers depot at Caven Point, Jersey City, New Jersey. We were due west of the Statue of Liberty and had an excellent land-side view of the magnificent ships.

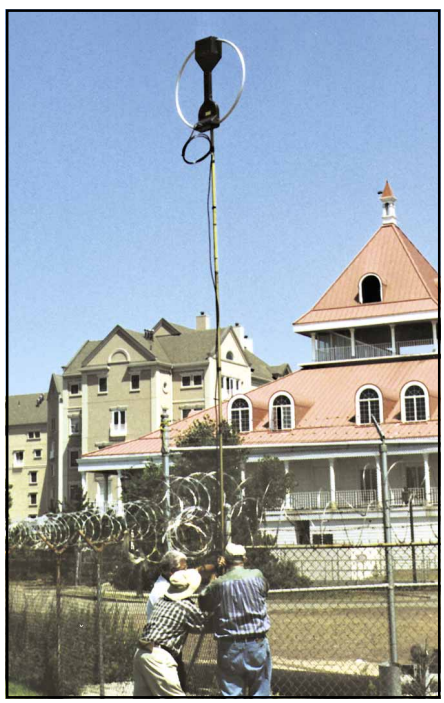
We had a dedicated team of radio operators from four states including: William Downes, N2KHP; Ken Ernandes, N2WWD; Arnold Knadle, N1JX; Carlton Lee, W2PTZ; Malcom McDonald, KA3YTS; Carl Stark, KD3KH; Marjorie Stark, N3HOZ and myself. Armella Stark worked miracles in the galley of the motor home and kept our crew well fed for days.

The 36-foot tower trailer was brought from Washington, Pennsylvania, behind the motor home. The trailer was built by my father, Carl Stark, KD3KH, several years ago for our radio club, Washington Area Communications (WACOM). The trailer includes a platform to bolt down a portable generator and a large box to hold equipment. The Butterfly beam antenna is carried (partially assembled) alongside the tower itself.

In addition to the Butterfly beam on the tower, our station antennas included an MFJ High-Q Loop, a Hustler 5BTV vertical and a Hustler mobile antenna. Our collection of rigs included a JRC JST-245, an ICOM IC-735, an ICOM IC-706 and a Yaesu FT-890. Not only did we use amateur frequencies, we also had VHF marine capability. This allowed us to compile reports from boats.

Was our operation a success? We think so! N2B worked 800 stations, 43 states, 7 Canadian provinces and 12 DXCC entities. We promoted OpSail 2000 and Amateur Radio—and enjoyed perfect "seats" for one of the most prestigious sailing events in many years. If you find yourself on 20-meter SSB some Saturday afternoon at 1700 UTC, join the United States Power Squadrons Net on 14.287 MHz.

*You can contact the author at 65 Stark Spur, Eighty Four, PA 15330;* **stark84@nb.net**.



**Don Stark, N3HOW, Bill Downes, N2KHP and Mac McDonald, KA2YTS, carefully raise the MFJ High-Q Loop at Caven Point (note the razor wire!).**

### PORTLAND, MAINE

*By Peter Sturdivant, N1PS*

This summer's celebration of the tall ships, OpSail 2000, was both a never-to-be-forgotten event and challenge for the ham radio operators in Portland, Maine. Eighty-eight operators participated in what was probably the largest Amateur Radio public service event ever held in the State of Maine.

**Almost ready to raise the tower at Caven Point. Left to right: Carl Lee, W2PTZ; Don Stark, N3HOW; and Arnold Knadle, N1JX.**

**N2B is on the air and made in the shade!**

OpSail is an abbreviation for Operation Sail, an idea fathered by President Kennedy in 1961. The first OpSail occurred in 1964 as a "stirring Tribute" as Walter Cronkite described it, to the late President. Since then, many Operation Sails have occurred, most notably in 1976 during the bicentennial year. This year, to celebrate the new millennium, Operation Sail toured seven east coast ports; the last port of call was Portland, Maine.

We first found out about OpSail two years ago during a monthly meeting of the Portland Amateur Wireless Association, an ARRL affiliated club. One of our members, Dick Jackson, W3EZ, was asked to be the communications director for the upcoming event. When Dick suggested that ham radio could offer a role to help alleviate marine, cell phone and public safety radio traffic and the OpSail organizers welcomed his idea. I should also point out that the organizers looked for help in their communications planning, which isn't a common use of ham expertise in public events. As the current club president, the first thing I did was to assign one of our most experienced public service event people to the job, Dale Darling, W9WBA. I then offered our club's assistance for the planning and operation of the event.

We knew that we had a large role to play in this event, scheduled for July 28–July 31, 2000. We were warned as many as 300,000 people could show up in this city of 75,000. Radio traffic overload on all radio bands including marine, two-way, public safety and cellular telephone became a real concern. We offered a radio-equipped volunteer group that could provide either primary or backup communications throughout the three-day extravaganza.

Logistically, we knew this would require something more than just a simplex frequency and a bunch of hams with H-Ts. The event was to be spread over an area of 30 to 40 square miles with a hill in the middle (the city of Portland). Therefore, Dale, W9WBA, and Dick, W3EZ, decided to go with four repeaters, two as backup. Dale and his crew installed the repeaters atop the Holiday Inn, one of the tallest buildings looking over the waterfront.

We also needed people. For a normal public service event, we usually can count on 10 to 20 people, but for this one, we knew we needed many more. We put out the word that we needed Amateur Radio operators, preferably with public service event experience. Eventually, we signed up enough hams to work the event. We also had a warm-up drill which Dale affectionately called the *wet run*.

The wet run was Harborfest 99. It was a scaled down OpSail with only two tall ships and several others including some Coast Guard assets. Like the big event, still a year off, there was a Parade of Sail led that year by the tall ships *Bounty* and the HMS *Rose*. We provided 25 ham operators to Harborfest. The results were good. We maintained a communications center with a ham net control operator and many others spread out throughout all the


**USCG Barque *Eagle* sails into Portland harbor.**

MIKE LEONARD, KA1IOD

individual events in the area. In addition to a ham simplex event channel, we also operated a marine VHF channel for communications to the ships, a two-way trunking radio system and 20 cell phones. Additionally, we asked for and received a special marine VHF Coast Station License from the FCC. The event organizers clearly relied on us as their communications experts. We more than met their expectations, but then we needed to make this model fit an event with 25 tall ships and 10 times more visitors.

With the experience of Harborfest behind us, it was decided to go with a much larger communications center. This Incident Command Center would place under one roof our own control operators plus that of public safety for two cities, the FBI, Secret Service (former President George Bush was the Honorary Chairman of OpSail Maine), US Navy and the US Coast Guard. The ICS went into the Naval Reserve Center, located in the middle of the waterfront. We would have four Amateur Radio net control stations on line during the event. As mentioned above, we decided this year to go with repeaters as opposed to using a simplex frequency. This would make it easier to communicate out to a wider area and allow hand-held radio use. OpSail would be a walking public service event. AT&T Wireless Services, one of the sponsors, gave us 30 cell phones to use before and during the event. We gave them to most of the VIPs and key personnel. We assigned ham "shadows" to others and to key venues.

Finally, after two years, the event was upon us. Over the course of a week, all 25 of the tall ships sailed into port. Some of the more noted ships were the US Coast Guard's *Eagle*, the 356-foot Argentine *Libertad*, the *Cisne Branco* from Brazil, the *Bat'kivshchyna* from Ukraine and the *Bowdoin* (a famous Maine ship that played an important part in scientific expeditions, including early radio experiments, to the arctic).

MIKE LEONARD, KA1IOD

**The Argentinean *Libertad* was a stunning sight in Portland.**

The event kicked off on Friday with the Parade of Sail led by the USCG *Eagle* with President Bush aboard. We placed 16 hams on 5 vessels and placed radio-equipped hams at key locations around the area. During the height of the event on Friday, our operators were very busy handling anything from routine traffic to missing person alerts. It was at this time that the cellular telephone system overloaded. This surprised both the organizers and the cell phone companies. But it didn't surprise us and we handled the extra radio traffic well.

During Saturday and Sunday, all the ships were tied to their berths, but it didn't mean we were any less busy. In fact, Saturday was perhaps the busiest of the three days, radio traffic-wise. The immense crowds overwhelmed the nonham radio circuits again as well as the 300 volunteers trying to control the crowds. But the people were very friendly and happy in general. Although there was no way to get an official count, the media had the crowds at about 400,000 people over the course of the weekend, more than 5 times the population of the city. We had about 30 hams working each day, each relating event status reports and any incidents at each venue.

We were fortunate to get 88 Amateur Radio operators, from three states (including California), to participate in the event for set-up, operation, and tear down. All told, Amateur Radio operators put in over 1900 man-hours. All of our radios, including the four repeaters, worked flawlessly with no failures. The only thing resembling an emergency was missing persons' reports; our people found 6 of the 12 people reported missing. The fact that all communications went very smooth was a tribute to Dale, W9WBA, and Dick, W3EZ, the two key people who worked very hard to ensure that there would be no glitches.

Just as important, it seemed everyone had an unforgettable time. Over the course of the event, I visited with and talked to most of the ham volunteers. All I saw from the men and women Amateur Radio operators throughout the weekend were smiles. For one week, Amateur Radio existed among craft from another era. It turned out to be a memorable experience for everyone.

*You can contact the author at 7 Pond View Rd, Standish, ME 04084;* **n1ps@arrl.net**.

**The Portland OpSail 2000 team.**

MIKE LEONARD, KA1IOD

By L. B. Cebik, W4RNL

# A Beginner's Guide to Modeling With *NEC*

## *Part 4:* Loads, transmission lines, tests and limitations

In this fourth and final installment of our series designed to get you started in modeling with *NEC*, we'll look at two disparate areas of modeling. The first arena involves a pair of auxiliary facilities built into *NEC*: the ability to model reactive (capacitive and/or inductive) loads and the ability to model transmission lines—both within limits. The second area is composed of model testing and some of the limits within which successful modeling occurs. Some words of caution will be a good way to conclude our preliminary survey. As we have done in the first three parts, we'll focus on *NEC*-2 and two commercial implementations: *EZNEC* 3.0 and *NEC-Win Plus*.

### Currents and Current Sources

In the very first episode of this series, we noted that using a voltage source is the most normal procedure for simple models with a single feedpoint. We can leave the source values at a magnitude of 1.0 and a phase of 0.0 degrees (the default values) for most models, since the critical output data in which the beginning modeler is interested does not depend on the source values. Gain, front-to-back ratio and the source impedance will come out the same for a single-feed antenna no matter what source values we use.

Sometimes it is convenient to use a current source. Should you wish to model phased arrays, you'll need to use current sources to establish the relative magnitudes and phases of currents for the feedpoint of each driven element. Our beginning project, however, will be much simpler: we want to look at the current levels along a simple dipole. We can do this by using a voltage source, but the typically low current values tend to be hard to interpret without some further arithmetic. If we only had a way to set the source current at a value of 1.0, then all of the other values along the dipole would be relative to 1 for easier comprehension.

Commercial versions of *NEC-2* provide a current source capability. The network used to transform the natural voltage source of *NEC* into a current source at the antenna feedpoint is invisible to the user. However, by selecting a current source and using the default value of 1.0 for the magnitude, we can perform our survey with ease.[1] Our one caution is to note that while the *NEC* core and *NEC-Win Plus* use peak values of voltage and current, *EZNEC* translates these values into their corresponding RMS values. For our work here, the difference will not have significance, but for translating voltage, currents and impedances into power levels and back again, peak values must be transformed into RMS values.

Now let's build a simple free-space (no ground) model, a 20-meter (14.175 MHz) dipole using 1-inch diameter aluminum, 21 segments, and a modeling length along

[1]Notes appear on page 35.

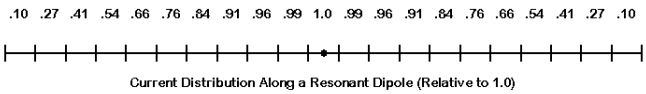



**Figure 1—The relative current distribution along a resonant dipole, using a source current value of 1.0 as a reference.**

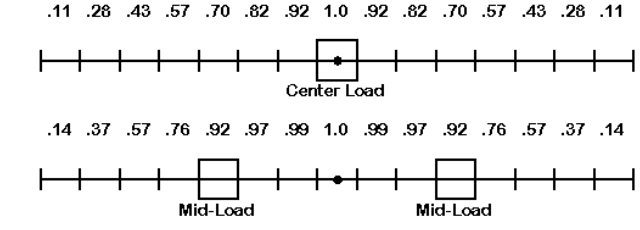



**Figure 3—A comparison of current distributions along equal-length short dipoles using a center-loading inductor and 2 mid-element-loading inductors, referenced to a source current value of 1.0.**

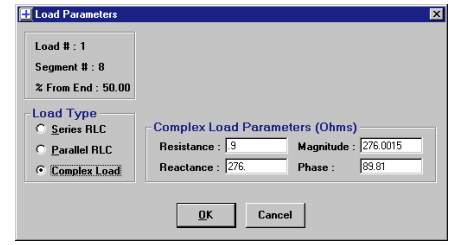



**Figure 2—The *NEC-Win Plus* basic entry screen for a load consisting of a resistance and a reactance in series (called a "complex load").**

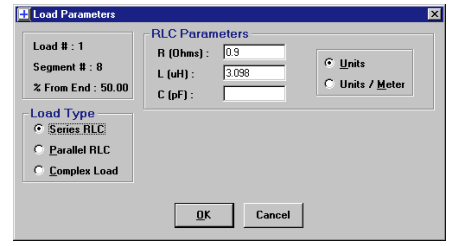



**Figure 4—The *NEC-Win Plus* basic entry screen for loads consisting of a resistance and an inductance in series. A series capacitor, not used in this example, could be added to the mixed load. Note that parallel combinations of resistance, inductance and capacitance are also possible.**

the Y-axis of +/–198.75 inches. We should find a source impedance at the design frequency of about 72 Ω with only a fraction of an ohm of reactance.

Our interest lies in Figure 1, a summary of the current magnitude on each segment of the model. *NEC* provides these values, and commercial implementations make them available as one of the tabular outputs. Figure 1 will be a standard for the next phase of our work, but for the moment, we can note two key items. First, the progression of values is almost, but not quite, a sinusoidal curve. Second, the lowest value is not zero because the calculation is for roughly the center of the outermost segment, not the very end.

## Loads

Next, let's shorten the dipole to +/–144 inches, or 24 feet overall. Reduce the number of segments to 15 so that each segment will be about the same length as in the original longer dipole. The shortened antenna, of course, will not be resonant. In fact, it will report a source impedance of about 27 – *j*275 Ω. If we want to resonate the antenna, we shall have to compensate for the high capacitive reactance with loading coils somewhere in the antenna structure.

*NEC* lets us model reactive loads. The loads can have a resistive as well as a reactive component, as shown by the *NEC-Win Plus* load screen in Figure 2. Adding a series resistance to the reactance lets us account for the Q of the loading coil. Note the reactance value: 276 Ω, just enough to compensate for the capacitive reactance. The resistance value (0.9 Ω) reflects a coil Q of 300. The upper left corner of the figure shows that the load has been placed at the center of the antenna, on the same segment as the source. Loads are always in series with a source on the same segment.

All loads that we introduce are mathematical models, not physical models. The difference is this: a physical model, such as the antenna wire, contributes to the radiation pattern. The mathematical loads do not. So any variations (normally insignificant) in radiation patterns that result from using large or small coils will not show up in the output of *NEC*.

If we run our model with its load, we'll find a source impedance of about 31 Ω and a fractional value for reactance. Remember that the inductive reactance of the load cancelled out the capacitive reactance at the source by simple addition. In series circuits, we add resistances and add reactances. The added resistance of the coil shows up in the resistive part of the source impedance.

***All loads that we introduce are mathematical models, not physical models. The difference is this: a physical model, such as the antenna wire, contributes to the radiation pattern. The mathematical loads do not.***

We need not always use a center loading coil. Instead, we can place coils in the middle of each antenna leg away from the feedpoint. If we remove the center loading coil, we can replace it with a coil 30% from the left end (segment 5) and another matching coil 70% from the right end (segment 11). Experimentally, we can adjust the reactance of the two coils until the antenna is once more resonant. For the 24-foot 20-meter model, values of *j* 212 Ω (reactance) will do the job, and for a Q of 300, we can assign the resistance box a value of 0.7 Ω. Running our new mid-element loaded dipole will yield a resonant impedance of about 45 Ω. The impedance value is higher than with center-loading, but lower than the impedance of a self-resonant dipole.

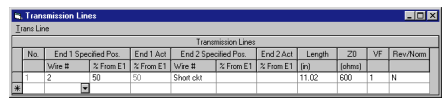



**Figure 5—The *EZNEC* screen for introducing a mathematical transmission line into a model.**

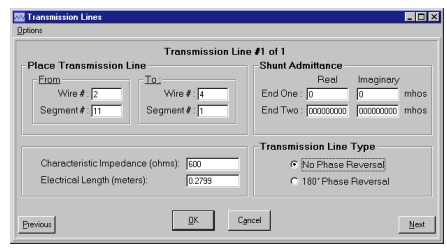



**Figure 6—The *NEC-Win Plus* screen for introducing a mathematical transmission line into a model.**

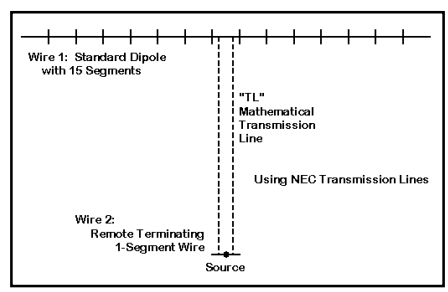



**Figure 7—A standard use of a transmission line between the antenna wire and a short, 1-segment terminating wire that becomes the location of the antenna system source.**

Before we leave the loaded dipoles, let's look at the current tables (since we used a current source for our runs). Refer also to Figure 1 for comparison. The current level on the antenna wire past the loads suddenly decreases relative to the current distribution on an unloaded dipole. Hence, we would expect either loaded dipole to show somewhat less gain than the unloaded standard.

There are some cautions to observe for loads. First, the mathematical load assumes equal currents on both ends of a coil. As Figure 3 shows, this condition only exists for the center loading coil, but not for the mid-element coils. Hence, the calculations you make for mid-element loading coils will be slightly less precise relative to building the coil. Second, using the coil's reactance is good only for a single frequency. If you wish to perform a frequency sweep of the antenna, reenter the coil values, an inductance and a resistance in the series RLC option for entry, as shown in Figure 4, a *NEC-Win Plus* load box for the center loading coil. Standard handbook equations for transforming reactance to inductance (or capacitance) apply here.[2] Some implementations of *NEC* call for µH and pF, while others may call for basic units. With inductive, capacitive, and resistive units, loads will show the correct reactance at each checkpoint of a frequency sweep, and the resulting source impedance values (and SWR values, if needed) will be much closer to the reality of the antenna's performance.

## Transmission Lines

A second mathematical convenience offered by *NEC* is the use of transmission lines in a model. Like loads, these lines do not enter into the calculation of radiation patterns. If the pattern influence of a transmission line is significant to a model, the modeler must physically model the line, which is possible for parallel lines, but not generally feasible for coaxial cables.

Figure 5 shows the *EZNEC* transmission line entry screen, while Figure 6 shows the *NEC-Win Plus* equivalent. Both show the same line: a shorted stub of 600-Ω line having a length of 11.02 inches or 0.2799 meters. *EZNEC* provides an invisible structure for open and shorted stubs, while *NEC-Win* shows the actual construction. Every transmission line must run from one wire to another. In *NEC-Win Plus* or raw *NEC*, we create a new short (1 segment) thin wire that is

far away from the antenna. Its position is not critical, since the line length entered into the proper box on the transmission line screen controls the calculation. A shorted stub requires a high shunt admittance. The long numerical entry for $1^{10}$ (1 to the tenth power) is used to assure a true short circuit at the far end. Note in passing that we can reverse the line between the two terminating wires, essentially giving it a half twist—a useful feature for modeling phased arrays.

The transmission line entry boxes illustrate the critical elements of a *NEC* transmission line. Figure 7 shows the layout of such a standard sort of model using a transmission line used with a dipole. The dipole wire is one end of the line, while a new short 1-segment line terminates the transmission line. For this kind of application, we move the source from its usual position at the center of the dipole and place it on the new wire. We might wish to see what impedance we might obtain at the end of the line using various line lengths. We need only change the line length, perhaps in quarter-wavelength increments, to explore the effects of line length on the system source impedance. Note that some programs have a velocity factor entry box, which lets you enter the physical line length. Other programs do not have a velocity factor box, so you must precalculate the electrical length of the line and use that figure.[3]

There are cautions to observe in the use of *NEC* transmission lines. First, they do not account for line losses. For short line runs, the source impedance error will likely not be significant, but the error will grow with very long transmission line runs. Second, transmission lines are in parallel with sources (in contrast to loads, which are in series with sources). Third, transmission lines are accurate only where the antenna element current on each side of the line is equal. Hence, they are most accurate at element centers and other low impedance points along an antenna and become quite inaccurate at low current, high voltage positions.

Transmission line runs to a remote source are only one use of this *NEC* facility. Stubs are also useful for modeling some kinds of matching networks for antennas. For example, consider the 20-meter 3-element Yagi in free space, as shown in Figure 8. Before adjustment with a matching network, it has a source impedance of about 24 – *j*25 Ω. The resistance and capacitive reactance are exactly suited to the use of a beta match. We can implement the match with a small coil across the feedpoint or with a shorted transmission line stub (often called a "hairpin"). In fact, the stub that we used to illustrate the basic transmission-line setup in Figure 5 and Figure 6 is exactly what we need to introduce an inductive reactance of about 50 Ω across the antenna terminals. Because transmission lines are mathematical and use remote terminating wires for stubs, Figure 8 does not show the stub, but indicates its presence with a dot. (If the view tried to show the terminating wire for the stub, the antenna structure itself would shrink almost to invisibility in the graphic.)

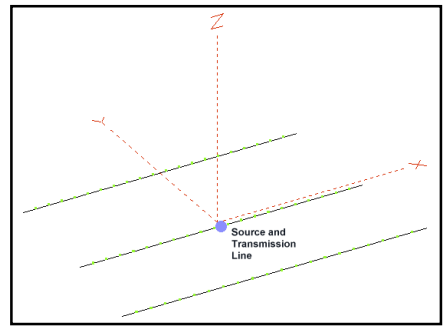



**Figure 8—An *EZNEC* view of the 3-element Yagi with a beta-match shorted transmission-line stub (hairpin) at the driven element terminals.**

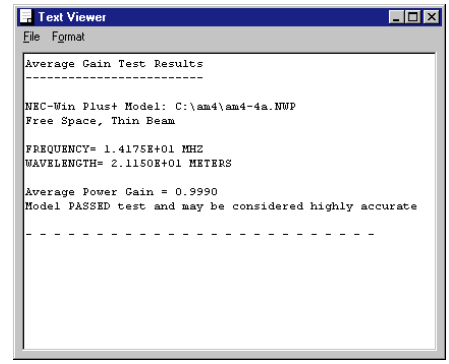



**Figure 10—The *NEC-Win Plus* report on the results of the average gain test for the 3-element Yagi used for the beta-match illustration.**

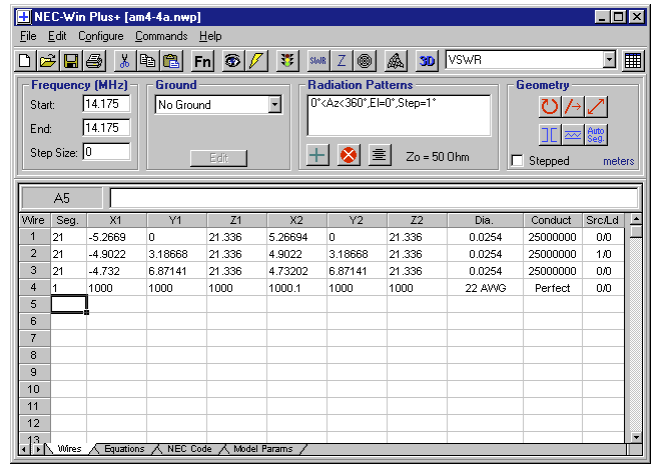



**Figure 9—The *NEC-Win Plus* wires page for the 3-element Yagi and beta-match stub, showing the remote terminating wire for the transmission-line stub.**

Figure 9 shows the *NEC-Win Plus* wires page that goes with Figure 6, the corresponding transmission line screen. Wire 4 is the remote 1-segment thin wire that terminates the shorted stub. The units of measure are meters, which coincides with the stub length in Figure 6. If we run the model, we should get a source impedance at 14.175 MHz of about 51 – *j*3 Ω. You may wish to run a frequency sweep of the antenna across the entire 20-meter band to check the 50-Ω VSWR at the band edges.

Besides their use as standard transmission lines and as stubs in matching networks, transmission lines have other uses in advanced modeling. For example, the phase-line needed in a log periodic dipole array (LPDA) runs from one element to the next with a half twist between each element. Such structures are extremely difficult to model physically, but the transmission line facility in *NEC* not only simplifies the process, but as well increases the accuracy of the array analysis. Used with care and with their mathematical (non-physical) nature always in mind, transmission lines in *NEC* can be a valuable design tool for many types of antennas.

## Testing Models

I have stressed that both loads and transmission lines must be used with care and within their limitations if we are to achieve accurate model results that coincide closely with the physical antennas the models represent. This same caution applies to the physical structure of models. There are two general tests that we can apply in order to increase our confidence in a given model.

The first analysis is called the convergence test. In Part 1 of the series, we noted the minimum number of segments to be used on open-ended linear elements. However, as the antenna geometry becomes more complex, we may need more than the minimum number of segments

to assure an accurate model. Moreover, segment length should ideally be about the same throughout a model. Whether we have enough segments of the right lengths is subject to a simple test.

Start by running the original model and recording the gain and source impedance. Then increase the number of segments for each wire by about 50%. Again, record the gain and source impedance. You may wish to give the test a third trial with another 50% increase in the number of segments per wire and record the results.

The level of segmentation at which the output figures for the model do not change significantly is the minimum level of segmentation for the model. The models are said to converge at this segmentation level. In some cases, minimum segmentation is satisfactory. In others, especially for antennas having a closed geometry (like angular loops), the required segmentation level may be higher. A few antennas, such as those with angular elements of different lengths extending from the feed point, may not converge until very high levels of segmentation. And some models will not converge at all because they exceed the limitations of the *NEC* core or have other construction errors. There is no absolute standard of what counts as the borderline between converged and non-converged models. However, if two successive levels of segmentation produce results that indicate differences in antenna performance or structure that go beyond normal tune-up adjustments, the models are likely not sufficiently converged.

A second test is called the average gain test. If we place a horizontal antenna model in free space or a vertical antenna over perfect ground, we can then perform a 3-dimensional radiation pattern test, using equally spaced checkpoints. To perform the test, we omit wire losses and resistive loads. The reason for these moves is that the average gain of a lossless antenna, taking into account a fair sampling of all possible directions of radiation, is 1. Resistive losses would interfere with this result.

For the 3-element Yagi that we used to illustrate the beta matching stub, we receive the *NEC-Win Plus* report shown in Figure 10. Equal in quality to the 0.999 average gain value would have been 1.001, since the test is run with a large but not exhaustive sample of directions for the radiation pattern checkpoints. Again, there is no absolute standard for what counts as "highly accurate." The level may depend on whether we are preparing to home brew an antenna or whether we are deriving some detailed performance trends. For most uses, values of 0.95 to 1.05 for the average gain test indicate a very usable model for virtually any purpose.

However, both the convergence and average gain tests are necessary conditions of model adequacy. They are not sufficient conditions. There are at least a few types of models that can pass both tests and still yield inaccurate results. However, passing both tests should increase our confidence that we have a good model.

## *NEC* Limitations

A bad model (one which fails either or both tests) does not necessarily mean that the modeler is at fault. *NEC* has limitations. We saw some of those limitations in Part 1, when we noted certain guidelines for the minimum segment length to diameter ratio, segments per half wavelength of wire, etc. There are others, a few of which are illustrated in Figure 11. For example, letting two wires touch at mid-segment points (in contrast to junctions) will trigger the *NEC* core to reject the model. Most of the *NEC* core rejection messages occur due to simple mistakes in creating or revising the geometry of an antenna model. The solution is to find and correct the error. By using the paper planning techniques shown in Part 2, we minimize the chances of receiving a core rejection notice.

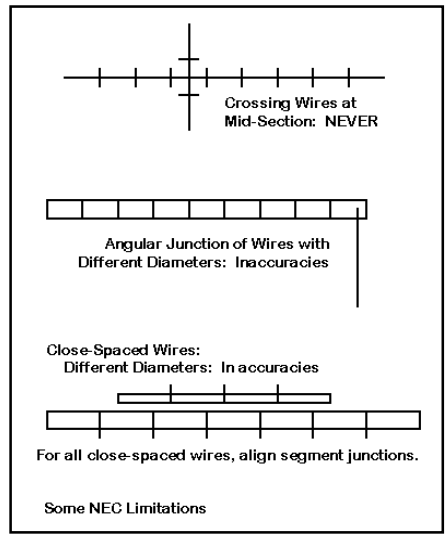



**Figure 11—Some *NEC* limitations, including the prohibition against wires crossing at mid-segment locations, and accuracy difficulties with angular junctions of wire having different diameters and close-spaced wires of different lengths or diameters.**

More subtle are *NEC* limitations that the core does not signal with a rejection message. For example, *NEC* will normally yield inaccurate results when two wires of different diameters meet at an angular junction. The difficulty grows more pronounced as we add more segments to each wire. Consider a folded **X**-beam composed of 1-inch aluminum elements in the facing **V** sections with thin wire tails pointing toward each other in each side of the structure. This antenna will not converge at any level of segmentation in *NEC*.[4]

Likewise, *NEC* can grow inaccurate when two wires of different diameters are brought close together. Wires of the same diameter should have their segment junctions well aligned when in proximity for highest accuracy, for example, with a folded dipole. However, even if the segment junctions are aligned, wires of different diameters and lengths will show errors of both gain and source impedance as they approach too closely. The degree of error depends on many factors, including the wire diameter, the spacing, the frequency, and the relative element lengths. The average gain test will normally catch this overstep of the limitations inherent in *NEC*.[5]

The *NEC* core also has a limitation in handling tapered-diameter elements, that

***Most of the NEC core rejection messages occur due to simple mistakes in creating or revising the geometry of an antenna model. The solution is to find and correct the error.***

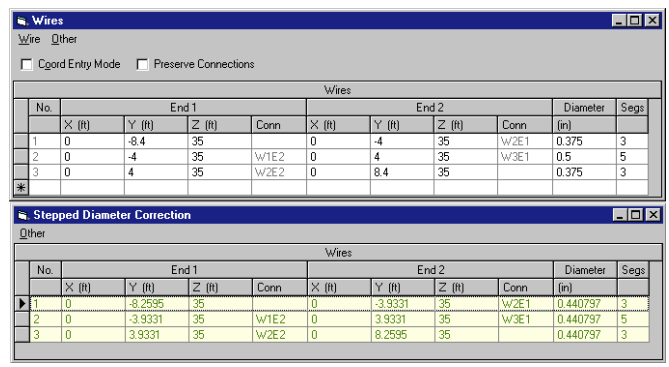



**Figure 12—A sample, from *EZNEC*, of the original tapered-diameter element and its uniform-diameter Leeson substitute.**

is, elements composed of ever-smaller diameters of tubing as we move outward from the element center. However, commercial implementations of *NEC*, including both *EZNEC* and *NEC-Win Plus*, offer the modeler a system of carefully calculated substitute elements having a uniform diameter. The corrective elements are based on the work of Dave Leeson, W6QHS (now W6NL).[6] Using a complex set of equations, the program precalculates substitute elements. However, the equations only work within about 15% of the design frequency and on symmetrical open-ended linear elements with no mid-element loads or transmission lines. Despite these limitations, the correction factor has been a boon to designers of directional arrays for the upper HF and lower VHF region.

Figure 12 provides a small sample of the Leeson corrections in action, using *EZNEC* as the source. The upper part of the figure shows the 3-wire dipole used as an example in Part 2 of this series. The lower portion of the figure shows the substitute elements that replace the tapered diameter model in *NEC* calculations. Note that the uniform-diameter element is not simply the average of the two diameters in the tapered-diameter version. As well, the uniform-diameter version is shorter than the physical dimensions being modeled. Elements that taper toward thinner diameters as we move away from the center feedpoint require longer physical element lengths for resonance than do uniform-diameter elements. Finally, note that the length dimension affects not only the outer ends of the element, but the length of the inner element piece as well.

The Leeson corrections have made the design of Yagis and similar directional arrays routine. Of course, the corrections must be used within the limitations that we noted above. The upshot is that there are arrays which are difficult (if not impossible) to model within *NEC*. Nonetheless, despite the limitations, *NEC* is capable of accurately modeling an almost endless variety of antennas for frequencies ranging from below the AM broadcast band into the upper UHF region.

## Conclusion

We have explored *NEC*-2 modeling with the eyes of a beginning modeler, starting from the basic language of the modeling enterprise and ending with some fairly advanced cautionary notes about the limits of *NEC*-2. We have not exhausted all of the possibilities for combining the features of the *NEC* core and its commercial interfaces to improve the precision of our analyses or to ease the work involved in creating models. For example, we have not mentioned trap antennas, which can be modeled with good results. We have not delved into modeling by equation, which can simplify the construction and revision of models and so speed up the design process. And we have not touched upon the modeling or complex structures, such as typical tower sections, or the use of substitute models.[7]

**Elements that taper toward thinner diameters as we move away from the center feedpoint require longer physical element lengths for resonance than do uniform-diameter elements.**

What we have attempted to do in this 4-part series is to acquaint you sufficiently with the fundamentals of *NEC* modeling so that you can embark on your own exploration of the antennas in which you have the most interest. Hopefully, there is enough information in these notes to make your initial efforts successful and make the next steps confident ones on your own.

Think of *NEC* as a precision tool. Even as I write, various improvements to the modeling process—some general, some for specific applications—continue to develop. However, even though *NEC*-2 is nearly two decades old, it remains far more precise than older calculation methods. It is superior by far to those rules of thumb by which we measure dipoles and quads, and it is a distinct advance in antenna pattern and gain analysis compared to aperture-area calculations that were popular in the middle of the 20th century. In short, *NEC* is a good tool for the student of antennas to master as we move into the 21st century.

However, like every precision tool, *NEC* requires care, practice, patience, and focus to master well. What we learn about antennas along the way will be the reward for our efforts.

### Notes

[1]Users of raw *NEC* can achieve a source current of 1.0 in the following way. For a resonant antenna, use the voltage source at its default values to obtain the source impedance. Then use the source impedance as a revised voltage magnitude and phase values, and rerun the model. The source current should be 1.0, since current equals the voltage divided by the impedance. Likewise, one can explore the actual current for a given power level by using the initial run source impedance and the desired power level. Select a voltage equal to the square root of the power times the impedance. See the main text for cautions concerning *NEC*'s use of peak voltage and current.

[2]As a reminder, here are the transformation equations for inductance and capacitance and their respective reactance values:

$$X_{L\ =\ 2\pi fL}\ L\ =\ \frac{X_L}{2\pi F} \qquad \text{(Eq 1)}$$

where $X_L$ is the inductive reactance in Ohms, L is the inductance in Henries, and f is the frequency in Hz.

$$X = \frac{1}{2\pi fC}\quad C\ =\ \frac{1}{2\pi fX_C}\ 2 \qquad \text{(Eq 2)}$$

where $X_C$ is the capacitive reactance in Ohms, C is the capacitance in Farads, and f is the frequency in Hz. In addition, when using either the series or parallel RLC option, place a zero in the box for a missing value, for example, the capacitance box of Figure 4. *NEC* interprets the zero as a missing value and not as 0 pF capacitance.

[3]For reference,

$$L_P = VF \bullet L_e \quad L_e = \frac{L_p}{VF} \qquad \text{(Eq 3)}$$

where $L_p$ is the physical length of the line, $L_e$ is the electrical length of the line (in the same units), and VF is the velocity factor, ordinarily 1.0 or less.

[4]Interestingly, *MININEC* has no difficulty in modeling the angular junctions of dissimilar wires, although length tapering may be needed at the acute angle corners. *NEC*-4 improves on the performance of *NEC*-2 for such structures, but remains shy of perfection.

[5]Once more, *MININEC* has no problem with close spaced wires of different diameters and lengths. Hence, it yields quite accurate results for folded dipoles that use wires of different diameters. For further details of *NEC* limitations, especially as they appear in *NEC*-4, see L. B. Cebik, "*NEC*-4.1: Limitations of Importance to Hams," *QEX* (May/June, 1998, pp 3-16). The limitations of *NEC*-4 also apply to *NEC*-2.

[6]David B. Leeson, W6QHS, *Physical Design of Yagi Antennas* (Newington: ARRL, 1992), Chapter 8. Once more, *MININEC* does not have difficulties in dealing with tapered-diameter elements and is used as a comparative standard by Leeson. (However, *MININEC* 3.13—the public domain version—does have numerous limitations of its own, such as a very slow-running core, limitations on the total number of available segments, no transmission line facility, a relatively poor system for calculating ground effects, source impedance calculated only over perfect ground, etc. These limitations have made *NEC*-2 the more preferred modeling core among radio amateurs, although *MININEC* still has important uses. *NEC*-4 requires a license and advanced software, both of which have placed this improved *NEC* core beyond the economic reach of most hams.)

[7]Those whose interests in antenna modeling grow deeper are invited to look at the series of *AntenneX* columns that I do monthly, all of which are at my Web site (**www.cebik.com**) under the "Antenna Modeling" heading, or to the text *Basic Antenna Modeling: A Hands-On Tutorial*, available from Nittany Scientific, Inc (**www.nittany-scientific.com**). The original *NEC*-2 manuals remain the most authoritative references for understanding the operation of the core. The on-line or paper manuals accompanying commercial implementations of *NEC*-2 are also authoritative for the respective software packages.

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By William J. Newman, K0NSA and Mary Joseph, N0TRK

# "So People Still Do That?"

## The Ak-Sar-Ben Amateur Radio Club in Omaha, Nebraska "went to the movies" and told the story of Amateur Radio.

That was the phrase that the members of the Ak-Sar-Ben Amateur Radio Club heard the most during the opening weekend of the movie *Frequency*. Not only did we assure theater patrons that we still did "that," we showed them all the cool new things that we do *now*!

The planning for the event started about 12 weeks before the opening when members of the club first heard about the movie and its tie to Amateur Radio. The club's public relations committee contacted various theaters to find out which ones were going to show the movie and which would be receptive to hosting the club in its endeavors to use the movie to promote Amateur Radio.

### The 20 Grand says "Yes"

The 20 Grand Theater, a 20-screen mega-theater, jumped at the opportunity to have us set up a display and was enthusiastic about our plans. We were given free run of the theater including the projection area and the roof for equipment and antenna set up. Their large free-access lobby allowed us to set up in a prominent location without being directly in the way of weekend movie crowds. The theater even said that they would place a notice in the local newspaper advertising the fact that we would be there during opening weekend.

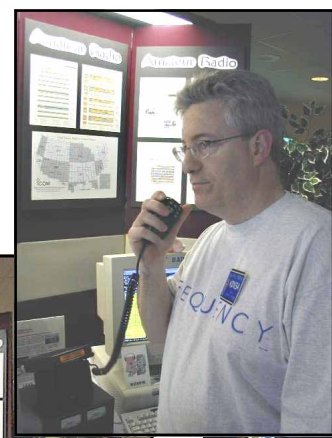
While the actual release date for the movie had not been set, the theater assured us we could be there no matter when the movie debuted. So, with the location secured, the planning of what we were actually going to do got underway. Our first job was to build enthusiasm and awareness about the movie with area hams.

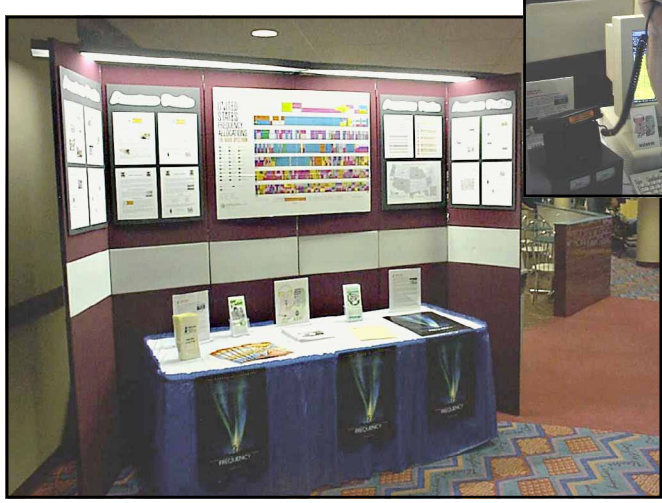
The club's public relations chairman set up a multimedia extravaganza at several club meetings to show the movie's trailer, and we took every opportunity to talk up the event on area repeaters and weekly radio nets. Once the excitement and anticipation began to build, ideas started flowing in. We circulated event sign-up sheets at club meetings/gatherings. We began to assign tasks, locate needed equipment, and schedule club members to staff the booth from the Friday afternoon opening until tear down Sunday evening. Our over-riding goal was to knock the public's socks off with the capabilities and advanced technology of our hobby! The club and its membership were firmly behind the project and it became the talk of the local repeater.

### Sneak Preview

When the movie was suddenly available for an earlier-than-expected sneak preview, one call to the theater secured our seats. The movie was fun, entertaining and the audience loved it—we knew we could capitalize on the interest it generated. Members of the club attended four sneak previews at theaters around the city, setting up information booths at theaters where possible. The audience reaction to our displays was

The author demonstrates 2-meter FM in the theater lobby.





This static display was available to theater patrons throughout the week.


It's a good night for a movie—and Amateur Radio—at the 20 Grand multiplex.

always positive, especially after they saw the film. It was a "feel-good" movie and Amateur Radio was a part of that feel-good feeling!

### Setting Up

Once club members had seen the movie preview and realized its potential for generating positive interest in Amateur Radio, our plans grew. The Friday of opening weekend (April 28, 2000), the members of the club began their invasion of the theater. The first to go up was the convention-style display booth, on which we hung four custom color posters explaining all about Amateur Radio and its many facets. Large fluorescent lights built onto the display booth increased its visibility and really brought out the colors in the posters even from across the expansive lobby.

As an additional movie tie-in, we also installed a rotating red and blue police/fire light above the center of the display booth (in *Frequency*, the character of Frank Sullivan was a firefighter and John Sullivan was a cop). The flashing light guaranteed that we would be seen by all movie patrons, and was very effective in generating interest in what we were doing, especially with younger theatergoers.

Next we hung a large, professionally made 6-foot blue-and-white banner over the entire display which read, "Amateur Radio Communications" so there was no doubt who we were. We then set up three banquet tables that were covered and skirted blue and white to match the banner. On these tables, we set up radios, computers, ARRL and club literature and a Heathkit SB-301 transceiver similar to the rig used in the movie.

The display was very attractive and the local Dayton Hamvention veterans declared it to be "commercial quality." Even the theater management said that this was the most attractive display they had ever had in their lobby.

Information about ham radio adorned the booth walls behind a row of computers sending Morse code, running APRS (Automatic Position Reporting System) displays, slow scan television, and QSO logging and radio interface software. Plenty of handouts were ready and the theater provided us with *Frequency* movie T-shirts and hats to wear, and a stack of movie posters to give out along with our ham radio pamphlets.

In a prominent location in the display sat the Heathkit SB-301, which was often recognized by the theater patrons as the "radio from the movie," and helped to attract even more visitors to our booth. Many visitors were truly surprised by the advances in ham radio over the years. These advances were dramatically highlighted when we compared the Heathkit "movie" radio with Icom's latest state-of-the-art rig—the ICOM IC-756 PRO, which was being used to make HF contacts.


**The booth enjoyed steady visitor traffic.**


**Our booth is set up and ready for the first visitors.**

### Greeting the Throngs

The display was designed to be very interactive. Visitors could try their hand at sending Morse code on the computer, logging HF contacts made with the computer-controlled 756 PRO, talking on HF, or tracking moving vehicles and weather conditions around the city with APRS. One of the biggest hits of the weekend with the younger crowd was SSTV. This was done using a Kenwood VC-H1 hooked up with a Kenwood D7A.

On the receive side of the SSTV system was an ICOM H-T hooked up to a Pentium computer. A club member would approach a group coming out of a movie, and ask them if they wanted to be on TV. Their picture was taken and they would be directed to go across the room to our booth to see it on the computer display. Once they were at the display they all had questions. When we explained that there were no wires, that the picture had been sent across the room via radio everyone was impressed. They were amazed we could do that without wires and even more amazed when we explained that we could send the pictures across the room, across town or even around the world.

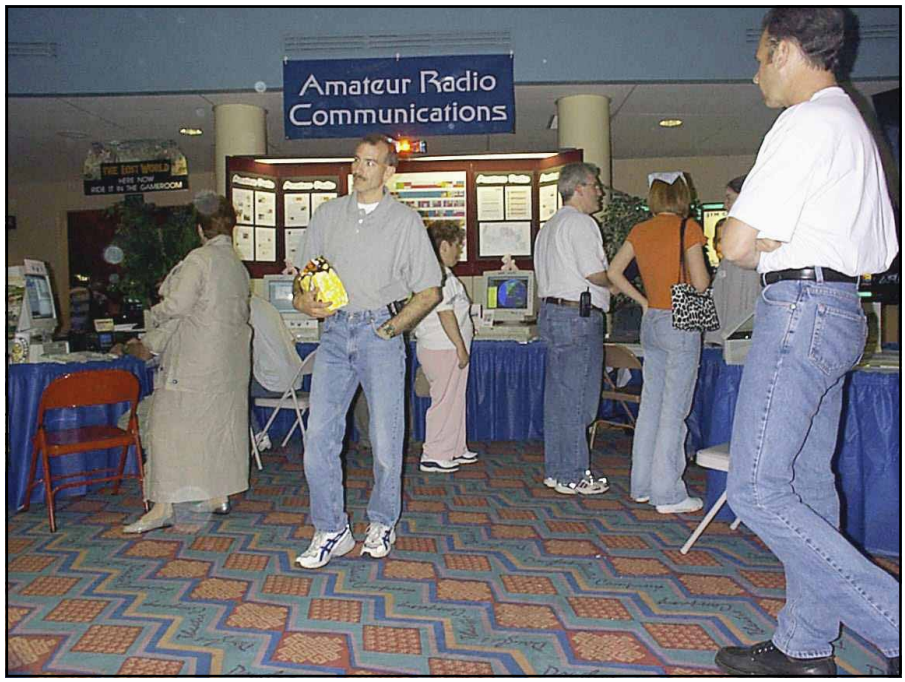
***One young lady of about 13 years of age stopped by and asked, "What's all this?" When we explained to her what it was, she asked, "Can I talk on it?" We made a quick contact to another ham on the local repeater and she had a wonderful time.***

One young lady of about 13 years of age stopped by and asked, "What's all this?" When we explained to her what it was, she asked, "Can I talk on it?" We made a quick contact to another ham on the local repeater and she had a wonderful time. All smiles, she ran off to join her friends saying: "I talked on the radio!"

The computer-controlled HF station was also a hit. The most-heard comments were: "Is this going through the Internet?" or "Are you getting that off of a satellite?" We explained that the radio and the computer were connected together, but every conversation was conducted via radio. We explained how each area of the world had a unique way of issuing its Amateur Radio call signs. By entering the call sign of the station we were talking to, the computer would give us their call sign information and approximate location on a world map. They were quite impressed, but even more so when they were told we had spoken with Japan, Germany and other countries earlier that day (or when they witnessed these contacts first hand).

We even contacted a few theaters around the country where other Amateur Radio operators there were doing much like we were, setting up our stuff and showing Amateur Radio to the masses. Several theater patrons, from small kids up to adults, were able to get on the radio and talk to other hams. Since the Nebraska QSO party was running that weekend, we used the Ak-Sar-Ben ARC's call sign—K0USA—to give out some Nebraska contacts from the theater.

Amateur Radio activities were chosen for display according to their visual and technical impact. HF communication with the new state-of-the-art computer-controlled-radio was the showpiece, but the APRS and SSTV displays drew a great deal of interest as well. The Midlands ARES group serves the National Weather Service during severe weather and is actively setting up ARPS




**Moviegoers pick up their popcorn, then check out our display.**

weather stations around the area to assist during SKYWARN operations. We were able to demonstrate this use of APRS and explain why ham radio operators are often the spotters that the meteorologists refer to when a weather warning is issued.

Also, numerous mobile APRS stations were active in the area and we were able to track them on the live display. Again, theater patrons were surprised to see that such a thing was possible.

### A Long-Term Success

The interactive display ran from Friday afternoon until Sunday night at around 6 PM, exposing ham radio to 7500 theater patrons. While a core group staffed the display most of the time, nearly 30 other club members stopped by to help, and to demonstrate the equipment and explain Amateur Radio to theatergoers. No matter what time it was, someone was always available on the repeater to give us a contact.

After Sunday, the radios and computers were removed, but not the display booth or the Amateur Radio literature. Instead, the booth (with posters and handouts) was moved to another high-traffic area where it remained for the following week. Stocked with handouts on ham radio, the ARRL and the Ak-Sar-Ben Amateur Radio Club, the display continued to have an impact on theatergoers. AARC club members visited the theater daily to make sure the handouts never ran out.

In order to take immediate advantage of the interest we had generated, a Technician license class was started in early May. We are proud to say that all the students enrolled did so as a result of seeing the display we had at the theater.

***In order to take immediate advantage of the interest we had generated, a Technician license class was started in early May. We are proud to say that all the students enrolled did so as a result of seeing the display we had at the theater.***

### Making Friends with the Theater

The cooperation of theater management really helped us pull this off flawlessly. We were denied nothing that we asked for, including an early Saturday morning set-up time to install the HF station before the theater opened to the public. We were a little concerned that the antenna, an MFJ loop on the roof, might interfere with the Dolby sound systems, but tests revealed that this was not the case. Not a peep was heard in any theater throughout the event, and the theater's neon lights were also clean—no nasty buzzing was heard on any frequency.

The theater security guards strolled by to talk with us numerous times during the weekend. The theater promotions manager and the general manager both frequented the display booth and asked many questions. They were so happy with the professionalism of the display and of the hams who staffed it, they have invited us back—with or without a movie promotion! The successful display was a direct result of the commitment of the membership of the Ak-Sar-Ben Amateur Radio Club to community service and increased community awareness of ham radio.

The public display was a great boost for the local ham community. Hams who have not been active in club activities came out to see the display and the movie. Many took their turn at showing off the hobby. Others drove in from nearby towns to see what they had been hearing so much about. Many commented that it was like a mini Field Day—only much more comfortable!

The mix of male and female hams staffing the display also encouraged both men and women to stop by. Some of our visitors were inactive hams who decided to get back on the air after seeing the activity. Thanks to the variety of informational displays, the mix of equipment being used (Kenwood, ICOM, MFJ, Kantronics, Comet, Diamond, Astron, etc), and the use of computers, it was readily apparent that Amateur Radio is alive and thriving in our high-tech world.

### Our Story Needs to be Told

This type of promotion was a great catalyst, but we do not have to wait for the next "ham radio movie" to publicize our hobby. Our experience from this event is not that Amateur Radio is not interesting to people, or that it has a bad image, rather—in many cases—it has *no image*. We need to get out among the people and tell our story. The public needs to know that we are here. They need to know that we are a diverse group of people from all ages and backgrounds, and that we are doing exciting things with state-of-the-art communications technologies. They need to know how we use our technical knowledge and communication skills to serve them in times of need.

Yes, cellphones and the Internet have removed some of the uniqueness of personal communication from Amateur Radio. However, if we take the time to shine it up a little and tell our story, ham radio is just as interesting to the techno-savvy kids of today as it was in the past. We just need to make sure we keep up with them.

We have a great story to tell—it just needs to be told!

*You can contact K0NSA at 15041 Binney St, Omaha, NE;* **k0nsa@arrl.net**. *N0TRK can be contacted at 1819 N. 110th St, Omaha, NE 68154;* **n0trk@arrl.net**. QST

By Sam Ulbing, N4UAU

# The World's Smallest Code-Practice Oscillator

## Using state-of-the-art technology, you can easily build a very small and flexible code-practice oscillator.

To some, CW is a "dead" language. I think that's unfortunate, because I find CW to be a lot of fun! Sure, CW isn't the most efficient way to communicate, which is why many commercial stations and the military no longer use it routinely. But how many sail-powered ocean freighters do you see? Yet people still sail for the *fun* of it. And how many horse-drawn 18-wheelers do you see on the interstate? None. But does that stop people from spending lots of time and money to enjoy the pleasures of horseback riding? Not at all! For those of you who want to experience the joy of CW, or want to upgrade from a codeless Tech license to a more advanced ticket, I can assure you it's easy to do with a little practice.

### Using Modern Technology

Many people use computer-generated Morse code just to get through the test. With a key, an oscillator, a battery and a small speaker or headphones, you can practice the code with a friend instead of an emotionless computer. To me, the difference is like that between playing solitaire versus a two-handed card game. Let me show you how to build a truly state-of-the-art code-practice oscillator and have some fun!

In years past, many code-practice oscillators were published in Amateur Radio literature. I thought it would be fun to apply state-of-the-art technology to this venerable project. Since 1996 when I first built a project using modern technology (ie, surface-mount [SM] devices),[1] I've been so intrigued with its possibilities for Amateur Radio use that I now work almost exclusively with SM parts. This project isn't difficult to build.[2] It only uses five parts and it's quite versatile.[3]

### Circuit Description

Refer to Figure 1. Except for the key, battery and speaker, all of the parts used in this project are SM devices. Two state-of-the-art components are employed. U1, an MIC1557, is a much-improved version of the popular and versatile LM555. Q1, an IRLML2402, is a powerful little MOSFET. Here's how the circuit works: Pin 4 of U1 is its power-supply pin and pin 3 is the shutdown pin, which is normally held at ground potential by R1. When the key is pressed, the voltage at pin 3 rises to $V_{cc}$, which takes U1 out of shutdown and causes it to oscillate at a frequency determined by the values of R2 and C1. With values of C1 = 0.1 µF and R2 = 10 k Ω:

$$f_o = 1 \div (1.45 \times R2 \times C1) = 689 \text{ Hz} \quad \text{(Eq 1)}$$

The output at U1 pin 5 is a square wave varying from 0 V to $V_{cc}$ at a frequency of about 700 Hz. U1 cannot handle much power, so its output is used to control the gate of an N-channel MOSFET, Q1, which acts as a simple power amplifier controlling the current through the speaker. When the potential at U1 pin 5 is 0 V, Q1 is off; when the voltage at pin 5 is greater than 1.5 V, Q1 is on. This action pulses current through the speaker at a 700-Hz rate and you hear the tone. Pretty simple, isn't it?

Despite the circuit's simplicity, it offers advantages over similar circuits built with older-technology components. Its first advantage is obvious: its small size (see Figure 2). The wires seem large because the board is so small—less than one-half inch square! As small as it is, the oscillator can blow your socks off if you use a suitable power supply and

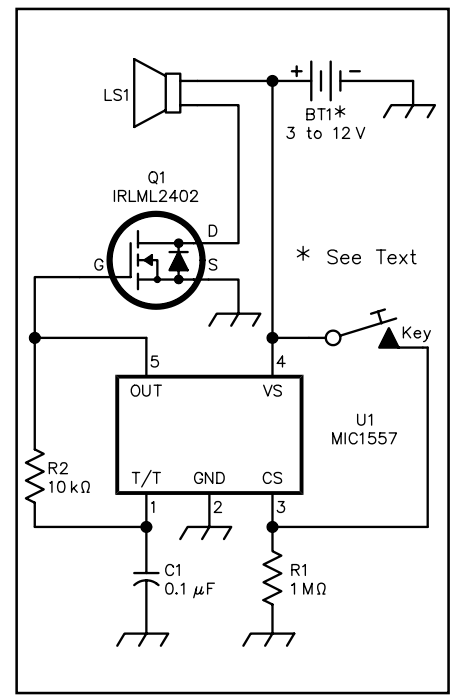



**Figure 1—Schematic of the state-of-the-art code-practice oscillator. All on-board components are surface-mount devices (see text). Unless otherwise specified, resistors are 5%-tolerance units. Part numbers in parentheses are Newark (Newark Electronics, 4801 N Ravenswood Ave, Chicago, IL 06040-4496; tel 800-463-9275, 312-784-5100, fax 312-907-5217; www.newark.com) and Digi-Key (Digi-Key Corp, 701 Brooks Ave S, Thief River Falls, MN 56701-0677; tel 800-344-4539, 218-681-6674, fax 218-681-3380; www.digikey.com.) Equivalent parts can be substituted.**

**BT1—3 to 12 V; see text.**
**C1—0.1 µF ceramic, 0805 X7R (Digi-Key PCF1126CT)**
**Q1—IRLM2402 FET (Newark 8F1207)**
**LS1—8-Ω speaker of suitable power rating; see text.**
**R1—1 MΩ, 0805 (Digi-Key P1.0MACT)**
**R2—10 kΩ, 1206 (Digi-Key # P10KECT)**
**U1—MIC1557BM5 (Newark 483F5883)**

[1]Notes appear on page 41.

speaker, which makes it great for use in a code class.

Secondly, the circuit works over a wide voltage and power range with *no* modifications. Figure 3 shows a test setup I built using a common 5-W speaker and four AA NiCd batteries. You might have to look twice to see the oscillator circuit because it's so small, yet this setup produces a loud tone. There are two reasons the tone is so loud. First, the MOSFET switch has an *on* resistance of only 0.25 Ω. This is less than the resistance of 10 feet of #24 hookup wire! So there's little power lost in the switch. Compare that to the commonly available IRF510, an old-technology MOSFET that's physically much larger (see Figure 4) and has an *on* resistance of about 1.5 Ω in a 5-V circuit. With an 8-Ω speaker, a 1.5-Ω switch greatly reduces the current flow through the speaker. For the values shown, the little switch allows a 33% greater power output than the larger switch. This tiny MOSFET can handle continuous currents of over 1 A and pulsed currents up to 7.4 A. Take a look at its size again and tell me electronic technology hasn't advanced!

The NiCds I used are the other reason for the loud sound. With a 5-V supply and an 8-Ω speaker, when the key is pressed, the current flow can be as high as 0.6 A. With that amount of current, the power output (0.6 A × 5 V) is 3 W, lots of volume—*if* the batteries can supply the required peak current. Small batteries have fairly high internal resistances and suffer large voltage drops at high peak-current demands. AA-size NiCds work well because of their very low internal resistance, Alkaline batteries, with a somewhat greater internal resistance, should still work satisfactorily, but the button-size lithium batteries won't deliver lots of power. Large sounds need large-capacity batteries with low internal resistances.

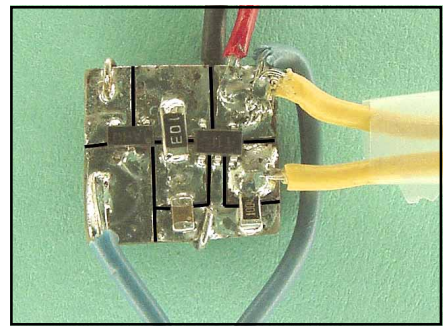


**Figure 2—The entire project fits on a board measuring less than one-half inch (1×1 cm) square.**

This versatile circuit also runs without modification from a 12-V supply.[4] So, if you need more volume (to fill an auditorium full of CW aficionados) you can use a 12-V supply to get an output of 18 W. That's pushing Q1 close to its limit. You'll also need a speaker capable of handling that desired power output.

On the other hand, if you want to practice your sending without disturbing others, you can use headphones. The circuit can be powered by a coin-size lithium 3-V cell (such as a CR2032) providing you add a current-limiting resistor of about 1 kΩ in series with the headphones. The resistor is required to offset the high internal resistance of the battery. Without the resistor, the circuit will try to draw about 100 mA causing the battery output voltage to drop excessively. With the resistor in line, the current demand is small and the sound is still ample for headphone practice. Figure 5 shows this configuration. The entire circuit and its battery easily fit on the key base.

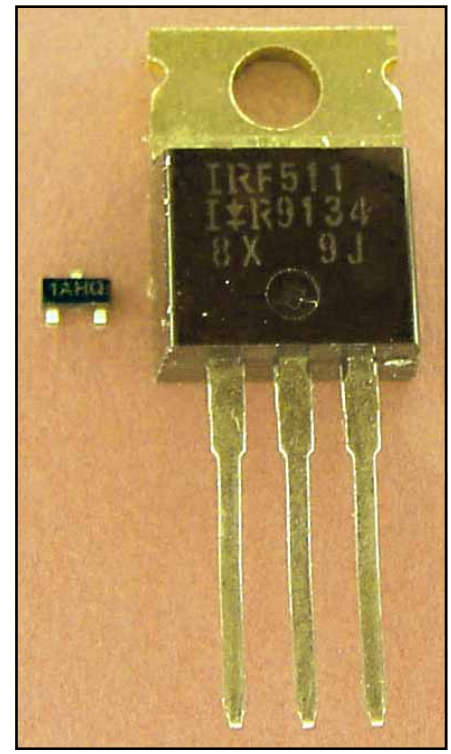



**Figure 4—The little SM MOSFET does a better job than its larger, old-technology counterpart.**

There is yet another advantage of the new technology used in this project. Notice that the circuit has no power switch. When you are done using the code practice oscillator, you can just walk away from it. That's because when pin 3 is low and U1 is shut down, the circuit draws less than 1 µA. That makes the circuit very power efficient as well because in between the dots and dashes the circuit is shut down—it draws current only when you close the key. Built-in shutdown circuitry is becoming quite common in

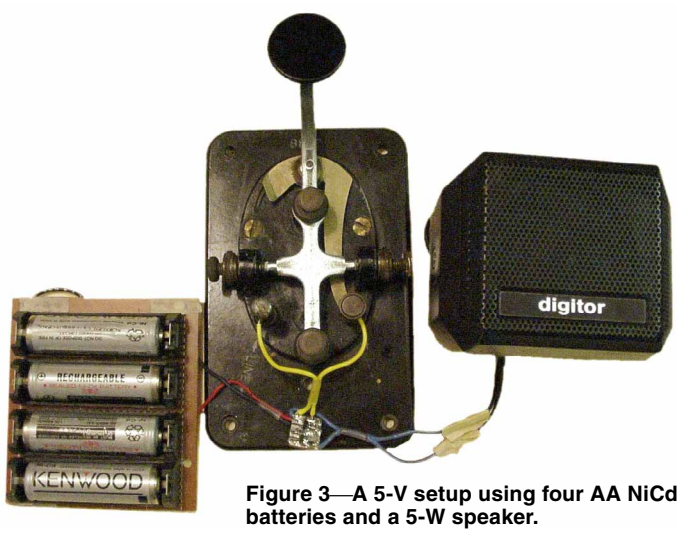



**Figure 3—A 5-V setup using four AA NiCd batteries and a 5-W speaker.**

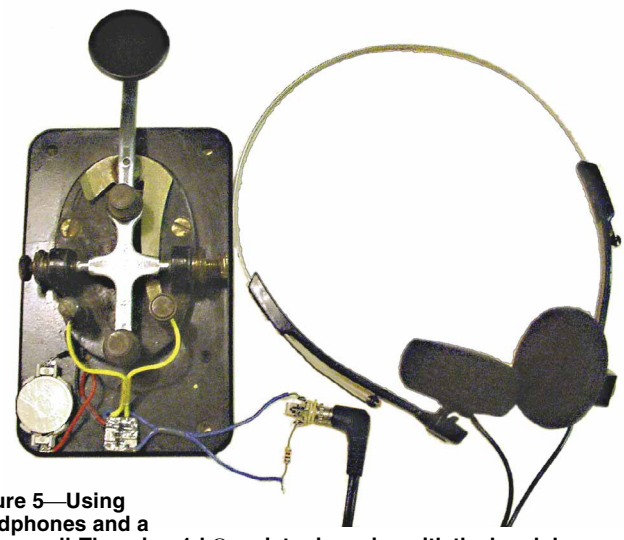


**Figure 5—Using headphones and a lithium cell. There is a 1-kΩ resistor in series with the headphones.**

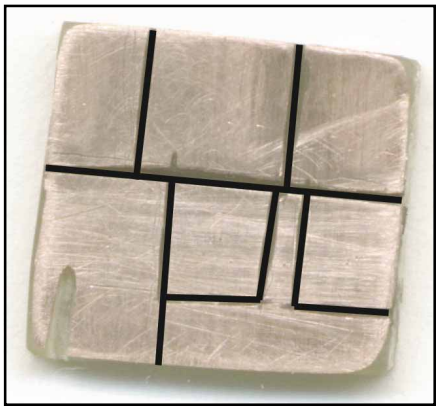


**Figure 6—I made the pad-isolating cuts in this small PC board with my Dremel hobby tool.**

SM ICs because of the explosion of portable devices that all need to conserve power.

### Building the Project

There are no new construction skills needed from those I described in my earlier SM articles (see Notes 1 and 2). In fact, I made the prototype board and soldered the parts to it in a little over an hour.[5] I formed islands on the top side of a double-sided board (see Figure 6) using my Dremel tool method and a 0.005-inch cutting wheel. I made the cuts first on a large piece of board, then cut out the 1 × 1 cm finished circuit. I used jumper wires to make a common ground on the back side of the board. Use as low a soldering-iron temperature as possible and small-diameter solder to avoid overheating parts.[6] An illuminated magnifier is a big help. Use double-stick tape to secure the board to the workbench, otherwise it is apt to slide around as you try to solder the parts to it. If you want to make the project a bit smaller, you could mount the MOSFET on the reverse side.

### Summary

Give this project a try! You'll experience some of the advantages of using state-of-the-art electronics parts and learn how much fun CW can be!

**Notes**

[1]Sam Ulbing, N4UAU, "SMALL—A Surface-Mount Amplifier that's Little and LOUD!," *QST* Jun 1996, pp 41-42.

[2]Although, if you have never built using SM parts, you might want to try a project with larger parts before you build this one. (See Note 1.) My four-part article series "Surface Mount Technology—You *Can* Work with It!"—*Part 1*, *QST* Apr 1999, pp 33-39; *Part 2*, *QST*, May 1999, pp 48-50; *Part 3*, *QST* Jun 1999, pp 34-36, and *Part 4*, *QST*, Jul 1999, pp 38-41, explains how I work with SM and provides several graduated projects to build.

[3]Some of you may point out that an even smaller oscillator could be made with a piezo buzzer with built-in driver and small battery. Although it's true that it would be smaller, I wouldn't consider it viable for code practice for two reasons. The resulting tone frequency is usually about 2 kHz. Although that's a good frequency for alarm systems, it's an annoying frequency for code practice and it's not anything like the note you'd hear on the air, so I feel that would hamper learning to copy code. Also, the piezo buzzer has a very low volume output and is limited in its applications.

[4]In fact, the absolute maximum power-supply voltage is 20 V.

[5]All parts and a PC board are available from the author for $6 including postage in the US and Canada; add 50 cents for shipment to other locations. Florida residents please add sales tax. Payment should be made by a US or international money order, or a check payable by a US bank. Credit cards are not accepted. Send your order to Sam Ulbing, 5200 NW 43rd St, Suite 102-177, Gainesville, FL 32606.

[6]When I was tinning the first board, one of the copper pads detached from the board. Although this could have been a foil-adhesive defect, I suspect the lifting occurred because I was using too high an iron temperature (700° F). On the next board, I set the iron temperature to slightly under 600° F, had no pad-detachment problem and the solder melted just as quickly.

*You can contact the author at 5200 NW 43rd St, Suite 102-177, Gainesville, FL 32606;* **n4uau@arrl.net**; **http://n4autoo.home.sprynet.com**

*All photos by the author.* QST

# NEW PRODUCTS

## DAIWA SWR/POWER METER FROM NCG

◊ NCG Company has added the Daiwa CN-801H to its product line.

The new SWR/power meter is designed for measurements between 1.8 and 200 MHz and offers three full-scale power ranges: 20, 200 and 2000 W. Type SO-239 connectors are used.

The large, illuminated meter face is approximately 3¾ × 3½-inches. Cross needle metering provides simultaneous indication of forward power, reflected power and SWR—no forward/reverse switching or calibration is required.

The suggested list price is $159.95.

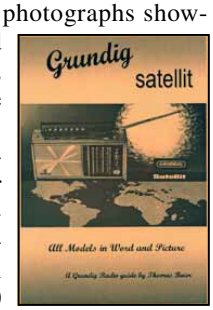

For additional information visit your favorite Amateur Radio products dealer or contact NCG Companies, 1275 North Grove St, Anaheim, CA 92806; tel 800-962-2611/714-630-4541; fax 714- 630-7024; **micks@cometantenna.com**; **www.cometantenna.com**.

## GRUNDIG SATELLIT RADIO GUIDE

◊ Universal Radio Inc is now offering *Grundig Satellit—All Models in Word and Picture* by Thomas Baier.

The 126-page book provides facts and specifications on the entire line of Grundig Satellit receivers manufactured between 1964 and 2000. These include the Satellit 205, 208, 210, 1000, 2000, 2100, 3000, 3400, 1400, 2400, 4000, 600, 650, 300, 400, 500, 700, 900 and 800 models.

The 5¾ × 8-inch publication features 120 black and white photographs showing the exteriors and interiors, accessories, manuals and even the boxes.




Price: $19.95 (order No. 2416). For additional information or to place an order contact Universal Radio Inc, 6830 Americana Pkwy, Reynoldsburg, OH 43068; tel 800-431-3939; fax 614-866-4267; **dx@universal-radio.com**; **www.universal-radio.com**.

## *ANTENNAS FROM THE GROUND UP, VOLUME 1*

◊ MFJ Enterprises now offers *Antennas from the Ground Up, Volume 1*. Written by antenna enthusiast L. B. Cebik, W4RNL, this book presents a practical, non-mathematical treatment of antenna topics intended for technicians, Amateur Radio operators and students.

The subjects covered were chosen specifically to assist those who are struggling to set up or make improvements to their antenna systems within the limitations of available space and budget. Guidelines are provided to help the reader develop reasonable expectations for the performance characteristics of the various antenna types described.

Price: MFJ-3306, $19.95 plus shipping and handling. For more information, visit your favorite Amateur Radio products dealer or contact MFJ Enterprises, PO Box 494, Mississippi State, MS 39762; tel 800-647-1800, fax 601-323-6551, **www.mfjenterprises.com/**.

Next New Products QST

By Larry Scheff, W4QEJ

# How to Maximize Your Receiver's Effective Selectivity—*Part 1*

Are you blaming other hams for interference that could be eliminated if you *really* knew how to operate your receiver? Is band noise irritating? Effective use of your receiver's selectivity features can reduce or eliminate much of the interference and noise that's been spoiling your fun.

To get the best performance from your receiver on the busy and often noisy MF and HF bands, you need to know a few things that your receiver's operating manual may not cover in detail. With the aid of several graphs, I hope to provide you with that information. For additional insight, I recommend you read two excellent, previously published *QST* articles that discuss receiver performance: one written by George Collins, KC1V, and the other by David Newkirk, WJ1Z.[1, 2]

## Some Fundamentals

The way a receiver's front-end stages operate significantly affects the IF-stage filters' ability to reject interfering noise and signals. The first step toward better reception is understanding that undesired signals and noise must be attenuated as much as possible *before they reach the receiver's detector stage.* These reductions should be accomplished without sacrificing desired-signal readability. To do this intelligently, you need to understand your receiver's selectivity characteristics. You'll find that if the interfering signals are weak compared to the desired signal, you might even eliminate interference from signals that are on the same frequency as the desired signal!

Remember this simple fact: *Filters work best if the signals applied to them are weak.* Some receivers typically exhibit higher gain on the MF and lower HF bands than they do on the higher bands. Additionally, the atmospheric noise level on the MF and lower HF bands is generally high and might even be considered negligible on the upper HF bands. Because you can't hear signals that are below the noise level at the receiver's input, it simply makes no sense to allow your receiver's front-end stages to amplify anything below that level. Often, you can use your receiver's attenuation and RF gain controls to reduce the noise level reaching the IF filters to a level so low that the noise will not pass through the filters at all, while the signal you want goes straight through to the detector. Under these conditions, the receiver's filters also do a better job of removing adjacent-frequency interference. I'll illustrate this process by using graphs that show the relationships between signal and noise amplitudes appearing at the IF-filter input and what the filters pass and reject.

## Filter Specifications and Representative Response Curves

Let's analyze the IF-passband selectivity figures included in the specifications for the receiver section of a pair of transceivers. I'll discuss the *variable bandwidth tuning* (VBT) feature of the Kenwood TS-940S and the *passband tuning* (IF Shift) of the Kenwood TS-440S as used during SSB reception.

For the first example, VBT, I'll use the specifications given for the Kenwood TS-940S HF transceiver.[3] The radio's SSB receiving selectivity is listed as 2.4 kHz at –6 dB and 3.6 kHz at –60 dB.[4] These numbers define five points that can be plotted two different ways to illustrate the receiver's selectivity characteristics. Often, this information is plotted as a filter-response curve, as shown in Figure 1A. Point A on the curve is not normally listed in selectivity statements, but it's safe to assume that the zero-attenuation point of a filter lies at the center of its response curve. Points B and C define the width of the response curve at a level 6 dB below the 0-dB attenuation point. Points D and E define the filter response curve width at 60 dB below the 0-dB attenuation point on the curve. Lines drawn between points A through E approximate the filter response curve. The shape of the curve beyond the 60-dB attenuation points is not defined by the usual –6dB/–60dB selectivity statement and cannot be accurately plotted from that information. It's realistic to assume, however, that the selectivity curve becomes fairly horizontal at each side of the bottom of the response curve, perhaps somewhere between –70 dB and –80 dB. Even so, a very strong adjacent signal might bypass the filter (a phenomenon known as "filter blow-by") if that 70 to 80-dB attenuation level isn't sufficient to eliminate it.

This filter-response curve can be used to analyze the combined bandwidth of two filters used in the TS-940S receiver IF stages. The first filter operates at an 8.83-MHz IF; the second filter operates at a 455-kHz IF. These two filters are cascaded, working together to form the

[1]Notes appear on page 48.

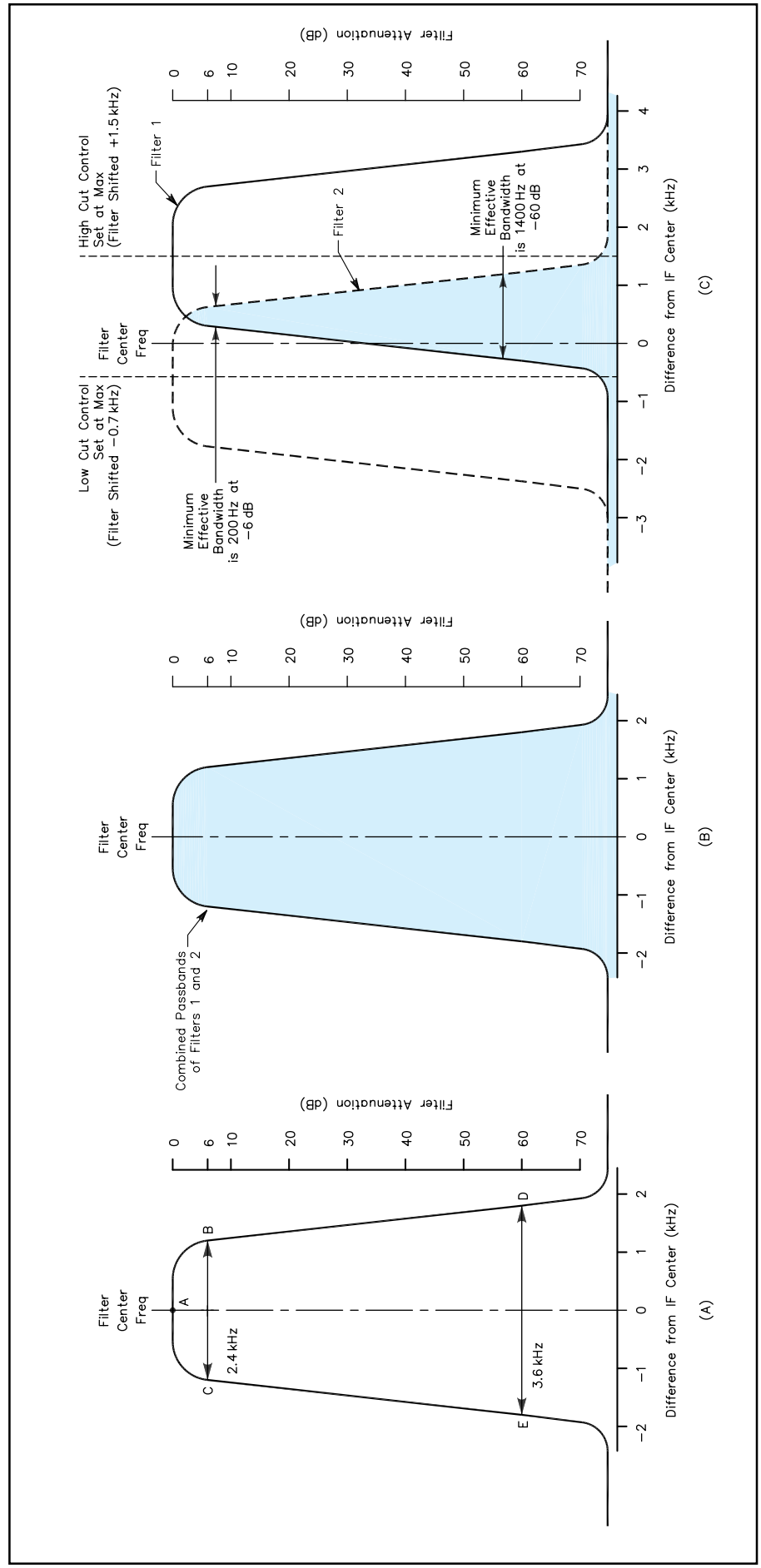



**Figure 1—At A, the response curve of a TS-940S SSB filter plotted from the manufacturer's selectivity specifications. At B, the overlaid response curves of two TS-940S cascaded filters. At C, the passband of filter 1 is shifted up 700 Hz from the filter center frequency; the passband of filter 2 is shifted down 1500 Hz to achieve the minimum effective bandwidth of the filter combination. These graphs are based on the following specifications: receiver selectivity set for SSB with a passband 2.4 kHz wide at –6 dB and 3.6 kHz at –60 dB. The SSB SLOPE TUNE controls are set for a high cut of 1500 Hz or more and a low cut of 700 Hz or more.**

equivalent of one filter with the characteristics similar to that of the hypothetical filters shown in Figure 1B. In the TS-940S, these cascaded filters produce a form of VBT referred to as *SSB slope tuning*. In SSB slope tuning, one filter passband can be shifted up in frequency and the other filter passband can be shifted down in frequency, effectively narrowing the bandwidth of the combined filters. This operation is illustrated in Figure 1C.

As mentioned earlier, if we're trying to remove interfering signals at our receiver's IF stages, it makes sense to amplify the interfering signals and noise *as little as possible* before they reach the IF amplifiers. It is also advantageous to *attenuate* interfering signals and noise as much as possible before they reach the receiver's RF amplifier. Signal strength and amplification are commonly plotted with zero signal strength at the graph bottom, with signal strength increasing vertically. In this presentation, I've inverted the filter-response curve so that the effects of attenuation, signal strength and amplification are plotted on the same graph, with the zero-attenuation point of each curve at the graph bottom. By inverting a filter-response curve, we produce a *filter selectivity curve* or an *attenuation curve*.

I'll use the attenuation-curve format for the graphs shown here because it is easier and more obviously meaningful to plot signal shapes and signal magnitudes against filter characteristics. In Figure 2A, I've inverted Figure 1A to produce an attenuation curve. In this figure, the transceiver's **SSB SLOPE TUNE** controls (**HIGH CUT** and **LOW CUT**) are set at minimum. The shaded areas emphasize what the filters reject.

Figure 2B shows both of the receiver's **SSB SLOPE TUNE** controls set at maximum. In this graph, you can see that these maximum **SSB SLOPE TUNE** control settings produce an extremely narrow passband that would be pretty good for CW,

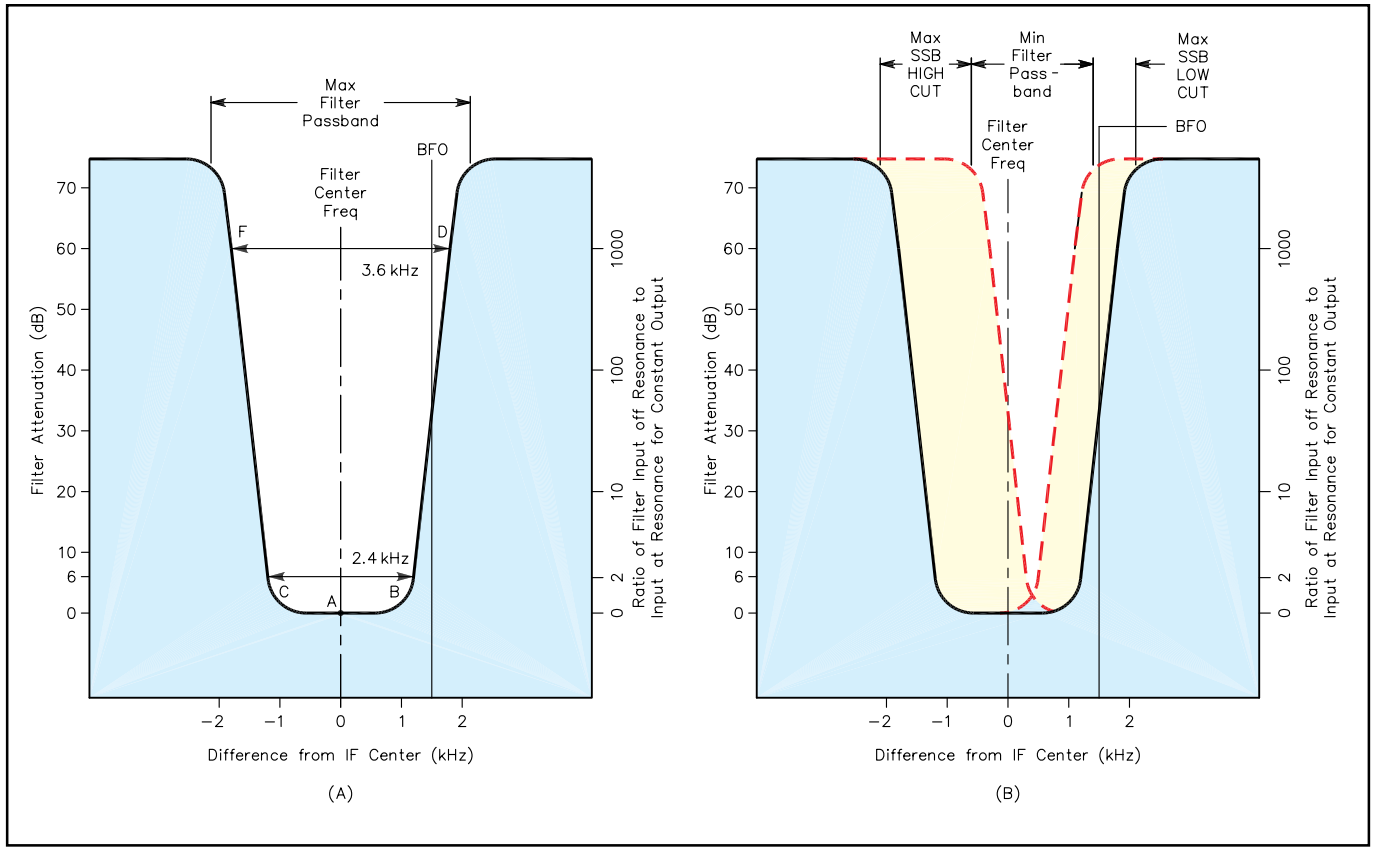



**Figure 2—SSB selectivity curves for a Kenwood TS-940S transceiver with variable bandwidth tuning. The curve at A is the result of setting the SSB SLOPE HIGH and LOW controls at minimum. At B, the resultant curve with the SLOPE HIGH and LOW CUT controls set at maximum: 1500 and 700 Hz, respectively.**

but is much too narrow for SSB because too much audio is eliminated from the desired signal. I've added the BFO frequency to Figure 2B to show the relationships between the **SSB SLOPE TUNE HIGH CUT** and **LOW CUT** settings and the BFO frequency.

When the TS-940S is in SSB mode, the BFO frequency is fixed. During SSB reception, the BFO signal replaces the suppressed carrier of the transmitted signal, being injected at the product detector after the IF filter. We want the IF filter to pass the desired sideband signal and reject everything else, including any small part of the suppressed carrier it might receive. The bandwidth of the IF filter is 2.4 kHz at the –6 dB points and the received sideband signal should be approximately centered within the IF-filter passband. Therefore, the BFO frequency must be offset 1.5 kHz (half the 2.4-kHz passband) from the IF-filter passband to produce the correct audio frequencies at the product detector. An SSB signal is considerably wider than a CW signal. Therefore, when using the same IF filter in the CW mode, the BFO frequency is offset about 800 Hz from the IF-filter passband to produce an 800-Hz tone with the **CW PITCH** control set at its center position.

For the second example, IF Shift (passband tuning) SSB filters, I've used the specifications for the Kenwood TS-440S HF transceiver (see Figure 3A). Here, the receiver's SSB selectivity is listed as 2.2 kHz at –6 dB and 4.4 kHz at –60 dB. Using these numbers, I created a graph similar to that of Figure 2A. Note that this filter passband is narrower at the bottom of the curve and wider at the top than that of the TS-940S. The TS-440S filtering system is different from the VBT scheme used in the TS-940S. With the TS-440S, you cannot change the passband shape, but you can *shift the passband* up or down in frequency as shown in Figures 3B and 3C. Shifting the passband up or down in frequency does not change the frequency relationship between the BFO and the desired signal, so the desired signal sounds normal.

## Examining Filter Performance

Now we'll start adding representative signals and noise levels to the receiver filter curves to visualize how the IF filters perform under different circumstances. The voice information in an AM signal is contained in two sidebands, one above carrier and a mirror image below the carrier (Figure 4A). An SSB signal (as shown in Figure 4B) has but one sideband and the carrier is suppressed. These examples assume that the signal is modulated by a voice having more low frequencies than high. In these cases, most of the audio-derived energy of the signal is concentrated near the carrier. With a voice having greater high-frequency content, more audio energy is farther away from the carrier. Why is this important when considering receiver SSB selectivity? Because the optimum settings of the **SSB SLOPE TUNE** controls (for VBT) or the **IF SHIFT** control (for passband tuning) will be somewhat different when listening to a high-pitched voice. In Figures 4A and 4B, the signal intensities are plotted vertically, so that stronger increments stretch higher on the graph than weaker increments do. The shape of an SSB signal with a high-pitched-voice might interact somewhat differently with the selectivity curves.

Being more concerned about *effective communications quality audio* than high fidelity allows us to make a significant reduction in audio bandwidth without sacrificing readability. We can use our receiver's selectivity controls to elimi-

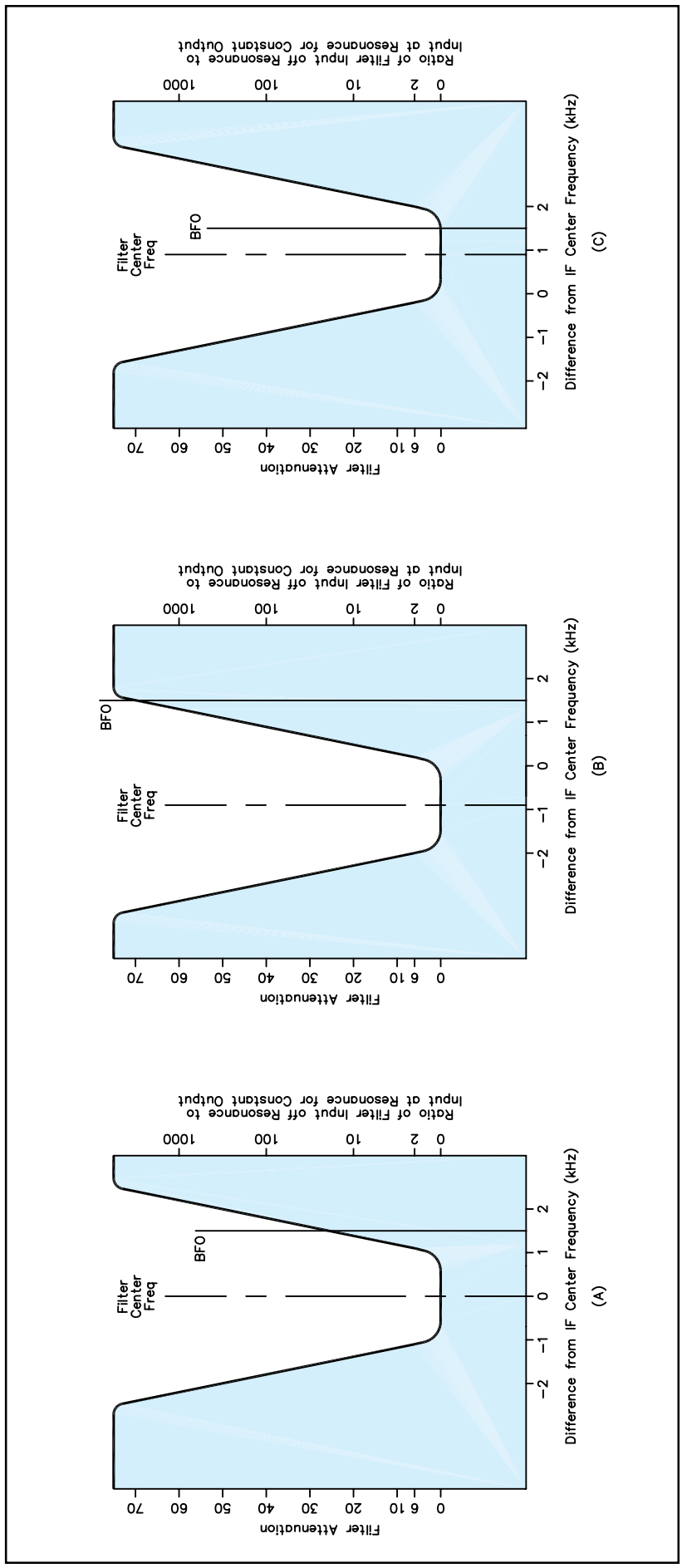



**Figure 3—SSB selectivity curves of a Kenwood TS-440S transceiver with passband tuning (IF SHIFT). At A, the selectivity curve with the IF Shift set at zero. Graph B shows the selectivity curve with the IF SHIFT set at –900 Hz. At C, the IF Shift is set at +900 Hz.**

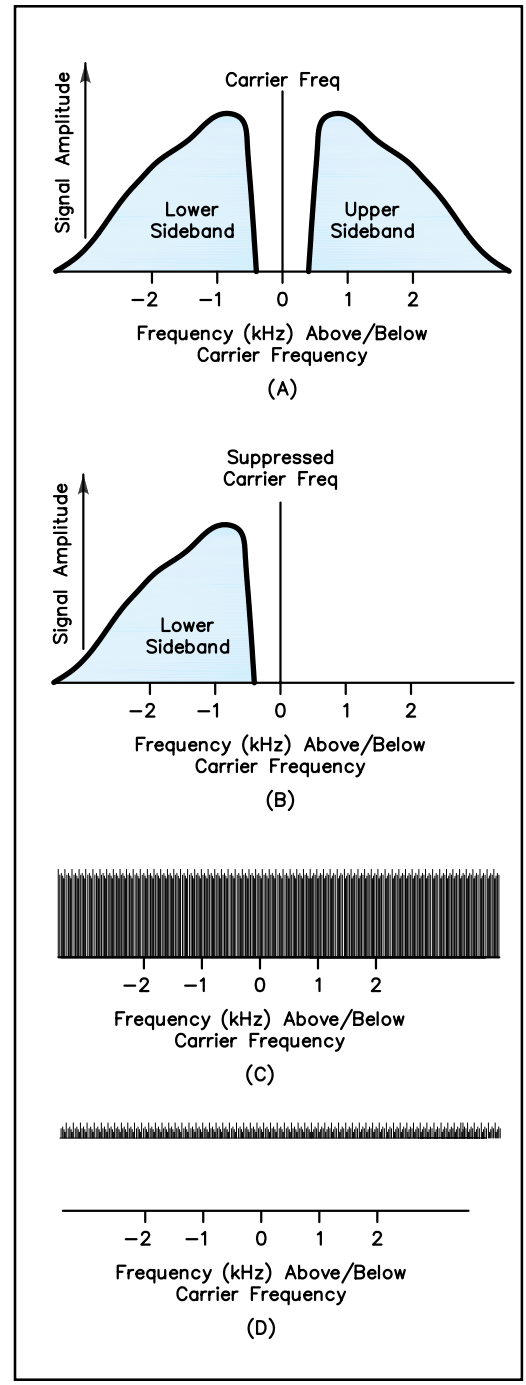



**Figure 4—At A, a double-sideband AM signal. An SSB signal is shown at B. At C, a representation of noise at and around a given operating frequency. An abbreviated graphical representation of broadband noise is shown at D.**

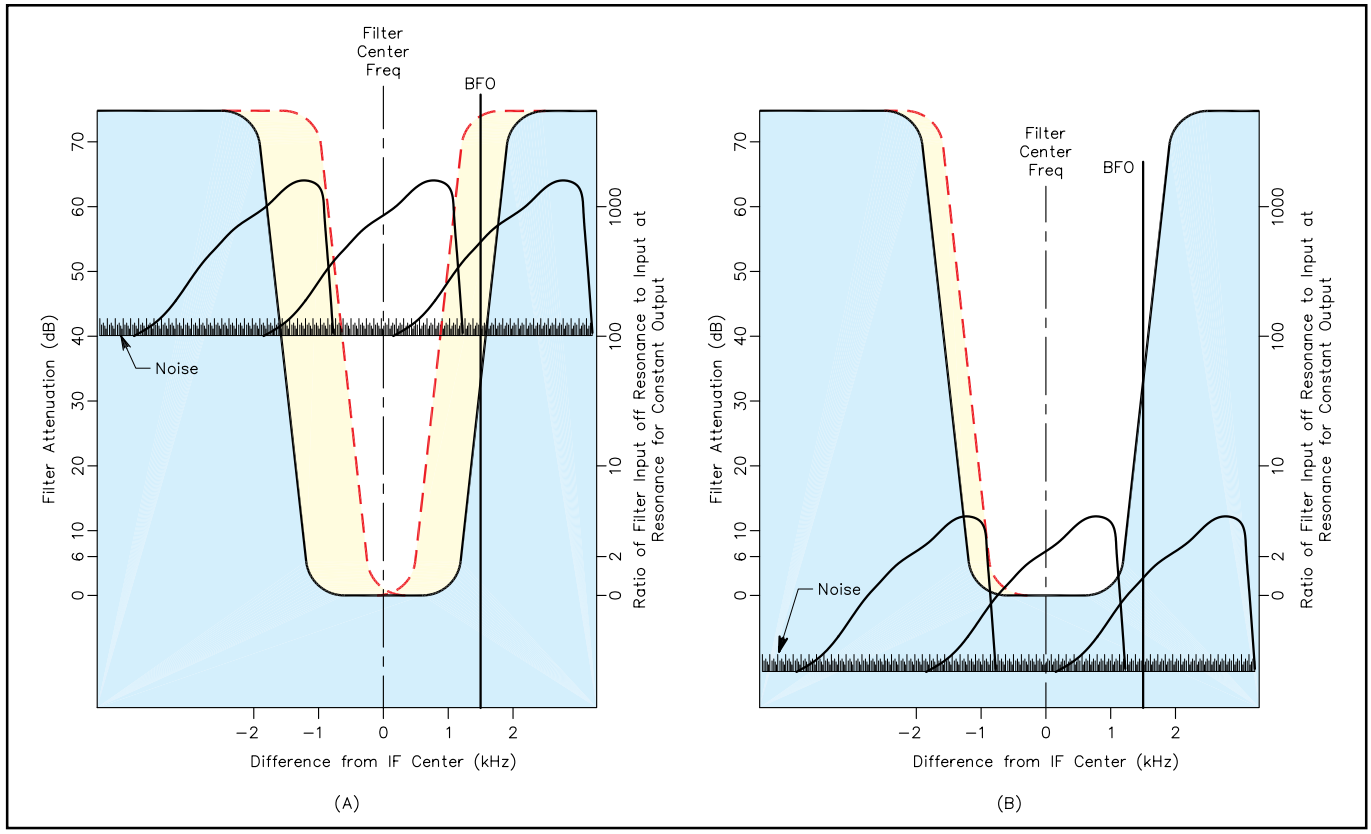



**Figure 5—Situation 1, using a TS-940S with SSB SLOPE TUNE control. There are two interfering LSB signals, one 2 kHz above and one 2 kHz below the desired signal. The signal strengths of the desired and interfering signals are equal, both peaking 25 dB above the noise. The received noise in this and subsequent graphs is represented by the heavy horizontal line at the zero-signal levels of the other signals. At A, the receiver's input attenuator and RF gain controls have not yet been adjusted to eliminate the interfering signals. The LOW CUT is set at maximum (700 Hz); the HIGH CUT is set at 60% (900 Hz). Under these conditions, the interference from the signal down the band is eliminated, but within the passband there is some interference from the signal up the band and the noise level is high. At B, the receiver's attenuator and RF gain controls have been adjusted to maximize rejection of the interfering signals and noise. The LOW CUT is set at zero; the HIGH CUT is set at 21% (314 Hz).**

nate some of the unneeded audio highs and lows of the desired signal and thereby reduce or eliminate interference.

### *Noise*

Much noise is broadband noise. The amount of noise your receiver responds to is proportional to the bandwidth used: Halving your receiver's bandwidth should result in halving the received noise power and so on. Static field strength appears, on average, to be approximately inversely proportional to frequency. The higher the frequency, the less static you have to contend with. On the MF and lower HF bands, noise is generally less severe during daylight hours than at nighttime because of varying band conditions, unless you have nearby thunderstorms.

Refer to Figure 4C, a graphical representation of noise at and around a given operating frequency. This graph can represent a broad bandwidth or mixture of individual random high, medium and low-intensity noise spikes. Because most of the lower- and medium-level spikes in this mix are overwhelmed by the higher-intensity spikes, the former can largely be ignored, allowing use of an abbreviated graphical representation of broadband noise (Figure 4D) in Figures 5, 6, and 7. I use this abbreviated representation to avoid cluttering the graphs below the applicable upper levels of noise.

## Getting the Most from VBT Filters in IF Stages

Now that the groundwork is laid, let's examine how we can reduce or eliminate interference and noise under different representative situations we might encounter on the bands.

Our first situation using a TS-940S (labeled Situation 1) involves two adjacent interfering signals and is illustrated in Figures 5 and 7. In Figure 5A, we assume that with TS-940's RF **ATT**enuator set to 0 dB and its **RF** gain control set at maximum, the noise level appears at +40 dB in the IF passband filters. (This is not an unreasonable assumption for nighttime reception on 75 meters.) We are trying to receive an LSB signal, which peaks at a level 25 dB above the noise. There are two equally strong LSB signals, one 2 kHz above and one 2 kHz below the desired signal.

In this graph—and in all the following graphs that relate to the use of VBT filters—the overall unadjusted bandwidth of the filters is shown. This clearly shows the effects of changing the settings of the **SSB SLOPE TUNE** controls. The right-hand side of the unadjusted selectivity curve relates to the minimum setting of the **SSB SLOPE LOW CUT** control; the left-hand side of the unadjusted selectivity curve relates to the minimum setting of the **SSB SLOPE HIGH CUT** control. Where the **LOW CUT** and/or **HIGH CUT** controls are used to decrease the effective bandwidth of the filters, curves representing the upper and lower sides of the adjusted bandwidth are shown. The shaded area (representing what the filters reject) ends at the adjusted lower and upper sides of the effective-selectivity curve. This makes the effects of the **LOW CUT** and **HIGH CUT** control settings very obvious.

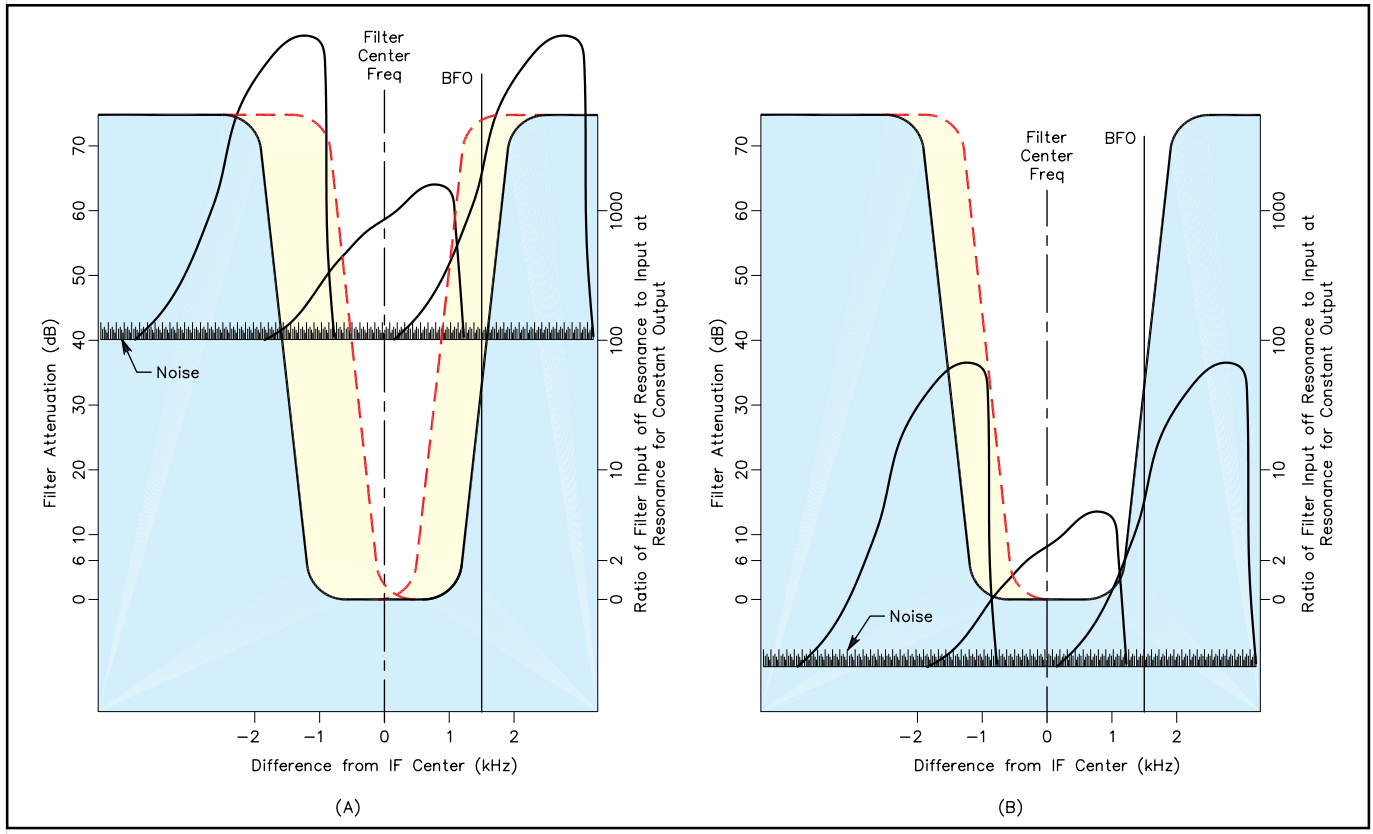



**Figure 6—Situation 2, using a TS-940S with SSB SLOPE TUNE control. Both graphs show two interfering signals, one 2 kHz above and one 2 kHz below the desired signal. The desired signal peaks 25 dB above the noise (represented by the heavy horizontal bar). Both interfering signals are 25 dB stronger than the desired signal. At A, the input attenuator and RF gain controls are wide open. The LOW CUT is set at maximum (700 Hz) and the HIGH CUT is set at 71% (1072 Hz). In this case, peaks of the high-intensity interfering signals pass right by ("blow by") the IF filters. The lower-level portions of the up-band signal are within the passband and the noise level is high. At B, by proper adjustment of the input attenuator and RF gain controls, the interfering signals and the noise have been eliminated—pushed right out of the passband. Here, the LOW CUT is set at zero; the HIGH CUT is set at 42% (623 Hz).**

As you can see in Figure 5A, with the **ATT**enuator control set to 0 dB, the **RF** gain control at maximum and the **SSB SLOPE HIGH CUT** and **LOW CUT** controls set at minimum, we have severe interference from both adjacent-frequency signals and the noise is objectionable.

Before we use the two **SSB SLOPE TUNE** controls, let's examine their operation. The **LOW CUT** and **HIGH CUT** controls are used to narrow the filter passband by moving the sides of the selectivity curve toward the filter center frequency. How do you know which control to use and what to expect? It's simple: If the interference is low-pitched, use the **LOW CUT** control to move the side of the curve nearest the BFO frequency closer to the passband center frequency (and away from the carrier frequency) by as much as 700 Hz. This reduces or eliminates the low-pitched interference and also cuts some of the lows from the audio of the desired signal. If the interference you hear is high-pitched, use the **HIGH CUT** control to move the side of the curve farthest from BFO frequency closer to the passband center frequency (and closer to the carrier frequency) by as much as 1500 Hz.

Figure 5A shows that we can use the **HIGH CUT** and **LOW CUT** controls to eliminate interference from the signal 2 kHz lower in frequency, but we can't eliminate all the interference from the signal higher in frequency.

In Figure 5A, the noise is at about the 40-dB level on the selectivity curve. The filter bandwidth at the 40-dB point of the curve is about 3.16 kHz wide with the **HIGH CUT** and **LOW CUT** controls set to zero. With the **HIGH CUT** and **LOW CUT** controls adjusted as shown in Figure 5A, the resulting bandwidth at the 40-dB level on the curve is about 1.52 kHz. Therefore, the **HIGH CUT** and **LOW CUT** controls have reduced the effective bandwidth to about 48% of the original. Because the noise is broad-spectrum noise, this bandwidth reduction should result in cutting about 3 dB of the noise that passes through the filters. If the signal you're trying to copy is down in the noise, this action may make the signal somewhat more readable.

Now look at Figure 5B. You can slide the signals and noise down the selectivity trough by adjusting the **ATT**enuator control to maximum (30 dB) and reducing the **RF** gain. You can now set the **LOW CUT** and **HIGH CUT** controls as shown in this graph. *This eliminates the noise and the interference from both interfering signals.* Yes, we have reduced the received-audio bandwidth of the desired signal to about 1700 Hz, but now you can copy with no interference and the received audio is still of acceptable communications quality. Any noise you might now hear is caused by noise generated *within the receiver* and is much less objectionable than the static crashes and other racket that is arriving at the receiver's antenna jack. In many cases, all you now hear is the signal you want to hear. Yes, you may have to turn up the audio gain and the S meter doesn't work, but so what? You got rid of the interference! With these things in mind, isn't it kind of dumb to let the receiver run wide open with no signal attenuation and the **RF** gain control set at maximum?

The second situation using a TS-940S

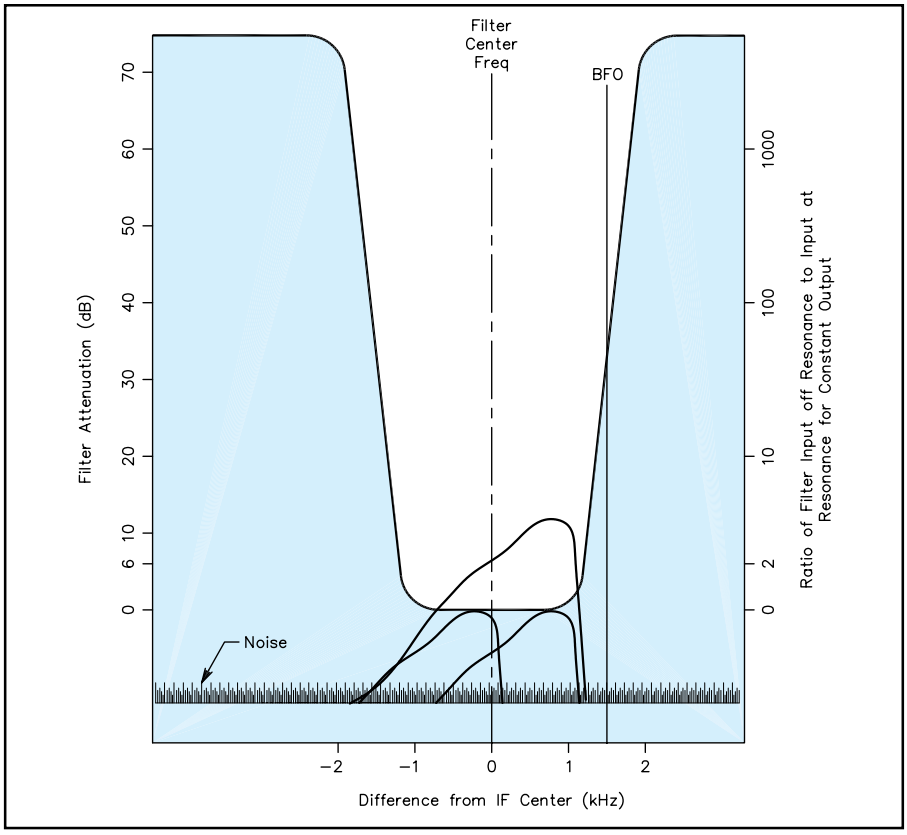



**Figure 7—Situation 3, using a TS-940S with SSB SLOPE TUNE control. The desired signal peaks 25 dB above the noise level. There are two interfering signals, one on the same frequency as the desired signal, the other 1 kHz below the desired signal. Both interfering signals are 12.5 dB above the noise. Again, the input ATTenuator and RF gain controls have been adjusted to eliminate the interfering signals and the noise. The LOW and HIGH CUT controls are set to zero.**

(labeled Situation 2 in the graphs) involves two extremely strong adjacent interfering signals; this is illustrated in Figures 6A and 6B.

Let's examine what happens when the signal we want is sandwiched between two LSB signals, both 25 dB stronger than our desired signal, one 2 kHz up the band and one 2 kHz down the band. See Figure 6A. Here we again assume that the receiver's **ATT**enuation control is set to 0 dB, the **RF** gain control is set at high and the noise level appears at the 40-dB level of the filters. The situation is similar to that we saw in Figure 5A, only much worse. Even setting the **LOW CUT** control at maximum will not eliminate part of the interfering signal up the band that falls near our BFO frequency. Setting the **HIGH CUT** control as shown in this graph eliminates an insignificant portion of the interference from the signal down the band. However, the interference that might be eliminated by narrowing the passband of the filters is insignificant compared to those parts of both interfering signals that are so strong that they blow right by the IF filters and reach the product detector. We still have very strong interference from both interfering signals as well as objectionable noise.

Refer to Figure 6B. Here, the receiver's **ATT**enuator is set at maximum (30 dB) and the **RF** gain control setting is reduced. This slides the three signals and the noise level down the selectivity curve to a point at which *the noise and both interfering signals can be eliminated completely*. The **LOW CUT** control can be set at zero and still eliminate the signal up the band, but it's necessary to use the **HIGH CUT** control to eliminate signal down the band. Compare this graph with Figure 5B. You will see that interference- and noise-free reception of a desired signal in the presence of two very strong interfering signals can be comparable to receiving the same signal in the presence of two interfering signals having the same strength as the desired signal.

The third situation using a TS-940S (Situation 3) involves interfering signals on or very close to the desired signal, but somewhat weaker than the desired signal. This is illustrated in Figure 7.

Referring to Figures 5B and 6B, you'll see that in both cases we have eliminated the noise by using the **ATT**enuator and the **RF** gain controls to slide the noise below the flat bottom of the selectivity curve. As shown in Figure 7, the same approach can often be used to eliminate interference from signals that are weaker than the desired signal and on, or very near, the same frequency as the desired signal. This is done by simply using the **ATT**enuator and the **RF** gain control to move the interfering signals below the flat bottom of the selectivity curve as shown in Figure 7. Of course, the audio of the on-frequency interfering signal would sound perfectly normal because the interfering signal is on the same frequency. All components of the off-frequency interfering signal, being 1 kHz below the desired signal, would beat with the BFO and sound 1000 Hz higher than normal; this signal would be unintelligible and annoying.

Part 2 of this series will discuss passband tuning as used in the Kenwood TS-440S.

**Notes**

[1]George Collins, KC1V, "Receiver Features that Help You Beat Interference," *QST*, Feb 1983, pp 43-47.

[2]David Newkirk, WJ1Z, "Transceiver Features that Help You Beat Interference," *QST*, Mar 1991, pp 16-21.

[3]Bruce O. Williams, WA6IVC, "Trio-Kenwood Communications TS-940S HF Transceiver," Product Review, *QST*, Feb 1986, pp 47-49.

[4]The numerical result obtained by dividing the –60 dB bandwidth by the –6 dB bandwidth is known as the filter's *shape factor*; the smaller the number, the better the shape factor. In this case, the TS-940S filter's shape factor is 1.5.—*Ed.*

*Larry Scheff, W4QEJ, has held that call sign continuously since being licensed in 1950, except for a brief stint between 1963 and 1966 when a move to Massachusetts included a call-sign change to W1ASW. At age 17, while in high school, he built a 10-meter NBFM rig. Since then, he has built ham gear rather than purchasing commercially manufactured equipment. A registered professional engineer in five states, Larry has held several electrical engineering positions having worked for General Electric, Reliance Electric, Harris Corporation and others. Larry has practiced as an independent consulting engineer since 1984. He also has performed forensic engineering for law firms and insurance companies in more than 120 cases. At age 68, Larry refuses to retire. To him, engineering is like Amateur Radio—it's too much fun to quit. You can contact Larry at 679 Creek View Dr, Lawrenceville, GA 30044-3770.* QST

By Barry A. Goldblatt, WA5KXX

# Radio Camp 2000—Texas Style

Vision, hard work, and a lot of enthusiasm from an engaging group of middle school students added 35 new licensees to the north Texas Amateur Radio population during the summer of 2000. Take a look at what teachers, a local radio club, area corporations and community volunteers in Texas did to increase awareness and involvement in Amateur Radio…

It could very well be the "dream team" of Amateur Radio: middle school teachers looking for new ways to engage students, college instructors, corporations, local radio club members and a philanthropic angel. Bring them together with a common goal and the results can be simply astounding. If you (or your club) are thinking about implementing large-scale Amateur Radio education programs in your community's middle schools, take a look at what happened during the summer of 2000 in Texas.

The program, now known as "Tech Camp 2000," enrolled more than 70 middle school students in two robust, three-week learning experiences that featured RF technology and lots of fun. By the time the second session ended on July 28, the "global electronic village" we all know as Amateur Radio increased by 35 new licenses and upgrades!

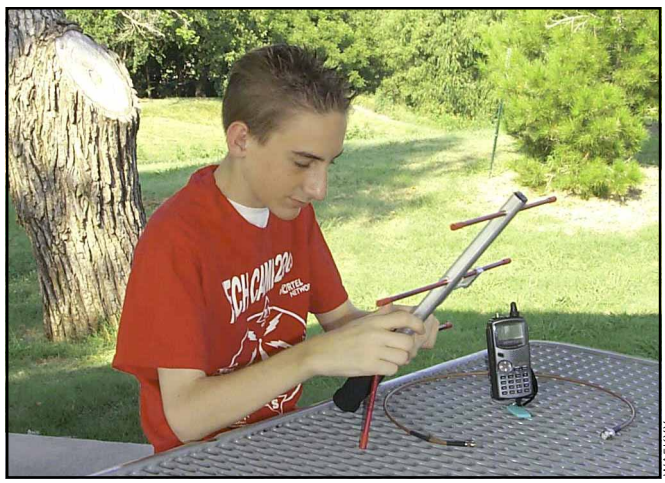
The first session included 30 students from Plano, Frisco, McKinney, Richardson and Dallas. Of those students, only two had passed the Technician exam before entering camp. The second session had an enrollment of 35 students. Like any success story, this one has a lot of players, so let's get acquainted with the Tech Camp concept and how it all began.

## Laying the Groundwork

Tech Camp 2000 is the result of a year-long effort by Jeff Fant, N5OLF, and Tom Mobley, KD5AC. Both are on the faculty of Collin County Community College, or "QuadC," as it's known in the communities it serves. Fant and Mobley developed a course outline for a camp centered around RF technology and submitted a grant proposal to the National Science Foundation. Along the way they managed to secure funding and mentoring support from Nortel Networks and Southwestern Bell.

## Building Enrollment for Tech Camp 2000

During the spring of 2000, Fant and Mobley pitched their unique student club concept to Haggard Middle School in Plano, Texas. Two teachers at the school, Brenda Hare and Debbie Pybus, liked the concept and agreed to charter the first Sigma Gamma Epsilon or "Student Gaming Enthusiasts" chapter. Neither teacher had any Amateur Radio experience, but both agreed to earn a Technician license during the spring semester. Hare, now KD5JPE, and Pybus, now KD5JPF, passed the Technician exam during the April 2000 license stampede. In the meantime, the One-Alpha Chapter of SGE held weekly meetings and began the Amateur Radio learning experience. Fant and Mobley visited Haggard Middle School frequently to familiarize students with ham radio techniques, equipment and terminology.




WA5KXX

Kyle McNeil, KD5KVJ, prepares his three-element hand-held Yagi antenna and Kenwood H-T for a Tech Camp 2000 foxhunt.


WA5KXX

Presenting the first new licensees from Tech Camp 2000! Tom Mobley, KD5AC, and Jeff Fant, N5OLF, are at the far left and right in the back row.

## Nurturing New Licensees

At that point, the Plano Amateur Radio Klub (PARK) got involved. PARK has an active, community-oriented membership. The club operates VHF and UHF repeaters that provide support for ARES and public-service agencies throughout Collin County. PARK President Bill Drake, KJ5ZV, recognized the potential benefits of the SGE and Tech Camp concept and began developing support within the club.

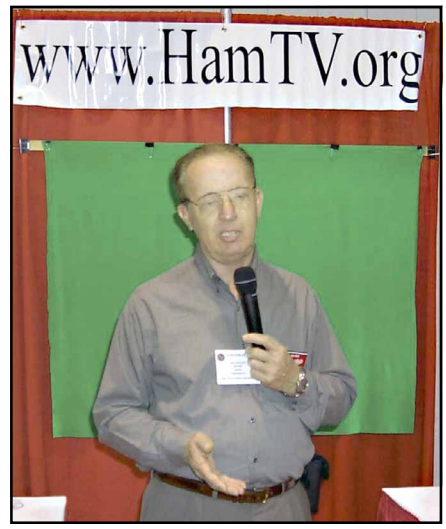
One of the club members accepted responsibility for Technician classes and began the weekly sessions in April 2000. Eight students (six boys and two girls) met every Monday night over the next eight weeks to cover the material needed to master the Technician license exam. The results were better than anyone expected: One student passed the Technician exam in May and three others followed in June. Two of the students from that group later upgraded their privileges by passing the Morse code test at the end of the first Tech Camp 2000 session.

## Community Support

Haggard Middle School is fortunate to have a supportive principal, Roxanne Burleson, and a community of parents interested in technology. Haggard was recently recognized as a US Department of Education "Blue Ribbon School." The school and the Parent Teacher Student Organization (PTSO) support a number of clubs and extracurricular activities for the students. In May 2000, Brenda Hare and Debbie Pybus met with local philanthropist David Brandenburg, K5RQ. Brandenburg, an outstanding US businessman and corporate CEO, heads the Brandenburg Life Foundation. After the meeting, Brandenburg told the teachers that Haggard Middle School would be the recipient of a grant for Amateur Radio equipment. By the fall of 2000 the Brandenburg Life Foundation had completed the installation of an HF/VHF/UHF transceiver with tower, coax, directional HF beam, rotator, VHF/UHF vertical antenna and 1.25-GHz ATV transmitter and receiver.

## Camp Activities

The Tech Camp 2000 concept is definitely cutting edge. The sessions were held in facilities provided by the community college district at its Frisco, Texas, campus. Fant, Mobley, several student assistants and mentors worked with class members from 9 AM to 4 PM each day. Area radio club volunteers also dropped in each week to lend a hand.




WA5KXX

**During the HamCom 2000 convention, ARRL President Jim Haynie, W5JBP, answers a Tech Camp student's question about ARRL publications.**

SANDRA REYES, COLLIN COUNTY COMMUNITY COLLEGE DISTRICT

**Nate Amstutz of Dallas and Andy Watson, technical writer at Nortel Networks (standing), look on while (bottom row) Chris Robinson of Frisco and Chelsea Fant, KD5KYC, of McKinney solder resistors to make an attenuator for the foxhunt.**

Morning activities were filled with group discussions and learning exercises. The topics included map reading, using a compass, radio theory and hands-on experience with a Kenwood dual-band hand-held. As a reward, each student who successfully completed Tech Camp 2000 and earned at least a Technician license and/or an upgrade received one of these fine transceivers at the graduation ceremony.

Afternoon sessions included preparation for the Technician exam, Morse code practice and outdoor foxhunts using orienteering skills and a directional, three-element Yagi antenna that each student builds during camp. The camp wasn't all fluff and RF. These kids spent time learning, of all things, *Math*. Tom Mobley loves to tell parents that "the students are learning trigonometry and they don't even know it."

## A Special Treat: ATV from HamCom 2000

A friend once told me that he'd rather be lucky than good. In this case, Tech Camp 2000 was very lucky, indeed. The first session of camp coincided with three major ham events: HamCom 2000 (held at the convention center in Arlington, Texas), ARRL Kids Day and Field Day 2000. The possibilities were enormous for learning and for some well-deserved publicity for the camp and its students. One of the PARK members approached Fant and Mobley about the possibility of two-way communications with Tech Camp 2000 students from the ATV booth at the upcoming HamCom 2000 event.

Fant and Mobley went into high gear and secured permission from the community college district for roof access. Then they secured the necessary equipment from Lee Rhoden, AB5IG. With help from a PARK member they managed to get the receiving antenna, down-converter and 2-meter antenna mounted on the top of the two-story classroom building. The installation (at 40+ feet) enabled the campus to make line-of-site contact with an ATV repeater located 25 miles from the campus.

The QSO with Tech Camp 2000 used the AB5IG 1.25-GHz repeater, which is installed on the roof of the Bank of America building in downtown Dallas. The building is the tallest in Dallas and provides exceptional coverage for the repeater with an antenna height of 880 feet AGL.

Thanks to a lot of work by Lee Rhoden and Rik Albury, K4TTT, the Dallas ATV repeater is frequented by more than 50 ATV enthusiasts from as far away as Decatur, Texas. Rhoden has been very busy lately putting up translators to extend the repeater's reach to Greenville, Denton and Cedar Creek Lake. Each of those locations is 30+ miles from downtown Dallas.

AB5IG's 50-W repeater provides an upper and lower channel plus a number of DTMF-selectable features including remote-controlled cameras, a waveform monitor, APRS and signal strength and SSTV displays. DTMF options are accessible using the intercom 144.32-MHz simplex intercom frequency. The

lower channel continuously relays Doppler weather radar information and the upper channel is used for ATV QSOs. The weather radar images are used during weather nets by ARES, RACES and area public-service agencies equipped with receiving grids and down-converters. Rik Albury's vision for the repeater's upper channel includes more time for educational purposes such as the QSO with Tech Camp 2000. Complete information about the AB5IG repeater and ATV in general is available via the Internet at **www.hamtv.org/**.

Albury masterminded the QSO that began at 1 PM on the opening day of HamCom 2000. The timetable called for a 30-minute exchange, but enthusiasm at both ends kept the two locations on the air for more than 90 minutes. It was time well spent with Jim Haynie, W5JBP, ARRL President; Gordon West, WB6NOA, noted author and educator; Rosalie White, K1STO, ARRL Field & Educational Services Manager; William Cross, W3TN, of the FCC; and Keith Pugh, W5IU, AMSAT Vice-President of Operations. Twelve-year-old Charlie Weinberger, KD5IUP, of McKinney, Texas, was the control operator at the Tech Camp 2000 site.

The student host at the Arlington Convention Center was a Haggard Middle School eighth-grader and Tech Camp 2000 participant Jordan Goldblatt, KD5KQM. In addition to his duties as the remote location emcee, Goldblatt also piloted a remote-control, 7-foot long, helium-filled blimp equipped with a color camera and transmitter provided by Rik Albury. Each of the on-camera guests took questions from the students, parents and media representatives in attendance at the Frisco, Texas, camp. As you might expect, questions covered a wide spectrum and included everything from Jim Haynie's job description to FCC licenses and satellite technology.

## Local Media Coverage

Once again, luck played a role in the ATV QSO with Tech Camp 2000. The event was covered from start to finish by the *Plano Star Courier's* Penny Rathbun. Penny, it turns out, is the wife of Michael Rathbun, KL7F, a *QST* contributor. Her article made the front page of the *Star Courier* along with a full color picture. Johnny Stigler, WA5ZRQ, stopped by the ATV booth at HamCom 2000. He's a video engineer for WFAA-TV in Dallas. Stigler's visit resulted in a new source of Doppler radar and feeds for the AB5IG repeater and an article about the event and Tech Camp 2000 in the Dallas Chapter of the Society of Broadcast Engineers newsletter.

WA5KXX

**Kyle McNeil, KD5KVJ (left), Wendy Masters, KD5KQX, and Jordan Goldblatt, KD5KQM, on the trail of the Tech Camp 2000 mechanical foxes.**

## Graduation Day

The last day of each camp session included an on-site test session staffed by area VEs so the students could earn licenses and upgrades before leaving camp. Volunteers from PARK and Nortel Networks joined Jeff Fant and Tom Mobley at the Frisco campus for the test session. By the end of the first session there were 16 new licenses and upgrades ready to process and send to the ARRL. The second session added 19 more.

Graduation ceremonies for the camp sessions were held at the Frisco campus on June 25 and July 30, 2000. Each time, the auditorium was filled with instructors, students, parents and friends. A representative of Nortel Networks spoke to both audiences about his company's commitment to education and their enthusiasm for the Tech Camp concept.

## What Did Tech Camp 2000 Accomplish?

Besides an increased awareness of Amateur Radio and the contributions made to the community and public-service agencies, many people in our area have a renewed appreciation for our hobby. The parents of one student had some doubt about whether their daughter would enjoy camp and get her license. Not only did the young lady enjoy Tech Camp activities, she received her graduation certificate, passed the Technician and Morse code tests and received her Kenwood TH-D7A H-T! She wants to use her new skills as a community volunteer and can't wait to use the new station being set up at Haggard Middle School.

The Amateur Radio experience provides new ways for youngsters to become involved in their community through volunteerism. In fact, a number of the students who attended Tech Camp 2000 are National Junior Honor Society members who must fulfill community service requirements. Tech Camp 2000 and Amateur Radio's continuing commitment to education make it possible for these middle school students to have fun, learn critical thinking and lifetime skills and contribute to their community.

In July 2000, Tom Mobley hosted the first Wireless Teachers Workshop for 10 area middle and high school teachers. Three of the teachers in the group passed their Technician test that month. The workshop consisted of six men and four women who teach subjects including math, science, English and history. The pilot workshop familiarized the teachers with RF terminology and techniques used by Fant and Mobley to teach the students during Tech Camp sessions. The modules written by the class will be used in their own SGE sessions during the coming fall term. Plans are underway to establish a net for the teachers on a local repeater so they can continue to share ideas and plan inter-school Sigma Gamma Epsilon club activities.

## What's Next?

Stay tuned to this frequency for updates to the Tech Camp story. At least two more sessions are planned for the summer of 2001. Fant and Mobley are determined to make future sessions even more exciting than the first. For starters, how about a QSO via satellite with the US Navy through the AB5IG repeater and a series of live contacts with ops in Antarctica? These are just a few of the ideas that are percolating in Texas.

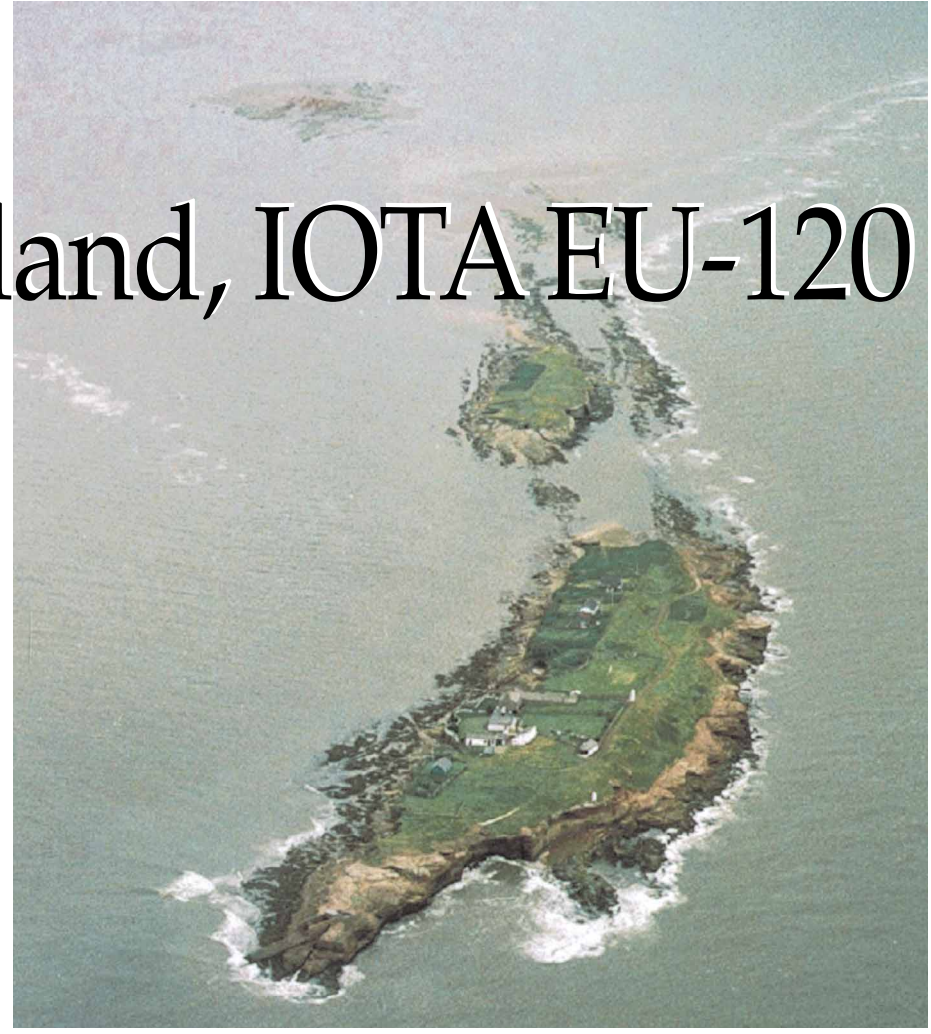
Want to learn more about the Tech Camp 2000 concept? Contact Jeff Fant (**jfant@ccccd.edu**) or Tom Mobley (**tmobley@ccccd.edu**) via e-mail for information about how to start a Sigma Gamma Epsilon chapter through your local college or university. Groups interested in grants for Amateur Radio equipment for school use can send e-mail directly to David Brandenburg, K5RQ (**davidbra@sprynet.com**). Ask for information about the Brandenburg Life Foundation's Ham Radio for Schools Program.

Want to get involved in Amateur Radio programs for youth? ARRL's Amateur Radio Education Initiative, better known as "The Big Project," will ramp up during 2001. Send an e-mail to **ead@arrl.org** for details.

*You can contact the author at 3212 Jeremes Landing, Plano, TX 75075-1519;* **wa5kxx@resource800.com**.

By Tony Barr, G0VBD

# Hilbre Island, IOTA EU-120



## Not every DXpedition is a major logistical undertaking. A journey to an IOTA island can often be just as rewarding.

Where in the world is Hilbre Island? To be specific, Hilbre and its two satellite islands (Middle Eye and Little Eye) are located in the mouth of the River Dee estuary, approximately 1.61 km off the mainland coast of England where the Dee empties into the Irish Sea. Hilbre is a nature preserve with an abundance of wading birds and a large colony of grey seals. Human habitation on the island was always sparse, but the Romans once claimed it, as did the Benedictine monks centuries later.

### A Promise Kept

My journey to Hilbre Island as an Amateur Radio operator was really the culmination of a promise made long ago.

I was introduced to Amateur Radio in 1952 at the age of 14 while in my second year at Foxhills Secondary School in Scunthorpe in the county of Lincolnshire, England. The school science master was Graham Layzell, G3AMM, who formed the school's Amateur Radio club under the call sign G3IHZ.

I took my 12-WPM Morse code test that allowed me to operate the station under Graham's supervision, but I was not a fully licensed ham. Even so, his kindness and patience never wavered. I often visited his home station where he taught me the finer points of DX hunting. His support carried me through difficult times, including the death of my father in September 1952.

When I left the school in 1953, I promised Graham that one day I would earn my full amateur ticket, but something always got in the way. My eventual professional career took me away from Scunthorpe for more than 26 years.

I returned to the area in 1993 and decided to locate Graham Layzell. I finally found him in November of that year and we met at his home in Berkhamstead in Hertfordshire. I reminded Graham of my promise and duly obtained my full Amateur Radio license less than a year later. Sadly, Graham died soon thereafter.

I dedicate my participation in the Hilbre expedition to this remarkable man. I may have been 40 years late, but I kept my promise.—*G0VBD*


**The Foxhills School Radio Club, G3IHZ, in 1952. The author is working CW next to his Elmer, Graham Layzell, G3AMM.**

Now the only resident of the island is a warden named Dave who maintains the preserve.

But why would such a forlorn rock be of interest to radio amateurs? The answer is found in the rabid pursuit of the Islands On The Air (IOTA) awards. Islands throughout the world, inhabited and otherwise, have been cataloged with specific IOTA designations and many hams, particularly in Europe, make it their passion to collect contacts with these islands. Think ARRL DXCC, but with an emphasis on islands rather than countries or entities.

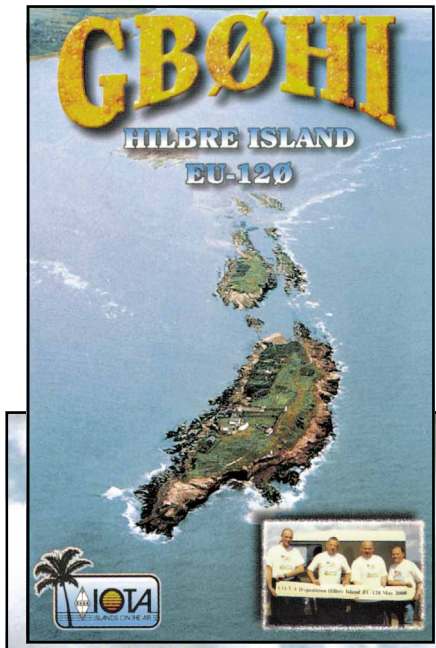
The IOTA designation for Hilbre is EU-120 and it has not been "activated" often. Our team of IOTA expeditioners comprised of Paul Scarratt, G0WRE; Brian Bowers, G0VAX; Terry Neale, G0WAB and myself decided that it was time to mount an operation to the island.

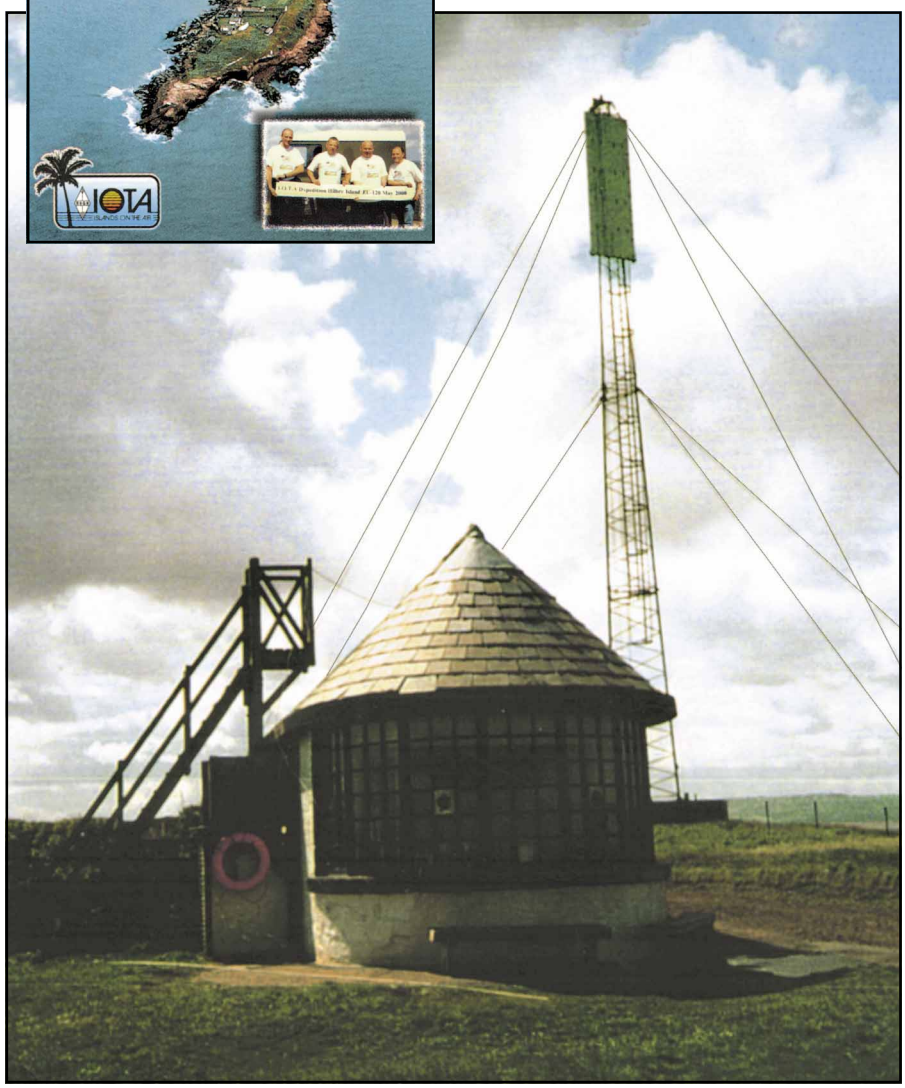
## Gather the Gear and Go

The first step was to obtain the permission of the Wirral Borough Council to operate on Hilbre. They are the governing body that administers the island. With that secured, we obtained the call sign GB0HI and proceeded to assemble our equipment. This was just a modest operation, so we wanted to travel light. We decided on a single Yaesu FT-990 transceiver, a Yaesu FL-7000 amplifier, a G5RV antenna and a GAP multiband vertical (we wanted to be active on as many HF bands as propagation would allow).

Access to Hilbre is from the town of West Kirby. Getting onto the estuary is easiest via the slipway at the end of Dee Lane (next to the marine lake). The crossing can be made at low tide when the water recedes and passage by foot is possible. This "land bridge" is available at low tide for seven hours in every 12. When planning a visit to Hilbre it is very important to check the tides so that you don't get stranded half way across! In our case, we made the crossing with a Land Rover.

We arrived on Hilbre at 1230 UTC on May 26, 2000, with calm seas and sunny skies. Warden Dave was kind enough to help us with our gear and allowed us to stay in the cozy "bunk house" and operate from the former Coast Guard lookout post.



**Our station was housed in this former Coast Guard post.**

## On the Air

To everyone's surprise, the station came together without a hitch. Propagation to North America was especially good, but the paths to Asia were rather poor. We kept a steady flow of QSOs on most bands, alternating between phone and CW.

Our luck was bound to run out eventually. On the following day (Saturday), a storm rolled in with heavy rain and powerful, bitterly cold winds. The waves pounded Hilbre's rocky cliffs and hail rattled on the roofs. The onslaught continued—and so did we, racking up more than 3000 contacts before we finally had to shut down on Monday morning. Of course, that was when the storm finally cleared and sunshine returned!

## A Delightful Experience

Despite the weather, it was a delightful Amateur Radio experience, one I would recommend to anyone. You don't need handfuls of money to enjoy your own DXpedition. If there is an IOTA island that you can visit, chances are that hundreds, if not thousands, of hams would be happy to work you. You can learn more about the IOTA program on the Web at **www.rsgbiota.org/**.

Our Hilbre Island expedition team would like to extend its thanks to the Royal Mail, our official sponsor, and to Ron, G4DIY, and Bill, G0WWC, for their help.

*You can contact the author at 8 Hornby Park, Liverpool, L18 3LL, United Kingdom;* **tony@g0vbd.freeserve.co.uk**.

By Michael Goode, N9NS

# Clipperton 2000

## Gale-force winds, tropical storms, dangerous beach landings, technology and gadgets galore, legions of nonhuman adversaries… A comic book? A James Bond movie? Science fiction? Nope. Clipperton!

In March of 1999 my eye caught an article in the local paper about an adventurer from Indiana who was just leaving on a trip to Clipperton Island! It seemed he was considered the "most traveled man in the world," having been to every "place" on this planet but three. One of those places was Clipperton, and he had chartered a ship to take him there. I was especially interested. In 1992, Clipperton was home to my first DXpedition. A few weeks after seeing the story I showed the clip to John, N7CQQ, a fellow Clipperton operator. That was the beginning of the end—John had already been thinking about another trip to the island!

Although we discussed the idea in detail, I wasn't too enthusiastic. Basically, I told John, "If you can keep the cost under $5,000, I'll go." John jumped at that challenge and within two months he'd found a way. The *Shogun*—a Clipperton regular—had been chartered by three tropical fish collectors who were going to Clipperton to collect rare Clipperton Angelfish. The charter's timing was perfect—late February—and the cost to get a bunch of hams aboard was $75,000. If we could round up an additional 10 hams to join the adventure, the cost would be about $5000 each.

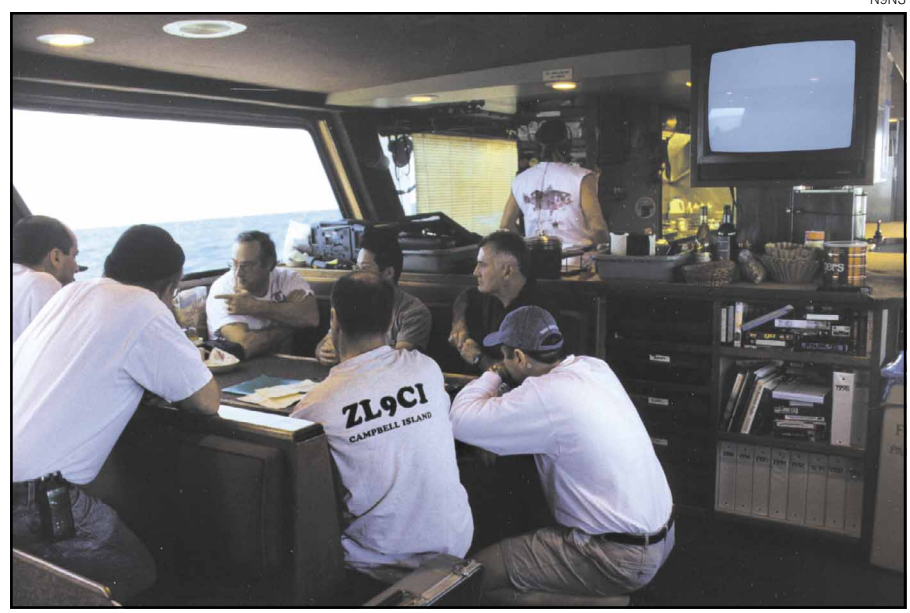
Fortunately, we found 11 other adventurous hams plus several sponsors who helped with the gear. By the departure date, all of the equipment was assembled at John's home near Laughlin, Nevada, or at Charlie's (W6KK) home near Los Angeles. The ship was set to depart the docks at San Diego's Fisherman's Landing at 9 AM on Wednesday, February 23.

I arrived at John's home a few days early, as did Mark, ON4WW. We helped load equipment into a truck and a rental car for the trip to San Diego. Ol' Murphy was on hand to say good-bye. He saw us off with a blinding rainstorm—a rare event in the desert…

### To Clipperton—What a Greeting!

Tuesday, February 22, was a busy day. As we loaded gear onto the *Shogun,* more of the DXpedition members arrived. The captain said if we were ready that evening we could get underway at midnight, a few hours early. Motivated by an early departure, by 7 PM everything was aboard and the ship's two cooks had fed us the first of many

N9NS

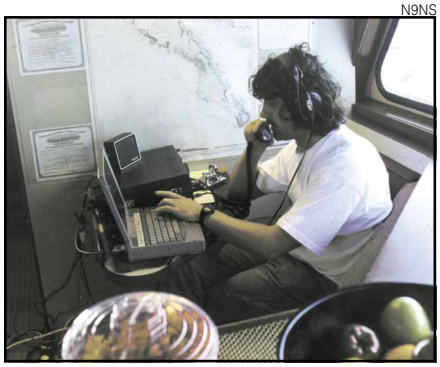



**John Kennon, N7CQQ, leads one of the many planning sessions during the voyage to Clipperton aboard the *Shogun*.**

### FO0AAA Operators

Eddie Stark, EA3NY
Willy Ruesch, HB9AHL
Koji Fukui, JK7TKE
Bob Allphin, K4UEE
Doug Faunt, N6TQS
John Kennon, N7CQQ
And Renato (HB9AHL's son)
Mike Goode, N9NS
Jim Mornar, N9TK
Charlie Hansen, N0TT
Mark Demeuleneere, ON4WW
Doug Renwick, VE5RA
James Brooks, 9V1YC

N9NS



**Mark Demeuleneere, ON4WW, passes the time aboard the *Shogun* operating N9NS/MM. More than 7000 QSOs were made from the ship!**

N9NS

**The crew assembles the antennas near the CW site—with a little help from the ever-present, curious crabs.**

excellent meals. At midnight we cast off. Everyone was on deck watching the city lights as we slowly headed out of San Diego harbor. It's some 1650 miles from San Diego to Clipperton, and at the ship's cruising speed of nine knots, that makes for a seven-day voyage!

At dawn on Tuesday, February 29, leap year day, we sighted our destination. "Sighted" is hardly the proper word. The island is so flat all we could make out were several groups of palm trees that appeared to be growing out of the water, and Clipperton Rock, which loomed darkly on the horizon. As everyone was on deck straining their eyes to see details, the captain cruised to the west side to find a spot he knew was suitable for landing.

The *Shogun* and its crew were no strangers to this place as they travel to Clipperton once or twice a year on fishing charters. NASA chartered the boat in 1996 as its support ship during a six-week scientific trip to the island.

By 9 AM the captain had found a landing spot and had sent two crewmen in a launch to check things out. The scouts weren't happy with the rough surf conditions, so the captain decided to cruise to the east side of the island to see if things were better there. With all of us waiting impatiently, we circled the island.

Transiting about a half-mile offshore gave us a good look at features such as Clipperton Rock, two wrecked Mexican fishing boats and the small shack at the NASA site. Huge waves crashed onto the reef around the whole island! Sometimes they peaked high enough to obscure the land entirely, and when they broke they sent clouds of spray soaring downwind.

After the ship had circled to the original landing spot, the captain announced it was now or never. So, at 1:20 PM local time, with life jackets donned and a weak grin on their faces, James, 9V1YC; Willy, HB9AHL; and Bob, K4UEE; jumped into the *Zodiac* raft and, with *Shogun* co-captain Bruce piloting, were off!

As the rest of us watched anxiously from the ship, the raft approached the reef and briefly disappeared into a trough. Moments later it popped into view, dry and nearing the beach! We all sighed in relief to see that landings could be accomplished safely.

I was aboard the third trip in—on a thrilling roller coaster of crashing waves. After a quick rush to the top of a wave we dropped down onto a small gap in the reef and Bruce skillfully brought the launch up to the beach. It sounds easy, but as we discovered later, it doesn't always work out.

Within an hour we had some of our gear and six members of the operating team on the island when a new menace appeared—a line of dark, ominous-looking clouds approaching from the east. Our worst fears were realized when, a few minutes later, the wind picked up and sheets of rain began falling. As we struggled to erect the first tent, the wind and rain intensified. The ferocity of these tropical squalls can't be described. Seeing—experiencing—is believing!

For the next hour the six of us endured periods of intense rain and gale-force winds. At times the rain struck us so hard we thought it must be hail! It was all we could do to hold on to the tent so it wouldn't blow away. What a welcome. Score two rain points for Murphy!

## Setting up Shop

At 3:30 or so the clouds finally parted, the wind dropped and we were able to

N9NS

**Ashore near the landing site, Willy and Bob attempt to raise the first tent as rain starts to fall.**

resume landing operations. By dark everyone was ashore and about half of our gear was piled on the beach. Two campsites, about 1100 feet apart, had been selected and we had set up two tents with cots for sleeping. At dark, about 7 PM, everyone was so exhausted we crashed early with the plan of assembling camp and antennas at first light (about 5:30 AM).

Without reservation, that was the worst night in my life (or at least a prime candidate). We were lying uncomfortably on army cots with no blankets or pillows. Many of us, including myself, hadn't gotten our personal gear onto the island, so we hadn't washed or changed into dry clothes. I was wet, uncomfortable and cold all night as the wind whistled through the tents. Add to this a carpet of crabs crawling around beneath the cots (when my arm dropped off the cot, within a few minutes they were nibbling on my fingers) and the constant honking of the tropical birds and, well, you get the picture.

Setting up antennas and tents that morning was certainly interesting! The birds were particularly active at sunrise so we had to shout at each other to be heard over the cacophony. The bright orange land crabs crawling everywhere on the otherwise barren landscape and the screeching of a thousand birds made for a most surreal setting!

We decided not to start operating until at least two stations were ready to go. Our goal was to have four stations, two at an "SSB site" near our landing area, and two at a "CW site" at our sleeping area. The two sites were placed 1100 feet apart to reduce interference. This worked out well as we had few interference problems. It was, however, a nuisance walking and hauling stuff between the sites with two-wheeled garden carts.

Merely walking on Clipperton isn't easy. There are two types of surfaces: one hard, one soft. The hard surface is a cemented amalgam of small coral fragments with a covering of loose, sharp shards. The surface is mostly level, but it's easy to turn an ankle or get cut on a sharp edge. The other surface is sand, into which the crabs have dug a labyrinth of burrows. This is no picture book stroll on the beach. When walking on the sand, almost every step is onto (into) a crab burrow, which suddenly collapses several inches, throwing the walker off-balance.

By mid-afternoon Clipperton was looking like home sweet home. We had tents, radios, antennas and generators assembled at both sites and were ready to go. At 4 PM we gathered at the SSB site where John would make the symbolic first contact. He chose 20 meters, 14.195 MHz, as a starting point.

N9NS

**The *Shogun's* crew brings our gear ashore.**

And who did we hear there? Good ol' V31JP ("Joe Palooka," K8JP), talking to none other than Pete, N0FW (a 1992 Clipperton trip organizer who held FO0CI). John broke in and put Pete in the log as the first QSO for FO0AAA. V31JP had to settle for second. *Déjà vu.* On the 1992 trip, after our first QSO, which was with a KL7, Joe, K8JP, broke in and was the second QSO for *that* Clipperton DXpedition as well!

After these QSOs, logged at 0015Z on March 2, the bands exploded with callers—Clipperton was on the air!

## Pileups Forever!

To keep each station manned round the clock we had to set up an operating schedule. We had 10+ operators, since Doug, N6TQS, was operating exclusively RTTY and Koji, JK7TKE, was manning the six-meter station with an occasional shift in the SSB rotation. Four stations running 24 hours per day means 96 hours of daily operating. That worked out to about nine hours per man, so James set up daily schedules putting everyone on three, three-hour shifts.

For the next several days all we did was operate and sleep, operate and sleep, with an occasional meal thrown in for good measure. After spending the first two days on the island (setting stuff up) with practically no sleep, all of us were very tired and were hitting the sack every chance we got.

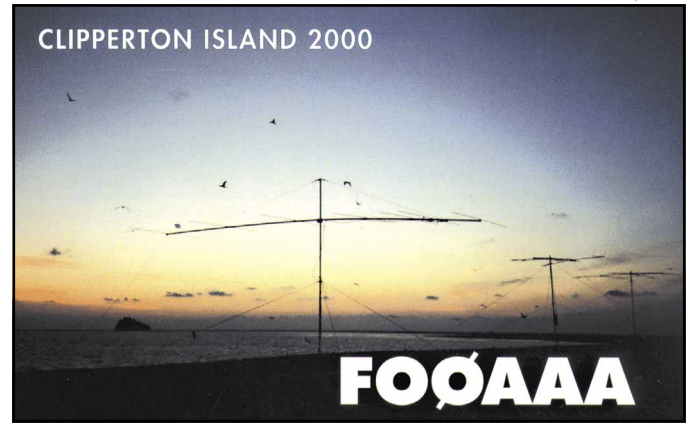
N9NS

**Clipperton beachfront property—lots of loose gravel and not a great deal of sand.**

ON4WW

**The author in full tropical gear, hauling equipment between the CW and SSB camps.**

JK7TKE




**Did one of these appear in your mailbox?**

I had the additional assignment of keeping the generators fueled, so between operating shifts I hauled gasoline between camps and fed the hungry generators. This was particularly challenging at night, with only a small flashlight for guidance. Finding the proper cart path was tricky. The route crossed soft sand and rough coral, and zig-zagged around dozens of sleeping birds. Several times while stumbling along half asleep, I ran into a snoozing bird, which startled me awake by squawking loudly and pecking me on the leg!

Our first day of operating was Wednesday, March 1, and after five days of this routine we were beginning to get rested up. On Monday, the 6th day, we felt so good it was time to make some camp improvements. Our original setup had the generators fairly close to the sleeping tents. Even if you're dead tired it's difficult to sleep with two engines roaring nearby, so when we had to shut the generators down for an oil change, I rearranged the power cords and moved the generators farther from camp.

Renato and Mark (the cook) also set up some tarpaulins to shade an eating area. And boy, did we eat. The two cooks from the *Shogun* kept us well fed! We got two hot meals a day plus all the snacks and drinks we could handle. It was the same Monday when "Marathon Man" Doug, VE5RA, donned his running shoes and circumnavigated the island in 1 hour 17 minutes! That's not bad for 6 1/2 miles of rough coral.

## Exploring our QTH

There were some interesting things to see on the island (in addition to the plethora of interesting things I've already mentioned!). Not too far from our camps was the largest grove of coconut trees on the island. Within this grove are the remains of several buildings built by the US Navy in World War Two. Relics of this occupation are scattered in other places around the island in the form of old machinery and a large ammo dump. The latter consists of piles of rusting cannon shells and .50-caliber machine gun ammunition!

Also interesting to explore is Clipperton Rock, a remnant of the volcano the island formed around. The Rock is some 320 feet long by 120 feet wide and rises 69 feet above sea level. It's grotesquely eroded, with many crevices and caves reaching far into the interior. At the highest point you can see the remains of a navigation beacon built by Mexico in 1906.

Other things of interest are much more recent. On the island side opposite from our landing was a small hut—all that was left of the site where, in 1996, NASA set up a radar station at the request of the French Government to track the first firing of the Ariane 5 rocket from French Guiana. After six weeks of preparation, the NASA crew had nothing to do as the rocket blew up a few seconds after launch!

On the beach near the NASA site was a shipwrecked Mexican fishing boat. Named the *Lilly Marie,* it's one of two boats that are wrecked on the island. The *Oco*, the other boat, was much closer to our camp. Nothing is known about these ships except that they both were wrecked about 1997.

## One Last QSO, One Exciting Departure

We had to leave the island the afternoon of Wednesday, March 8. We figured it would be a slow and difficult process to get off the island, so to make sure we could get away in time we started breaking camp at daybreak on the seventh. We intended to remove all but the bare essentials necessary to keep some stations going into the next day. Everything but the tents, antennas and one generator were taken down and hauled to the landing site. This took until mid-afternoon, so FO0AAA was off the air for about 10 hours that day. That night, everyone was sad and happy that we were leaving. We decided to shut down for good at 1800Z the next day. As the hour approached, Charlie, N0TT, made a final CW contact, then we all gathered around the SSB tent to watch John make the last QSO. He found XF4LWY near the IOTA hangout of 14.260 MHz—a station on Revilla Gigedo Island. As John broke a pileup for the last FO0AAA contact, we thought that one rare island talking to another was a fitting end to our DXpedition.

After that we began taking everything down and hauling gear to the landing site (or should I say departure site?). Things went smoothly until mid-afternoon. The tide was going out and the water over the reef was getting quite shallow when it was my turn to get into the launch and head back to the *Shogun*.

The island is completely surrounded by a reef that extends about 100 yards from the shore in the form of a relatively level shelf. The seaward side of this shelf ends with an abrupt drop-off to a depth of 40 feet or more. Waves approach from the ocean about 10 to 12 seconds apart, and when they encounter this abrupt change in depth they rise rapidly to form an almost vertical wall of water six to eight feet high before crashing violently onto the shelf. This happens over a distance of less than 50 feet. To get away

from the island it's necessary to pass through this dangerous 50-foot "surf zone" between waves. With a 10- to 12-second spacing there's only a five or six second window when this can be done without being flipped over or buried under tons of water!

Our escape technique took advantage of a narrow notch in the reef that extended shoreward about 50 feet. The water depth on the shelf was usually less than three feet—not enough to safely run the outboard motor. Fortunately, the water in the notch was somewhat deeper, so the launch would be pushed out to the edge of the notch and shoved into the opening just as a wave broke. The operator then could lower the motor, start it and zoom through the danger zone before the next wave built up. The *Shogun* crew mastered the technique pretty well. During our stay there was only one accident when the launch got sideways and was flipped over. Fortunately no one was hurt and all we lost was a day's ration of drinks.

By 1:30 PM there were four of us remaining on the island: me, N9NS; Jim, N9TK; Mark, ON4WW; and Eddie, EA3NY, along with our personal gear and a few pieces of camping equipment. The tide was going out and the water on the reef was less than a foot deep. Jim and I loaded ourselves and our gear into the launch, which was pushed by two crewmen toward the notch in the reef. With the water so shallow we had to move particularly far out, where we stayed for 10 or 15 minutes waiting for a smaller set of waves to come in. Finally, Bruce, our captain, said, "After the next one," and when the wave broke we were shoved into deeper water. He put the motor down, started it and off we went—until the motor stalled!

As Jim and I watched, Bruce frantically pulled the starter cord. After what seemed an eternity the engine caught, but we were now face-to-face with a 10-foot high tsunami! Bruce gunned the motor, but in an instant we were inundated! The experience was very similar to jumping off a high diving board and landing flat on my stomach! We were smashed flat by the falling water and nearly washed overboard. Fortunately, we all managed to hang on!

The first wave pushed us back over the reef, so we couldn't use the motor. The launch was turned sideways and as the two other crewmen rushed over to try and move the boat back away from the edge, we got hit a second time. Jim and I jumped out and helped move the boat out of danger. We were a sorry looking bunch as we dragged the boat, now full of water, back to the beach.

After reaching the shore and collecting our wits we checked that everybody was still in one piece and that most of our gear, now rather soggy, was still with us. After consulting with the *Shogun*, Bruce decided we couldn't risk another trip until the tide turned and the water over the reef got deeper. That meant a three-hour wait in the scorching sun. We had no shade, but we did have a cooler full of cold drinks!

After several false starts we were able to find our timing in the reef notch—barely. We roared off the reef and climbed a wall of water as the next wave built up. Zooming over the top of the wave the boat went airborne briefly before coming down with a bang that jolted us all. When we reached the *Shogun,* Jim and I assured our colleagues we were okay and immediately headed for a hot shower! Fortunately, Mark and Eddy made it out on the next run without much trouble. At about 5:30 the *Shogun* weighed anchor and we headed north.

The adventure was over—almost—save for another seven-day sea voyage. There were a few anxious moments when thick smoke began pouring out of the engine room early one morning. The *Shogun* crew quickly fixed the problem and we were underway within a few hours. Time passes slowly when you have nothing to do, but eventually we reached San Diego, and after checking in at customs (Clipperton *is* a foreign country) the *Shogun* tied up at Fisherman's Landing.

We were all tired and glad it was over. In six and a half days of operating we made 75,106 contacts, including 14,136 in the first 24 hours! The excitement, the victories and the hardships were all behind us. With more than 75,000 QSOs in the log it was certainly worth it. We wanted to put Clipperton Island in as many logs as possible. I think we succeeded. Now on to the next one....

*You can contact the author at 10340 Broadway St, Indianapolis, IN 46280-1344;* **mgoode@in-motion.net**.

## You've Read the Story, Now See the Video!

DXpedition member James Brooks, 9V1YC, has produced a professional 60-minute video about Clipperton Island. The program documents not only the 2000 DXpedition, but includes rare film and photos of every other Clipperton effort. The video also details the history of the island, beginning with its probable sighting by Magellan in 1523 through the US Navy's occupation during World War II.

The price is $15 plus shipping. To order, contact Charles Hansen, N0TT, 8655 Highway D, Napoleon, MO 64074-9733; **n0tt@arrl.net**. European readers should contact Declan P. Craig, EI6FR, 167 St James Rd, Greenhills, Dublin 12, Ireland; **ei6fr@gofree.indigo.ie**.


**The remains of the *Lily Marie*, a fishing boat wrecked off the island in 1997.**

By Jennifer Hagy, N1TDY

# Announcing the Tenth Annual Philip J. McGan Memorial Silver Antenna Award

Each year, ARRL Public Information Coordinators, Public Information Officers and other Public Relations volunteers strive to keep Amateur Radio visible in their communities by publicizing special events, writing press releases, and maintaining good relations with local media among many other valuable activities. Their efforts benefit their own local ham radio activities and the ham community at large. If you know someone who has achieved public relations success on behalf of Amateur Radio, please consider nominating him or her for the McGan Award. These public relations volunteers deserve to be recognized.

The award's namesake, journalist Philip J. McGan, WA2MBQ (SK), served as the first chairman of the ARRL's Public Relations Committee, which helped reinvigorate the League's commitment to public relations.

Unfortunately, Phil never got to see how much his efforts have paid off. In honor of Phil, his friends in the New Hampshire Amateur Radio Association joined with the ARRL Board of Directors to pay a lasting tribute to the important contributions he made on behalf of Amateur Radio.

The 2001 McGan Award will go to that ham who has demonstrated success in Amateur Radio public relations and who best exemplifies the volunteer spirit of Phil McGan.

The nominations will be judged by ARRL's Public Relations Committee and the group's recommendation will be presented to the ARRL Board of Directors at the July 2001 Board Meeting.


**Last year's McGan winner, Diane Ortiz, K2DO, accepts her award from Hudson Division director Frank Fallon, N2FF.**

## CALL FOR NOMINATIONS

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

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

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

(4) Deadline: Nominations must be received at ARRL HQ in Newington by 5 PM May 25, 2001. Nominations arriving after the deadline or without an entry form cannot be considered.

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

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

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

### Public Relations vs Public Service

In the past, there has been some confusion about the difference between "public relations" and "public service." Public Relations activities for which the McGan Award is given include efforts specifically directed at bringing Amateur Radio to the public's attention (and most often the media's) in a positive light. This may include traditional methods, like news releases; or non-traditional methods, such as hosting a radio show or being an active public speaker. Some candidates have been nominated for their public service activities, such as emergency communications, net leadership and other activities that, while helping maintain a positive impression of Amateur Radio among the public, don't fit the definition of "public relations." So, if you're considering nominating someone in your area for the award, please ask yourself if your candidate's work fits the *public relations* criteria.

By Jim Idelson, K1IR

# A Journey to Sweepstakes

## How do we attract more young people to Amateur Radio? Could contesting provide the answer?

"CQ Sweepstakes…CQ Sweepstakes…this is K1IR…Kilo One India Radio…Kilo One India Radio…Contest!"

Ten-year-old Sander Idelson, KB1FPU and 12 year-old Chris McCarthy, KB1ELV, both of Sudbury, Massachusetts made a big effort this year in the ARRL Phone Sweepstakes Contest. They operated K1IR to a Clean Sweep—working all sections by the end of the contest.

Sure, lots of stations worked Clean Sweeps in the 2000 Sweepstakes, but this situation was a bit out of the ordinary. It involves a tale of a young amateur who suddenly discovered the spark of radio excitement—even in the age of the Internet. It is a road not often traveled these days, and the journey wasn't always easy. Read on and you'll understand.

### Show and Tell

On Saturday afternoon as the contest started, I showed the boys how to operate the station. I trained them how to use the rig, how to switch and aim the antennas and how to enter contacts in the log. I armed them with a chart of band privileges. I posted the exchange right in front of them so they wouldn't forget what to say. We practiced a few QSOs out loud so they got the feel of operating in the contest.

Sander, now KB1FPU, enjoys his first QSO.

Next, I gave them both a set of headphones so that they could listen while I made a few demonstration contacts. I showed them how to tune in the station calling CQ, make a call, and get all the information necessary for a complete contact. Slowly, I transferred responsibility for making contacts to them. They went from logging for me, to logging for each other. Eventually, they were able to operate without my help…they took over the station and began to fill the log with QSOs.

### The Light Bulb Goes On

After successfully mastering the mechanics of making and entering contacts, Sander and Chris began to wonder if there was more to it. Suddenly they understood. Amateur Radio contesting is a competitive *sport*—just like the physical sports they played on the ball field. This was something they could relate to!

Knowing that it was their first effort, and that their QSO rate might not be the same as the pros, I looked for a good goal for them to shoot for in this contest. A Clean Sweep was the obvious answer. They had already begun to notice that the multiplier window in the logging software was starting to fill up. So, by late Saturday evening, the search for all sections was in full swing.

With so many stations on the air, it was easy to show them how band selection and propagation would be important factors in whether they would be able to work a particular section. Soon, they were celebrating with high-fives as the new sections were worked.

### On Their Own

At about 11 PM on Saturday night, I'd had enough. With just a hint of peril in my heart, I told the boys that the station was theirs for the rest of the night, and I went off to bed.

This was a pivotal moment. Would they remain interested, or grow bored? Would they see the challenge, or find it all mundane?

At 9 AM, when I returned to the shack, the answer was clear. Two bleary-eyed boys with only a couple hours sleep were at it again. These kids were hooked!

### The Journey

So, how did we come to this point? What did it take to get a couple of modern-day, computer-literate kids into ham radio?

We hear so much talk about the dwindling numbers of new, young hams…it's time to take a look at just how it can still be exciting for youngsters to get into this great hobby.

I guess it's obvious how Sander became interested. When he was very young—only a few years old—I pulled my HF station out of some boxes in the basement, put up a tribander at 18 feet, and started speaking with other hams around the world. Just after learning to talk, Sander spoke his first words on the radio, "Hi. Where are you?" With changes in my career, and a move to a new home, the radios went back in their boxes for a few years.

The next appearance of the radios in Sander's life was quite a bit more dramatic. I decided that it was time for a *real* HF station—including a tower in the

Ten-year-old Sander Idelson, KB1FPU (background) and 12 year-old Chris McCarthy, KB1ELV, made a big effort this year in the ARRL Phone Sweepstakes Contest.

backyard. I was determined to put together the station of my dreams—a fairly competitive DX contest station.

Along with the rest of the family, now numbering four, eight year-old Sander watched as I went through the process of applying for a tower permit, putting up the tower and antennas and building the station. These activities were time-consuming, challenging and exciting—and the feelings were contagious. Sander began to learn about various aspects of radio and ask some interesting questions.

Naturally, in the back of my mind, I was thinking about whether Sander would ever be interested enough to want to get his own license. Some dads dream of their children growing up to take over the family business; I was consumed with the idea that someday my kids might take over my station for multi-op contests!

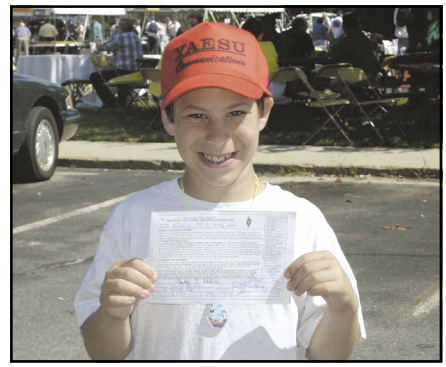
When he was nine, I bought him a copy of *Now You're Talking!*. Sander looked at it briefly and never returned to it. Getting a license was still not that interesting to him. And, the material was a bit above his level.

### Kids' Day 1999

No pressure. This was my mantra. I was not going to pressure any of my kids to become hams. I knew that, were it me, I'd be completely turned off if I were pressured. So, I let time pass and simply looked for opportunities to keep radio in the picture. Kid's Day was one such opportunity. Planning for this event well in advance, I told Sander that there was a special kind of operating event coming—meant just for kids. I told him he could invite a few friends to the house to show them what ham radio is, and let them all operate if they wanted to. He liked the idea. He really wanted to show off his dad's hobby—and show his friends that he knew a lot about it, too.

That day, Kids' Day 1999, Sander had three of his good friends over to participate in the event for a few hours. We started with a quick tutorial on ham radio, using materials provided by Extra Class youngster Rebecca Rich, KB0VVT. It was a great way to open the discussion. Then we took a tour of the shack and the antenna farm. It was all hands-on. Everybody got to go out to the tower and look up at all the aluminum. They thought it was cool. "Do you really climb all the way up there, Mr. Idelson?" Then we all learned how to send our names in Morse code.

Next, it was time to operate. We started by tuning around the band, just listening. Then I made a demonstration contact. We began to pass the mike around. The kids were having great fun. They clearly had the most fun when they spoke with their peers—kids their own age experiencing Amateur Radio for the first time.




**Success! Sander with his cherished Certificate of Successful Completion at the 2000 New England Division convention.**

For about an hour, we scanned the bands and logged some QSOs. When there was QRM, they tried their best to hear—sometimes successfully, sometimes not. Occasionally, the conversation would become more engaging—questions about school and sports would creep into the discussion. Then, rather suddenly, the boys decided to go outside and play soccer. Had they suddenly lost interest? No! They'd just done what all nine year-old kids do—moved on to the next thing in an exciting young life.

### Deciding to Go for It

Shortly after that 1999 June Kids' Day, Sander decided that he wanted to study for his license. At that time, we were aware of the impending changes in licensing, so we talked about which license he would try to get. He decided that his goal was the Technician Plus.

We picked up our year-old copy of *Now You're Talking!* with plans to study a small part of the material every evening. Unfortunately, that plan fell apart very quickly. *Now You're Talking!* was still aimed too high for this fourth-grader. Before this became too discouraging, we changed our focus to learning Morse code.

The code was a very different story! Sander found this much easier and lots of fun. He soon realized that Morse code was a secret language of sorts. He enjoyed memorizing a couple of new letters each day. After a week or so, we were having short CW exchanges over the dinner table.

To make things even more interesting, we built an oscillator from parts in my old junkbox. Using a circuit diagram right off the Web (**www.uoguelph.ca/~antoon/circ/morse1.htm**) we hooked up a few components and a battery and had it running in a couple of hours. This was also a great opportunity to teach about electronics from a very practical perspective. We identified the parts, how they were shown in the schematic diagram, and Sander did the assembly and soldering. Finally, we went out and bought a brand new key to complete the project.

For a couple of weeks, sending CW on the new code practice oscillator was fun. Sander's proficiency definitely improved. But, receiving was a different story. Although we did do some practice at the kitchen table, he became unenthusiastic before we made it to the 5-WPM level. I was disappointed, but once again I just decided to let it go. No pressure.

### Two Critical Success Factors—Classroom Study and a New Friend

I was looking hard for a good classroom study program to take Sander to the next level. It was evident that self-motivation and dad-motivation were not going to be enough to put him over the top.

Enter the Framingham Amateur Radio Association (FARA). This local club has a long tradition of successful entry-level licensing classes. It was a few months away, but the next scheduled code class looked like the right answer. Sander was ready and willing to give it a try.

About this time, we reached another very important milestone. I received a call from a friend in town who asked if she could hook me up with a 12 year-old boy in her neighborhood who had recently become involved in ham radio. Would I be interested in showing him my station? I immediately seized on the opportunity to meet him, hoping he might be interested in partnering with Sander in pursuit of their licenses.

It turned out that Chris, KB1ELV, had recently received his Technician ticket, and was busy studying for the General, but he hadn't yet mastered the code. Soon, Sander and Chris were both signed up for the FARA code class—ably led by Ed Weiss, W1NXC. Once a week, they spent two hours with a group of about eight other students—all much older. Having a friend of the same age made it much easier. We practiced at home regularly so that Sander would be ready for the next class. Being "tested" each week in front of the other class members was sufficient motivation to keep Sander on track. We also had the opportunity to work with a very helpful computer program—*Morse Tutor* (**www.ggte.com/mt.htm**). It's a great tool for creating sample CW tests.

### Taking the Exam...Three Times!

It was time to take the code test. It was easy to convince Sander that he should give the written part a try, too. Who knows? Maybe his brief exposure to the material would be enough to give him a

passing grade. At a minimum, he'd have a chance to see what it was like to take the test…and alleviate some fear of the unknown. This was a very helpful exercise. He had never taken a test before!

The code test was given as part of a regular FARA VE session. He was in the room with 20 other examinees. The VEs ran the exam and began to correct the papers. Unfortunately, they had used the wrong tape, and had to run the correct one. So, they started all over again. Papers were collected and graded. Sander copied his solid minute, and passed the code test. Mission accomplished! When he came out, he reported that he probably wouldn't have passed the first time…he was thrilled that he'd had a second chance.

Twice a year, the Framingham club runs a novel program, a License-in-a-Weekend class. This is an intensive training program, beginning on a Friday evening and concluding on Sunday afternoon with a VE session. The program is designed to bootstrap students from zero to Technician in just two days. Sander loved the idea that he might be able to get the written material under his belt that quickly…so we signed him up for the next License-in-a-Weekend class.

It was a great weekend. Sander was, by far, the youngest student in the class. He really enjoyed the program. Some parts were easy and some were more difficult for him. Finally, it was Sunday afternoon and time to take the exam. Sander wasn't sure he was ready, but he really wanted to pass. When the test was over, and the papers were graded, he'd missed a passing grade by only one question. This was his lowest point in the whole process. He had put more effort in this test than anything else in his life. It was a crushing experience to come up short by only one question. That was May 2000.

After allowing some time for Sander to recover from that testing experience, I learned about the outstanding AA9PW practice exam site on the Internet (**www.aa9pw.com/**). I printed out a test, and asked Sander if he'd like to give it a try. He did, and missed by six or seven questions. We decided that he would practice with one or two AA9PW exams every day—aiming for the ARRL New England Convention in August as his next shot at the license.

This was a difficult effort to keep on track. We would do a couple of tests each day. Sander didn't seem to improve just from taking the exams. Memorizing that many questions and answers was too much. I kept every one of his completed exams in a folder. After several weeks of testing, I took a look at all the exams. It was becoming clear that certain areas were giving him more trouble than others. Learning the frequency allocations and other FCC rules were the toughest. So, we started to focus on those specific areas. I worked with him using a frequency allocation chart and the relevant sections of the question pool. This technique worked like a charm. As he studied the sections, his overall test scores began to improve. The convention date was approaching, and we had a goal of getting no more than three or four questions wrong on every practice test. This would leave plenty of room for a test with surprise questions and the stress factor.

### Getting the License

The day finally arrived. He signed in and took his spot in the exam room. He had all his study materials with him. I made the mistake of coming across like a nervous father…I asked him to repeat back to me a few of the key answers that we'd been working on. He told me to go away. Good advice, I think.

An hour later, we were waiting anxiously for the test results. When he got the word that he'd passed, he wanted to know immediately how many questions he had missed. Only two. All those practice tests worked!

CSCE in hand, we cruised the convention exhibits. Yaesu kindly provided a hat and a logbook. And, dad promised a reward for such a big success.

A few weeks later, Sander was crowned with the call sign KB1FPU. A very exciting day.

### Staying Interested

It all started off with a bang. Whitey, K1VV, trustee of the Marconi Wireless Club and the call sign W1AA, offered to be Sander's first HF QSO. This was a special treat. Whitey kindly sent along a beautiful W1AA QSL card and audiotapes commemorating the contact. Sander also got on 2 meters with his new handheld, where he met several young amateurs who run a nightly net. Although they go to different schools, Sander and Chris remain friendly, occasionally talking on 2 meters.

Our local Amateur Radio community is a great source of support. Licensed grandparents and family friends N1CPC, K1LZ, K1VR, K1ZM and KM2P, represent every walk of life. They provide a sense of comfort that ham radio is a truly mainstream avocation.

Dad's activities are a constant reminder of ham radio. Sander likes to help out with antenna and station projects. He's always interested in how I'm doing in the big contests, and he wants to learn the ropes of contesting so he can be part of our multi-op efforts in the future.

### Secrets to Success

What are the key things that got us to this point? Clearly, there is no single formula that can be uniformly applied to every interested child. What works for one child might fail for another. Even so, I believe I found some key elements that seem to enhance the odds of success.

✔ Be patient. Invite your child to share your interests, but be patient. Their excitement will wax and wane. Resist the temptation to push too hard. If you show excitement for ham radio, their curiosity will draw them to you.

✔ Promote the *sport* of Amateur Radio. Unless your child is an electronics prodigy, chances are that he or she will more quickly embrace the sporting aspects of ham radio—*contesting*. Try involving them in a contest, if even for a short time.

✔ Provide your child the best study tools available. Use appropriate books and software. The Web is a big help and children can relate to it easily.

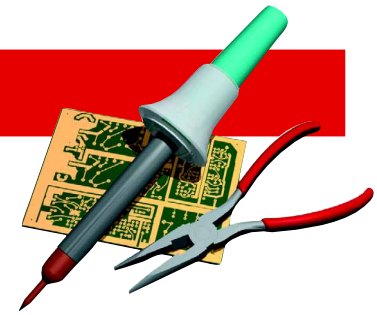
✔ Introduce your child to other friends his or her age who are interested in Amateur Radio. Interaction with supportive peers can be the most powerful force guiding your child to success.

✔ Encourage risk-free exploration. Let children use their own creativity. Leave behind any rigid thinking you might carry with you. And, allow them to experience failure. Don't stop them if they are about to do something that you know won't work. Lessons learned from failures are often the most effective. Learn from failures; reward successes.

✔ Take advantage of your local Amateur Radio community. Find a club that gives license classes. Expose your child to a wide variety of Amateur Radio operators and operating activities.

✔ Remember that success does not require perfection! If you and your child strive only for perfection, you are much less likely to succeed. Build a code practice oscillator that makes code; it doesn't have to be a work of art. Don't wait for perfect scores on practice tests; take that final exam as soon as you think you just might pass it!

*Jim Idelson, K1IR, was first licensed as WN1QJU in 1972 at the age of 13. He taught several Novice classes before the age of 16. Jim has served as a mentor in the Jewish Big Brother Big Sister Association. He is an active contester and a charter member of the Yankee Clipper Contest Club. Jim has a BSEE from WPI and an MBA from Boston University. He is president of DesigNET Int'l, an information services company specializing in videoconferencing. You can contact Jim at 96 Morse Rd, Sudbury, MA 01776;* **k1ir@designet.com**.



# The Doctor is IN

**Q Every time you double your antennas, say, going from a single VHF/UHF Yagi to a stacked pair of Yagis, you realize an increase in gain, but you also lose a certain amount of power through the power divider or phasing harness. How do you manage to come out ahead?**

A It is true that stacking antennas produces additional directivity and gain. You can stack antennas vertically (Figure 1) or horizontally, although vertical stacking is most common.

The "secret" is in the fact that gain can only come from taking power that would otherwise be radiated in other direction(s) and concentrating that power into the main, desired lobe(s).

The most easily understood physical demonstration is one that I've used for years at radio club meetings (see Figure 2). I take a balloon, blow it up so that it is roughly circular in shape and then declare that this is a radiation pattern from an isotropic radiator. Next, I blow up another balloon to the same size and shape and tell the audience that this will be my "reference" antenna.

Then I squeeze the first balloon in the middle to form a sort of figure-8 shape and declare that I've now created a dipole and compare the maximum size to that of my reference "antenna." The dipole can be seen to have some "gain" over the reference isotropic. Next, I squeeze the end of the first balloon to come up with a sausage-like shape to demonstrate the sort of pattern a beam antenna would have, again comparing the gain to the reference isotropic antenna, er, balloon.

By combining antennas in a stack, you can accentuate this gain and directivity even further. In the end, you have created much more total gain in the antenna system than would be lost in the power dividers or phasing harnesses. Stacking isn't easy or inexpensive, but the performance gain can be substantial.

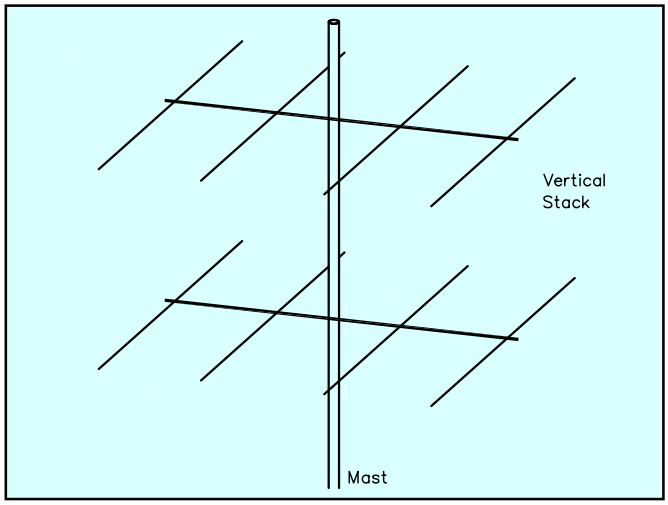



**Figure 1—An example of vertical antenna stacking.**

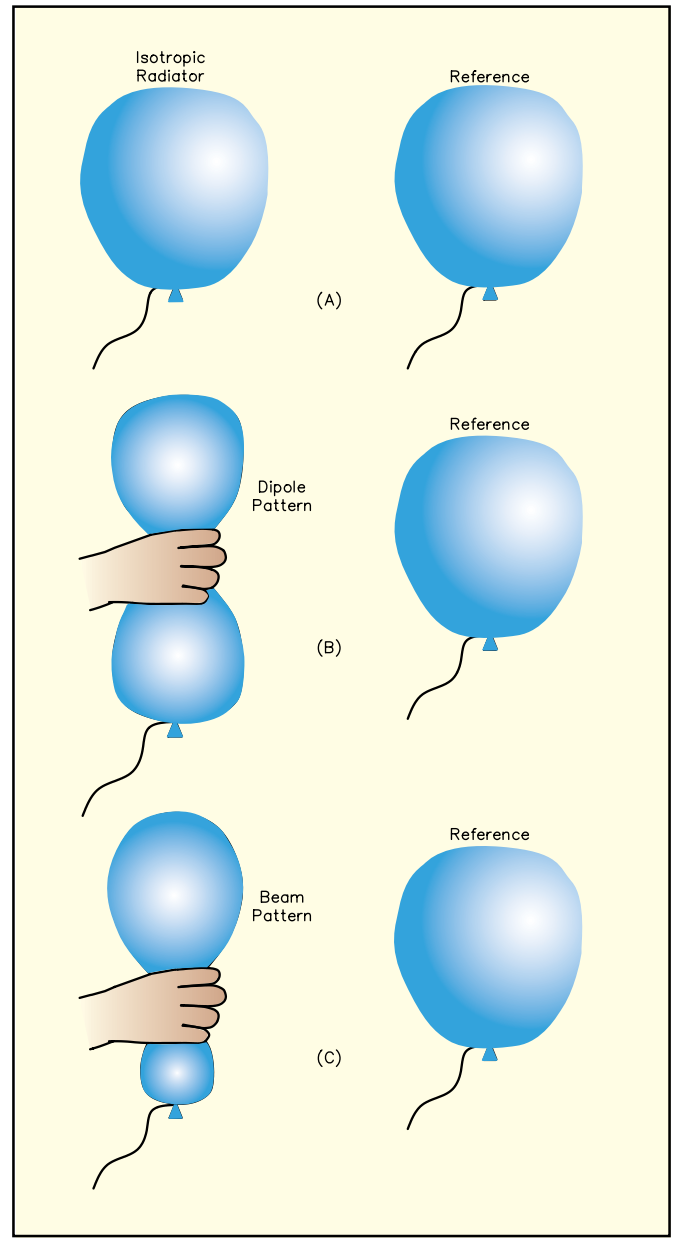



**Figure 2—Demonstrating antenna pattern gain with balloons. Take a balloon, blow it up so that it is roughly circular in shape and then declare that this is a radiation pattern from an isotropic radiator. Next, blow up another balloon to the same size and shape and tell the audience that this will be the "reference" antenna (A). Then, squeeze the first balloon in the middle to form a sort of figure-8 shape and declare that this is a dipole and compare the maximum size to that of the reference "antenna" (B). The dipole can be seen to have some "gain" over the reference isotropic. Next, squeeze the end of the first balloon to come up with a sausage-like shape to demonstrate the sort of pattern a beam antenna creates (C).**

**Q What is wrong with operating FM simplex between 145.8 and 146 MHz? I hardly ever hear signals in that part of the band.**

A This touches on the issue of voluntary band planning, which was addressed in "Washington Mailbox" in the December 2000 *QST*. You might want to take a look at that column.

The problem with operating in the 145.8 to 146 MHz segment is that the amateur satellite community uses this portion of the spectrum. There are several FM repeater satellites that operate with *uplinks* in this segment. If you're chatting with a local friend on 145.85 MHz, for example, there is a chance that OSCAR 27 will hear you and relay your conversation over thousands of miles without you even realizing it! The FM satellites are crowded already, so they don't need "unintentional signals." Other SSB and digital satellites have uplinks here as well, and your signals could make it impossible for these birds to hear the signals intended for them.

SO-35 and AO-10 have *downlinks* in this portion of the band. These signals are often weak and your terrestrial FM QSOs will obliterate them.

Just because you can't hear the satellite signals, doesn't mean that they are not there. With the typical FM setup, you're not likely to hear satellites in this portion of 2 meters at all.

Voluntary band planning allows everyone to enjoy Amateur Radio in all of its various forms, but it only works if we all respect the plans. It isn't so much a legal issue as it is one of common courtesy.

**Q Keith, KF4BXT, asks, "What is a switching type power supply and what type is typically used and/or recommended for running a station? I think most of us, by now, understand that our power supplies should be regulated and filtered, but are there reasonable ways to add regulation and filtering to those that don't already have it?"**

A In a linear power supply, the line voltage goes directly into a low-frequency transformer where it is stepped down to the appropriate low voltage before rectification, filtering and regulation. In a switching power supply, the line voltage is directly rectified and filtered to produce a high dc voltage. This voltage is then "switched" at a high frequency rate (not RF, but certainly higher than audio—perhaps 50 kHz, for example) by switching transistors. It is then fed into a high-frequency transformer and the output is rectified and filtered. Regulation can be done in the output stage, but more typically, the regulation is done at the switching transistor to allow the amount of energy fed to the transformer to be adjusted as needed.

One advantage of the switching technique is that higher frequency components are much smaller and lighter weight for the same power capability than their low frequency counterparts. Another advantage is that, since the transformer is the least efficient part of the supply, controlling its input power (as is done in a switching power supply) can provide much better efficiency. The power lost as heat in a linear supply is typically 40-60% of the output power. In a switching supply, that typically drops to 10-20%.

The disadvantages of a switching supply are the increased complexity (more likelihood of a component failure), increased cost (many more parts) and tendency to create radiated RF (the switching waveform is usually pretty close to a square wave, so it contains a lot of harmonics). This last item has been the main one that has kept switching supplies out of the ham market until recently. Current designs use an extensive amount of filtering and radiation suppression techniques to greatly reduce unwanted RF.

Adding filtering and regulation to a linear supply is a simple matter. Information on calculating filter component values for a particular desired ripple can be found in *The ARRL Handbook* chapter on power supplies. However, regulation will come at a cost in reduced output capacity—if you have an unregulated supply that puts out 15 V, you probably won't be able to get more than 13 V from a regulator system attached to it.

All switching supplies have some kind of regulation, although some designs are quite crude and could use improvement. I don't suggest trying to modify a switching supply unless you have studied switching power supply design extensively.

**Q I'd like to try microwave operating from home, but I can't put up antennas outdoors. Is it possible to at least receive microwave signals with an attic antenna? Will the signals make it through a standard shingled roof? I'm thinking specifically of receiving satellite microwave downlinks.**

*Bob Bruninga, WB4APR, answered this question with an interesting experiment:*

A "Since I have a Direct-TV 1-meter dish on a tripod that I use for demonstrations, I decided to check its performance through various materials. The unit has a bargraph signal-strength meter for use during alignment. The meter scale goes from 0 to 100. Here are the results:

Outdoors in the clear: 92
1/4-inch plywood covering: 80
7/16-inch plywood covering: 77
3/4-inch plywood: 60
3/4-inch Masonite: 70
3/4-inch stack of paper: 60
1.5 inches of plywood: 43

(Note that the signal drops out completely at 35.)

"I have no idea if the scale is at all linear or logarithmic, and my arm was too short to both hold the wood and see the monitor well. So, your mileage may vary.

"With digital the picture is always perfect. You don't lose any quality until it drops out completely. Of course, most of this margin is needed in case of rain. But it looks to me like it should be possible to receive microwave downlinks through a simple 3/4-inch roof and shingles, as long as rain, ice or snow are not involved."

**Q Ray, WA3CLD, asks, "I have an old Swan TB-3HA tribander beam antenna. How can I check and recondition the traps? It has 4 driven-element traps, 2 director traps and no reflector traps. Can I adapt one of the driven element pairs of traps for the reflector?"**

A The biggest problem with old traps is corrosion, both external and internal. To "recondition" them, you'll have to take them apart and thoroughly clean the inside. You can check a trap for internal corrosion without taking it apart by putting an ohmmeter across it—the resistance should be a relatively low value. If it is over 100 Ω, you probably have a corrosion problem.

Traps are designed to present a high impedance at the "trapped" frequency and to act as a loading coil at lower frequencies, so you should indeed be able to use driven element traps for the reflector by adjusting the tubing lengths slightly.

If you have an antenna analyzer or a dip meter, you can check the resonance of just the reflector (it should be about 5% lower than the driven) by assembling it as a unit. You may need to get it at least 10 feet up in the air, however, because the effect of the nearby ground detunes a low antenna, changing the resonant point from where it will be when the antenna is installed later.

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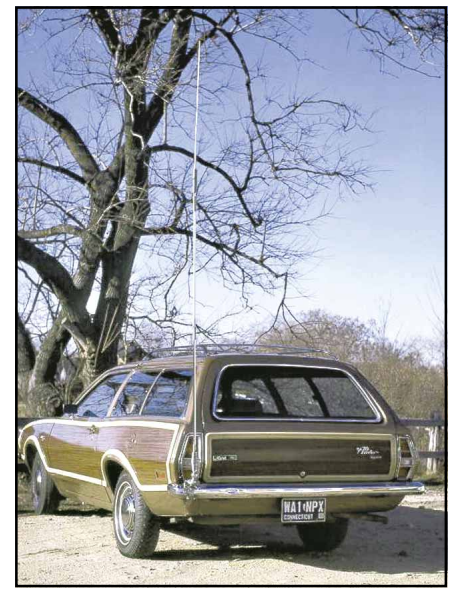
**Do you have a question or a problem? Ask the doctor! Send your questions (no telephone calls, please) to: "The Doctor," ARRL, 225 Main St, Newington, CT 06111; doctor@arrl.org; www.arrl.org/tis/.** QST

By Al Alvareztorres, AA1DO

# An HF Mobile Installation—Step By Step

## The ARRL Technical Information Service Coordinator leads you through a typical HF mobile installation—his own!



My beloved 1972 Pinto wagon with a Hustler antenna clamped to the bumper.

I've been "mobiling" since the early '70s. My first installation was in a 1972 Pinto wagon, which sported a Hustler antenna system with a Heathkit HW-22 40-meter monoband transceiver under the dash. I later installed the Yaesu FT-101B on an in-'n'-out basis with a complement of antenna resonators. The same equipment went into a '78 Plymouth Volare. In the '80s I bought a Yaesu FT-747 transceiver and squeezed it into an '86 Subaru sedan. All this time I had not felt the need for a new antenna.

Around 1990, on a whim, I sold the '747 and put the antenna away…and after about a year I regretted it. You can take the ham out of the mobile, but you can't take mobiling out of the ham.

### That Old Familiar Feeling

About a year ago, I had the opportunity to get a real "up-close-and-personal" look at the FT-100 transceiver. At first I thought it was just another 2-meter rig until its true nature as a miniature HF/VHF/UHF rig became clear. It was love at first sight and the mobile itch started again. But it turned out to be only an infatuation with the exotic little Yaesu. Although it is a very fine radio, I convinced myself that I really didn't need, nor want, an HF rig that covered 6, 2 and 440. I have a 6-meter rig at home I hardly ever use, I have a perfectly good 2-meter rig in the car, and I have 440 on my handheld that I have never even programmed.

A colleague at work suggested the Yaesu FT-900. I looked up the Product Review in the November 1991 *QST* and discovered that it fit my operating style exactly. And the removable control head (like the FT-100) would make mounting in a modern car possible (I was now driving a '94 Subaru Wagon). In the following spring (after I put together my dream multimedia computer) I would begin searching for a nice used FT-900.

As luck would have it, just a few weeks after the conversation, there appeared an FT-900 on the Ham Equipment For Sale e-mail list that sounded very attractive—the fellow said it was virtually in mint condition. Well, I couldn't let such a deal go by, so I postponed accumulating components for my dream computer. Installation of the radio, however, would have to wait until spring.


The Heath HW-22 with room to spare.

### Installing the Antenna

Mounting mobile antennas on the rear bumper has gone the way of 25-cent gasoline, so an alternative was needed. I had never mounted an antenna by drilling holes in the body of a car before—and since the '94 Subaru was "new" to me, this would take considerable "imagineering" (a term borrowed from Walt Disney—imagination + engineering).


**The access door to right storage bin.**

**The "well" area under the carpet and the grounding hole I drilled.**

**The antenna mount had to be attached at a low point on the rear rocker panel.**

There are storage compartments on either side of the car in the rear. I had mounted speakers to the access panels with Velcro. These compartments are fitted with molded plastic linings though, and afford no access to the car body. Another route had to be found.

There are additional compartments under the carpet, which are "unfinished" and afford access to the car's outer body shell. The one on the driver's side contains the tank for the rear window washer. So this, the passenger side, was my spot. I found a bracket between the body and the rear deck and I drilled a hole for the antenna ground.

One-inch chassis punches are available, but they are somewhat expensive. See if a friend has one you can borrow—it makes the job a snap. A pilot hole is drilled the size of the bolt. The bolt with the large piece is placed through the pilot hole and the small piece is threaded on from the other side of the panel. A wrench is then used to turn the bolt thereby drawing the small piece into the large one and slicing a neat hole in the metal.

The job wasn't difficult, but I used extreme care anyway. I measured and re-measured and measured again before putting drill bit to body. After drilling and punching, I used Rust-Oleum primer applied with a Q-Tip to protect the exposed metal left by the process. To add that professional touch, I found matching spray paint at the local auto parts/accessory store for $2.99. (Of course I painted the mounting disk before I installed it.)

Since I had to attach the mount at such a low point on the car, it was obvious that I would be installing the mount on a portion of the body that curves toward the ground. This would have left the antenna protruding outward at an ungainly angle, but I had planned for that. I used one of my Hustler "resonator" springs to allow me to pull the antenna vertical. The normal, larger, base spring did not have enough "give," and I feared that this would deform the car body and put too much strain on any holding system.

Very early on in the "imagineering" phase I realized that the antenna had to be held close to the car body and vertical. In the past, with bumper mounting, I had used string to position the antenna, but I figured that in this position string would not have the strength to withstand the strain. I didn't want the string to break at an awkward moment and slap a pedestrian up-side the head—lawsuit city! Another solution was needed.

Fortunately, the '94 Subaru Loyale (and many other wagons and SUVs today) has adjustable roof racks and additional adjustable tie-down points. A plan started to form that should result in a restraint that allowed for very little movement of the antenna. Keep in mind that real engineers come up with solutions for such problems in a matter of minutes—it took me from November to March (but then again, I'm not on the clock).

At the local home improvement store I found PVC **T**s that were just the right size to slide down the antenna shaft. I also picked up a section of the matching pipe, two end caps and a can of PVC cement. The whole thing came in at about $8.

A quick trip to my local privately owned, knowledgeable, "I've got it here somewhere," hardware store gained me the two metric bolts of the right length to replace the hand-screws on the roof rack—50 cents. (It is unfortunate that these badly needed stores are disappearing from the landscape.)

I cut one side of each **T**, making it into an **L**, so as to leave as little vertical distance between the two bars as possible, and I cut the pipe to the proper lengths, measuring all by eye–this, after all, was not rocket science, it just had to be near vertical; the sliding captive nuts on the roof rack would allow for adjustment. I glued the pipe to the modified **T**s and installed end caps to the other end of the pipes. After letting it set for

the proper time, I drilled small holes at the joint of each **T** and pipe and installed a small self-tapping screw for added strength—I always "over-imagineer". I had originally intended to glue the two **T**s together, but during pre-assembly I decided against it. I wanted to leave some flexibility for adjustments.

When fabrication was complete, I painted the system the same color as the antenna mount. I think it looks a lot better than the white PVC.

### A Place for the Control Head

I must say that the FT-900 arrived in absolutely immaculate condition. The optional mobile mounting kit had never been used and was still sealed in its original plastic bag. I knew that, because of the detachable head, installation would be easier than the FT-747 had been on my previous Subaru.

After a quick stop at my local Subaru dealer, I learned that there was nothing of importance behind the dashboard padding at the location I had chosen for the mounting of the head. I might only encounter the air conditioning ducts—no problem. I took another research-and-development trip to my local hardware store, with FT-900's head mounting bracket in hand, and the fellow there suggested small wall anchors and screws. Ten anchors plus one for good measure and ten screws came to just $1.

I drilled holes through the foam. Behind it I encountered a hard base and then emptiness. I then inserted the small plastic wall anchors. In the accompanying photo you can see one where I drilled and found nothing behind (good thing it would be hidden by the bracket). As I pushed each anchor in I felt the barbs snap into place. Wonderful! This was getting to be almost too easy.

Next, the bracket and cable were installed—very carefully I might ad. You won't believe how tiny the two cable-connector-mounting screws are. I had to use eyeglass-sized Phillips screwdrivers. I was afraid I'd drop one–and there are no extras.

### Time for the Radio

There was no putting it off any longer. Next was the task most dreaded by mobilers—getting the power cable through the firewall.

In the past, when the engine compartment was mostly empty space and you could lie on the floor at the front seats and gaze into the cavernous space behind the dash, putting in a mobile HF rig was a snap. Now it's a maze back there.

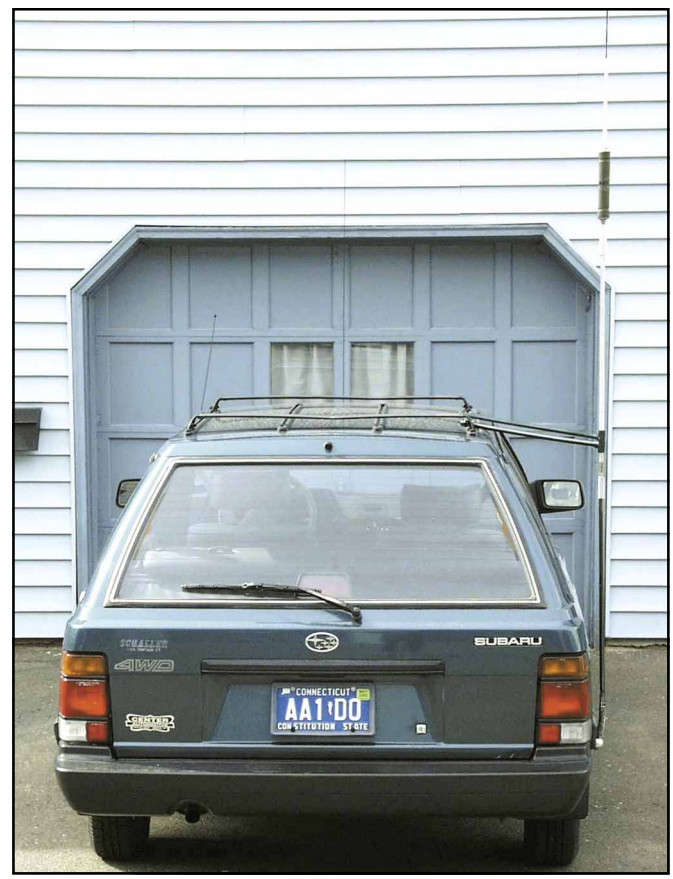
Contrary to popular belief, there is *always* a way to get the power cable through the firewall. There will be a rubber boot over a hole (3 to 4 inches in diameter) through which wires and plumbing are fed into the passenger compartment. If you can't find this or are afraid to indiscriminately go poking around (the better part of valor), here are a couple of hints:

- Buy that new stereo you've been wanting for the car and while they're installing it, ask them if they could please "snake this here wire through" for you. Or convince the spouse that you should have a car alarm installed and proceed as in the stereo method.
- If these methods seem too extreme, you might just drop by one of the above or your local car dealer and ask them where is the best place to penetrate the firewall "for this here wire." Bring the wire with you—at the first mention of ham radio their eyes glaze over. Who knows, they might do it for you, even if it costs a couple of bucks.

For the installation of a 2-meter rig in this car I opted for the first method. I was buying a new stereo and for $30 (well worth it to me) they installed my FT-212 into the dash like it had been done at the factory!

So, for this installation, all I had to do was look inside the engine compartment and find where the "foreign" 2-meter power wires from the battery disappeared into the firewall. I then took some ground wire (coat hanger or anything will do), made a hook on the end and pushed it gently through the same hole. I went inside the car, looked under the dash and there

**A close-up view of the antenna and bracket.**




**The finished antenna installation with a 40-meter resonator installed.**

was my wire. I crimped the hook around the solder lugs I had installed on the power cable and pulled the cable back through the hole. Presto!

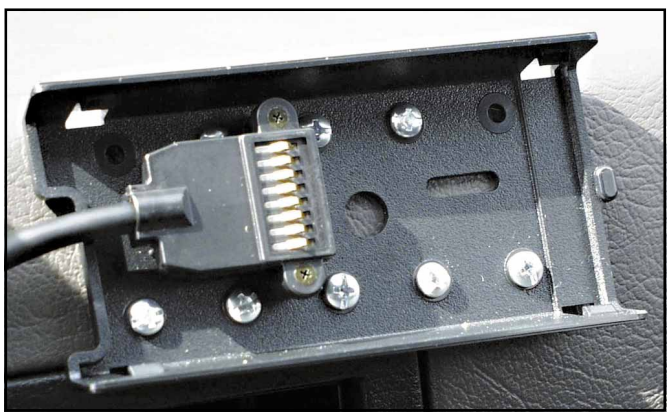
The radio itself would go under the driver's seat. I might point out that the FT-900 seems to be a very nice radio and that I am a staunch Yaesu fan, but this rig seems to have been designed by a committee. The cable that connects the control head to the body is long enough to reach from the dash, out the tailgate and connect to a radio dragging along on the ground behind. The power cable, however, is just long enough to reach from the battery to just under the front seat. The route had to be as direct as possible!

Connecting the coax to the antenna was a real challenge since I was working completely in the blind and had chosen to use RG-214 double-shielded cable. To conform to good "imagineering" practices, I had placed the antenna mount as high as possible, just under the side molding—this would allow for minimum slant of the antenna. However, it meant that the storage compartment above hid the entire assembly from view.

Having placed terminals on the coax and one end of the antenna ground strap, it took an exorbitant amount of time to install them on the antenna mount's screws and tighten the lock washers and nuts. But I did it with no skinned knuckles. Incidentally, I save old scraps of coax. The braid when stripped off makes a good source for ground straps.

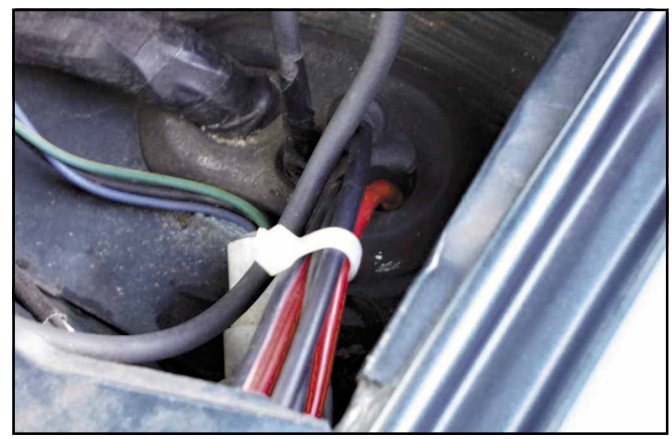
The other end of the antenna ground was attached to the hole on the bracket that I had prepared. The coax was brought forward around and under the rear seat and along the hump to connect to the radio. I was also fortunate to find a nice unused hole in one of the brackets that bolt the driver's seat to the car. I ground a speck of paint off and tested for ground continuity.


**Notice the wall anchors installed in the dash.**

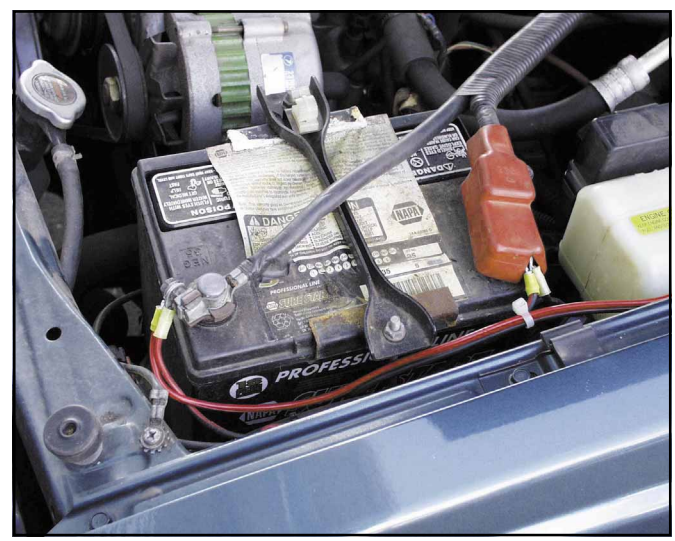


**The FT-900 control head bracket and cable.**


**The control head in place. I don't intend to leave it there because of the sun. It slides on and off very easily and fits in the glove compartment.**



**You can see the oval boot through the firewall. With care and patience you can *just* squeeze your wire through among existing wires.**



**Connecting the power cable to the battery was the easiest part—making absolutely sure to get the polarity right, of course.**

**The FT-900 slides right under the driver's seat.**

**The last chore was the installation of a remote speaker.**

Zero ohms! Grinding some more paint off, I installed a grounding strap from the radio chassis to the seat bracket.

The radio was placed on the floor under the seat. There is a hump across the front of the floor that will prevent the rig from sliding forward in a sudden stop.

The last chore was the installation of a remote speaker, which, incidentally, connects to the control head—a nice touch. I now dressed any cables that were around the dash to keep them out of the way.

With the speaker mounted and the wires dressed, all that remained was tuning the resonators.

### Tune Up and Smoke Test

I borrowed an antenna analyzer and tuned the 80, 40, 15 and 20-meter resonators (I left the 10-meter "stinger" up to the radio's auto-tuner).

Then came the smoke test. I called CQ on 20 CW and nabbed W8PBO in Ravenswood, West Virginia. I then slid up to the SSB portion of the band and jumped in on the tail end of QSO and got some good signal reports.

I'm back in the saddle again, working HF stations wherever I travel. I'd recommend HF mobile to anyone—especially to hams who suffer under antenna restrictions. You'd be surprised at what you can do with a simple installation. You can even work DX while making a quick trip to the convenience store for a carton of milk!

Pick up a copy of the *Your Mobile Companion* by Roger Burch, WF4N, and keep it handy as your guide (see your favorite dealer, or call the ARRL toll free at 1-888-277-5289). Find a way to get your rig into the car—it *can* be done!—and start having fun on the road.

**225 Main St**
**Newington, CT 06111**
**aa1do@arrl.org**

QST

## GOING ONCE, GOING TWICE...

### SOLICITATION FOR PRODUCT REVIEW EQUIPMENT BIDS

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

Alinco DR-135TP VHF FM mobile transceiver, serial number T000510 (see "Product Review," January 2001 *QST*). Minimum bid: $170.

Alinco DM-330MV switching dc power supply, serial number M0000797 (see "Product Review," September 2000 *QST*). Minimum bid: $120.

AOR DDS-2A external local generator (VFO+) for the Collins KWM-2 and S/Line, serial number 00146 (see "Product Review," January 2001 *QST*). Minimum bid: $510.

Diamond GZV4000 switching dc power supply, serial number 00400788 (see "Product Review," September 2000 *QST*). Minimum bid: $125.

Grundig Satellit 800 Millennium shortwave receiver, serial number 58005002965 (see "Product Review," October 2000 *QST*). Minimum bid: $350.

Patcomm PC-16000A HF transceiver, serial number 25070D0047 (see "Product Review," December 2000 *QST*). Minimum bid: $650.

Patcomm PC-9000 HF/6-meter transceiver with FM option, serial number 04069C0026 (see "Product Review," November 1999 *QST*). Minimum bid: $350.

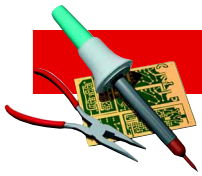
RadioShack HTX-245 dual-band FM hand-held transceiver, serial number 0002509 (see "Product Review," October 2000 *QST*). Minimum bid: $135.

RadioShack HTX-252 VHF FM mobile transceiver, serial number 203257 (see "Product Review," December 2000 *QST*). Minimum bid: $120.

Sealed bids must be submitted by mail and must be postmarked on or before March 1, 2001. Bids postmarked after the closing date will not be considered. Bids will be opened seven days after the closing postmark date. In the case of equal high bids, the high bid bearing the earliest postmark will be declared the successful bidder.

In your bid, clearly identify the item you are bidding on, using the manufacturer's name and model number, or other identification number, if specified. Each item requires a separate bid and envelope. Shipping charges will be paid by ARRL. Please include a daytime telephone number. The successful bidder will be advised by telephone or by mail. Once notified, confirmation from the successful bidder of intent to purchase the item must be made within two weeks. No response within this period will be interpreted as an indication of the winning bidder's refusal to complete the transaction. The next highest bidder will then have the option of purchasing the item. No other notifications will be made, and no information will be given to anyone other than successful bidders regarding 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



By H. Ward Silver, N0AX

# Test Your Knowledge!

## A winter's basket of problems!

(1) You bought that slightly-used tower at the hamfest, but can you get it home? There are six straight sections weighing 50 pounds each, a top section that weighs 60, plus guying hardware and cable that weigh another 120 pounds. Your trusty station wagon can haul 800 pounds, but you also bought three surplus tuning units that were "really good deals," weighing 45 pounds each and taking up so much space that there's only room for two sections and the hardware inside the car—well, mostly inside the car—and the roof rack is rated at just 200 pounds. You have two buddies who say they can each haul a section for you. Are you in a pickle, or have you got it covered?

(2) The new software can be downloaded immediately, but it's an 8 MByte file. Can you get the job done before you have to leave for work in 20 minutes? Your modem usually connects at 44 kbps and the software protocol generally transfers bytes at one-tenth the bit rate.

(3) Santa brought you a new rig that needs 14 A at 13.2 V. Your existing 13.2-V power supply also runs equipment that consumes 10, 25 and 55 W. If the existing supply is rated at 20 A, can it handle the load or is it time for a trip to the store?

(4) Your tribander is mounted on a short tower in the side yard, but a second-story bedroom is only 10 feet away and 5 feet below. Performing an RF safety evaluation shows that the antenna should be at least 25 feet from living quarters. How much should you raise the antenna to meet the separation requirements? What other options do you have to meet the safety threshold?

(5) There's 15 minutes left in the ARRL DX contest and you are 5000 points short of the score you promised to the club. Each QSO counts for 3 points. In your log are 386 QSOs with a multiplier total of 192. Which is a better tactic: trying for 3 new mults or 10 more QSOs?

(6) Packing up for that mountaintop QRP trip, it's time to choose the batteries and the packs are almost full. From prior experience, you know you'll need 18 A/h of capacity. You have gel-cell packs that are rated at 5 A/h and alkaline batteries that are rated at 1.5 A/h and require a set of four in series to run the radio. The gel-cells weigh 12 ounces each and the alkaline cells 2 ounces each. Which type of battery will do the job with the least pack weight?

(7) There's a problem in your buried run of RG-213 coax. At the cable input, the antenna analyzer shows a short circuit at 1.62 MHz and 3.24 MHz—none lower in frequency. How far away is the problem? Is it likely a short circuit or an open circuit?

(8) According to a gray-line program, sunset for the DXpedition to the Isles of Langerhan occurs at 7:44 PM local time and sunrise at 6:22 AM. Your sunset occurs at 8:15 PM local time and sunrise at 5:50 AM. The expedition is 6 time zones behind you. How long is the period of mutual darkness in which you can try to work them on Top Band?

**Bonus:** What three equal value resistors when combined in series give 450 Ω and in parallel 50 Ω?

**Total Your Score!**

Give yourself one point for each correct answer.

| | |
|---|---|
| 7-9 | Top of the class |
| 4-6 | Better check your calculator batteries |
| 1-3 | Try again! |

**22916 107th Ave SW**
**Vashon, WA 98070**

QST

**Answers**

(1) The total weight of all the tower gear is 6 × 50 + 60 + 120 = 480 pounds, plus the tuning units are 135 for a total of 615 pounds. Put four sections on the roof of your car, two more sections and the hardware inside. Give the top section to one of your buddies and you're home free! Drive safely!

(2) The expected net byte transfer rate is 44 / 10 = 4.4 kbytes per second. An 8 MByte file will transfer in 8000 / 4.4 = 1818 sec = 30.3 min. You'd better wait until after work.

(3) The existing gear requires a total current of (10 + 25 + 55) / 13.2 = 6.8 A for a total load of 20.8 A. That's too much for the old supply.

(4) The current separation is $\sqrt{(10^2 + 5^2)} = 11.2$ feet. For 25 feet of separation, the tower will have to be $\sqrt{(25^2 - 10^2)} = 22.9$ feet higher than the bedroom—17.9 feet higher than at present. Two more 10-foot sections will do the trick. Your other options include reducing power, reducing transmission duty cycle and making sure there is no one in the bedroom when you're on the air.

(5) Working a contact that counts as a new multiplier is worth (new QSO points × new multiplier total) – (old QSO points × old multiplier total) = 1737. Three new multipliers are worth 1737 + 1743 + 1749 = 5229 points. Ten new QSOs will raise your score by 10 × 3 × 192 = 5760 points. Fire up the QQ machine!

(6) You'll need four gel-cell packs to satisfy the 18 A/h requirement for a total of 48 ounces. Using alkaline cells in groups of four requires (18 / 1.5) = 12 packs each weighing 4 × 2 = 8 ounces per pack for a total of 96 ounces. Clearly, the gel-cells are an easier haul.

(7) Because the frequencies at which the short circuits occur are an octave apart, the fault is also a short circuit, located one-half wavelength away from the analyzer at 1.62 MHz and one wavelength away at 3.24 MHz. If the fault were an open-circuit, the higher of the two lowest short-circuit frequencies would be three times the lower. An open is seen as a short circuit at one-quarter and three-quarters wavelength distance. (810 kHz and 2.43 MHz, respectively). The actual distance to the fault is (300 / 1.62) × 0.66 = 122.2 meters or 401 feet, including the 66% velocity of propagation factor in cable with a solid polyethylene center insulator.

(8) First, convert the expedition's sunset and sunrise times to your local time by adding six hours to their local time. Sunset on the island at 1:44 AM your time and sunrise at 12:22 PM your time. Mutual darkness occurs for four hours and six minutes. Set the alarm clock for oh-dark-thirty and have at it!

**Bonus:** The answer is 3 × 50 = 150-Ω resistors.

# Array Solutions Swinging-Gate Side Mount

At the 1999 Dayton Hamvention, I noticed that Array Solutions had a few of their new "swinging gate" tower side mounts on display. By summertime, when it was time to improve my station antennas, I knew I needed one.

The swinging-gate side mount is intended to be used for side mounting antennas on Rohn 25-45-55 towers. Depending on the placement of the elements on the antenna you wish to use, you can get almost 300° of rotation. The mount looks much like a gate with one side close to the tower while the other swings about two feet outward (and most of the way around the tower).

## Heavy Metal

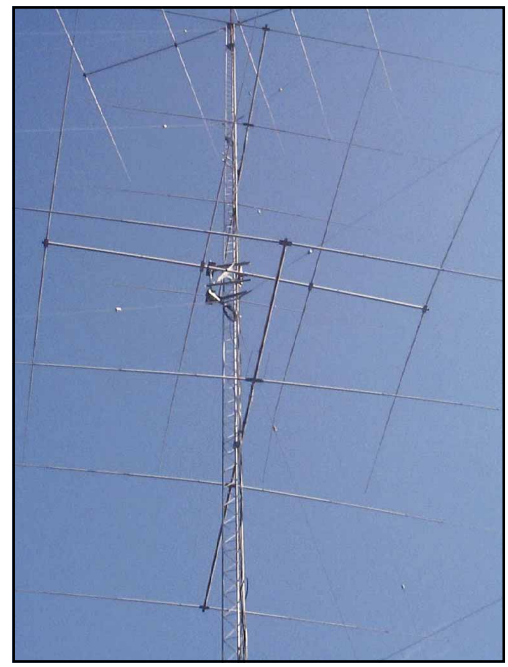
The side mount comes packaged in two very heavy cardboard boxes. My first reaction was that it was heavier than the 4-element 20-meter Yagi I was about to haul up the tower—and it is. The actual weight of the assembly is 85 pounds. (In Dayton I saw one fall over and hit someone's leg pretty hard. Ouch!) The gate seemed much sturdier than the Rohn 25 tower I was going to install it on, so I assume the assembly will handle even heavier antennas. The entire side mount is made of thick galvanized steel and should last a very long time.

Assembly was reasonably straightforward—though a couple of U-bolt saddles were missing from the package. They were replaced by Array Solutions within a few days. I also had to use a small file to smooth out some of the galvanizing inside two of the holes—a 10-minute job. I used two pieces of 2-inch schedule-80 pipe for the two short masts (about 4 feet long).

The top and bottom gate supports attach tightly to the tower (different hardware is supplied for the Rohn 45-55 model). Your rotator is attached to the lower mount of the gate itself. The mount is pre-drilled for the Tailtwister 6-hole pattern, which is also compatible with the Ham IV rotator pattern. The bottom of the antenna mast on one side of the gate goes into the top of the rotator. You'll want to secure the bottom mount first and only loosely attach the top mount until the gate is in place. Rehearse this maneuver at the base of the tower so you won't have to do it more than once when you're finally in the air. Also, because the side mount does not allow you to turn your antenna the full 360°, you'll have to decide what direction you can live without and install the mount accordingly.

Once you have the mount attached and tightened down, try turning it with your rotator, making sure it turns freely in each direction. (The mount includes a bearing for smooth operation.) When you're satisfied that everything is operating normally, mount your antenna on the outside mast of the swinging gate. Again, you'll want to make sure it turns freely from end to end, and that you have it aligned correctly to match your rotator control box indication.

The gate and mounting brackets awaiting assembly.



The swinging gate mount and Yagi (middle portion of photo) completely installed on the tower.

Before you decide to buy a side mount, you'll want to run some calculations to make sure the antenna you plan to install will actually fit in the space available. Sometimes those guy wires are closer than they look.

If you become really ambitious about using the side mount, there's even a way to add additional brackets and longer masts. In the end, you could actually have antennas installed from the bottom of your tower all the way to the top. Contact Array Solutions for more information.

## Conclusion

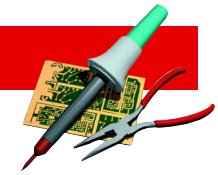
Overall, I'm pleased with the Array Solutions swinging-gate side mount. It gives me the extra flexibility of having a separate rotatable antenna partway up my tower.

*Manufacturer: Array Solutions, 350 Gloria Rd, Sunnyvale, TX 75182; tel 972-203-2008; fax 972-203-8811;* **www.arraysolutions.com/**. *$359.—Tom Frenaye, K1KI*

# STRAYS

## CRYSTAL RADIO DX CONTEST

◊ The third annual International "Elmer Memorial" Crystal Radio DX Contest will take place from 1200 UTC on Friday, February 16 to 1200 UTC on Sunday February 25. Contest rules are available on line at **www.thebest.net/wuggy/**. You can also obtain a copy of the rules by sending a self-addressed, stamped envelope to: Crystal Radio DX Contest, c/o O. Pool, WB4LFH, 216 Hermitage Way, St Simon Island, GA 31522.



# The Art of Soldering

Soldering is used in nearly every phase of electronic construction. A soldering tool must be hot enough to do the job and lightweight enough for agility and comfort. A 100-W soldering gun is overkill for printed-circuit work, for example. A temperature-controlled iron works well, although the cost is not justified for occasional projects. Get an iron with a small conical or chisel tip.

You may need an assortment of soldering irons to do a wide variety of soldering tasks. They range in size from a small 25-W iron for delicate printed-circuit work to larger 100 to 300-W sizes used to solder large surfaces. Several manufacturers also sell soldering guns. Small "pencil" butane torches are also available, with optional soldering-iron tips.

Keep soldering tools in good condition by keeping the tips well tinned with solder. Do not run them at full temperature for long periods when not in use. After each period of use, remove the tip and clean off any scale that may have accumulated. Clean an oxidized tip by dipping the hot tip in sal ammoniac (ammonium chloride) and then wiping it clean with a rag. Sal ammoniac is somewhat corrosive, so if you don't wipe the tip thoroughly, it can contaminate electronic soldering.

If a copper tip becomes pitted, file it smooth and bright and then tin it immediately with solder. Modern soldering iron tips are nickel or iron clad and should not be filed.

The secret of good soldering is to use the right amount of heat. Many people who have not soldered before use too little heat, dabbing at the joint to be soldered and making little solder blobs that cause unintended short circuits.

***The secret of good soldering is to use the right amount of heat. Many people who have not soldered before use too little heat, dabbing at the joint to be soldered and making little solder blobs that cause unintended short circuits.***

Solders have different melting points, depending on the ratio of tin to lead. Tin melts at 450°F and lead at 621°F. Solder made from 63% tin and 37% lead melts at 361°F, the lowest melting point for a tin and lead mixture. Called 63-37 (or eutectic), this type of solder also provides the most rapid solid-to-liquid transition and the best stress resistance.

Solders made with different lead/tin ratios have a plastic state at some temperatures. If the solder is deformed while it is in the plastic state, the deformation remains when the solder freezes into the solid state. Any stress or motion applied to "plastic solder" causes a poor solder joint.

Never use acid-core solder for electrical work. It should be used only for plumbing or chassis work. For circuit construction, only use fluxes or solder-flux combinations that are labeled for electronic soldering.

The resin or the acid is a *flux*. Flux removes oxide by suspending it in solution and floating it to the top. Flux is not a cleaning agent! Always clean the work before soldering. Flux is not a part of a soldered connection—it merely aids the soldering process. After soldering, remove any remaining flux. Resin flux can be removed with isopropyl or denatured alcohol. A cotton swab is a good tool for applying the alcohol and scrubbing the excess flux away. Commercial flux-removal sprays are available at most electronic-part distributors.

The two key factors in quality soldering are time and temperature. Generally, rapid heating is desired, although most unsuccessful solder jobs fail because insufficient heat has been applied. Be careful; if heat is applied too long, the components or PC board can be damaged, the flux may be used up and surface oxidation can become a problem. The soldering-iron tip should be hot enough to readily melt the solder without burning, charring or discoloring components, PC boards or wires. Usually, a tip temperature about 100°F above the solder melting point is about right for mounting components on PC boards. Also, use solder that is sized appropriately for the job. As the cross section of the solder decreases, so does the amount of heat required to melt it. Diameters from 0.025 to 0.040 inches are good for nearly all circuit wiring.

Here's how to make a good solder joint. This description assumes that solder with a flux core is used to solder a typical PC board connection such as an IC pin.

✔ Prepare the joint. Clean all conductors thoroughly with fine steel wool or a plastic scrubbing pad. Do the circuit board at the beginning of assembly and individual parts such as resistors and capacitors immediately before soldering. Some parts (such as ICs and surface-mount components) cannot be easily cleaned; don't worry unless they're exceptionally dirty.

✔ Prepare the tool. It should be hot enough to melt solder applied to its tip quickly (half a second when dry, instantly when wet with solder). Apply a little solder directly to the tip so that the surface is shiny. This process is called "tinning" the tool. The solder coating helps conduct heat from the tip to the joint.

✔ Place the tip in contact with one side of the joint. If you can place the tip on the underside of the joint, do so. With the tool below the joint, convection helps transfer heat to the joint.

✔ Place the solder against the joint directly opposite the soldering tool. It should melt within a second for normal PC connections, within two seconds for most other connections. If it takes longer to melt, there is not enough heat for the job at hand.

✔ Keep the tool against the joint until the solder flows freely throughout the joint. When it flows freely, solder tends to form concave shapes between the conductors. With insufficient heat solder does not flow freely; it forms convex shapes—blobs. Once solder shape changes from convex to concave, remove the tool from the joint.

✔ Let the joint cool without movement at room temperature. It usually takes no more than a few seconds. If the joint is moved before it is cool, it may take on a dull, satin look that is characteristic of a "cold" solder joint. Reheat cold joints until the solder flows freely and hold them still until cool.

✔ When the iron is set aside, or if it loses its shiny appearance, wipe away any dirt with a wet cloth or sponge. If it remains dull after cleaning, tin it again.

✔ Soldering equipment gets *hot*! Be careful. Treat a soldering burn as you would any other. Handling lead or breathing soldering fumes is also hazardous. Observe these precautions to protect yourself and others:

✔ Properly ventilate the work area. If you can smell fumes, you are breathing them.

✔ Wash your hands after soldering, especially before handling food.

✔ Minimize direct contact with flux and flux solvents.

QST

By Leonard Kay, K1NU, and Jim Idelson, K1IR

# Raise Your Tower Without Breaking Ground!

Want to know what your new tower and beam will look like before you start construction? Want the neighbors and the local zoning authorities to know, too? Put your best foot forward with today's digital imaging technology.

"It'll be ugly!" "You'll see it from everywhere!" "It's gonna be twice as tall as the trees!" Sound familiar? If you're thinking about putting up a tower, you may have already heard similar outbursts from members of your local zoning board, from irate neighbors—or even from your spouse! After all, not everyone considers a gleaming steel column (aka *antenna support structure*), with its cap of aluminum sparkling in the sunshine, a beauty to behold.

But by using modern digital image-editing techniques, you and your neighbors can see exactly how your tower will look—whether beauty or beast—before you ever break ground. Today's computing technology has put the ability within reach of just about everyone. Such an "artist's rendering" might be just the thing your zoning board needs to lean its decision in your direction. It might also convince your spouse that your new tower might be a thing of beauty after all.

In this article you'll learn the basics of illustrating your proposed tower installation and take a look at several examples—comparing them to the actual installations—that show just how accurate "simulated antenna installations" can be!

## What You'll Need

- A digitized picture of the proposed site—taken with a digital camera or a scan of a conventional photo. In either case, make sure the resolution is as high as possible.
- A computer running a "capable" image-editing application. That is, one that supports advanced techniques such as "cloning," transparent pixels, color processing, filtering, etc. Most image-editing applications that come packaged with processed film or with digital cameras *do not* have the needed functionality. Some popular titles that have plenty of power include *Adobe PhotoShop*, *LView Pro*, *Paint Shop Pro* and *Image Composer*.

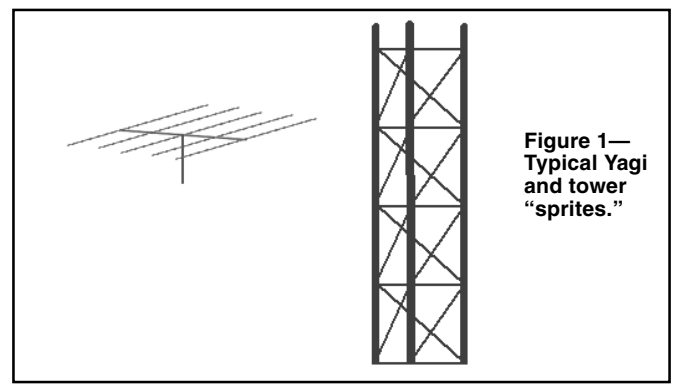


**Figure 1—Typical Yagi and tower "sprites."**

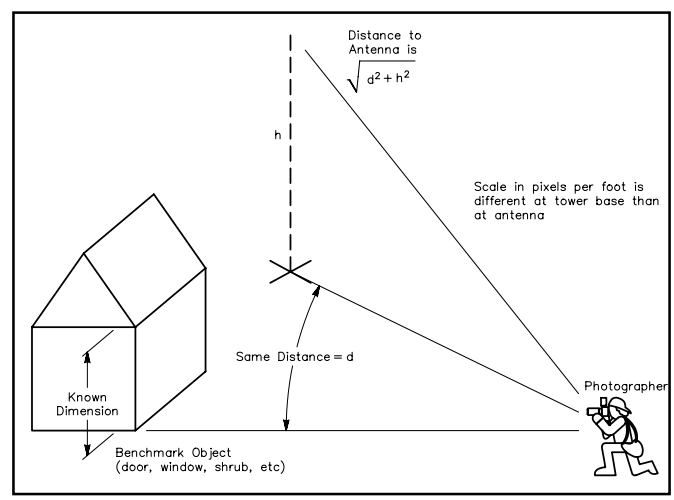



**Figure 2—Important distances and angles.**

**Figure 3A—K1NU's "before" picture.**

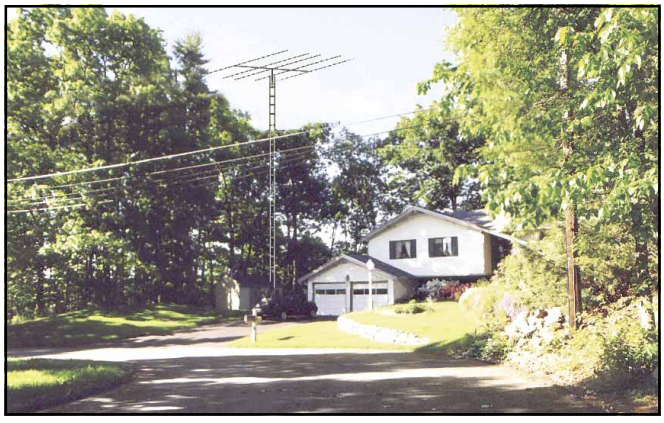


**Figure 3B—K1NU's tower site simulation. Note the disappearing hickory tree!**

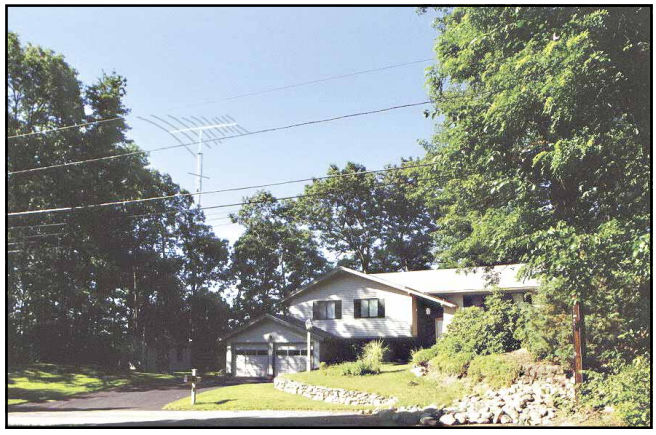


**Figure 3C—K1NU's actual installation.**

• Some glossy paper for printing photo-quality images from your inkjet printer. Most computer paper and printer manufac-turers make such paper, which can be found at office supply stores.

## Preparing the 'Before' Picture

• The first step in the overall process is producing a "before" picture of the proposed tower site. Take several shots from the various angles at which the tower is likely to be viewed. Be sure to note the distance between the tower site and the camera (for each photo). In addition, make sure you know the precise dimensions of at least one "benchmark" object appearing in each picture (a window, a door frame or a small tree, perhaps). Be sure to allow enough vertical space to put your whole tower in the picture!

• Scan your photos or import your digital camera images.

• Launch your image-editing software and load a "before" picture.

• If your tower installation will require the removal of trees or other items in the picture, here's your chance to practice your digital airbrushing. Use your image-editing software to "erase" the undesirable trees, etc, replacing them with pieces of the sky (or background) taken from nearby parts in the picture. Blend where necessary.

## Building your Tower

• Once the picture's background is ready it's time to insert the tower. Do this by first making a separate tower object or "sprite." You have two choices here: (1) Photograph and scan an actual tower section (shot against a solid contrasting background) and "clean it up" using your image editing software, making the background pixels transparent where necessary. This gives the most realistic look to your final result. Or you can (2) build up a tower image from gray lines and boxes, using a dull gray (remember, you want to show everyone how unobtrusive it is!). Be creative. K1NU made "tower section" objects for Rohn 25 and 45 that can be "stacked" to build a tower of any desired height. Don't worry about the actual size—as long as the tower itself is properly proportioned. We'll scale it later.

• Similarly, make an antenna object from gray lines of various widths or a scanned image. Choose an azimuth angle to minimize surface area. Simply draw a boom and add

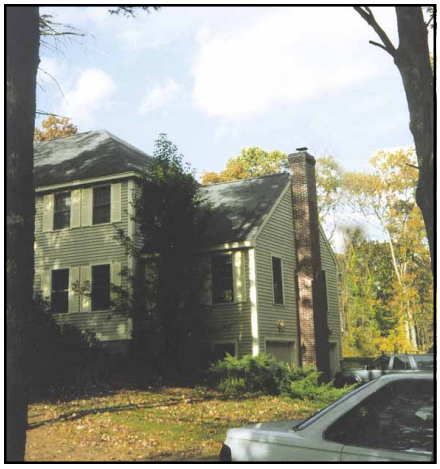
## Tools for Effective Digital Imaging

*Image Capture*
Whether your digital images come directly from a digital camera or from scanned-in photos, they need to be of sufficient resolution to minimize pixellation (graininess) in the final picture. An absolute minimum for scanners is 240 dpi (dots per inch), with 300 dpi strongly recommended. For digital cameras, we recommend at least a 2 to 3 megapixel model.

*Image Manipulation*
This is by no means an exhaustive list, but here are some of the more common packages. Check the 'Professional' section of your local software store or search on the Internet for phrases like 'graphics editing software' for more.
• Adobe *PhotoShop* or *PhotoShop LE* (available at software stores). *Windows* and Mac versions.
• *LViewPro* (shareware, **www.lview.com**). *Windows* only.
• *Microsoft Image Composer* (comes with *FrontPage 98* and some versions of *Windows*). *Windows* only.
• *Color-It!* (**www.microfrontier.com**). Mac only.

*Printing the Image*
If you choose to print your own, we recommend at least a 600-dpi color inkjet or 300 dpi laser printer. Better than printing yourself is a local camera or photo shop that will take your digital image file (on floppy disk or CD) and directly produce a photo quality print. Check your local Yellow Pages; many shops now offer this service. On-line services also exist, such as **www.ofoto.com** (highly recommended).

*Hardware Requirements*
When using the Image Capture recommendations above, your picture file size will be on the order of 1-2 Mbytes. For your editing software to process such an image real-time at a reasonable speed, we recommend the following as a minimum hardware configuration: 266 MHz Pentium II (PC) or 300 MHz Power PC (Mac) CPU, 32 MB of RAM, and a 1GB hard drive. Slower CPUs and less RAM will probably work, but will be sluggish.



Figures 4A—K1IR's "before" image.

Figure 4B—The K1IR simulation.

Figure 4C—Compare this shot of K1IR's actual antennas to the simulation in Figure 4B.

elements. Again, don't worry about the actual size; we'll adjust the scale later. Figure 1 shows a typical tower object and a simple three-element HF Yagi.

## Assembling your Tower

We're almost done. All that remains is a bit of mathematics. Before we paste the tower and antenna objects onto the background, we have to make sure they're the right size.

- Using the known size of the "benchmark" object you previously identified—and by counting the number of pixels in its image—determine the scale of the "before" picture near the tower site in pixels per foot. See Figure 2.
- Now paste the tower sprite into the picture. Make sure you use a new "layer" in your image-editing software so you can change, move and/or delete the tower sprite. Zoom in to the proper size using the pixel-per-foot scale you just calculated and the known size of the tower. For example, if you determined that the "before" picture has 30 pixels per foot and you are trying to insert a 60-foot tower, scale the tower image so it's 1800 pixels tall (60 feet × 30 pixels per foot).
- Now do the same with the antenna. Be sure to account for the Pythagorean theorem—the pixels-per-foot scale may be significantly different near the top of the tower! Again, see Figure 2.
- Save the "after" picture and either print it on glossy paper or use a digital photo printing service (see sidebar). Print it to match the *same physical size* as the "before" picture for a true "apples to apples" comparison.
- If desired, repeat the process for other "before" pictures (here's where creating the separate tower and antenna images comes in handy) or other proposed "after" pictures.

After the job is completed and you like your results, you might want to compress the images to a single layer and save the composite image in JPEG (or other standard) format for use in other tower-related documents.

## Other Issues

What about guy wires? After exper-imenting with this technique, we chose not to include guy wires in these simulations. It turns out that even at the minimum thickness of one pixel, a simulated guy wire would still be much too thick, representing an actual guy wire that's an inch or more across! In reality, even a $^{3}/_{16}$-inch guy wire becomes nearly invisible at a distance of roughly 100 feet.

Save your work often while creating the image. You may want to go back to an intermediate version!

## Results

Figures 3A, 3B and 3C show the "before," "simulation" and "after" views of K1NU's installation. In the "before" picture, the tower site required the removal of a 75-foot hickory tree, so in preparing the "after" picture we had to "airbrush" the entire tree before adding the tower. Figure 3B shows the simulation. Note that the large treetop behind the tower is missing! Figure 3C is a recent photo.

As it turned out, the pictures were never needed at K1NU's permit hearing. Although Len encountered minimal opposition during the permit process, no one challenged his installation on aesthetics and the permit was granted as requested. But Len was prepared—and the pictures *did* help on the home front. Len's wife is wonderfully supportive of Amateur Radio. Nonetheless, she was pleased to see that the tower was, in fact, not twice as tall as the trees.

Figures 4A, 4B and 4C show similar views of K1IR's installation. These simulations were extremely important in several public hearings. The zoning board of appeals scrutinized the simulated views and permitted the public to view them as well. One board member jokingly asked if it would be possible to simply build a simulated station designed to operate using the simulated antenna support structure! After much public comment and extended deliberation, the permit was *granted!* When the permit was up for renewal 12 months later, photos of the actual installation were compared to the simulations. The board was quite proud of its decision.

## Conclusion

Seeing *is* believing, and by creating simulated views of your proposed antenna support structures, you can defuse the potentially tense situations that result from fear of the unknown (or fear of giant ham towers). The simulations, as obvious as they are, give everyone concerned something tangible to look at, analyze and feel good about.

Good luck!

**32 Bradley Rd**
**Andover, MA 01810**
**www.k1nu.com**

**96 Morse Rd**
**Sudbury, MA 01776**
**k1ir@designet.com**

# Logikey K-3 Memory Keyer

Just what the world needs. Another CW memory keyer. Both of my HF radios have built-in keyers, and I use my computer to send CW for contesting. With all of that capability already available, the Logikey K-3 by Idiom Press would have to offer something special to earn a spot on my operating table. After using it for several months, I think it does.

The K-3's layout is deceptive. There are six pushbuttons across the cabinet top and a single knob labeled **SPEED** on the front panel. That's it. It's not until you read the manual and play with the K-3 for a while that you appreciate all it can do. The layout is simple because you program the keyer using Morse code commands sent by paddle. You can ask for current keyer settings and program or change functions. More on this in a moment.


## Keyer Functions

At the most basic level, the K-3 is an iambic keyer with speeds from 5 to 60 WPM. The speed control is nice and linear and the speed is easy to control, but I just don't need the highest or lowest speeds for my normal operating. So I changed it to 15 to 40 WPM using one of the function commands. It's easy: Press and release the two left-hand buttons. The K-3 responds by sending "F" in Morse code. I respond with "R1540" sent from the paddle and now I have a keyer that works from 15 to 40 WPM with a speed control that allows fine adjustments within that range. If I want to know the exact speed, I press and release the two right-hand buttons to enter the inquiry mode. The K-3 sends "?" and I respond with "S" from the paddle. The K-3 sends one or two digits indicating the speed. It's really quite clever, and it's not hard to remember often-used functions.

The K-3 offers full control over keying characteristics. You can enable automatic character spacing, set weighting, send a continuous tone for transmitter tuning and turn the internal monitor on or off. If you operate full break-in (QSK) and your transceiver truncates characters, you can use the "keying compensation" function to improve the sound of your on-air CW. There are also 10 options for setting keyer timing and dot and dash memories. After playing with these options, I settled on the defaults.

## Memory Functions

The K-3 really shines in the memory department. You can have either six memories of 255 characters each, or three banks of six memories for a total of 18 (85 characters each). What's really amazing is what you can do with the memories — a lot more than just remember what you sent. Using "embedded functions" you can program a message to include a contest serial number. Serial number options allow zeroes to be sent as "O" or "T," nines to be sent as "N," and suppression of leading zeroes. If you have a broken contact or a dupe you don't want to log, press the middle two buttons and the contest serial number is automatically backed off by one, so that you don't need to reprogram the serial number generator. Other options allow you to repeat a contest exchange without incrementing the serial number. You can program a pause or suspend a message to insert text sent from the paddle. You can program a message to call another message. You can speed up or slow down various pieces of a message or make slight adjustments to inter-character or inter-word spacing to make copy easier (for example, to spread out a call sign like K5SES).

## Making it Play

To use the keyer you'll need a paddle and cable, a 12-V dc supply and power cable, and a cable to the key jack on your transceiver. RadioShack had everything, but a cable set (model HK-3) is available. The K-3 doesn't have an on-off switch, but current drain is so low when the keyer's not in use that some operators just use a battery pack. There's a 5-V regulator built in, and six AA cells (9 V) work just fine.

The instruction manual is excellent. In addition to a full description of the functions and examples of how to use them, the manual offers a tutorial that's broken into three very well written sessions. The first session explores setup and basic operation. By the end you can send CW and program messages. The second session gets into using the inquiry and function modes to set the keyer up for your tastes. The third lesson gets into embedded functions and more advanced features. There are detailed explanations of the options, and you're encouraged to try everything and see what effect the various settings have. You can try anything you like and you won't screw it up. When you're done playing around, press pushbuttons 1-3-4-6 to return the K-3 to its default settings.

I was impressed with the K-3. It's helped me to improve my CW sending, and its capabilities go well beyond anything built into my transceivers. Although I use my contest software for sending CW during the contest, I hook up the K-3 in parallel for manual sending when I'm not quick enough on the keyboard. The additional memories come in handy for variations on the CQ and for times when I want to send the exchange more slowly without stepping through a bunch of preset speeds in my software. If you're serious about CW, take a close look at the K-3. If you like rolling your own and want to save some money, a K-3 partial kit (the CMOS Super Keyer III) is available. See the Idiom Press Web site for details.

*Manufacturer: Idiom Press, PO Box 1025, Geyserville, CA 95441;* **www.idiompress.com**. *Suggested retail price: K-3, $129.95; HK-3, $10.95. Available directly from Idiom Press or from selected Amateur Radio dealers.* QST

Mark Wilson, K1RO ♦ QST Editor

# ChromaSound

I've been waiting for a software package like this one. I knew it was just a matter of time.

The ubiquitous PC sound cards have been slowly invading various niches of Amateur Radio, taking over functions that were once the exclusive domains of dedicated station accessories. First the sound cards stormed into the digital front, elbowing their way past stand-alone multimode data processors and doing RTTY, slow-scan TV, CW, PSK31 and more. It only stands to reason that the next stand-alone station accessory to be confronted by the sound-card invasion would be digital signal processing (DSP) audio processors.

## Meet *ChromaSound*

*ChromaSound* is a DSP program for *Windows* that essentially allows your PC to do all of the things an outboard audio processor can do—and more. Setup is simple—you route a receive-audio cable from your transceiver to the **MIC** or **LINE** input of your sound card. That's all there is to it.

*ChromaSound* processes your audio and plays it back through your computer speakers. Think of your receive audio as a fire hose spewing what you want to hear, along with a lot of what you *don't*. With *ChromaSound* you can custom design audio filters to enhance the sounds you want to hear while rejecting everything else. You can design high-pass, low-pass, band-pass and band-reject filters of your liking. Creating a filter with *ChromaSound* is so easy, anyone could do it. You just select the filter type you want, then click and drag your mouse cursor to adjust the filter skirts and attenuation. You can even add various levels of noise reduction.

The process of creating filters is actually fun. I found myself running around the bands, sampling various signals and applying the *ChromaSound* filtering. You can see some examples in the accompanying images. (Figures 1 and 2 show a "before and after" comparison test.) If you create a filter profile that you want to save (an SSB filter that you think is ideal, for instance), you can slide your mouse cursor from the filter screen to the array of "buttons" below. Release the cursor over a blank button and *ChromaSound* will prompt you to enter a label name. Once you've done this, the filter is saved for future use. *ChromaSound* also comes with pre-design filters for various modes that you can select by clicking on the buttons.

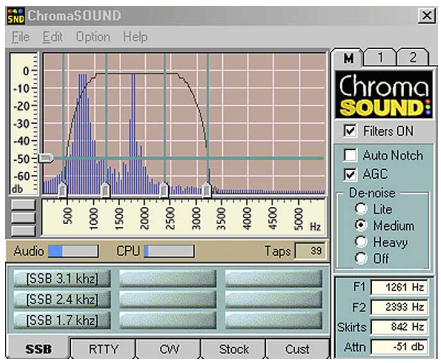



**Figure 1—(Before) Two CW signals, both within the 842-Hz filter I've set up.**

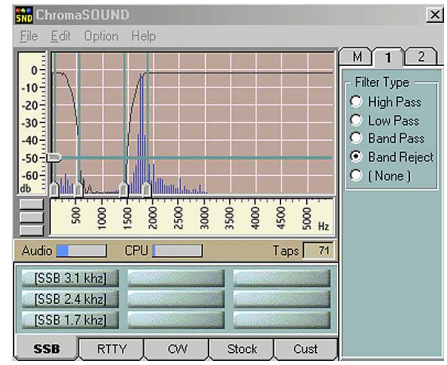



**Figure 2—(After) Now I've applied a notch filter to delete the lower of the two CW signals.**

### ChromaSound Specifications

Sampling rate: 11,025 samples/second, 16-bit mono
Dynamic range: 96 dB (maximum, depends on sound card)
Internal precision: 64-bit IEEE format floating-point
Latency (delay): 140 ms minimum (5-20 ms in DirectX version)
Filter Designer: 60 dB maximum attenuation, 100-Hz skirts
DSP algorithms: FIR, ALE, LMS, FFT, some proprietary
Filter phase-response: Linear phase, MA type
Win32 contexts: 2 processes, 6 threads total in current version

## Great for CW and Phone Operators

*ChromaSound* works especially well with CW signals, which is not surprising since DSP techniques can create some very sharp filters. *ChromaSound* is capable of creating filters as narrow as 100 Hz with remarkably vertical skirts. I was able to set the software up to allow a specific CW signal through the filter to the exclusion of virtually everything else. The only drawback is the latency of the DSP. This means that there is a slight delay between the time the receive audio reaches your sound card and the time the processed result actually reaches your speakers. The delay is only about 140 ms, but that is enough to be disconcerting if you are listening to your radio and your speakers simultaneously. The delay can also make tuning difficult, so I found it was easiest to tune the radio to the desired signal *first*, then turn down the rig volume and crank up the PC speakers.

The benefit of narrow filtering aren't quite as profound with SSB signals, but it is still impressive. If you tighten up the *ChromaSound* audio filter a little, then add some de-noising, the audio quality suffers, but the intelligibility increases.

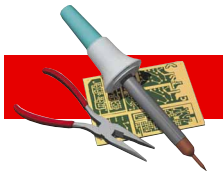
## Computer Requirements

*ChromaSound* demands a fair amount of processor muscle, so you'll need a 200-MHz Pentium or better for best results running *Windows 95/98/ME*. You also need a 16-bit full-duplex sound card, but most modern sound cards meet this requirement. I used a 266-MHz system for this review.

*ChromaSound* is the first of what may be a long line of sound-card DSP software products for audio processing. *ChromaSound* gives you performance that rivals outboard hardware audio processors, but at a substantially lower price.

*Manufacturer: Silicon Pixels.* ChromaSound *is shareware and a demo can be downloaded free at* **www.siliconpixels.com**. *Registration cost is $50.*

Steve Ford, WB8IMY ♦ Managing Editor



# HINTS & KINKS

## MORE HARDLINE CONNECTORS

◊ The aftermath of "Ice Storm 98" has left the North Country with an abundance of 75 Ω hardline that may be used by hams as a good low-loss antenna feed line. The problem is: "How do we put a PL-259 fitting on it?"

This technique has worked well for me. (Please refer to Figure 1.) Go to your local hardware store and purchase a $^1/_2 \times ^1/_2$ compression union normally used on copper tubing. Inside the union is a concentric shoulder that positions it on the tubes to be joined. Remove the nuts and ferrules from both ends, clamp union body in a vise and drill a $^1/_2$-inch hole through the shoulder inside the body to clear a $^1/_2$-inch path all the way through the union. Place one nut and a ferrule onto the rear of a PL-259 (*with* the barrel *on* the connector). Assemble the connector, ferrule and nut onto one end of the union and tighten the nut leaving just enough space so the connector barrel can wiggle a bit. Then solder just a bit of the connector body to the union for a good electrical connection.

Use a tubing cutter to cut through the aluminum jacket of the hardline in two places: $^3/_4$-inch from the end and $^7/_8$-inch back from that cut. Then cut a lengthwise slit through the jacket of these two pieces. (I used a Dremel tool with a cutoff wheel for this operation.) Pry the slit open slightly with a screwdriver and remove the two pieces of aluminum jacket. Next, carefully cut through the foam dielectric at the $^3/_4$-inch cut and remove that piece of foam, being careful not to nick the center conductor.

Now, remove the barrel from a PL-259 connector and screw the connector onto the foam dielectric until it touches the aluminum jacket (it is difficult), then remove it by reversing the process. This essentially threads the foam to make sure the finished fitting will go all the way onto the hardline.

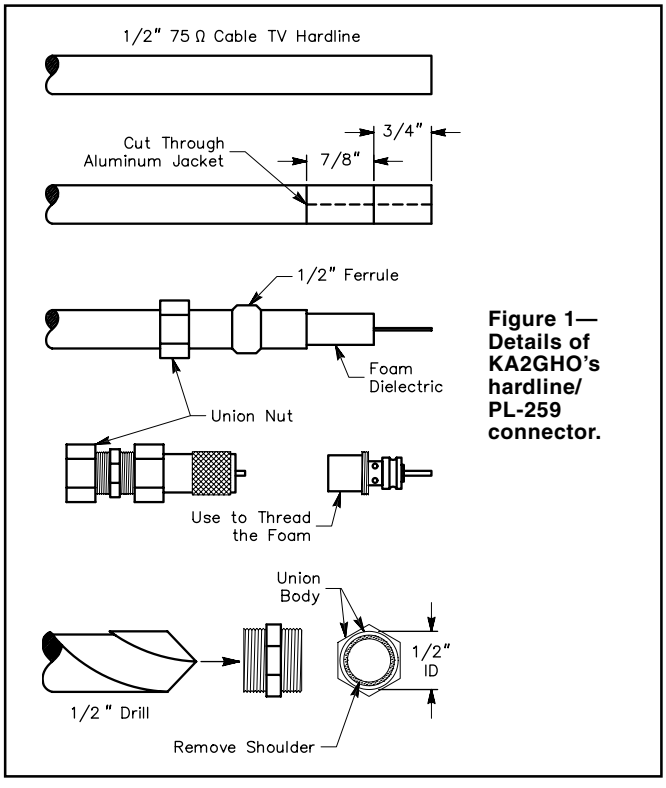



**Figure 1—Details of KA2GHO's hardline/PL-259 connector.**

Now, put the remaining nut and ferrule on the hardline, then screw the fitting with the union attached onto the hardline until it is tight against the jacket. Slide the ferrule into place, slide the nut up and tighten it until the union securely grips the hardline. (You may want to put on a bit of co-al jelly for dissimilar metals to prevent corrosion.) Connect hardline to fixed equipment through a short piece of coax for flexibility.

I have had 125 feet of this hardline running (buried) to my vertical antenna for nearly two years and it works great!—*Edwin N. Patience, KA2GHO, 24978 Ny St Rt 26, Redwood, NY 13679*

## MORE SCHEMATIC DRAWING SOFTWARE

◊ CadSoft produces *EAGLE*, a schematic/PC-board-layout program. They have a Web site (**www.cadsoftusa.com**) and offer freeware trial versions of their software for DOS and *Windows*. I took a quick look at the *Windows* version. It appears to be of German origin, and it has been around since at least 1995. It uses European schematic styles (rectangular blocks for resistors and a single horizontal line for the ground symbol), but the program offers the ability to construct your own symbols. The program also allows the use of scripts and if you're fluent in *C*, you evidently can do some program customization.

The freeware version is limited to one schematic page and a PC board size of something like 4×3.5 inches, but that should be sufficient for many who build small projects. For current prices, visit their Web site or contact the US distributor: CadSoft Computer, Inc, 801 S Federal Hwy, Delray Beach, FL 33483-5185; tel 1-800-858-8355, 561-274-8355, fax 561-274-8218; **www.cadsoftusa.com**; **sales@cadsoftusa.com**; **support@cadsoftusa.com**.

*TurboCAD 4.0* and later (a generic CAD program) has some nice electrical symbol libraries, but I doubt that it's as well integrated as dedicated schematic-capture/PC-board-layout programs. A free download version of *TurboCAD 2D* V6 is available from the IMSI Web site.[1]

*Circad* is a schematic-capture/PC-board-generation package with autorouting, netlists, etc. Holophase Inc (**www.holophase.com**) offers free size-limited downloads of *Circad* in 32-bit Windows and 16-bit MS-DOS versions (**www.holophase.com/dleval.htm**). Although it's not readily apparent at the Holophase home page, there's a **CIRCAD Library Exchange Project** page (**www.holophase.com/libexproj.htm**) from which user-generated libraries can be downloaded. Holophase encourages user library exchanges.

If one is not concerned with creating net lists, PC boards, and so on, just about any CAD program can be used to draw schematics, but they'll likely lack the smoothness of dedicated programs.—*Paul Pagel, N1FB, ARRL Staff*

◊ Free schematic drawing software can be found at **hometown.aol.com/KQ6QV/index.html**. The program, which I wrote, can be downloaded in a few minutes. Enjoy!—*Ken Nist, KQ6QV, 22001 Scenic Heights Wy, Saratoga, CA 95070; KQ6QV@aol.com*

[1]IMSI Corporate Headquarters, 75 Rowland Wy, Novato, CA 94945; tel 415-878-4000, fax 415-897-2544; **www.turbocad.com**.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

◊ I saw the December hint about schematic drawing software. I use the drawing facility of Microsoft *Word97*. The later versions of MS-*Word* have a pretty good drawing package and most folks that have purchased computers in the last couple of years have *Word*. (This is *Draw98*; *Office97* users can upgrade to *Draw98* from **download.microsoft.com/download/office97std/Update/1/WIN98/EN-US/draw98.exe**—*Ed.*)

[2]This symbol file has been added to SCHEMAT.ZIP as DRAW98.DOC. You can download this package from the ARRL Web at **www.arrl.org/files/qst-binaries/**.

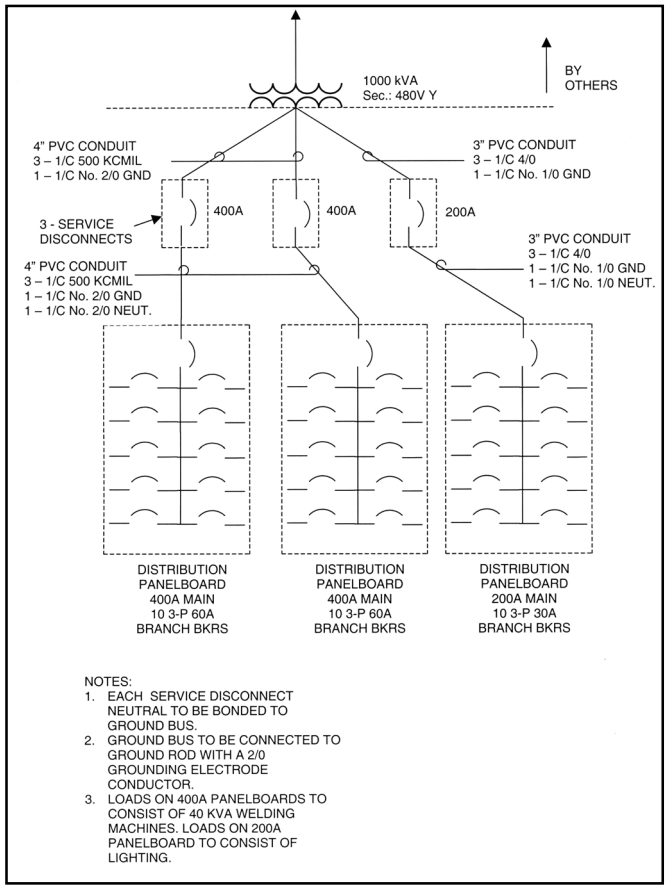



**Figure 2—A sample diagram drawn with Microsoft's *Draw98* facility of *Office97*.**

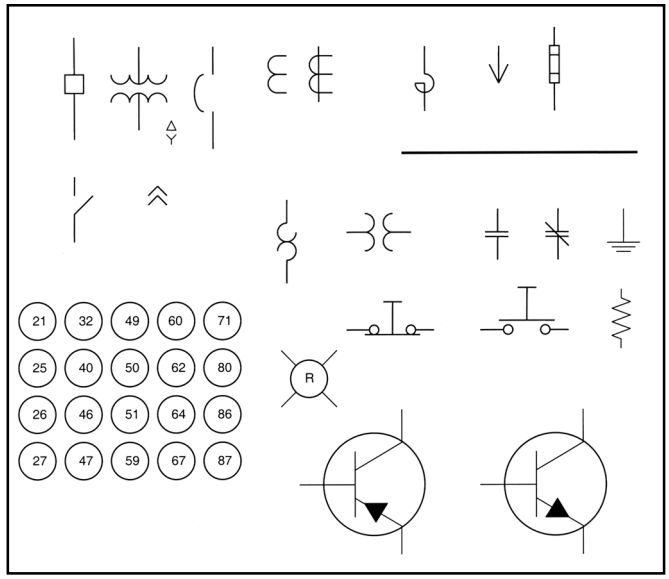



**Figure 3—A simple *Draw98* symbol file.**

Figure 2 is a little sketch I made some time ago that was used to describe a temporary construction power arrangement. Figure 3 is a small symbol library.[2] Notice that the sample is not an electronics drawing but the principles are the same. You can create your own symbol library with capacitors, transistors and so on. I am an electrical engineer (power) and these are some of the symbols I used most often. A professional draftsperson I am *not*.

Start by opening MS-*Word*. I find that using a 200% or 300% Zoom factor, you can nudge the symbols into line effectively. Be sure to set the **GRID** command so the objects are snapped to each other. (If you don't do this, you will have one heck of a time.) Open the symbol library file. Leave the library image displayed and click on **FILE NEW** to get a new page in front of you. (As you probably know if you use Word, you can cascade the two files—or you can switch between the files by clicking on **WINDOW**.) Click on **VIEW TOOLBARS**, **DRAWING** to get the drawing toolbar on the screen. To make a line, select the line tool by clicking on the line button (to the right of **AUTOSHAPES**, indicated by a line segment). Next, click on the page where you want the line to begin and drag the line to where you want it to end. Right click on the line (or any other object) and click **FORMAT AUTOSHAPE**. Then, you can set the line width of the object.

The *Draw98* Help file is fair, but most of the commands are intuitive. Text boxes can be created, moved, resized and the text font can be changed. The **SNAP** function is good, but if you look closely at Figure 2, you will find some disjointed lines and symbols.

When I start a drawing, I throw all symbols that I think I might need in the corner of my clean sheet and then drag them around or copy/paste them where I need them. I was trained on *AutoCAD*; it is an expensive (but good) program. When I worked in the field at construction sites, however, I did not always have *AutoCAD* program available. *Word* is, for better or worse, usually available. Drawings are printed in the same way as a text document. By the way, *Draw98* is also accessible from *Excel*, the spreadsheet program.

Earlier versions of *Draw* were—in my opinion—very unstable and in general, very primitive. I struggled with it on an overseas project where I had to make some sketches and was very unhappy. My employer later upgraded with later versions of Word and the new versions were much improved. One function that is very helpful is **GROUP**. Using the "select" arrow on the draw toolbar, you can enclose several objects and group them together. Sometimes I will make an entire section of a drawing, group it, copy it, move it, ungroup it and modify it. (That's a trick I learned with *AutoCAD*.)—*John Hudelson, K5DL, PO Box 21, Carmine, TX 78932-0021*; **k5dl@arrl.net**

## KLM KT-34XA ANTENNA BOOM/MAST COUPLER FAILURE

◊ My KT-34XA antenna had been up for about 10 years here in north Texas. Sometime during the night of May 5, the $^{3}/_{16}$-inch aluminum boom-to-mast coupler plate failed completely (See Figures 4 and 5). Saturday morning when I went out to go somewhere, I heard a strange noise from the direction of my antenna. I looked up—and gulped!! The antenna was hanging by the boom-truss guys and had flipped on its side (Figure 6). It was also swinging wildly back and forth in the high winds we were having that day. I managed to remove the **U**-bolts and what was left of the plate from the mast and boom. Then I tied the boom to the mast with some rope and a heavy chain. I also stuck a piece of fence pipe through the tower next to the rotator, angled it upward and secured the

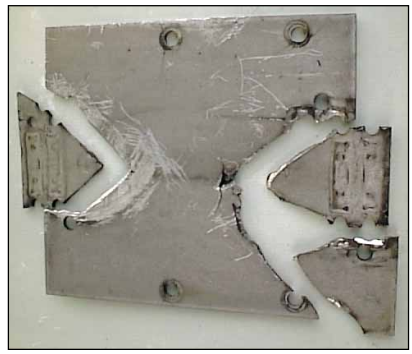


**Figure 4—Shards of the broken boom-to-mast mounting plate.**

**Figure 5—A close-up view of cracks in the failed mounting plate.**

**Figure 6—KC5UH's KT-34A hangs on its truss wires after the ancient mounting plate failed.**

boom to it with wire. This kept the antenna from swinging to self-destruction.

I am lucky that the antenna had a boom truss—only that kept it from crashing down into the trees and onto the roof of my house. KT-34 antennas don't have trusses because their booms are shorter, but I'm guessing that they use a similar mounting plate.

Hams who have KLM KT-34 or KT-34XA antennas should inspect their coupler plates—especially if they live in high-wind areas. Figures 4 through 6 show the broken coupler plate and the antenna hanging sideways.

Luckily, my employer does quite a bit of aluminum work, so I was able to get two pieces of 0.190-inch-thick T2024-T3 aluminum plate to make a new coupler (notice that I doubled the thickness). In addition, when I rotated the antenna back to horizontal, I found one-inch hole worn through the bottom of the boom where it had been rubbing on the broken coupler.—*David Cash, KC5UH, 2405 Kingston St, Arlington, TX 76015;* **dncash@home.com**

[It is critically important to periodically inspect antennas and their hardware. Ten years is an acceptable life from a part such as this because aluminum is subject to failure from fatigue. I know of a bicycle mechanic who recommends retiring aluminum bicycles after five years, lest the frame fail.—Ed.]


**Figure 7—W1HQ's 2-meter transceiver with several modifications to aid those with poor muscle control. The PTT paddle is on the far side of the mic. The red LED is visible on the mike's near side. Hook-and-loop material secures the mic on the side of the radio, and a toothpick makes the volume control more manageable.**

*Here are some hints from 40-years-past Hints and Kinks Editor Laird Campbell. All of these hints can be seen in Figure 7.—Ed.*

## AN EASY MIKE HANGER

◊ My brother added a strip of "industrial-strength" hook-and-loop tape to the back of my microphone. He then put a much larger piece of the mating half of the tape on the side of my radio. The mic hangs there with the lightest of pressure. With this technique it's easy to put a mic mount on any convenient surface.

## PUSH-TO-TALK PADDLE

◊ Due to difficulties with my manual dexterity, I find it difficult to press the PTT switch on my mic. My friend Jim, W5GAF, cemented half of a medical tongue depressor on the PTT button. This paddle provides a larger surface that I can more easily handle.

## A VOLUME-KNOB HANDLE

◊ I also have difficulty grasping and turning small rotary panel controls. Jim glued a toothpick to the end of the knob. Now I can extend a finger and easily control the volume.

## DISTANT PANEL LIGHTS

◊ When the panel lights burned out on my rig. I couldn't tell whether the power was off or on. Since there's power in the mic for the DTMF pad, Jim attached a red LED on the side of the mic. This makes it easy for me to see when the power is on.—*Laird Campbell, W1HQ, Ware Memorial Care Center, 400 W 14th, Rm 240, Amarillo, TX 79101*

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

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

# ICOM IC-R3 Communications Receiver

*Reviewed by Steve Ford, WB8IMY*
QST *Managing Editor*

When you unpack this little hand-held receiver, your eyes are drawn immediately to the 2-inch color TFT screen. Despite the fact that the 'R3 offers coverage from 495 kHz to 2.450 GHz (816 to 902 MHz is blocked), the first thing most users want to do is watch TV!

Very well. Let's watch TV.

You press the green **POWER** button to bring up the radio, jab the ▶ arrow on the four-way front-panel switch (the user manual refers to this as the *joystick*) until you see channel numbers on the smaller monochrome sub LCD display then, while holding the **FUNC**tion button on the side of the unit, press and hold the ▲ arrow on the joystick. The color screen springs to life and you're watching television! I dialed up channel 3, which has a strong signal in my area, and was treated to a crisp, colorful display. The audio volume is adjusted easily enough by tapping on the joystick button. The IC-R3 also sports a composite audio/video output jack so that you can port the signals to a much larger monitor if you become tired of the 2-inch image.

The only thing that detracted from the otherwise excellent picture was a single red pixel in the display that was continuously on. The pixel appeared as a miniscule dot in the upper middle portion of the screen. The dot wasn't visible all the time; it depended on the nature of the image being displayed. For example, the dot disappears into flesh tones, but is very obvious against a blue sky. A paragraph on the first page of the manual—under "Cautions"—explains that this is not due to a malfunction or failure and is typical for displays of this type.

In addition to broadcast television, you can watch amateur television (ATV) on the 'R3. The rig is capable of displaying FM or AM ATV. In this country, most ATV is AM, but the manual was written under the assumption that *all* amateur TV is FM. This can be a little confusing at first. Just make sure you read the instructions for "TV Frequency (AM TV) Receiving." I tried the 'R3 on the output of a 70-cm ATV repeater located about 10 miles away, but with its 22-inch telescoping antenna, the screen showed nothing but snow. No surprises there. Without a directional antenna you'd need to be practically on top on an ATV repeater to receive it. On the other hand, I was able to view FM TV picked up from a neighbor's 900 MHz remote video link (with the neighbor's permission, of course!).


**Bottom Line**

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

Below the main and sub LCD displays, there is a row of four buttons. We've already mentioned the **POWER** button. Above and to the right is the **V/M/SKIP** button, which is used to toggle between VFO and memory modes, start the memory write process, adjust a memory channel's skip setting, register a frequency to be skipped while searching and edit the alphanumeric tags. The **MODE/SET** button is used to change the receive mode, change the step size and enter or leave the SET mode. Finally, we have the **SQL/ATT** button, which is used to open the squelch, set the squelch level, set the attenuator level and enable duplex receive. Even the VFO knob has several functions. It is used to change the current VFO frequency, change the currently displayed memory bank and/or channel, and change the value of SET mode parameters.

## At the Low End of the Spectrum

You can prowl the AM broadcast band with the 'R3, or sample shortwave broadcasts above 1700 kHz. The audio quality is acceptable, within the limitations of its compact 1-inch diameter speaker (much better with headphones). Sensitivity and selectivity was average if you use the telescopic whip antenna. I plugged my HF longwire antenna into the 'R3 and, of course, signal levels jumped considerably. So did the tendency for the receiver to overload. Fortunately, ICOM had the foresight to include the 4-step attenuator (6, 10, 15 and 30 dB). In all fairness, the 'R3 is intended as a hand-held, portable receiver; it isn't designed to perform like a tabletop unit when connected to an outdoor antenna.

Getting around the bands is a matter of selecting the desired frequency segment with the joystick button, then spinning the VFO knob. You can change the tuning steps up to 1 or even 10 MHz to speed the process (the minimum tuning step is 5 kHz). The faster you twist the VFO knob, the faster you zip across the frequencies. A direct-entry keypad would have been a nice addition to the 'R3, although it would have definitely increased the size of the radio. Even so, the huge 400-memory capacity gives you the abil-

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

**Table 1**
**ICOM IC-R3, serial number 01372**

| *Manufacturer's Claimed Specifications* | *Measured in the ARRL Lab* |
|---|---|
| Frequency coverage: Receive, 0.5-816, 902-2450 MHz. | As specified. |
| Modes of operation: FM, WFM, AM, AM-TV, FM-TV. | As specified. |
| Power requirements: 0.73 A (maximum volume, TV on, 4.5 V dc); 3.6-6.3 V dc. | 0.76 A (maximum volume, no signal), tested at 4.5 V dc. |
| Size (HWD): 4.7 × 2.4 × 1.3 inches; weight, 10.6 oz. | |
| AM sensitivity (10 dB S/N): 0.5-5 MHz, 5-30 MHz, 1.0 μV; 118-136 MHz, 0.8 μV; 1.4 μV; 222-330 MHz, 1.0 μV. | 10 dB S+N/N, 1-kHz tone, 30% modulation, 1.0 MHz, 1.0 μV; 3.8 MHz, 0.6 μV; 53 MHz, 0.56 μV; 120 MHz, 0.7 μV; 146 MHz, 0.65 μV; 440 MHz, 0.9 μV. |
| FM narrow sensitivity (12 dB SINAD): 1.6-5 MHz, 0.32 μV; 5-470 MHz, 0.25 μV; 470-800 MHz, 0.45 μV; 800-2000 MHz, 0.56 μV; 2000-2300 MHz, 1.0 μV; 2300-2450 MHz, 1.8 μV. | FM narrow, 12 dB SINAD: 29 MHz, 0.25 μV; 52 MHz, 0.2 μV; 146 MHz, 0.28 μV; 223 MHz, 0.25 μV; 440 MHz, 0.35 μV; 902 MHz, 0.55 μV; 1246 MHz, 0.43 μV; 2400 MHz, 1.1 μV. |
| FM wide sensitivity (12 dB SINAD): 76-108 MHz, 175-222 MHz, 1.0 μV; 470-770 MHz, 1.8 μV. | 100 MHz, 0.9 μV. |
| FM two-tone, third-order IMD dynamic range: Not specified. | 20 kHz offset: 29 MHz, 44 dB; 52 MHz, 45 dB; 146 MHz, 52 dB*; 440 MHz, 47 dB*; 906 MHz, 47 dB*; 1246 MHz, 43 dB*. At 10 MHz offset, 146 MHz, 56 dB; 440 MHz, 51 dB. |
| FM adjacent channel rejection: Not specified. | 29 MHz, 60 dB; 52 MHz, 56 dB; 146 MHz, 52 dB; 440 MHz, 48 dB; 906 MHz, 47 dB; 1246 MHz, 46 dB. |
| Spurious and image rejection: Not specified. | First IF rejection: 146 MHz, 38 dB; 440 MHz, 37 dB; 906 MHz, 65 dB; 1246 MHz, 91 dB; 2400 MHz, 69 dB; image rejection: 146 MHz, 61 dB; 440 MHz, 37 dB; 902 MHz, 45 dB; 1246 MHz, 81 dB; 2400 MHz, 8 dB. |
| Squelch sensitivity (threshold): Not specified. | At threshold: 29 MHz, 0.53 μV; 52 MHz, 0.41 μV; 146 MHz, 0.91 μV; 440 MHz, 1.3 μV; 906 MHz, 3.6 μV; 1246 MHz, 0.37 μV. |
| S-meter sensitivity: Not specified. | S9: 52 MHz, 1.2 μV; 146 MHz, 2.5 μV; 440 MHz, 3.8 μV; 903 MHz, 9.7 μV; 1246 MHz, 0.95 μV. |
| Audio output: 100 mW at 10% THD into 8 Ω. | 104 mW at 10% THD into 8Ω. |

Except as noted, all dynamic range measurements were taken using the ARRL Lab standard spacing of 20 kHz.

*Measurement was noise limited at the value indicated.

ity to store just about every frequency destination you're likely to need. The 'R3 also allows you to attach a 6-character name to each memory channel for quick reference. Without a keypad, however, entering the characters is a tedious, multistep operation that involves hopping through the alphabet with the VFO knob and the joystick button. An optional cable and *Windows* software kit is available for programming the memories with your PC, but I wasn't able to test this feature.

### Back Above 30 MHz

The 'R3 really shines above 30 MHz because you can bring the main (color) screen into play as a multifunction display (below 30 MHz, only the sub LCD is available). The frequencies are *much* easier to read on the color display. In addition, you can toggle a combination S meter/volume display, a sweeping bandscope, or an interesting "direction finding" function that temporarily displays and stores S meter readings (for about 5 seconds) as you search for your target. Why the main display is not made available below 30 MHz is puzzling.

I found myself skipping and tuning through a number of VHF, UHF and microwave bands. Switching to FM, I monitored a couple of 6-meter amateur repeaters. FM broadcast reception was quite good, but not in stereo, unfortunately.

AM aeronautical signals seemed a bit sparse, for some reason. Even the local air traffic-control frequencies were relatively quiet. This could have been a function of the 'R3's stock antenna. Connecting the radio to an outdoor groundplane antenna brought a marked increase in signals.

With the included antenna, the 'R3 offered average performance on the 2-meter amateur band, and on public service frequencies between 148 and 450 MHz. The signals had to be moderately strong to be listenable on the 'R3. For example, I was able to monitor local police and fire communications easily enough, but transmissions from AMTRAK railroad units 10 miles away—that I can usually hear on the expanded receive portion of my amateur hand-held—were inaudible. The 'R3 was also unable to pick up the amateur FM repeater satellites UO-14 and AO-27 when using its telescoping whip. The


**Figure 1—The IC-R3's color TFT main display—available only above 30 MHz—is capable of presenting a tremendous variety of information in several different formats and your choice of eight background colors. This "Simple screen" displays just the bare essentials. The sub LCD shows similar information when the main LCD is off.**

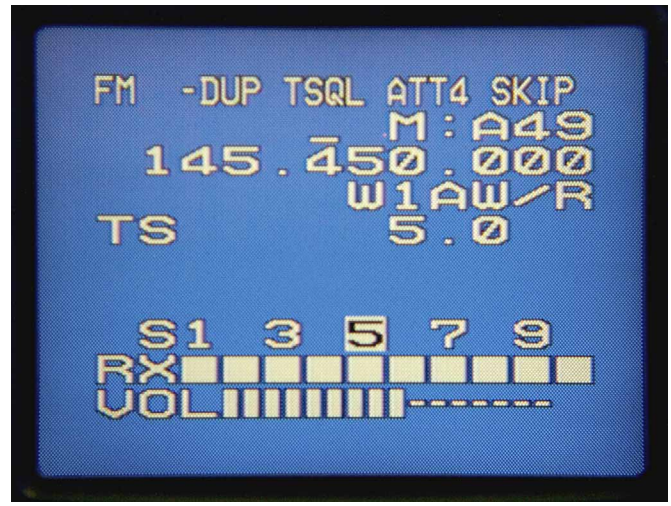



**Figure 2—The main display's "Multi-function" screen adds visual indications of the squelch setting, the signal strength and the volume level to those shown on the "Simple screen." In this photo, the receiver is in the memory mode. Memories can be assigned alphanumeric labels ("W1AW/R" in this example) to aid identification.**

outdoor groundplane antenna made a big difference in all of these instances.

As you'd expect, the higher I tuned in frequency, the less activity I encountered. In fact, I heard nothing above about 1200 MHz. My microwave oven was able to raise quite a racket on the radio, though!

Speaking of racket, the 'R3 has a multifunction squelch control that goes a long way toward preserving your sanity. The squelch can be locked open, set to use one of nine programmable levels or placed in "automatic mode." If you are listening to weak signals that may not otherwise make it past the squelch, you can use the **SQL** button to force the squelch to remain open.

### *Scanning*

Scanning is one of the 'R3's strong suits. At the most basic level you can opt to scan the entire coverage range of the radio, or only within the selected band. The most useful scanning function for me was the *program scan* where I specified the start and stop frequencies, and had the 'R3 scan repeatedly between those two points. You can program up to 25 pairs of stop and start frequencies in memory. If you keep encountering birdies or other unwanted signals during a scan, you can lock out those annoyances with the *frequency skip* function.

The 400 memory channels are divided into 8 banks with 50 channels each. In the memory scan mode you can breeze through all of the memories, or only through the 50 within one of the banks. There is a skip function here, too. You can program the R3's memory scan to jump over certain memory channels (ones that are perpetually busy, for instance). And like all good scanners, the 'R3 includes a *priority watch* that allows you to monitor one frequency for activity while scanning through others.

### *CTCSS Features*

You can program the 'R3 to respond to specific subaudible tones (CTCSS)

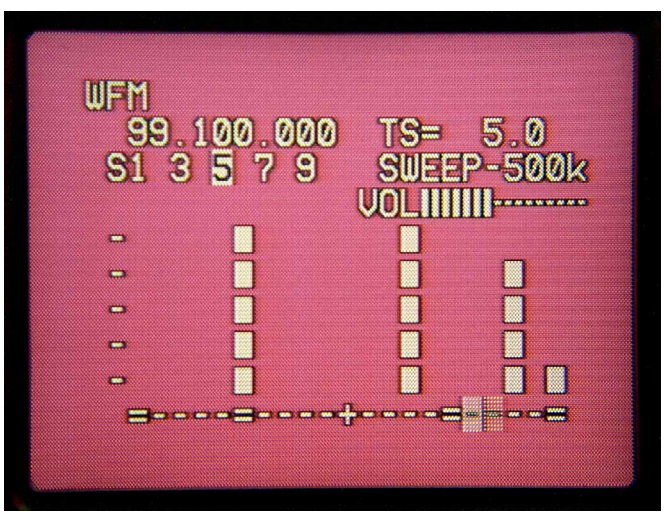



**Figure 3—The "Band scope" screen. This feature provides a plot of signal strength versus frequency. The range of the sweep can be set to any of five values from 10 kHz to 1 MHz. The receiver can be commanded to continuously sweep the range or to make a single sweep and then stop.**

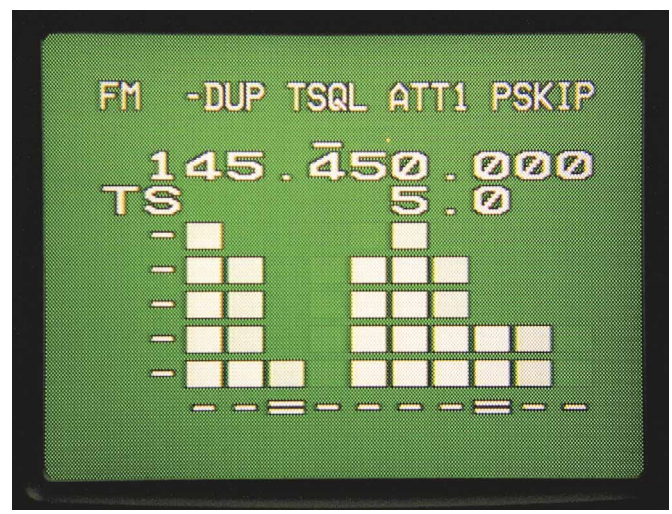



**Figure 4—The IC-R3 also offers a unique "Direction finding" feature. The signal strength versus time (in 0.3-second intervals) is continuously plotted. Connect a directional antenna, aim for maximum signal strength and you'll have a likely heading to the signal source. The 'R3's 4-step attenuator can be very handy for this application.**

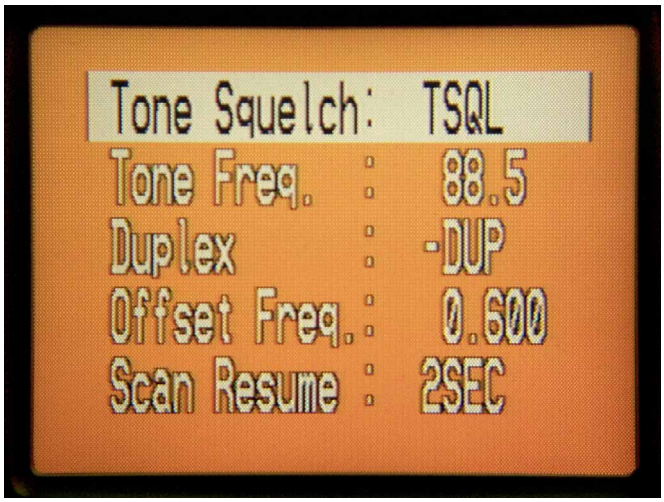



**Figure 5—The "Set mode" screen provides convenient viewing of the state of several menu settings simultaneously. The menu contains a total of 18 parameters. The main encoder dial is used to scroll up and down through the list. When the main display is off, the same menu choices can be displayed—one item at a time—in the sub LCD.**

**Figure 6—The "TV screen." This image of Tom Brokaw—obviously exhausted after weeks of presidential election coverage—was captured from broadcast television. The image shown on the screen of the IC-R3 in our lead photo is live ATV from the lobby of HQ using a 70-cm ATV transmitter and an inexpensive camera.**

with its *tone squelch function*. I programmed the radio to remain silent until it received a signal from a nearby FM repeater that included the 88.5 Hz CTCSS tone. The radio obediently sat there, silent as the Sphinx, until it suddenly "opened" with audio from the repeater. With the *pocket beep* feature the 'R3 will also flash its display and beep when it receives the correct tone. You say you don't know what CTCSS tone the repeater is using? The 'R3 can tell you that with its *tone scan*. When tone scanning the 'R3 can automatically set the CTCSS tone for a given memory channel, but as soon as you switch off that channel you'll find that the tone frequency shifts to the *previously* programmed value. For a permanent setting you need to change the CTCSS programming of the memory channel by editing its data, copying it to the VFO and then writing it back to that memory channel.

## Power

The issue of power is important if you are considering the 'R3. You can power the radio from the supplied Lithium-Ion battery pack, from 3 AA alkaline batteries or from an external dc power source. While it's natural to fall in love with 'R3's color LCD and TV tuner, this feature is also its greatest weakness when it comes to power consumption.

If you use the battery pack with the main LCD frequency display mode active (but not tuning TV channels), you can expect about 2 hours of listening time before the battery is depleted. But if you decide to watch TV, your battery life will drop considerably. Turn off the main LCD altogether and use only the sub LCD along with the battery save feature, and your available time jumps to more than 25 hours!

I'd recommend that you activate the battery saver function to get the most out of your power source. If you are listening to a single frequency and there is no activity for 5 seconds, the power saver kicks on and initiates a cycle where the 'R3 "sleeps" for a short time, then "awakens" briefly to monitor the frequency before returning to sleep once more. The automatic power off feature is also handy if you seem to have trouble remembering to turn off your 'R3. The APO will shut the radio down if you do not use it after 30, 60, 90 or 120 minutes.

While the 'R3 is off and connected to external power with the rechargeable pack installed, the LCD indicates "HI V" and the battery level indicators cycle through their display states. This continues while the battery is being charged. The 'R3 senses when the battery is completely charged and stops charging at that point. It can take 13 to 15 hours to completely charge a fully discharged battery pack. A 2.5-hour rapid charger—the BC-135—is available as an optional accessory.

I ran into trouble when I tried to use the 'R3's "ac adapter" to power the unit. When I turned the power on the main LCD began rapidly pulsing on and off. Further reading in the manual revealed that the included adapter is intended for battery charging only.

## Conclusion

The TV tuner is clearly the star of the 'R3, and it delivers on its promise of a sharp color picture, but don't buy an 'R3 on this basis alone. This receiver is also a competent, versatile scanner that will provide years of listening enjoyment. Its shortwave performance isn't stellar, but it is more than adequate for casual broadcast listening.

My wish list for the next-generation IC-R3 (the 'R4?) would be an SSB receive mode, an AM synchronous detector, a numeric keypad and main LCD functionality below 30 MHz. The 'R3 may not be an Amateur Radio grade receiver throughout its entire frequency range, but it is a heck of a lot of fun.

*Manufacturer*: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004; 425-454-8155; fax 425-454-1509; **75540.525@compuserve.com**; **www.icomamerica.com**. *Manufacturer's suggested list price:* $599. Typical current street price: $490. List prices of selected accessories: CS-R3 *Windows 95/98* programming software, $24; OPC-478 serial cable (computer to radio), $45; BC-135 desktop rapid charger, $80; CP-18A Cigarette lighter adapter, $30.

# ICOM IC-PW1 Linear Amplifier

*Reviewed by Mark Wilson, K1RO*
QST *Editor*

A quick survey of the power amplifiers available to hams today reveals a wide variety of configurations and features. All will boost your signal, but they take different paths to produce the power. Some amplifiers use one tube, others use multiple tubes. Some tune themselves automatically, some you tune manually. The IC-PW1 from ICOM is a solid-state, no-tune amplifier that uses eight MRF150 power FETs to produce 1 kW output on all amateur bands from 160 through 6 meters. It's rated for a full 1 kW output on all modes, including RTTY. With a selling price around $5400, this amplifier is at the high end of the market, competing with auto-tune tube amplifiers from Alpha-Power[1] and ACOM[2], and with the solid-state Yaesu Quadra.

The 'PW1 is big, black cube that weighs in at 55 pounds. The power amplifier modules and heat sink, an antenna tuner, switching for up to 4 antennas, a 45-V, 40-A power supply and extensive control circuitry are all inside the box. Control, switching and metering functions are handled by the 'PW1's control head which is normally mounted to the front panel but can be removed and used remotely. The 'PW1 works best with a 200-240 V ac supply (15 A max), but you can run the amplifier from 100-120 V ac at reduced power (500 W out).

The IC-PW1 includes extensive protection circuitry. The amplifier will switch itself out of the circuit if the temperature, drain voltage, drain current, drive power or SWR exceed the limits, or if the transceiver and amplifier are set for different bands. Various LEDs on the control panel blink to give you an indication of the problem.

## Rear Panel

The 'PW1's rear panel has connections for two transceivers. The instructions show how to use the amplifier with one ICOM transceiver with one antenna line; one ICOM transceiver with two antenna lines (for example, separate antenna jacks for HF and 6 meters); two ICOM transceivers; one ICOM transceiver and one non-ICOM transceiver; or two non-ICOM transceivers. You can use only one transceiver at a time, but this feature is handy

if you regularly use more than one HF radio and don't want to continually swap wires. Or you might want to use the amplifier with one HF-only radio and one 6-meter radio.

There are two identical sets of rear-panel connections, one for each transceiver. If you're using an ICOM transceiver with the 'PW1, you just connect your radio to the 'PW1 with three supplied cables (each nearly 10 feet long). 1) Use the cable with PL-259s on each end to connect the antenna jack on your transceiver to **INPUT1** or **INPUT2** on the 'PW1. 2) Connect the supplied 7-pin DIN cable from the appropriate **ACC** jack on the back of the amplifier to the **ACC(2)** jack on the back of your transceiver. This cable handles TR switching, ALC and control signals. 3) Connect the 1/8-inch phone plug between the appropriate **REMOTE** jack on the 'PW1 and the **REMOTE** jack on the back of your transceiver. This is for ICOM's CI-V frequency control interface. When this cable is connected and the 'PW1 is in **AUTO** mode, the amplifier will automatically follow when you change bands on the transceiver. If you're not using an ICOM transceiver, the 'PW1 has phono jacks for TR switching and ALC.

The 'PW1 also offers connections for up to four antennas, and the amplifier's control circuitry remembers which antenna is used for each band. In my station, I used these connectors for my multiband beam (20-10 meters), 40-meter dipole, 80-meter inverted **V** and 6-meter Yagi.

## Front Panel

The nerve center of the IC-PW1 is the control head that's mounted in the upper center of the front panel. The first thing I did when I got the amplifier home was disconnect the control head for remote mounting. That operation is detailed in the instruction manual and takes about 20 minutes. Like the ACC and CI-V cables, the supplied separation cable is nearly 10 feet long. This allowed me to place the 'PW1 on the floor under my operating desk, saving valuable table space. The wedge-shaped control head is about 8 inches wide, 3.5 inches high, and 2.5 inches deep. It fits nicely under the front of my computer monitor.

The control head includes two analog meters. One switches among power output, drain current and temperature. The other monitors collector voltage, SWR or ALC. In addition to the **POWER** switch on the left side, **TUNER** activates the internal antenna tuner and **AMP/PROTECT** places the amplifier in standby. On the right side is switching for transceiver 1 or 2 and the four antenna jacks. Finally, band information is along the bottom. There's an LED indicator for each band. You can switch bands using the **UP** or **DOWN** buttons, or place the amplifier in **AUTO** mode to follow band changes on an ICOM transceiver with CI-V interface.

## Using the IC-PW1

As shipped from ICOM, US versions of the 'PW1 do not work on 10 or 12 meters because of FCC regulations regarding amplifiers that could be used for CB. You have to remove a surface-mount diode on one of the PC boards to make your 'PW1 work on these bands. The diode is easily accessible with the top cover removed and the modification isn't particularly difficult. Contact ICOM's service department, send them a copy of your amateur license, and they will send the details.

You also have to provide a suitable connector for the ac line cord. The 'PW1 detects the line voltage and adjusts itself accordingly. You don't have to worry about switches or jumpers. We only used the 'PW1 with a 240 V ac source and did not try operation from 120 V. Before installing the connector, slip two provided ferrite cores over the outside of the line cord and secure them with wire ties. According to the manual, the ferrite cores help with RFI.

I used the IC-PW1 with my IC-746 transceiver. Hookup was simple with the three supplied cables. The only problem was getting the 'PW1 to recognize frequency data from the IC-746. The instruc-

**Bottom Line**

The ICOM IC-PW1 provides an effortless 1 kW of RF from 160 through 6 meters. It integrates especially well with ICOM transceivers, and it works so smoothly that you forget it's there.

[1]Product Review: "AlphaMax and AlphaRemote for the Alpha 87A," *QST*, Aug 2000, pp 73-73; Product Review: "ETO Alpha 87A MF/HF Linear Amplifier," *QST*, Jun 1992, pp 53-56.
[2]Product Review: "ACOM 2000A HF Linear Amplifier," *QST*, May 2000, pp 64-66.

**Table 2**
**ICOM IC-PW1, serial number 01203**

| ***Manufacturer's Claimed Specifications*** | ***Measured in the ARRL Lab*** |
|---|---|
| Frequency Range (US units): 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,[1] 28-29.7,[1] 50-54 MHz. | As specified. |
| Power output: 1000 W PEP, all modes.[2] | As specified for SSB and CW. |
| Driving power required: 100 W maximum. | Typically 40 W (band dependent). |
| Input SWR: Not specified. | Typically 1.0:1. |
| Output matching: up to 3:1 SWR (2.5:1 for 6 meters). | As specified. |
| Spurious signal and harmonic suppression: 60 dB or HF, 70 dB for 6 meters. | 60 dB on HF and 6 meters. |
| Intermodulation distortion (IMD): Not specified. | See Figure 7. |
| Primary power requirements: 100-120, 200-240 V ac. | |
| Size (HWD): 10.4 × 13.8 × 14.8 inches; weight, 55 lb. | |

[1]See text.
[2]On 200-240 V ac, de-rated to 500 W on 100-120 V ac.

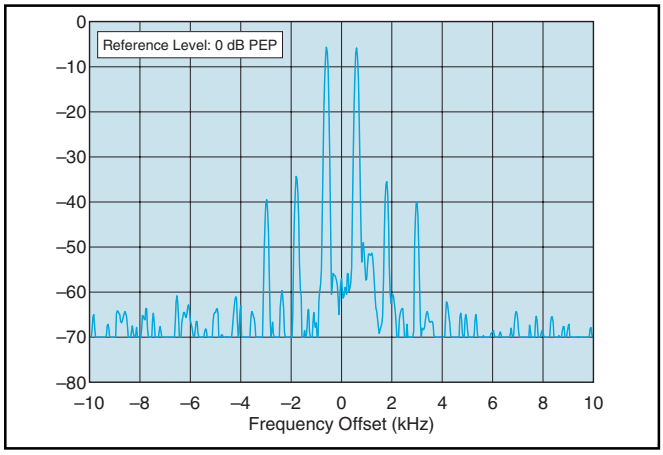



**Figure 7—Worst-case spectral display of the ICOM IC-PW1 amplifier during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 36 dB below PEP output, and the worst-case fifth-order product is approximately 41 dB down. The amplifier was being operated at 1 kW at 14.010 MHz. The levels of the third- and fifth-order IMD products are higher than those we have observed on other recently reviewed tube-type amplifiers.**

**Figure 8—The rear panel of the ICOM IC-PW1 offers input, ALC, switching and control connectors for two separate exciters and outputs for up to 4 antennas.**

tions are simple: Press and hold the **INPUT** switch on the amplifier's control head, turn the transceiver power on, and rotate the transceiver's frequency dial until the input LED quits blinking. Try as I might, I couldn't make the LED stop blinking. I finally discovered that the IC-746 has a menu option called "CI-V Transceive," and this must be set to "ON." Once I did that, it took only a few seconds for the transceiver and amplifier to communicate.

The instructions say that you should not connect the 'PW1 and transceiver to an ICOM CT-17 level converter for computer-controlled operation. Computer control of my transceivers is important to me, especially for use with contest logging software. We asked ICOM about this, and they came up with a way to use software with a 'PW1, IC-756PRO or IC-746 and CT-17. I was able to get this procedure to work with my IC-746 and *Writelog* contest software. Contact the service department at ICOM for information.

I connected a second radio, a Yaesu FT-1000D, to the amplifier using the second set of input connections. Again, hookup was simple using a piece of RG-58 for the antenna connection and a couple of phono cables for ALC and TR switching.

The rest of the setup went smoothly. The manual stresses the need to adjust the ALC so you don't damage the amplifier by overdriving it. This involves increasing the transceiver's power to full output while adjusting the ALC potentiometer on the back of the 'PW1 until the ALC meter is centered and the power output is 1 kW. This took a couple of back-and-forth adjustments of the transceiver's power control and the ALC pot, but once adjusted power output is consistently 1000 W on each band with 40-50 W drive.

The next step is to go through each band and select the appropriate antenna. The 'PW1 remembers which antenna you


**Figure 9—The control panel can be removed from the front of the amplifier's cabinet and relocated up to 10 feet away (the remote cable and a blank cover plate for the amplifier front panel are provided).**

last selected for each band, and whether or not the antenna tuner was used. After the initial setup, everything is pretty much automatic and you don't use the controls much.

The built-in antenna tuner can match 15 to 150 Ω (3:1 SWR) on HF and 20 to 120 Ω (2.5:1 SWR) on 6 meters. The tuner does not work above 1950 kHz on 160 meters, but otherwise works across all bands. The tuner can be used when the amplifier is in standby; this is handy if you need a tuner and your transceiver does not have one built in. The tuner had no problem finding a match with any of my antennas, including my Cushcraft X7 multiband beam which works on 18 and 24 MHz but has an SWR greater than 3:1 on those bands.

In early IC-PW1s (before serial number 1165), you could not bypass the amplifier and use your transceiver barefoot without turning on the amplifier and using the **AMP/PROTECT** switch to put the amplifier in standby. ICOM changed the circuitry in current production 'PW1s so that when you turn on your ICOM transceiver, and the 'PW1 is off, some of the LEDs on the control panel light and some of the functions work. The **INPUT** and **ANT**enna switches work, as do the automatic band switching (if you have the CI-V cable connected), band **UP/DOWN** switches and metering. If you're using a non-ICOM radio, you need to apply 13.8 V dc to pin 7 of the 'PW1's **ACC** jack to use the antenna switching and bypass the amplifier when the power is off. ICOM does not offer an upgrade for older amplifiers.

The IC-PW1 is fairly quiet when you first turn it on. An additional fan kicks in whenever you transmit using the antenna tuner, adding a bit to the noise level. If you transmit for an extended period (say, for RTTY operation) the cooling fans switch to a higher speed and stay on (even in receive) until the temperature drops. I did find the 'PW1 a bit noisy with all of the fans on, but placing the amplifier on the floor and using headphones helped.

Overall I really liked the 'PW1, especially with the IC-746 transceiver. Once I had everything configured, it was like having a 1 kW transceiver. There is really nothing to do when using the amplifier—no band switching or tuning. Power output was always 1 kW, and the amplifier never went offline for any reason.

During the review period, I gave the 'PW1 a workout on all bands, including about 10 hours of operation in the OK RTTY DX Contest in mid-December. RTTY contesting is very hard on equipment because of extensive key-down transmit periods. I ran the amplifier at its full rated output during the contest with no problems.

It was especially nice having the 'PW-1's 6-meter capability when the band opened to Europe in mid-December. I was able to work several very weak stations who would have had trouble hearing me with my usual 100 W. Several operators used another IC-PW1 and an IC-756PRO to put W1AW on the air for both modes of ARRL November Sweepstakes. That combination worked so well that the ICOM IC-PW1 is now a permanent fixture at W1AW.

If you're in the market for a power amplifier, the IC-PW1 is worth a look, especially if you're using an ICOM transceiver that can take full advantage of the control circuitry. The 'PW1 does not run a full 1500 W legal-limit output like the tube-type auto-tune amplifiers, but it does include 6 meters, a wide-range antenna tuner and automatic antenna switching.

*Manufacturer*: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004; 425-454-8155; fax 425-454-1509; **www.icomamerica.com**. *Manufacturer's suggested retail price*: $5995. Typical current street price: $5400.

*Bid solicitations for Product Review equipment appear on page 69.*

# NEW PRODUCTS

## HF/VHF/UHF MOBILE ANTENNA FROM COMET

◊ NCG Company is now distributing the Comet UHV-6 multiband mobile antenna. With HF, VHF and UHF capabilities, it's particularly well suited for use with multiband HF/VHF/UHF transceivers.

The UHV-6 comes complete with coils for 40, 15 and 10 meters. The mast section is resonant on 6 meters, 2 meters and 70 cm. Optional coils are available for 20 and 17 meters. As many as four HF coils can be attached at once, allowing instant access to up to seven bands.

The UHV-6 is terminated in a PL-259-type base connector and can be mounted on most vehicles using trunk lip or hatch/door edge mounts. The mast section is hinged, allowing the antenna to be folded over to provide clearance when entering garages or other low structures.

Comet offers a wide variety of diplexers, mounts and cabling kits. For additional information visit your favorite Amateur Radio products dealer or contact NCG Companies, 1275 North Grove St, Anaheim, CA 92806; tel 800-962-2611/714-630-4541; fax 714-630-7024; **micks@cometantenna.com**; **www.cometantenna.com**.

Previous • Next New Products

# TECHNICAL CORRESPONDENCE

## CLEAN UP YOUR PSK31 SIGNAL

*By Richard J. Kruis K8CAV, 6007 Route 82, Hiram, OH 44234;*
**major107ac@aol.com**

◊ Steve Ford's article "PSK31 2000" in the May 2000 issue of *QST*[1] brought an explosion of PSK activity on 20 meters and to a lesser degree on 15 and 10 as well. Unfortunately, there are a lot of dirty PSK signals that cause interference and reduce the available bandwidth for other stations operating close to such a signal. In one instance, I saw a signal so bad that it was showing up in three different places on *DigiPan*'s panoramic display—loud and clear in all three spots! Here's some information I've collected that can help clean up a dirty PSK signal.

When I first started operating PSK31 in April 2000, I built an interface that includes isolation transformers and potentiometers to adjust the transmit and receive levels between the radio and my laptop computer. But no matter what I did, my transmitted signal was terrible! Even at a power-output level of 2 W, signal reports I received were very bad: a wide signal with sidebands several hundred hertz away from the main carrier and a software-indicated IMD of no better than –9 dB.

During the course of modifying my interface, I connected my oscilloscope to the output of my computer's sound card to check the audio level. I was horrified to see the audio-output waveform being severely clipped! My laptop does not have a **LINE OUT** jack, only an **EARPHONE** jack. The audio level to the jack is adjusted by the laptop's **VOLUME** control through an audio power amplifier. As soon as I moved the **VOLUME** control to

[1]Steve Ford, WB8IMY, "PSK31 2000," *QST*, May 2000, pp 42-45.

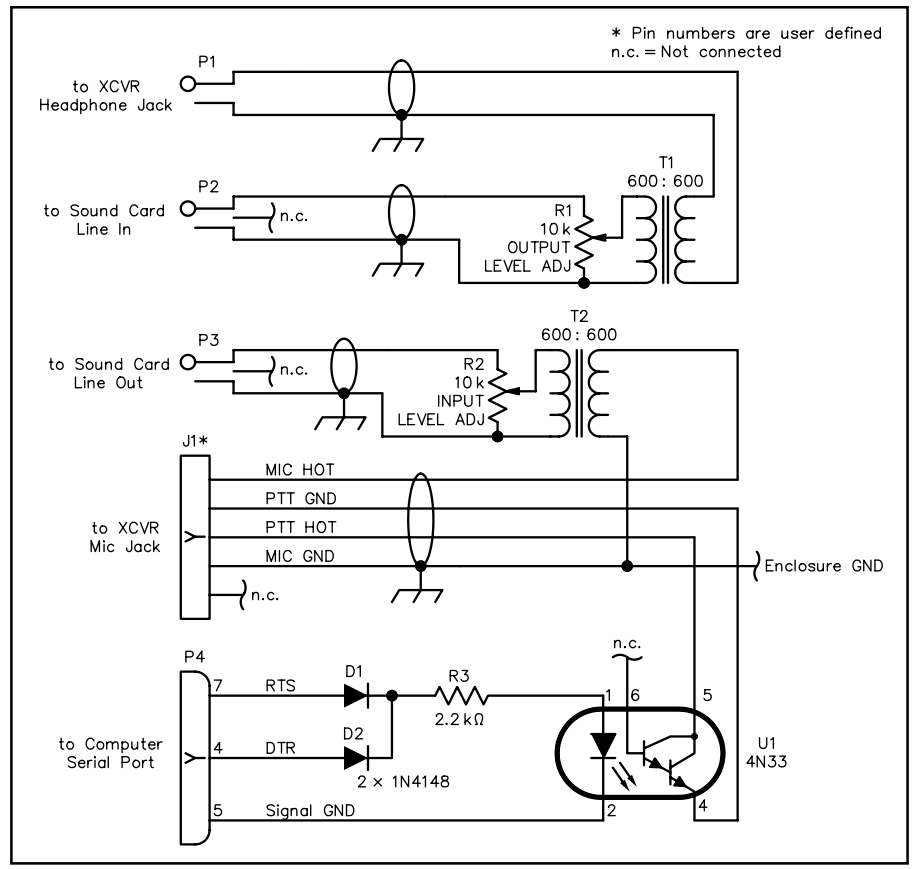




**Figure 1—Schematic of K8CAV's generic PSK31 Interface. The shield/ground connections shown for P1 through P3 and J1 are isolated from the metal cabinet and each other. Pin numbers are not shown for J1 as they are user selectable.**
**J1—Five-pin panel-mount DIN connector**
**P1—Two-circuit, 1/4-inch phone jack**
**P2, P3—Three-circuit, 1/8-inch phone jack**
**P4—DB9 connector/cable assembly**
**R1, R2—10-kΩ panel-mount pot, audio taper (RS 271-1721) or linear taper (RS 271-1715)**
**T1, T2—600 Ω, 1:1 isolation transformer (RS 273-1374)**
**U1—4N33 or 4N32 optoisolator (RSU 11567963)**

**Figure 2—For the front-panel labeling, Rick used a 2×4 1/8-inch clear Avery shipping label (#5663) made for use with a LaserJet printer. These labels are available at Staples and other office-supply stores.**

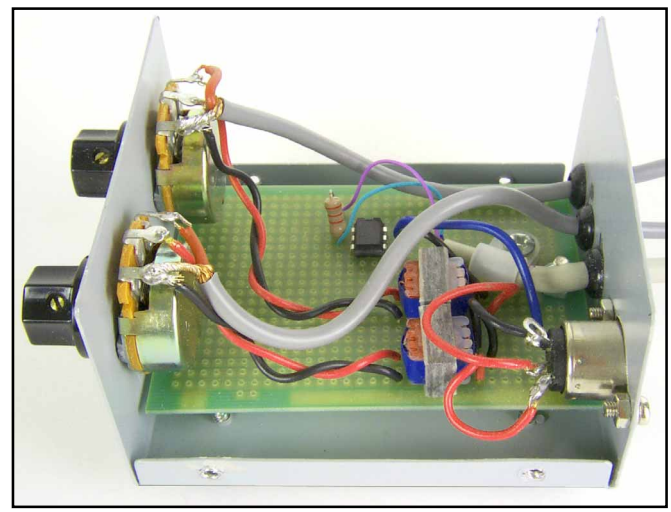


**Figure 3— An inside view of the simple interface.**

Paul Pagel, N1FB ♦ Senior Assistant Technical Editor

midrange, the clipping disappeared. When I got back on the air, I received very good signal reports: The software-indicated IMD was greater than –25 dB and there were no signs of overmodulation. Lesson learned: If you're using a laptop with only an **EARPHONE** jack for output, adjust the **VOLUME** control to eliminate clipping in the laptop's audio amplifier.

Even though most operators use desktop computers equipped with a sound card and standard **LINE IN** and **LINE OUT** ports, clipping and distortion can still occur if the volume controls in *Windows*' Multimedia section are wide open. A suggestion that worked well for a friend of mine was to set the volume controls in *Windows* Multimedia (**START**, **SETTINGS**, **CONTROL PANEL**, **MULTIMEDIA**, **PLAYBACK, VOLUME CONTROL**) at approximately 50%, then use the interface's level-control pot to adjust the audio level fed to the transceiver.

An interface between your rig and computer is invaluable. It makes setting drive levels quick and easy—necessary because the amount of audio drive required depends upon the amount of power you want to run and where the signal is in your transceiver's audio passband. Another very good reason to use an interface is that it eliminates ground-loop problems that can cause hum and distortion on top of the audio signal. *ARRL's HF Digital Handbook*[2] has several interface circuits you can build for $20, less if you have a well-stocked junk box.

Using an interface helps you maintain the audio level necessary to prevent overdriving your transmitter and ensure you have a clean signal. Enlisting a friend's help with on-the-air analysis makes the job of adjusting your signal a lot easier, especially if the software your friend is using has an IMD indicator. So if your signal is occupying more bandwidth than it should, take the steps mentioned earlier to clean it up—and make friends in the process.

## QRP WATTMETERS

*By Robert E. Roberts, K6VK,*
*PMB 3603, 136 Rainbow Dr,*
*Livingston, TX 77399-1036*

[Note: The author is commenting on an article that appeared in QRP Power, "A Wattmeter of Your Own," *QST*, Aug 2000, p 98.]

◊ It's been a while since I've done any real calculations on ac (RF) power and a comparison to dc voltage used for calibration. The RMS value of an ac or RF sine wave voltage is 0.707 of the peak value.

$P = EI$; $I = E/R$, therefore, $P = E^2/R$ (Eq 1)

where
P = power in watts
E = ac RMS voltage
I = current in amperes
R = resistance in ohms

Say a 5-W RF signal is applied to the power-meter circuit shown in Figure 1. Neglecting the drain of the diode and meter, the RF circuit voltage can be calculated from:

$P = E^2/R$ (not $P = E^2/2R$ as mentioned in the article) (Eq 2)

and

$E_{RMS} = \div \sqrt{PR} = 15.81\ V_{RMS}$, or 15.81/0.707 = 22.36 V ac peak (Eq 3)

Substituting a dc voltage of 22.36 V provides a reasonable approximation of the same voltage on the capacitor and current through the rest of the meter circuit. However, the shunt potentiometer can provide an additional current requirement from the RF signal not indicated by the microammeter and the rectified ac could result in a considerable ripple and lower ac (RF) effective voltage, which I did not try to calculate.

I therefore suggest that the shunt potentiometer be changed from shunt to series with an additional fixed resistor in series with the meter so that the only load on the rectified voltage is the current required by the meter movement.

The total series resistance for a 200-µA meter can be calculated as follows (neglecting the internal meter resistance):

R=E/0.0002 A = 22.36 V/0.0002 A = 111,800 Ω. This resistance value can consist of a fixed-value 100-kΩ resistor and a 25-kΩ potentiometer when using a 200-µA meter movement; and double the value for a 100-µA meter movement.

*ARRL Lab Engineer Zack Lau, W1VT, responds:*

The formula used in the original article appears on page 137 of *The Joy of QRP*.[3] The circuit measures peak voltage, approximately. It could be modified to measure RMS voltage with a scaling resistor. But, because one isn't used, one has to scale it mathematically by $1/(\sqrt{2})$. Because the scaled voltage is squared, one gets:

$P=(E/(\sqrt{2})) \times E/(\sqrt{2}))/R$, which equals $E^2/(2\times R)$ (Eq 4)

Here is my analysis of the circuit. The source impedance is 25 Ω: the 50-Ω impedance of the rig in parallel with the 50-Ω resistive dummy load. For the sake of simplicity I'll assume a conjugately matched transmitter and linear, time-invariant analysis.

The load impedance is R5, since the capacitor provides an RF short to ground. Note that it is much higher than 25 Ω, and isn't affected by R6. There is a time constant formed by the capacitor and R6 and the meter. With a capacitance of 0.01 µF and 100 Ω, the time constant is 1 µs. However, changing the capacitor to 0.1 µF does not seem to affect the frequency response on HF, according to actual measurements.

$V_{eff}^2/R$ is the integral of the voltage squared with respect to time divided by the time interval and the resistance. Thus, you can integrate $E^2(\sin^2 \theta d\theta)$ over 0 to $2\pi$, one cycle of the sine wave. I've applied formula 296 out of my ancient 61st edition of the *CRC Handbook of Chemistry and Physics*, which integrates to

$E^2\times(\theta/2-1/(4\sin(2\times\theta))$ (Eq 5)

This is evaluated over the interval 0 to $2\pi$. The integral works out to

$E^2\times (2\pi/2 - 1/(4\sin(8\pi)) - 0/2 - 1/(4\sin(0)))$ or $E^2\pi$ (Eq 6)

To determine the power, this has to be divided by the time interval and resistance:

$E^2\pi/(\text{time interval}\times\text{resistance})$ (Eq 7)

$E^2\pi/(2\pi R)$ (Eq 8)

$E^2/2R$ (Eq 9)

Robert's calculation from peak to with RMS seems cumbersome, since he then converts it back into peak voltage. I prefer to just calculate the calibrating voltage and skip two steps. Robert's circuit also re-introduces a problem that Rich's circuit eliminated, the poor meter accuracy (10% of full scale) which makes measurements of a 1-W signal difficult, if you just have a 5-W scale. There is a distinct benefit to having separate scales of 0.5, 1, 5 and 10 W, compared to just a single 5-W scale.

[2]Steve Ford, WB8IMY, *ARRL's HF Digital Handbook* (Newington: ARRL, 1999), ARRL publications order no. 7652. ARRL publications are available from your local dealer, or directly from the ARRL (tel 888-277-5289). See the ARRL Bookcase elsewhere is this issue, or check the ARRL Web site at: www.arrl.org/shop/.

[3]Adrian Weiss, K8EEG/W0RSP, *The Joy of QRP*, (Vermillion, SD: Milliwatt Books), 526 N Dakota St, Vermillion, SD 57059; ISBN 0-9614139-0-5.

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*CRC Handbook of Chemistry and Physics*, 61st Ed, 1980-1981. CRC Press. Editor Robert C. Weast, p A-65; ISBN-0-8493-0461-X.

# AO-40 Fails to Phone Home

As this issue of *QST* goes to press, AMSAT OSCAR-40 has not been heard from for more than one week, and command stations have been unable to reestablish contact with the Amateur Radio satellite. It had been hoped that an onboard computer timeout expected on or about December 16 would restart the beacon telemetry and give the ground crew some clues as to why AO-40 suddenly stopped transmitting on December 13. That did not happen.

"There were no observations, and command stations tried to re-establish communication by sending blind commands," said AMSAT-DL's Peter Guelzow, DB2OS, of the AO-40 team. If the initial reset had occurred, the satellite would have been restored to its post-launch configuration and attempted to transmit on 70 cm. However, the 70-cm transmitter has been problematic, and the satellite likely still would need to be reconfigured for 2-meter transmission at that point to be heard on Earth.

AMSAT-NA President Robin Haighton said several options remained to be investigated, and that control stations were working "to develop a positive sequence of events."

The AO-40 team was continuing to investigate reports of weak signals on the 2-meter downlink frequency of 145.898 MHz that seem to be coming from AO-40, but it discounted reports of telemetry heard there as a hoax. Other reports persist of a weak, unmodulated carrier, however.

Guelzow said the AO-40 team was encouraged by a report from the North American Aerospace Defense Command—NORAD—indicating that AO-40 was in one piece, that the orbit was exactly where it should be, that the radar cross-section was as expected, and that no other pieces were found. Guelzow said the NORAD data countered rumors "which no one on the inner team believed" that AO-40 might have exploded.

When and whether the satellite will be heard from again depends, in part, on whether AO-40 has picked up any of the "blind commands" sent by ground controllers. Guelzow said that if AO-40's IHU-1 onboard computer did not accept any "blind commands" sent by ground controllers since contact was lost December 13, it was hoped that a second automatic "command-assist" watchdog routine would cycle the satellite through various receive, transmit and antenna configurations. As of press time, the AO-40 team had received no indication that the watchdog routine had occurred. If AO-40 did pick up some commands, Guelzow said, the command-assist watchdog would be reset for another 10 orbits. That could extend the wait until Christmas.

Guelzow said the "watchdogs" are software resets. Ground controllers want to avoid doing a hard re-boot of the main computer. "If the IHU has crashed, then a reset command can be issued from the ground," Guelzow said. "This would be the last resort." He said AO-40 had a "very fail-safe system" and ground controllers wanted to thoroughly check out and analyze all other possibilities before issuing a hard reset command. "There is no need to hurry, and the command team doesn't want to miss any option," he said.

In the wake of the AO-40 problem, Guelzow found himself fending off criticisms that the satellite was launched even though the Phase 3D team was aware of problems with the helium valves that control fuel flow to the onboard 400-Newton propulsion system. Ground controllers did report trouble operating the valves while they were attempting to perform an orbit-change maneuver, and the satellite's telemetry ceased during subsequent efforts to test the propulsion system.

"There were no *known* problems," Guelzow said in a December 18 posting to the AMSAT bulletin board. "The valve which seemed not to operate correctly [during ground testing] was sent back to the manufacturer in the US and was repaired."

Guelzow said the valve and pressure regulator worked perfectly during testing in the Orlando Phase 3D Integration Lab and during the pressure test at the launch site in Kourou, French Guiana, prior to launch. "All other subsystems worked perfectly, including the 70-cm TX," he said.

AO-40 ground controller Stacey Mills, W4SM, was optimistic in a posting to the AMSAT-BB. "The command team remains very hopeful that we can recover P3D, but remember, this really is rocket science. There are no absolute guarantees," he said.

The AMSAT-DL Web site has the most up-to-date AO-40 information at **www.amsat-dl.org/journal/adlj-p3d.htm**.

## "The Big Project" Attracting Big Donations

Before it's even officially off the ground, "The Big Project"—the educational initiative of ARRL President Jim Haynie, W5JBP—already has attracted a few substantial donations plus several smaller ones. The project, known formally as "The ARRL Amateur Radio Education Project," is aimed at providing a turnkey Amateur Radio curriculum at the middle school level plus resources and equipment to bring it to life for youngsters.

***"Kids get the hobby of a lifetime and preparation for good careers—that's the ultimate goal."***

"Without asking we've already received approximately $125,000 for the project," Haynie said. "This tells me people are very serious about this initiative." Haynie has been courting corporate dollars and seeking foundation grants for the project.

So far, the project has received two substantial donations of stock from anonymous donors. Since the ARRL is a 501(c)(3) organization, donations are tax deductible—at the appreciated value in the case of securities.

In addition, the ARRL Foundation has pledged $50,000 in start-up funds for the project. A formal check presentation was scheduled for the January ARRL

Rick Lindquist, N1RL ♦ Senior News Editor

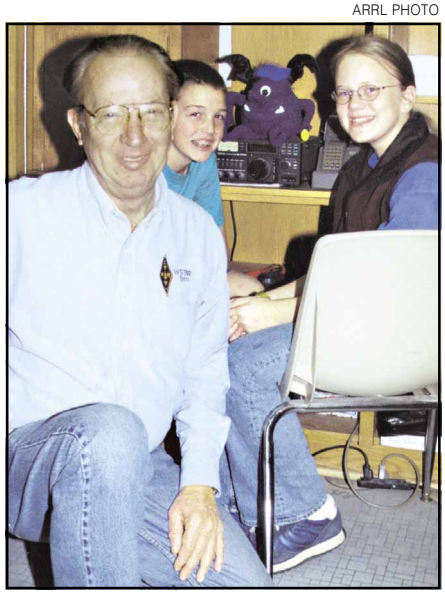
Board of Directors meeting.

As conceived by Haynie and under the guidance of ARRL Vice President Kay Craigie, WT3P, the ARRL Amateur Radio Education Project will work directly with teachers who use Amateur Radio as a teaching strategy in the classroom. "The goal is to improve the quality of education for kids by providing educationally valid techniques involving Amateur Radio for teaching all sorts of subjects—science, geography, languages, speech," Craigie said. "Kids get the hobby of a lifetime and preparation for good careers—that's the ultimate goal."

Craigie said the project's philosophy is that Amateur Radio can be a "powerful resource" for teachers in attaining their educational goals—whether or not licensing is involved. "It's about improving education."

Growth in the amateur ranks could be a delayed effect of the program. "Some children will want to study for licenses immediately," Craigie said. "Others will return to the idea in later life." If nothing else, those exposed to ham radio through The Big Project "will remember Amateur Radio as a good thing that made school more fun," she said.

ARRL PHOTO



**ARRL President Jim Haynie, W5JBP, visits with newly licensed students Jay, KD5LXN (middle), and Lyndsey, KD5LXP (right), at the Dallas-area DeGolyer Elementary School. "The kids are like sponges," Haynie said of the sixth graders. "They learn faster than we even want them to." Haynie said the youngsters he's worked with already are comfortable with the Internet, "but they enjoy ham radio too," he said. Haynie has loaned some of his personal equipment to the youngsters to help them get started. Students at DeGolyer already have formed an Amateur Radio club (KD5MEW, but a vanity call sign is in the works).**

"These kids who have good school experiences with ham radio will grow up to be our neighbors, zoning board members, and political officials," Craigie said. "Amateur Radio can never have too many friends."

Donations are encouraged to the ARRL Amateur Radio Education Project, c/o Barry Shelley, N1VXY, 225 Main St, Newington, CT 06111. Contact Shelley, **bshelley@arrl.org**; 860-594-0212, to discuss details.

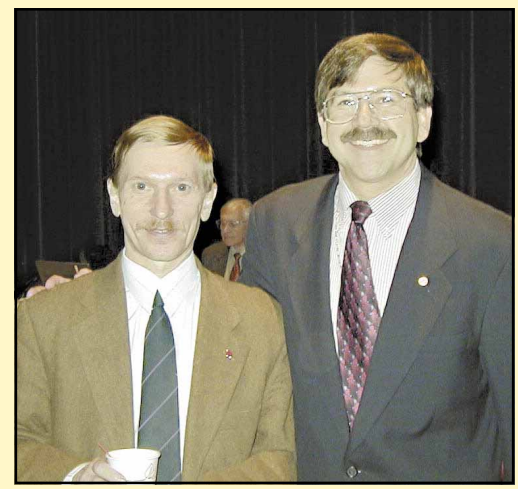
## ARISS International Partners Ratify Bylaws, Elect Officers

Amateur Radio on the International Space Station—or ARISS—delegates have ratified new bylaws and elected officers. The ARISS International Group also logged considerable progress in planning the future direction of the ARISS program when it met December 1-3 at Goddard Space Flight Center in Maryland.

Now that the solar wings have been deployed and brought on-line aboard Space Station Alpha, more routine operation of the initial ARISS station on 2 meters is anticipated. So far, only Amateur Radio test passes have occurred, although Expedition 1 Commander William Shepherd, KD5GSL, did work a Pennsylvania ham at the tail end of one test pass. Packet operation is expected to begin soon.

Delegates from the US, Russia, a consortium of European countries, Canada and Japan elected Frank Bauer, KA3HDO, to chair the ARISS Board. European Subregional Working Group Chairman Gaston Bertels, ON4WF, was chosen as Vice Chair. ARRL Field and Educational Services Manager Rosalie White, K1STO, was elected Secretary-Treasurer. All will serve for two years.

On the third try, youngsters at Luther Burbank Elementary School near Chicago on December 21 became the first students to talk with the Expedition 1 crew via Amateur Radio. The Illinois school had been on the waiting list for such a contact for almost five years. Two attempts a couple of days earlier to talk with the Space Station Alpha crew were unsuccessful. (See "Illinois School Thrilled By First ARISS Contact" on next page.) Schools in Virginia and New York were tentatively scheduled for the second and third ARISS contacts in January, and another two dozen schools are on the roster for future QSOs.



**ARISS-Russia delegate Sergej Samburov, RV3DR (left) and newly elected ARISS Board Chairman Frank Bauer, KA3HDO (right), at the ARISS International Group meeting in December.**

Contacts between the ISS crew and schools was a major focus of the ARISS International Group's discussions. The international partners plan to share the time allocated for school contacts. The oldest two years' worth of school applications for the former Space Amateur Radio EXperiment program will get top priority. The ARISS delegates agreed with a motion from observer Ron Parise, WA4SIR—a NASA payload specialist—to require that all school QSO applications include specific educational proposals. It's hoped that the ISS crews eventually will be able to handle at least one school contact per week.

ARISS delegates also approved a QSL card featuring a color photograph of the ISS. The ARRL will handle QSLs for QSOs made by US amateurs with the ISS crew. Other QSL points will be announced.

The ARISS International Group approved a Russian proposal to send up a higher-power mobile transceiver to be installed in the *Zvezda* Service Module, possibly as soon as next year. Antennas for both 2 meters and 70 cm are to be installed during a space walk next year. A proposal to activate Slow-Scan TV is in the works.

The Expedition 1 crew of Shepherd and Russian cosmonauts Sergei Krikalev, U5MIR, and Yuri Gidzenko has been aboard the ISS since early November and has been extremely busy with its normal work schedule.

For more information about Amateur Radio on the ISS and SAREX, visit the ARISS Web site, **ariss.gsfc.nasa.gov/**.

## NOTABLE SILENT KEYS

• **Gerald W. Mason, W1KRF:** Jerry Mason, W1KRF, of Freeport, Maine, died June 2, 2000. He was 78. A ham since the age of 15 and an ARRL member, Mason was among the hundreds of New York and New England amateurs who provided emergency communication during the disastrous September 1938 hurricane, flood and tidal wave that surprised the region, destroying homes, buildings and vessels with its high winds and extensive flooding and claiming more than 600 lives. During the storm, Mason and several other hams kept hard-hit Westerly, Rhode Island, in contact with the outside world via Amateur Radio for more than 48 hours, handling some 800 pieces of emergency traffic The efforts of Mason and other ham radio heroes of the famous storm were chronicled in a compelling cover story in the November 1938 *QST*.

• **Alf Almedal, LA5QK:** Former IARU Region 1 Executive Committee member and HF Chairman Alf Almedal, LA5QK, of Sola, Norway, died November 11. He was an ARRL member and a former president of the Norwegian Radio Relay League.

• **Joseph J. Carr, K4IPV:** Amateur Radio author Joe Carr, K4IPV, of Annandale, Virginia, died November 25. He was 57. An ARRL member, Carr contributed hundreds of articles over the years to various publications, including *QST*, *Popular Electronics*, *73*, *Nuts and Volts* and others. At the time of his death, Carr was the "Antennas & Things" columnist for *Popular Communications*. Carr was a prolific author and had written more than 100 books, including *Joe Carr's Loop Antenna Handbook*, *Practical Antenna Handbook*, *Receiving Antenna Handbook*, and *Practical Radio Frequency Test & Measurement—A Technician's Handbook*. Book publisher and author Harry Helms, AK6C, of LLH Technology Publishing knew Carr personally and professionally for more than 20 years. "Joe was a first-rate technical writer and editor, a consummate professional in his craft, and a pleasure to work with," Helms said. Carr's wife, Bonnie, survives.

• **Steven C. Affens, K3SA:** Well-known contester and DXer Steve Affens, K3SA (ex-K3ZAW), of Olney, Maryland, died November 28 reportedly after suffering a heart attack in the Cayman Islands. He was 52. According to reports, Affens and his wife were celebrating their 30th anniversary in the Caymans. He also had operated from the Caymans as ZF2SA during the *CQ* World Wide CW DX Contest. An ARRL Life Member, Affens was first licensed in 1963. He was a member of the Potomac Valley Radio Club. A videographer for WJLA (Channel 7) in Washington, DC, Affens won the White House News Photographers' Association award for Cameraman of the Year five times. He also was the recipient of several Emmy Awards and numerous other photography citations. Survivors include Affens' wife, Patti, N3HOT, and their son Scott, KA3TUE.

• **Millard L. "Gib" Gibson, W7JIE:** Former ARRL Northwestern Division Vice Director "Gib" Gibson, W7JIE, of Seattle, Washington, died December 1. He was 81. An ARRL Life Member, Gibson served as Northwestern Division Vice Director in 1983 and 1984 after being appointed to fill an unexpired term. Gibson previously served as director of the IARU Region 2 Intruder Watch program and was active as an Official Observer. Gibson was a member of the Quarter Century Wireless Association. He was an active CW QRP operator.

• **Jack D. Gant, W5GM:** Former ARRL West Gulf Director Jack Gant, W5GM (ex-W5EGR), of Ardmore, Oklahoma, died December 6. He was 84. Gant served as West Gulf Division Vice Director from 1972 to 1976 and as Director from 1977 to 1980. Gant had been licensed for 66 years and belonged to the Quarter Century Wireless Association. ARRL President Jim Haynie, W5JBP, said Gant mentored him when Haynie first joined the Board as West Gulf Director in 1982. "He was a good advisor and a nice guy who was well-liked on the Board," Haynie said.

## Illinois School Thrilled By First ARISS Contact

COURTESY OF RITA WRIGHT

It was a historic moment for Amateur Radio. Several hundred youngsters, teachers, parents, and news media representatives were on hand at Luther Burbank Elementary School near Chicago December 21 for the first Amateur Radio on the International Space Station school contact. During the 10-minute pass, 14 first through eighth graders plus one teacher got a chance to pose questions about life aboard Space Station Alpha to Commander William "Shep" Shepherd, KD5GSL, who used the special NA1SS call sign for the occasion. Seventh grader Jessica Lehocky—shown at the microphone—had the honor of asking the first question, while eighth grader Kurt Susniz awaits his turn. Their T-shirts bore a Burbank-ISS contact patch designed by students at the school. Shepherd said his most favorite aspect of being on the space station was the ability to float around in space. "It's like you're not moving at all. You're just like in a pool and you can move anywhere you want, but there's no water in it." Veteran Chicago-area SAREX/ARISS mentor Charlie Sufana, AJ9N, and his team braved frigid temperatures and repeated snowstorms to install antennas on the school's roof. At the conclusion of the successful contact, the grateful crowd applauded loudly and offered up a hearty "thank you!" and "73!" to Shepherd and his Russian crewmates. Shepherd said he enjoyed the chat and looked forward to more school QSOs.

## ARRL'S "RADIOS ON-LINE" SERVICE NOW FREE TO MEMBERS

Listing a classified ad to buy and sell Amateur Radio-related equipment on the ARRL's *Radios On-Line* service now is free to League members. Listings will continue to be available for viewing by everyone, but now that *Radios On-Line* is an ARRL membership benefit, only League members may post ads.

ARRL members now can post free ads up to 100 words—subject to a few rules. Members first must register for access to the ARRL members-only pages and be logged on as a member in order to post ads. Classifieds listed on *Radios On-Line* will remain posted for 30 days unless canceled earlier.

*Radios On-Line* is for noncommercial, personal use. There are no provisions for nonmembers to post classified advertising. The service provides for listings in more than two dozen categories. Members may list ads seeking or selling Amateur Radio-related equipment. The site includes a search engine to look for specific items.

The ARRL does not warrant any items advertised on *Radios On-Line*, nor are individual advertisers subject to scrutiny. The ARRL reserves the right, at its discretion, to decline a listing or to discontinue an ad without prior notice.

Visit the Radios On-Line site **www.arrl.org/RadiosOnline/** to place or view ads.

## FAR ANNOUNCES 2001-2002 SCHOLARSHIPS

The Foundation for Amateur Radio Inc, a non-profit organization with headquarters in Washington, DC, plans to administer 67 scholarships for the 2001-2002 academic year to assist radio amateurs. FAR invites applications from qualified amateurs.

The Foundation—composed of more than 75 local area Amateur Radio clubs—fully funds 10 of these scholarships with the income from grants and its annual Hamfest. The remaining 57 are administered by FAR without cost to the various donors.

Amateur Radio operators holding a valid license may compete for these awards if they plan to pursue a full-time course of studies beyond high school and are enrolled in or have been accepted for enrollment at an accredited university, college or technical school. The awards range from $500 to $2500 with preference given in some cases to residents of specified geographical areas or the pursuit of certain study programs. Clubs—especially those in Delaware, Florida, Maryland, Ohio, Pennsylvania, Texas, Virginia and Wisconsin—are encouraged to announce these opportunities at their meetings, in their club newsletters, during training classes, on their nets and on their world wide web home pages.

Additional information and an application form are available by letter or QSL card request postmarked prior to April 30, 2001. Address requests to FAR Scholarships, PO Box 831, Riverdale, MD 20738.

The Foundation for Amateur Radio, incorporated in the District of Columbia, is an exempt organization under §501(c)(3) of the Internal Revenue Code of 1954. It is devoted exclusively to promoting the interests of Amateur Radio and those scientific, literary and educational pursuits that advance the purposes of the Amateur Radio Service.

# In Brief

- **DXCC applications list available:** DXCC applicants no longer need wonder whether their applications made it to ARRL HQ for processing. Now they can find out by visiting the List of DXCC Applications Received page, **www.arrl.org/awards/dxcc/appstatus.html**. The page lists pending DXCC applications by call sign.

- ***Mir* to be deorbited in late February:** According to press accounts, Russia plans to deorbit the *Mir* and send the space station on a re-entry trajectory that will put it into a desolated part of the South Pacific. The deorbit and re-entry is scheduled to take place in the February 26-28 time frame—15 years plus one week from the day the initial *Mir* module was put into orbit in 1986. The more than 130-ton spacecraft, on which several US astronauts served tours of duty with Russian cosmonauts, will be pushed out of Earth orbit using Progress rockets. Amateur Radio aboard *Mir* became a primary source of communication in the wake of a near-disastrous fire aboard the craft. It also allowed the crew members to speak with schoolchildren on Earth. Space debris experts are estimating that as much as 50 tons of space junk are likely to survive re-entry in Earth's atmosphere and—assuming all goes as planned—land in the Pacific. NASA Chief Daniel Goldin says he salutes Russia's decision to dump *Mir* in the interests of safety. One Progress rocket already is docked at *Mir*. Another Progress loaded with propellant was scheduled to join it in January. It will take several days of "phasing burns" to position *Mir* for deorbiting.—*from press reports*

- ***CQ* introduces Amateur Radio Hall of Fame:** *CQ* magazine has announced the establishment of the "*CQ* Amateur Radio Hall of Fame." The new hall of honor joins *CQ*'s "DX Hall of Fame" and "*CQ* Contest Hall of Fame." *CQ* says the dual goals of the new program are to recognize individuals who have made significant contributions and to focus public attention on the far-reaching and longstanding value of Amateur Radio in society. Nominees will be judged on the basis of qualifying in one of two broad areas: Individuals, licensed or not, who have made significant contributions to the Amateur Radio hobby; and radio amateurs who have made significant contributions to society in general. *CQ* is accepting nominations for the inaugural class of the Amateur Radio Hall of Fame until March 31, 2001. A nomination form and full details are available on the *CQ* Web site, **www.cq-amateur-radio.com**. Initial selections will be announced at the 2001 Dayton Hamvention next May.—*CQ news release*

- **REACT honors youngster for FRS rescue:** REACT has honored a Washington youngster for her quick thinking in responding to a call for help transmitted on a Family Radio Service channel. The nonprofit volunteer emergency communications organization presented 11-year-old Mikayla Whitley of Marysville, Washington, with its "Little Hero Award" and "Distinguished Service Award." On September 24 Mikayla picked up a call for help from injured hiker Michael Wyant 100 miles away. The girl's parents called authorities, who launched a rescue while the youngster acted as a communication relay between the hiker and rescuers. Wyant was picked up by a helicopter later that afternoon, treated at a hospital and released. He also called to thank his radio rescuer. REACT officials presented the two awards October 15 in Kirkland, Washington.—*Paula Glovick, KD7CCF/REACT*

- **UK extends 73 kHz authorization:** The Radiocommunications Agency in the UK has announced a three-year extension to the 73-kHz Amateur Radio allocation there until June 30, 2003. The allocation has been available to hams in the UK since 1996. It was due to be withdrawn completely at the end of June. The Radio Society of Great Britain says the RA agreed to the extension because experimentation on 73 kHz has been slower than anticipated due to the high-noise floor towards the top end of the allocation. The RSGB said that additional work is under way on how propagation is affected by the current enhanced solar flare activity.—*RSGB*

## FCC SEEKS TO REQUIRE FCC REGISTRATION NUMBER

The FCC has proposed requiring that everyone it does business with obtain and use an FCC Registration Number—or FRN. Many amateurs registered with the Universal Licensing System already have been assigned a 10-digit FRN by the Commission Registration System—or CORES. To date, the FCC has not made FRN use mandatory, however. The FCC released a *Notice of Proposed Rulemaking* (MD Docket 00-205) December 1.

The FCC says requiring individuals and entities to obtain an FRN will help it to better track and manage the collection of fees. The FCC proposes requiring that FRNs be provided with any filings that require payment of a fee, such as the vanity fee for amateurs.

The FCC also says it intends to reject filings requiring an FRN that do not include the number. The Commission said its proposed rules "would make the use of the FRN mandatory in certain circumstances so that anyone not yet assigned an FRN or who has not yet obtained one must obtain one."

An individual does not have to hold an FCC license to obtain an FRN. The FCC says the information collected by CORES includes the "entity name and type," Taxpayer Identification Number or TIN—typically a Social Security Number for an individual, contact address and e-mail address. CORES information is not made public.

Comments on the FCC rulemaking notice were due 30 days from the date of publication in *The Federal Register*. Reply comments were due by 45 days from the date of publication.

The FCC began implementing CORES last year. CORES registration eventually will replace Universal Licensing System, or ULS, registration. The FRN will coexist with the Licensee ID Number issued by the ULS, an FCC spokesperson said.

More information on CORES is available on the FCC Web site, **www.fcc.gov** (click on the CORES registration link).

## FCC MULLS REQUEST TO EXPAND HF MESSAGING SYSTEM

The FCC is considering a proposal to expand a nationwide, commercial two-way short-data messaging system it authorized on a conditional basis three years ago. Terion Inc—formerly known as Flash Comm Inc—filed with the FCC late last year to modify its current conditional authorization. The company also seeks to obtain "a renewal expectancy."

In July 1997, the FCC's Wireless Telecommunications Bureau conditionally granted authority to Flash Comm Inc to construct and operate—on a secondary basis—a nationwide, commercial two-way short-data messaging system that operated in the 3-30 MHz range, subject to certain conditions. The frequencies the system uses do not fall in any current ham bands, but some are close, and the ARRL strenuously objected to the plan when it was first proposed. The ARRL planned to file comments this time around as well.

Under the Flash Comm/Terion system, so-called "intelligent transceiver units" are installed on vehicles and structures. Transmitted data enable the service to track the location or monitor the status of each "asset." Transmissions are in short bursts averaging two seconds on HF channels the system selects automatically as being unoccupied.

Terion wants to quadruple the amount of authorized spectrum. It also wants the FCC to approve increasing the total HF energy transmitted each day, also by a factor of four and jump the aggregate transmissions per hour from one percent to four percent.

The company says it wants to "obtain a renewal expectancy in the event it provides a showing of substantial service" prior to the expiration of its five-year conditional authorization in order to eliminate the need for a separate rulemaking proceeding.

## FCC DENIES ANOTHER UNTIMELY RENEWAL PETITION

The FCC has denied a *Petition for Reconsideration* from a former ham who filed for license renewal beyond his two-year grace period. The FCC ultimately turned down the petition from Richard Josslin, ex-W7CXW, of Bainbridge Island, Washington, because Josslin had not properly filed his reconsideration petition. But the FCC also told Josslin that ignorance of FCC rules was no excuse and that he should have known he needed to renew his ticket on time.

The FCC said that Josslin's ham ticket already had been expired for more than two years when he attempted to register with the Universal Licensing System. Josslin was informed that his W7CXW call sign no longer was in the FCC database. The following month—nearly three years after his license had expired—Josslin applied for renewal by writing his renewal request on the Report he got back from the FCC instead of on the required FCC Form. The FCC dismissed the renewal attempt because Josslin was well beyond the two-year grace period. The FCC advised him that he had to take his exams again to hold an amateur license.

Josslin attempted to get the FCC to change its mind, claiming that he failed to renew his license because of an erroneous belief that his license was good for life.

The FCC was unmoved, however. It said Josslin failed to file his petition within 30 days of the release date of the Commission's action and sent it to the FCC in Gettysburg instead of to the FCC Secretary in Washington, DC.

The FCC noted, however, that Josslin's application for renewal was properly dismissed in the first place because it wasn't filed on the correct form. Beyond that, the FCC said, Josslin's erroneous understanding about his license term was not sufficient justification to reinstate his license.

## FCC TO ACCEPT INTERNET DATA TO IDENTIFY SILENT KEYS

The FCC says it's prepared—under certain conditions—to accept a printout from an Internet Web site as sufficient proof of death to cancel a license in the Amateur Service. The FCC will continue to accept death certificates and published obituaries, and now can accept multiple cancellation requests.

According to a spokesperson in the FCC Licensing and Technical Analysis Branch in Gettysburg, the FCC now can accept a printed copy of information appearing on the Internet as adequate proof of death "provided the printout contains certain, verifiable, information." The Licensing Bureau also will accept a list—with supporting documentation—of multiple requests for cancellation of amateur licenses.

"It's basically no different than us taking requests today, other than a person can now send multiple cancels in one re-

quest and can also send documentation printed from a reliable Web site," the Licensing Branch spokesperson said. "We still require the same information."

According to information on the FCC's vanity Web site, **www.fcc.gov/wtb/amateur/vnityfaq.html**, individuals can report the death of a licensee by submitting a signed request for license grant cancellation accompanied by a copy of an obituary or death certificate to the Licensing Branch.

The FCC says it's been able to match up the name, address and birth date of the deceased included on some submittals it's received via the Ancestry.com Internet site, **www.ancestry.com**. "The validity of these printouts as proof of death is equal to the same level of sufficiency as an obituary, in terms of reducing the risk of the inadvertent cancellation of a valid amateur call sign," the FCC spokesperson said.

### *Amateur Enforcement*

♦ **FCC reaffirms reduced fine for former amateur:** The FCC has denied a *Petition for Reconsideration* filed by a former Houston, Texas, amateur and has affirmed a $4000 fine. Leonard D. Martin, formerly KC5WHN, had asked the FCC to reconsider its reduced fine for operating without a license and for refusing FCC requests to inspect his radio installation. Last summer, the Commission substantially reduced the $17,000 fine it had proposed. On July 12, the FCC issued a Forfeiture Order telling Martin to pay $4000 for repeated unlicensed operation on 11 meters and for failing to allow equipment inspections on several occasions. In responding to the initial Notice of Apparent Liability, the FCC said, Martin did not deny the violations but requested cancellation of the fine arguing that he was unable to pay it. In his reconsideration petition, Martin still did not deny transmitting without authorization or refusing to allow an equipment inspection. But he contended the FCC failed to comply with its own procedures by, among other things, not providing him with "proper notice to inspect" and by not giving him a chance to have an attorney present. Martin also claimed the FCC Forfeiture Order was based on "unsubstantiated allegations," that the fine was out of proportion to the violations, that the FCC exceeded its authority to regulate interstate communications, that his First Amendment rights were violated, and that he was denied due process. The FCC categorically turned away Martin's arguments and concluded that he "has failed to provide a sufficient justification" for canceling or reducing the fine. The FCC ordered the fine paid within 30 days.

♦ **Michigan ham agrees to HF suspension:** The FCC says Amateur Extra licensee Michael E. Guernsey, ND8V, of Kalamazoo, Michigan, agreed to a nine-month suspension of his HF privileges, starting January 1. FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth said that if Guernsey does not violate FCC rules or the license modification agreement, the FCC will clear his file of past complaints in any future enforcement action against his license. The action came in the wake of allegations that the licensee had caused deliberate interference on 20 meters "particularly communications of Hispanic operators and truckers when you perceived them to have an improperly 'wide' SSB signal or a signal which in your opinion exhibited excessive microphone gain," Hollingsworth said. The FCC also cited allegations that the licensee may have used profanity and obscenity on the air, that he may not have identified by call sign, and that he might have deliberately interfered with communications on the Maritime Mobile Service Net.

♦ **Ohio ham could face hearing:** The FCC has told General licensee Jeffrey J. Pipenur, WA8IKW, of Vandalia, Ohio, that it's poised to designate his station license for a revocation or renewal hearing and his operator's license for suspension. The FCC cited monitoring information and "complaints before the Commission" alleging that Pipenur "deliberately interfered" with other amateur communications on 75 meters. Further such complaints could lead to a hearing, Hollingsworth told Pipenur. Last March 1, after considering Pipenur's response to earlier FCC allegations of "deliberate interference, poor Amateur practice, and operation contrary to" FCC rules, the FCC set aside his renewal grant and renewed his license for one year. In his response, the FCC said, Pipenur did not deny the activity, apologized, and consented to the short-term renewal.

### SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Maryland-DC, Nevada, New Hampshire, Northern New Jersey, Rhode Island, San Joaquin Valley, Utah and West Texas Sections. You are hereby solicited for nominating petitions pursuant to an election for Section Manager (SM). Incumbents are listed on page 12 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. Petition forms (FSD-129) are available on request from ARRL Headquarters but are not required. We suggest the following format:

(Place and Date)

Field & Educational Services Manager, ARRL

225 Main St

Newington, CT 06111

We, the undersigned full members of the _____ ARRL section of the _____ division, hereby nominate _____ as candidate for Section Manager for this section for the next two-year term of office.

(Signature___ Call Sign__ City__ ZIP__)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on March 9, 2001. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before April 1, 2001, to full members of record as of March 9, 2001, which is the closing date for nominations. Returns will be counted May 22, 2001. Section Managers elected as a result of the above procedure will take office July 1, 2001.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning July 1, 2001. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the July 2001 *QST*. A Section Manager elected through the resolicitation will serve a term of 18 months. Vacancies in any Section Manager's office between elections are filled by the Field & Educational Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Rosalie White, K1STO, Field & Educational Services Manager*

# Wildfire!

*By Bob Cowan, K5QIN*

Over a hundred hams responded to provide communications during a large forest fire near Los Alamos, New Mexico, in early May 2000. It was by far the largest emergency ever supported by amateurs in this area.

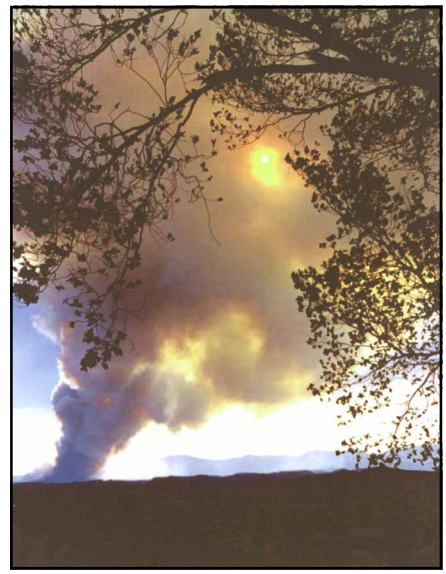
The Cerro Grande Fire began on May 4, 2000, in Bandelier National Monument, New Mexico, in an attempt to reduce the fuel content of 1000 acres of forest by igniting a "controlled burn." High winds and extremely dry conditions caused the fire to quickly escape its intended boundaries. Before it was extinguished several weeks later, it had consumed 48,000 acres of forest, destroyed 261 residences in Los Alamos, and left 444 families homeless. Firefighting costs exceeded $15 million and the total cost was expected to approach $1 billion.

The Los Alamos Amateur Radio Club, since its founding in 1948, has been involved in many emergency communications operations. Over the years we have developed a very well-equipped club station, W5PDO. We have excellent HF facilities as well as numerous VHF and UHF radios. Four telephone lines, a FAX machine, and several computers add to our capability. An emergency electrical generator can power the station. Field Day has always been our favorite club activity, and this experience was very useful during the Cerro Grande Fire.

## W5PDO Activated

We were first activated on Sunday evening, May 7. W5PDO was opened, and we were to be in service for two weeks including many days and nights of continuous operation. Our first duties were to staff three Red Cross shelters and the Los Alamos County Emergency Operations Center (EOC). About 500 residences in Los Alamos were evacuated that evening. Many persons occupied shelters in nearby White Rock; others went to locations in the Rio Grande Valley. Hundreds of messages were passed among the shelters regarding supplies, staffing, and location of shelter residents. Operations continued this way on Monday, May 8.

On Tuesday, May 9, the winds calmed and Forest Service firefighters felt that they had a good chance to control the fire. Bulldozers built fire lines, backfires were lit, and slurry bombers dropped huge loads of red fire retardant. Everyone hoped for the best. But high, gusty winds were forecast for the next day. Communications activities continued as they had on Monday with large numbers of messages being passed among many stations.



BOB COWAN, K5QIN

**The Cerro Grande Fire as it approached Los Alamos on Sunday, May 7. Five hundred residences were evacuated that evening.**

The wind returned on Wednesday, May 10, with a vengeance. At 8:30 AM, county officials expressed concern that the fire lines would not hold. We were notified of an impending evacuation of the entire community at about 10 AM. Club members packed a few prized personal possessions and assembled at W5PDO to assist with the evacuation. The Los Alamos Police Department asked us to man about a dozen locations along three evacuation routes. With gusty 60-mph winds, the fire line was soon breached. The first evacuation order by an automated telephone notification system came at 2 PM; the second and final one an hour later. About 10,000 people were evacuated yet it proceeded quite orderly.

Several club members stayed at W5PDO during the early stages of the evacuation. We intended to "tough it out" if at all possible. At about 4 PM, though, flames topped a ridge line only a half-mile from our club station and headed our way. We decided then that valor had its limits. We grabbed several VHF radios, a computer, and our logs and joined the evacuation. Police and National Guardsmen were stationed along the way to ensure a smooth flow of traffic. The air was thick with smoke and homes were burning only a few blocks away as we made our way out of town.

## Operations Forced to Move

We moved our operations to White Rock, about 10 miles away, where we commandeered a room in the Senior Center. Two VHF radios and antennas were quickly set up. Operations continued there for several hours. At about 1:30 AM, though, the fire was reported to be heading for White Rock. An immediate evacuation of that community was ordered. This proved to be a nightmare as the normal population of 7000 had grown substantially by the previous evacuations. Only one road led out of town. We closed operations, rounded up our families, and headed for safer locations. At this time, radio communications control was assumed by the State EOC in Santa Fe which was manned by members of Santa Fe County RACES and using the call sign of the Santa Fe Amateur Radio Club, W5SF.

On Thursday, May 11, we followed news reports hoping to hear that the fire had spared our homes. Most of us were so blessed. Many of our friends and several hams were not so lucky. New Red Cross shelters were set up in Pojoaque, Santa Fe and Glorieta. Hams were stationed there, and a huge volume of traffic was passed. The efforts of firefighters had saved a large part of Los Alamos from total destruction, but the fire continued to burn out of control toward the north.

One of our club members returned to Los Alamos on Friday, May 12. He found that the club station had survived, but barely. Electrical power was out in that part of town because of burned power poles, but our generator started without hesitation. It saw continuous use for a week. Club members were called back and we resumed operations about 4 PM.

We set up a computer spreadsheet program to schedule operations at

W5PDO, Red Cross shelters in Pojoaque Valley, Santa Fe, and Glorieta. Our assistance was again needed at the County EOC. Los Alamos was still under an evacuation order, yet many workers were needed in town to assist with fire fighting, security and recovery operations.

About 90 percent of our communications were carried out on the 145.19 MHz KB5RX repeater located on Pajarito Mountain, just west of Los Alamos. This repeater is solar powered and performed magnificently during the entire operation.

### The Recovery

The fire had moved beyond Los Alamos by Saturday, May 13, and recovery operations began immediately. Utilities needed to be restored before residents could be allowed to return to town. A public information center was set up with 50 telephone lines. It was manned by volunteers who answered many questions from evacuees. Two hams were stationed there. Many pets were left behind when the town was evacuated. Several out-of-town animal rescue agencies arrived to assist with locating, evacuating and feeding many animals. We provided hams to accompany these persons as they were not familiar with the town. Over 500 pets were assisted.

We provided "followers" to assist County officials as they traveled around town. Using 2-meter hand-held radios, they were always in instant contact with the EOC, Red Cross and other agencies. New Mexico citizens donated an enormous amount of relief supplies. Getting it to Los Alamos was a problem. Several hams volunteered their trucks to help. Communications assignments often changed hourly, but there was always someone ready to take on any job that came up. We never lacked for people to assist at any location. The cooperation of all hams in New Mexico was superb.

Our logs showed that 134 individual hams and two club stations participated in this operation. They gave 2500 hours of service over a period of 14 days. Fifteen different locations including eight Red Cross shelters were served.

It has been said, "Wisdom is examined experience." Here are a few things we learned:

(1) Ask for help. Many hams will respond with abounding enthusiasm to perform any task that might be needed. (2) No amount of planning will account for every contingency, but we can plan to improvise. (3) A computer with a spreadsheet program is invaluable for scheduling operators, making lists of telephone numbers and keeping track of everyone who participates. (4) Traffic handling seems to be a lost art. Training operators in this skill should be a priority in all Amateur Radio clubs. (5) Have extra people standing by to assist with calls for immediate assistance.

The most difficult time at W5PDO was at night when the winds calmed and smoke moved in. With every breath, we smelled smoke. After catching a few catnaps in the wee hours of Monday morning, May 15, we awoke to hear a robin singing. At that point, we knew that all would be well again. New trees would grow and be green again. Los Alamos would be restored to its natural beauty, but not in our lifetimes, nor in that of our grandchildren. Fire, though far more terrifying, is as much a part of nature as gentle rain and spring flowers.

## FREAK STORM FLOODS FRANKLIN COUNTY

*By Pauline Masson*

When a freak thunderstorm hung suspended over central Franklin County, Missouri, in the early morning hours of May 7, it dropped 14 inches of rain in a four-hour period. The deluge turned the network of dry ditches, runoff creeks and streams that drain the rolling hills and ragged ravines of this northern tip of the Ozarks into raging flood waters. The water roared through the narrow stream beds like released logging flumes, lifting propane tanks, trailers and some homes from their foundations. It washed out culverts and filled low-lying areas.

A severe weather warning the previous day had been shrugged off in the glow of benign sunshine. A first stage drought that had begun in the summer and fall of 1999 had dried up local farm ponds and reduced some spring fed creeks to a trickle. The slow, steady rain that started early in the evening of May 6 gave no hint of what was to come.

### First Response

In St Clair, Keith Wilson, K0ZH, Franklin County RACES officer, was awakened by a 2:30 AM phone call from a friend asking if the family was okay; the friend had been watching the storm on the TV news. Wilson dressed and headed for the Emergency Management Agency Operation Center, EOC, in Union, nine miles north. While en route, he talked to Bob Goza, W0BOB, in Beaufort, and Craig Brune, N0MFD, in Washington on the Zero Beaters Amateur Radio Club repeater, WA0FYA.

When Wilson arrived at the EOC at 4:30 AM, emergency officials already knew they had a major catastrophe in the making. Jerry Goff, KB0UTG, EOC director was en route from his home. Franklin County Presiding Commissioner Gene Scott arrived at the center, as did Dan Niec, a Missouri Department of Transportation area engineer.

As hams throughout the area awoke and turned on their home or mobile stations and learned of the scope of the disaster, they went out in the deluge to assess road conditions near their locations. They relayed road and bridge damage reports to the EOC where Lt Eileen Stapp, Franklin County 911 director, was in contact with fire, ambulance and law enforcement throughout the area.

PAULINE MASSON

**Keith Wilson, K0ZH, Franklin County RACES officer (left) and Jerry Goff, KB0UTG, EOC director, at the ham desk in the EOC center in Union, Missouri.**

In Union, the county seat, where the brunt of the storm was centered, a propane tank had been lifted from its moorings and carried downstream where it slammed into a business in Union and exploded. Fire fighters were fighting the blaze. Flat Creek had overrun its banks and washed through two trailer parks, reducing most of the trailers to rubble. Firemen were waking residents in the path of rising water and evacuating them. The National Guard was called in to prevent looting.

### Radio Amateurs Assist Red Cross

The local Red Cross chapter had been called to set up emergency shelters in Union, Washington and St Clair for the displaced persons. Throughout the day on Sunday, five Red Cross shelters were set up with five mobile feeding units.

All major highways and some 43 county roads were under water or completely washed out in one or more spots, and more than 600 individuals were displaced. On Monday morning, when the reports of the damage began to accumulate, Bob Masson, KB0JDY, Zero Beaters president, arrived at Red Cross Headquarters on Elm Street in Washington to operate a base station. Red Cross volunteers from other areas of the state arrived to assist. They were unfamiliar with local roads and maps were of no avail.

Other hams also began to arrive at Red Cross chapter headquarters. Red Cross workers, frustrated that the two incoming lines were continually tied up, and cell phones were overloaded or did not work, quickly learned to rely on hams. A ham was assigned to every Red Cross vehicle so Wilson, at the EOC, could direct them to passable roads to reach their destination.

After the storm subsided and Red Cross workers began the task of assessing damage and delivering food or emergency items to victims in remote areas, some 20 hams were at work. When volunteers from AmeriCorp arrived on Monday, a ham went with each team to direct them through the damaged areas and maintain contact with Red Cross headquarters.

At the Red Cross, hams had a temporary 2-meter base station, which consisted of power supply, 2-meter radio and portable mag-mount antenna. On Red Cross vehicles, hams provided equipment to operate on 2 meters, which included portable antennas and either 2-meter mobiles or H-Ts. "When we knew we would have a number of guys coming in to help, we contacted anyone who could bring in additional equipment, such as 2-meter radios, mobiles or H-Ts, extra mag-mount antennas and

portable power supplies, and any radios with cigarette lighter attachments," Masson said.

### Assessment and Summary

Tallies showed that two fatalities had resulted from the storm and 30 individuals had to be treated at area hospitals for flood-related injuries. All major highways in the county were closed for a period, including Interstate 44. Forty state and county roads were closed in places into the second day. Some 650 homes were damaged, 121 completely destroyed. Dozens of industrial forms had been severely damaged. Vehicles were washed away; crops were ruined. Damage estimates exceeded $100 million.

The freak storm on May 7 set records for rainfall and road closings in Franklin County and was the first true test of the emergency communication equipment and multiagency cooperation envisioned by Goff, Wilson and Scott. The EOC and County 911 dispatcher (located within arm's reach of each other) provided the central point for communication among and between county commissioners, the Franklin County Sheriff's Department, Washington, Union and St Claire police departments, fire departments and public works departments, three regional ambulance districts, the Missouri Department of Transportation, Red Cross shelters and field disaster workers, and some 25 area Amateur Radio operators.

"Hams provided the critical communications link between the county emergency operations center and the various Red Cross response and relief locations that, quite frankly, were virtually unreachable by other communication means," Goff said. QST

## Rusty Hack, NM1K, Honored for Service to HANDI-HAMS

Russell "Rusty" Hack, Jr, NM1K, was honored last year by the Courage Center of Minneapolis, Minnesota, for 1,000 hours of volunteer service to HANDI-HAMS. Rusty, of Enfield, Connecticut, is well known among traffic handlers as he has achieved Brass Pounders' League and Public Service Honor Roll every month since 1988. Since then, he also has served as a Message Originator for HANDI-HAM members and volunteers. Rusty is active in the ARRL Field Organization as an Official Relay Station, Emergency Coordinator and as an Official Bulletin Station. For twelve years, Rusty was a head instructor of licensing classes for the Newington Amateur Radio League. Congratulations, Rusty!


**Rusty Hack, NM1K, is shown holding the "Crystal Pitcher for 1,000 Hours of Volunteer Service to Handi-Hams."**

# Field Organization Reports

### Public Service Honor Roll
### November 2000

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

876 NM1K
354 K5NHJ
324 N5JZ
321 K7BDU
319 N9VE
318 K9JPS
265 KK5GY
249 W7TVA
246 KA2ZNZ
237 AG4DL
230 NN7H
225 K7VVC WA5OUV
221 KK3F
215 WA9VND
214 W6DOB
208 W7BO
207 WB5ZED
199 N5OUJ
198 N5IKN
196 K8GA
195 KB2RTZ N2LTC
193 KB1AJ
191 N2YJZ W6IVV
187 KA1DSB KA5KLU
183 W4EAT
180 K2UL
178 KA4FZI
176 W8YS WX8Y
177 KC5OZT
175 W5ZX
174 WB2UVB
171 N9KNJ N2RPI
169 KA2GJV
168 N8IO N5NAV K6YR K9FHI
165 KJ3E
162 WN0Y
161 WB4GM
W6QZ K4RBR KB2EV
160 KC4TLG
159 N2OPJ WB5NKC
157 KV4AP
156 N8FPN
155 N2CCN KC2AHS
154 WO0A N5JUU N7YSS
152 KC2DAA
151 KC4ZHF
150 K0IBS KB8ZYY K4SCL
149 K4IWW
W0OYH W3YVQ
148 N0SU WA4DOX KD4GR
147 WB0ZNY K8KV
146 KB5W W0WWR W3CB WA5I AF4GF
145 KA1GWE NZ1D
144 WA1FNM KB2VVD
143 NY2V N2JBA KB2VRO WD9FLJ
142 N8BV WB4TVY KT4TD
141 W0LAW
140 KR4MU WB5NKD
139 W4CAC W2MTA KB5TCH N9BDL NR2F
138 NC4ML N2KPR N2WDS KT6A WB2ZCM W7GB W7ZIW
137 N1LKJ W2EAG W9YCV
136 W2RJL KE4JHJ KE4PRB
135 AC4CS
134 W3BBQ N3ZKP
133 W3VK N2AKZ AF4NS
132 K2DN WB2GTG W2AKT AB4XK K4FQU
131 NN2H WU4C W9CBE KJ4N
130 KC2EOT KB2KLH
129 WD8DHC WA2UKX WB2QIX W1PEX
AD9IH WB2FGL
128 K5VV K5IQZ N3WKE AA3SB WA0TFC WX4H KB2VVB
127 KG2D WA1JVV WD9HII
126 KB2ETO
125 W1ALE
124 N7AIK KB0DTI W2JHO N7AIK
123 AA8PI K9LGU KA4UIV
122 KE1AI KC8CON N3WAV KG4EZQ
121 WW8D KD1LE N9TVT
120 W7GHT N1JBD K5DPG K0PIZ AA8SN KC8LBZ K7GXZ W7LG K4DMH AF4QZ
119 K4MTX W5CDX W5GKH AA2SV KF6OIF N9MN KB4DXN
118 KI4YV W4CKS KA8WNO KA2DBD K2GBR W9ZY W3IPX KE4IFD W3OKN K7MQF
117 N8DD W4NTI
116 W2GUT KA2CQX
115 AD6LW
114 W4DGH WA2YBM WA4EIC
113 W4AUN KF4KSN
112 WA4QXT AA3GV WD0GUF K2PB AG9G
111 W6JPH KC5VLW W7QM
110 AB4E W1QU KA4HHE
109 K8JP KC4VNO AF2K K2VX
108 K8QIP KB2WII W2FR W4WXA K4WKT W2MTO
107 AA2ED
106 WA8SSI K4YVX WA2GUP
105 AA4YW KD4HGU WB4PAM
104 KG4CHW
103 K8VFZ KE0K K8LEN KC6NBI
102 AD4XV W2PII N8EXV KA4LRM
101 K5MC N3WK WB2LEZ
100 W1JX KA2ZKM
99 W4CC K4BG
98 KJ7SI
97 WA1QAA
96 W8SZU
95 N5GG
94 KF5A
92 N1IST
91 KC8HTP W1JTH
90 KO4OL KC3Y WJ3K K4BEH
89 KG5GE WR8F KA7TTY
88 N2GJ AA4BN
87 WB4UHC W2LC WI2G WA2YOW W2CC KG4IGE
86 KC2ANN
85 W5XX W4QAT
84 AA4AT AF4CD KA0DBK K3TX
83 K8ZJU KC6SKK AC5Z WB2IIV KE4VBA
82 WB9GIU
81 K3UWO
80 KM5YL WA4EYU
79 KE4DNO
78 K3CSX N4JAQ
77 KV4AN KB4WBY
75 N2VQA
74 WA8DHB KM4WC
73 KJ5YY WB7VYH K8AE KB4WBI N3RB
70 N1SGB

The following stations qualified for PSHR in October, 2000, but were not listed in last month's column: W2MTA 147, N2KPR 138, KA2BCE 118.

### Section Traffic Manager Reports
### November 2000

The following ARRL Section Traffic Managers reported: AK, AL, AR, AZ, CO, CT, EMA, ENY, EPA, EWA, GA, IA, ID, IL, KY, LA, KS, MDC, ME, MI, MN, MO, MS, NC, NH, NFL, NNJ, NTX, NV, OH, OK, ORG, SBAR, SC, SD, SDG, SFL, SNJ, STX, TN, VA, VT, WI, WCF, WMA, WNY, WPA, WV, WWA, WY.

### Section Emergency Coordinator Reports
### November 2000

The following ARRL Section Emergency Coordinators reported: AL, AZ, CT, ENY, EWA, IN, KS, KY, LA, MDC, MI, MN, NLI, OH, SD, SFL, STX, SV (North), TN, VA, WCF WMA, WNY.

### Brass Pounders League
### November 2000

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* |
|---|---|---|---|---|---|
| KK3F | 27 | 1540 | 1384 | 56 | 3007 |
| NM1K | 861 | 213 | 971 | 0 | 2045 |
| WX4H | 3 | 677 | 978 | 30 | 1688 |
| N2LTC | 0 | 650 | 744 | 27 | 1421 |
| W5SEG | 44 | 624 | 563 | 10 | 1241 |
| W1PEX | 0 | 98 | 925 | 15 | 1038 |
| WZ7V | 0 | 583 | 32 | 474 | 1009 |
| W7BO | 44 | 455 | 499 | 0 | 998 |
| KT6A | 0 | 514 | 474 | 0 | 988 |
| WB5ZED | 17 | 480 | 400 | 22 | 919 |
| W6DOB | 0 | 437 | 390 | 76 | 903 |
| K7VVC | 73 | 304 | 377 | 15 | 769 |
| WA9VND | 22 | 404 | 284 | 15 | 725 |
| N5IKN | 0 | 320 | 211 | 109 | 640 |
| K7BDU | 136 | 181 | 303 | 17 | 637 |
| KA2ZNZ | 24 | 293 | 224 | 84 | 625 |
| W9IHW | 1 | 289 | 45 | 249 | 583 |
| W6IVV | 33 | 424 | 120 | 0 | 577 |
| N9VE | 0 | 264 | 39 | 254 | 557 |
| W4EAT | 9 | 264 | 270 | 6 | 549 |
| WB2GTG | 3 | 202 | 303 | 11 | 519 |
| N9TVT | 0 | 151 | 362 | 3 | 516 |
| K5NHJ | 196 | 51 | 233 | 20 | 500 |

BPL for 100 or more originations plus deliveries: K9JPS 222, KK5GY 147, K9GU 146, N5JZ 136, KB1AJ 110. QST

# Jeff Leer, KG0VL—Arctic Rover

VHF rovers have become all the rage, but Geoffrey Leer, KG0VL, may be an exceptional case. Over the past five years, Jeff has operated 2- and 6-meter portable stations from more than 140 grids, extending across the subarctic of Ontario to Alaska and south into the northern tier of states. This is not traditional territory for VHF rovers, so what is the great attraction?

It cannot possibly be the hordes of summer-time black flies and mosquitoes as big as half dollars, nor the hazards of winter-time blizzards, white outs and below zero temperatures. Jeff certainly has experienced all of these conditions during his many ventures into the subarctic, but the real attraction (as you may have already guessed) is the northern lights, or aurora borealis.

**Figure 1—KG0VL set up with Yagis for 6 and 2 meters from a lonely spot in Manitoba.**

## The Attraction of the Aurora

Aurora are present nearly every night over the auroral zone, which is normally situated north of 55° latitude in central Canada (but varies in other northern regions). During geomagnetic storms, the aurora spreads southward, sometimes well into the United States. Aurora produce fantastic visual displays of blue, green and red lights, but VHFers are probably more interested in the strange effects it has on radio propagation.

Signals at 50 through 432 MHz can be scattered up to 2000 km by the southerly edge of the auroral curtain, imparting a distinctive Doppler-shifted hissing sound to signals. Associated auroral-E propagation is an almost nightly occurrence across the auroral zone, which supports strong, clear 50-MHz signals 1000 to 5000 km and further, quite similar to sporadic E. At times, 144 MHz signals can also span distances up to 2000 km by auroral E as well.

The only secret to using these two propagation modes is that stations must be within 1000 km of the aurora, and ideally, much closer than that. You can wait for the aurora to come to you, and many VHFers in the northern half of the US do just that. A dozen or so days a year, strong auroras do make possible aurora and sometimes auroral-E contacts across the northern half of states. Once every few years, auroral conditions may be observed as far south as the Gulf Coast.

There is another way to experience aurora almost every night. Simply travel far enough north to be within the auroral zone. That, simply put, is how Jeff Leer and his wife Kim got started chasing auroras. There are practical problems with that scheme, of course. It is a long drive, even from the northern US. Most paved roads end long before they get to the auroral zone and gravel roads take over. Other problems include lack of services—or indeed, any habitations at all—weather, insects and the unexpected.

## The Early Years

Jeff began his ventures in 1995. He and his wife began a series of short trips and vacations in a pick-up truck loaded with antennas and equipment to northern Minnesota, western Ontario and southern Manitoba, relatively safe places directly north of his home in Iowa. They did not see aurora or hear auroral VHF signals as often as they liked, and it soon became evident that they needed to travel much further north.

To be sure of having visual aurora nearly every night (barring clouds, of course), Jeff concluded they needed to travel at least as far north as central Manitoba. The place he chose for the first real venture into the auroral zone was 275 km northwest of the town of Lynn Lake (DO97) and 1600 road kilometers (that's 1000 miles) north of Winnipeg. That is where the gravel roads end and about as far north as can be conveniently driven.

It was a perfect spot to watch the aurora directly overhead and to scan the bands for distant 6-meter signals. Hooked after their initial trip into the auroral zone, Jeff and Kim subsequently devoted nearly all their free time traveling through the subarctic regions of Canada and Alaska. They typically make several trips a year lasting a few days to a week or two each. So far, they have been to Ontario, Manitoba, Alberta and Alaska. Just this past summer, Jeff joined an expedition to Svalbard Island, north of Norway in the Greenland Sea, just to operate 6 meters.

## Equipment

Jeff quickly found a comfortable routine. He takes complete SSB/CW rigs for 50 and 144 MHz (along with HF equipment, mainly for liaison), with 400-W solid-state amplifiers for both bands. Stacked 9-element Yagis for 2 meters were permanently mounted in the pick-up truck bed on a rotator, which can be used while in motion. The 5-element Yagi for 6 meters had to be put up on its own mast when parked, but Jeff could get

**This Month**

| | |
|---|---|
| Feb 4 | Excellent EME conditions |
| Feb 11 | Excellent EME conditions |

Emil Pocock, W3EP ♦ Box 100, Lebanon, CT 06249 (Voice 860-642-4347, fax 860-594-0259) ♦ w3ep@arrl.org

it assembled and erected in just a few minutes.

It can get lonely up there in the north country. To be sure of hearing at least one signal on each band, Jeff brings along his own portable beacons. The 6-meter unit runs 100 W to a 3-element Yagi, usually put up at the 30-foot level. The companion 2-meter beacon also runs 100 W with a 7-element Yagi on the same mast. Both will transmit continuously for nearly two days on four deep-cycle batteries hooked up in parallel.

Jeff finds a remote location about 100 km east or west of where he plans to operate and sets up the beacon. He then has a perfect indicator of local auroral conditions. He has used the beacons to perform all sorts of interesting experiments, including those involving antenna polarity and signal strength, elevation angles to high-latitude aurora, comparisons of 50 and 144 MHz signals and several other more technical observations. Every two days, Jeff must drive out to the beacon site and replace the batteries with a freshly charged set.

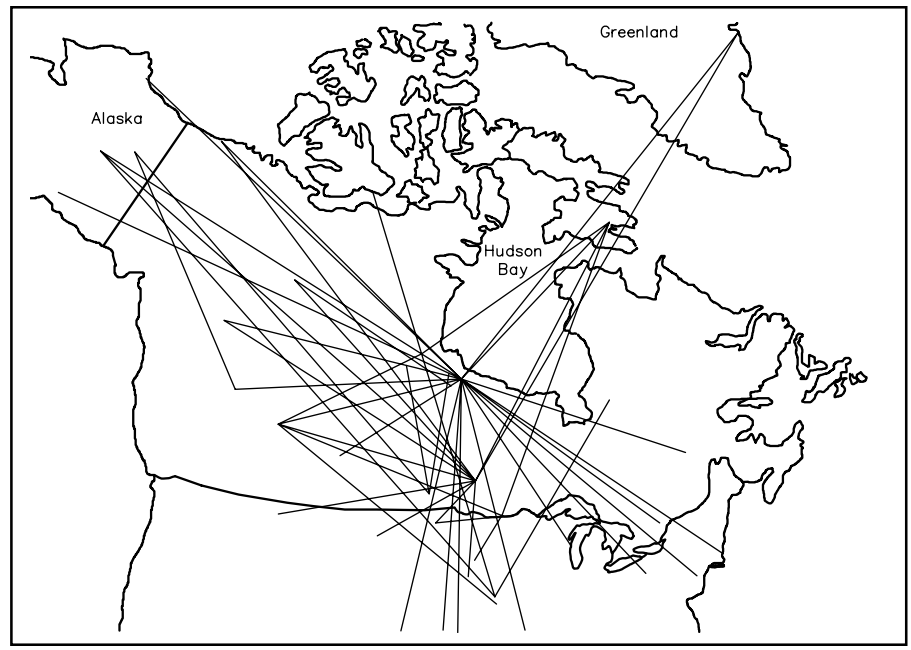



**Figure 2—Lines show paths of 50 MHz auroral-E signals heard or worked by KG0VL over the past several years from various locations in the auroral zone.**

## On the Six-Meter Band

Jeff also listens for the dozen or so 6-meter beacons scattered across the arctic subarctic from Alaska to Greenland. The first time Jeff heard the VE8BY beacon from Baffin Island was a bit of a surprise. It was just after 1:00 PM on a sunny day. He found a raspy sounding signal and wondered what computer hash was doing so far out in the bush. It quickly dawned on him that it was the auroral tone of FSK keying used by the VE8BY beacon. During subsequent trips, Jeff has heard at one time or another all the 6-meter beacons from VE4, 5, 6 and 8, mostly via auroral E.

Oh yes, Jeff sometimes made contacts as well, conditions permitting. On some occasions, 6-meter auroral-E conditions have been fantastic and Jeff has made dozens of two-ways from Alaska to the East Coast and as far south as Kansas. See the accompanying map for a plot of 6-meter signals Jeff has heard or worked on 50 MHz over the past several years.

One such memorable event took place on October 20, 1999. Jeff was set up in EO36 (northern Manitoba) when an impressive aurora storm began. At 0342, he worked KL7NN (BQ60), who had been alerted by Jeff's portable beacon, with a nice, clear auroral-E signal. Later Jeff learned that KL7NO (BP54) had been hearing him call CQ, but made no contact. Both the Alaskans were more than 3000 km to the northwest.

On the afternoon of the next day, indicators were the aurora was intensifying. Jeff drove 80 km through blowing snow to change the beacon batteries, all the while copying the VE8BY (FP53) beacon 1500 km to the northeast with 40-over-S9 signals using a mobile whip. When he got back on the air at 0135, 6 meters was already open. The first station Jeff worked was W3EP (FN31) with a clear 57 auroral-E signal. That contact surprised both of us, as it was my first QSO of the evening as well. From then until nearly 0700, Jeff worked stations across Canada and deep into the US. The final tally was 28 QSOs in VE2, 3, W1, 2, 3, 9 and 0.

There were other surprises. During one trip to western Ontario grid EO30, Jeff tuned up on 50.125 MHz, thinking the band was completely dead. He reflexively spoke into the microphone, "Is the frequency in use?" Ha, it was! A KL7 came back immediately and said, "I haven't heard that in 30 years." The effects of auroral E can be found at least as high as 144 MHz, although Jeff has not heard any 2-meter beacons and has not made any such contacts on the band, despite many attempts. He has heard radio bingo broadcast in the Inuit or Dene language on 94 MHz FM, apparently from an isolated broadcast station far to the north.

Jeff's trip to Svalbard this past July was also an adventure. Few of the HF operators on the expedition thought anything would come from the 6-meter station, but Jeff thought differently of course. There were many problems with transportation, power generation and equipment, and band conditions were not as wonderful as Jeff had hoped. Nonetheless, on the evening of July 11, Jeff heard OH and SM beacons and worked a number of stations in Finland and Sweden via auroral E. Later in the morning, he copied the VE8BY beacon for more than an hour, but did not make any contacts into North America.

## Adventure

Jeff's wife Kim accompanies him on many of these trips, and she quickly found something to do as well. Kim has been taking auroral photographs for the past several years. The green auroral scene in this month's Up Front is one of hers. Typically, Jeff and Kim sleep during the day and get up around midnight local time, when the sun finally goes down in summer, to look for both visual and radio aurora. In winter, some things are more convenient. It gets dark much earlier, for one thing. There are no mosquitoes or black flies, and the gravel roads are frozen solid, making driving much easier. Of course the snow and cold can be a problem, but Jeff has become hardened to putting up antennas in a blizzard.

Kim also shares the nonauroral adventures with Jeff. Most rovers have had encounters with local police. Jeff was once pulled over in a remote area by a Royal Canadian Mounted Police officer, red lights flashing and all excited. He stopped Jeff to let him know that he was going the wrong way to get to the airplane crash. On another trip, Jeff and Kim could have used a Mountie. Far from any town or village, much less a gas station or repair shop, Jeff discovered that one of

the leaf springs on the pop-up camper they were towing had broken, dropping the camper bed onto the wheel. There was no alternative. He unhooked the camper, removed the broken spring and drove 150 km over a gravel road to Leaf Rapids in search of help. There he finally found someone who welded the spring into a useable form. He drove back to the camper, reinstalled the spring and resumed driving. The detour only took one day.

Jeff's expeditions to the auroral zone have proven that there is plenty of unusual VHF propagation across the arctic regions. Prior to future trips, Jeff says he will be more public about his plans, so that VHFers across Canada and the northern US, at least, will know when and where to look for him on the VHF bands. More about Jeff's expeditions to the auroral zone, photographs and additional information can be found on his new Web site at **www.kg0vl.com**.

## US Six-Meter Expeditions in November

8R1/W7XU, Guyana, Oct 30 through Nov 7, 690 QSOs in 35 DXCC entities; 130 QSOs with W4 and W5. See **www.iw.net/~w7xu/8r-1.html**.
VP2MJJ (W6JKV) and VP2MJD (K6MYC), Monserrat, Nov 2 through 19, worked all US call areas and much of Europe. See **www.w6jkv.com**.
FG/N0JK, Guadeloupe, Nov 4 through 8, 102 QSOs in 16 DXCC entities; 7 QSOs with VE1, W4 and W5. See **communities.msn.com 6MDX&naventryid=110**.
J3/W1AIM, Grenada, Nov 9 through 23, 126 QSOs in 20 DXCC entities, including W1, 2, 8, 9 and 0; VE3 and 9.

## ON THE BANDS

Six-meter activity dominates the news for November, just as Cycle 23 was probably nearing its peak. Two great auroral events also aided 6-meter DX hounds, while providing some interest for 2-meter operators. A bit of sporadic E and one tropospheric opening round out most of what happened in November. Thanks to all those mentioned in the summaries and to K1SG, K1TOL, N1RWY, WB2AMU, K1WVX, N4MM, W4MW, WB4WXE, K6YK, K7JA, WD8KUF, K9AKS, W9RPM, K0SQ, W9UD, K0CBA, KC0BMF, WA0TIZ and YV4DDK; newsletters from G4UPS, OZ6OM and SM7AED; VHF columns from G3FPK, G4ASR and VK5KK; the Web UKSMG Announcement Page and the DX packet spots on the Web DX Summit. Dates and times are all UTC.

## Six-Meter DX

Six-meter DX possibilities were excellent throughout much of the world in November, yet conditions were often marginal for many North Americans looking for new countries. The best periods were generally November 1 through 7 and 21 through 30, when the 2800-MHz solar flux was at least 180. It topped 200 only on November 1 and 25. Two massive auroral events centered on November 6-7 and 26-27 created some interesting propagation at midlatitudes during subsequent days.

### *Caribbean, Central and South America*

Much of the eastern half of the US and adjacent Canada had propagation to the Caribbean, Central and South America on more than a dozen days during the month. Every section of the country had at least some opportunities to work south of the border. Signals were usually quite strong and SSB was the rule. Activity was aided by 6-meter expeditions to 8R1, FG, J3 and VP2M (see the sidebar for details). In addition to commonly worked DXCC prefixes CX, HC, HC8, HK, KP4, LU, PY, PY0, TI, YV, many US and Canadians reported 8P9HT, FG5BG, FM1DQ, FY5KE, HP2CWB, J87AB, P43AB, V31PC, V44KAA and YS1AG.

Even stations in the W6 and W7 call areas were able to nab a few of these DX prizes. N6CA logged FG5BG on November 30, perhaps the first time Guadeloupe has ever been worked in California on 50 MHz. On the same day, CO2KK worked 26 Californians and one W7 using low power and a simple wire antenna. Other unusual contacts, mostly from the western states, into the Caribbean, Central and South America during November are listed in Table 1.

South Americans continued to make fantastic runs into Europe and Asia during November as well, almost as a routine matter. Perennial DX leader PY5CC worked BA7IA, BG7OH and several VRs on November 9, for example. He also tallied two new countries during the month, including KH5/KH6ND for his 200th DXCC entity, the first operator to achieve that level. This remarkable achievement has been the result of years of persistent operating. Congratulations Peter!

### *Africa and the Indian Ocean*

Opportunities to work to Africa and the Indian Ocean during the first week of the month were also good, especially for those in the Midwest. FR1AN, FR1GZ and FR5DN, made a big hit from Reunion on the morning of November 1, when they worked stations from VE1 to W0, mostly on SSB. W7RV (Arizona) nabbed FR1GZ for a nice 18,000 km contact—well done! Several other Africans worked into the Midwest that day, including 5R8EE, EH8BPX, EH8BYR and Z22JE. Widely scattered US and Canadian stations also reported 3C5I, 7Q7RM, EH9IB, TR8CE, ZD7VCT and ZS6PJS during November. There is room only to list some of the other more unusual contacts from the US and Canada to Africa in Table 2.

In addition to all of the African and Indian Ocean stations that made it to North America, Europeans also logged A22ZS (Botswana), D44AC, BS and CF (Cape Verde), E30TA (Eritrea), S92DX (Sao Tome and Principe), S07U (Western Sahara), ST2SA (Susan), TS7N (Tunisia) and TT8DX (Chad). Many of these stations were expeditions that were on the air for a limited time only. For a wonderful 28-page review of the ZD8SIX expedition by G3WOS, see **www.uksmg.org/ascension-1.htm3**.

### *Europe, the Mediterranean and the Middle East*

Well-equipped stations in the Northeast worked the bulk of the Europeans from North America on at least a dozen mornings in November. VE1YX and other Canadians in VO1, VE1 and VE9 usually had the best conditions, followed by those in northern New England. Operators in other areas found opportunities more limited. Typically, signals from western Europeans CT, EH, EI, GI, G, GW, F, PA, ON, F and DL were weak and openings were often highly selective, even for those in the favored Northeast. Most contacts were made using CW.

Despite disappointing conditions for the peak of the solar cycle, select Northeastern operators made it as far as the Middle East, making brief contacts with 5B, 4X, OD and J2 (Djibouti). The most unusual opening took place on the morning of November 7, when many stations all along the East Coast noticed

**Table 1**
**US to the Caribbean, Central and South America on 50 MHz in November**

| *Day* | *US Calls and Call Areas (State)—DX Calls* |
|---|---|
| 1-7 | W1, 2, 3, 4, 5, 0—8R1/W7XU |
| 4-8 | W1 through 0—VP2MJJ, MJD |
| 6 | K5SW (OK)—FM1DQ |
| | N0JK (KS)—V44KAA |
| | W0 (IA)—P43JB |
| 7 | W4 (GA)—CE, FY5 |
| | W5, 6, 7—KP4UK |
| | W5 (OK, TX), W7 (AZ)—P43JB |
| | W7 (MT, OR)—LU , CX |
| 11 | W5 (OK, TX)—J3/W1AIM |
| 12 | VE3, 9; W1, 2, 8, 9, 0—J3/W1AIM |
| 28 | N7IJ (ID)—HP2CWB, TI |
| 29 | W6, 0 (CO)—FG5BG |

**Table 2**
**US to Africa and the Indian Ocean on 50 MHz in November**

| *Day* | *US Calls and Call Areas (State)—DX Calls* |
|---|---|
| 1 | W9 (IL), 0 (IA)—5R8EE |
| | W9 (IL), 0 (MN)—Z22JE |
| | W9 (IL)—EH8 |
| | W0 (KS, MN)—TR8CA |
| 4 | K5AM (NM)—7Q7RM |
| 6 | W1, 3, 4, 8, 9, 0 (MO)—ZS6PJS |
| 7 | W4, 5 (NM), 7 (AZ, NV), 0 (KS, CO), KH6—ZD7VC |
| | W5 (TX, NM), W7 (AZ)—3C5I |
| 30 | K8MFO (OH)—3C5I |

the Europeans peaked along a skewed southerly path, well off the great circle route. VE1YX, for example, found CT, EH, EH6, F, G, I, S5 and SV at around 135°. Strong Caribbean and Central American stations came in not long after.

A few fortunate operators in Ohio, Virginia, Florida and Missouri also reported some western European contacts, which are briefly summarized in Table 3. Texans worked into Europe during the last week of November, when conditions improved after the mid-month lull. Yes, it is true that the East Coast had the edge on transatlantic propagation, but it was not a monopoly, as the sample of some of the unusual contacts into Europe and the Middle East shows.

For their part, Europeans seemed to have the run of the rest of the world. They worked at least as far as HC8N to the west, ZS to the south and BY, VR2, DU and JA to the east. Some of the openings were just astonishing. EH7KW ran 180 JA stations via the long path on the evening of November 3. The next morning, G0LCS reported "more JAs than I've ever heard before." OH2BC made 55 JA QSOs in a huge pileup. G4CBW also found DU/GM4COK, while PA7MM and OZ4VV worked 9M2JKL. That same day, UN3G and UN6P (Kazakhstan) and EY8MM (Tajikistan) made several hundred contacts each into every part of Europe.

### Asia and the Pacific

Propagation from the West Coast across the Pacific followed a pattern similar to the transatlantic contacts. Washington, Oregon and California stations got the bulk of the openings to KH6, VK, ZL and JA in the afternoons, but there were opportunities for those all across the country as far as the East Coast to make contacts. The big hits for the month included KH5/KH6ND (Palmyra) and ZM8CW (Kermadec Island). Table 4 is a sample of some of the more unusual contacts across the Pacific.

Other North Americans also got in on the Pacific DX. KL7IKV had modest runs of JA stations on November 2, 3, 18, 19 and 25, but he did not report any adjacent countries, such as HL, BV, BY or VR2. NL7Z found ZM8CW on November 4. XE2EED worked Japan on November 5, 10 and 28 and also logged KH5, KH6, V73AT, VP6 and ZL.

Stations from China and Hong Kong continued to make interesting contacts, especially to the east as far as Europe. VR2XMT, who logged LA5QFA for country #100 on November 1, worked A52JA (Bhutan), S21YJ, A45ZN and FR1AN two days later. BG7OH found KH6IAA on November 12, perhaps the closest yet the Chinese have come to hooking up with those elusive North Americas.

Perhaps the most exciting news from Asia was the appearance of several Indian stations on the band, after an absence of many years. The Indians were initially restricted to 50.350 MHz only using FM, but by the end of the month, they had permission to use SSB and CW on their spot frequency. On November 30, VU2ZAP worked widely throughout Europe as far westward as England, with signals as loud as 59 into ON4AOI.

### Transcontinental

Transcontinental openings appeared on November 7, 8, 22 and 24 through 27, generally after 1700. WA5JCI in Texas, who worked several VO1 stations on November 24, also reported hearing the OX3VHF beacon. Others from Florida to Texas and the Midwest also noticed the Greenland beacon when transcontinental openings were in progress.

### Two-Meter TEP

While operating as FG/N0JK from Guadeloupe in the Caribbean, Jon Jones chatted with PY5CC on 50 MHz in the early evening of November 27. He suggested trying on 144.200 MHz. Sure enough, PY5CC was right there with a 559 signal. Jon heard other Portuguese-speaking stations on 2 meters, but could not break in. More expeditions and vacation operators to Caribbean islands should try this. South American FM operators can often be found on 144.300 MHz.

### Aurora and Auroral E

The aurora early on November 4-5 and 6-7 had a big effect in Europe, but the timing of disturbed geomagnetic conditions did not favor North America. Northern Europeans reported strong auroral signals on the evening of the fourth, and GM4PLM heard the OX3VHF beacon via 6-meter auroral E. Conditions were even more spectacular two nights later, as stations from Finland to Slovenia found 6 and 2 meters full of activity. Many 6-meter signals flipped between auroral and auroral E within a few seconds. JX7DFA had a huge 40-over S9 auroral-E signal on 6-meters over much of northern Europe.

The aurora of November 26-27 was the only one for the month that attracted much attention in North America. Nevertheless, the effects did not seem to extend further south than New Jersey to central Indiana and west to Oregon on 50 and 144 MHz. Northern Europeans again reported widespread activity. The day or two after each auroral, there were unusual 6-meter conditions worldwide, including strong north-south propagation and odd southerly-skewed paths over long east-west distances.

### Tropospheric Ducting

K5SW (EM25), KU4WW (EM54), K1MOD/9 (EN40) and KC8KGK (EM89) reported a ducting event on November 11 and 12. At its maximum limits, the duct extended from Ohio and Illinois on the North, eastern Oklahoma and Texas to the west and the Gulf coast to the south. K5CM in Oklahoma worked as far as EL95 in south Florida on 2 meters, at about 1700 km, probably the longest path for the session. This was certainly an ordinary opening, but a bit unusual for so late in the autumn.

### Leonids Meteor Shower

Not one operator reported activity during the Leonids meteor shower (November 17-18), although this year yielded some higher-than-normal meteor counts. Shelby Ennis, W8WN, reported that the consensus of visual and radio observers was that two peaks exceeding the equivalent of 200 meteors per hour occurred at 0344 and 0715 on November 18. This is considerably above the normal rate for any annual shower.

The peaks matched some widely publicized predictions based on a new model that took into consideration the Earth's passage through individual debris streams laid down by the parent comet Tempel-Tuttle during previous close encounters with our planet. If the model holds up, next year's Leonids meteor shower should be even more intense. For more information, visit the NASA Web pages at **spacescience.com/headlines/y2000/ast10oct_1.htm**.

**Table 3**

**US to Europe, the Mediterranean and the Middle East on 50 MHz in November**

| *Day* | *US Calls and Call Areas (State)—DX Calls* |
|---|---|
| 3 | K1DAM (RI)—4X1RF, 5B4FL, OD5/OK1MU |
| | W1JJM (RI)—5B4FL |
| | W3EP (CT)—4X1RF |
| 4 | W4 (FL)—CT, F |
| 5 | K1SIX (NH), W1JJM (RI)—J28NH |
| 6 | K2RTH/4 (FL)—EH, CT, 9H |
| 7 | N4MM (VA)—EH |
| | K2RTH/4 (FL)—CT, F, 9H, I |
| | K0FF (MO)—EH |
| 8 | W4 (FL), K7ICW (NV)—EH7KW |
| 9 | VE1YX—YL3AG |
| 23 | W5UWB (TX)—ON4AIO, G3VYF |
| | N5WS (TX)—G3IBI, PA0HIP |
| | WA5IYX (TX), WB5HJV (TX)—PA0HIP |
| 24 | W1OO (ME)—J28NH |
| | W2FU (NY)—SM7BAE |
| | W8ERD (OH)—GW4VEQ |
| | W4 (FL)—GI0OTC |
| 26 | W8 (OH)—CU3, EI |
| | N5WS (TX)—G, GW, PA, ON, DL |
| | WD5K (TX), N5WS (TX)—G4HBA |

**Table 4**

**US to the Pacific and Asia on 50 MHz in November**

| *Day* | *US Calls and Call Areas (State)—DX Calls* |
|---|---|
| 5 | W6, 7—ZM8CW, V73AT |
| | W5 (OK)—V73AT |
| | NX7U (AZ), K5LLL (TX)—KH6 |
| 6 | W5UWB (TX)—ZM8CW |
| 7 | W1 (ME), 2 (NY), 4, 5, 6, 8, 9, 0—KH6 |
| | W2, 3, 4, 6, 7, 8, VE3—VP6PAC |
| | NX7U (AZ), K7ICW (NV)—KH5/KH6ND |
| | W5OZI (TX)—ZL4AAA |
| | N4MM (VA)—VK2QF |
| | W5, 7, 8—VK4BLK |
| 8 | VE9, W1, 2, 4, 5—KH5/KH6ND |
| | K2AXX (NY), W4WTA (GA)—VP6PAC |
| | W7RV (AZ)—ZM8CW |
| | W5OZI (TX)—VK4 |
| | W3 (MD), 4 (VA, GA), 6, 8 (OH)—VK2QF |
| 10 | W7, KG9N (IL)—KH6 |
| | W6, 7—KH5/KH6ND |
| 21 | W7XU/0—JA |
| 25 | W5UWB (TX)—JA |
| 28 | N7IJ (ID)—JA |
| | K5SW (OK)—VK, AH8A |

# Federal Islamic Republic of the Comoros

The Comoros Islands are a group of volcanic islands located in the North Mozambique Channel between Mozambique and Madagascar (11° 42′ south, 43° 14′ east). The group consists of Grande Comore (Njazidja), Anjouan (Nzwani), Mayotte and Moheli (Mwali) islands measuring 2235 sq km (863 sq mi).

European navigators spotted the Comoros in the 16th century, and over time, the islands became inhabited by a melange of Arabs, Africans and Asians. In 1843, the French occupied the island of Mayotte and the remaining islands became French protectorates later in the century. By 1914, the islands were a colony attached administratively to Madagascar.

The Comoros became a French overseas territory in 1947 and was given internal autonomy in 1961. On July 6, 1975 the Federal Islamic Republic of the Comoros (D6) gained independence and included all the islands except Mayotte (FH).

The three islands have some 500,000 residents, none of whom are Amateur Radio operators. In mid-1997, the islands of Anjouan and Moheli separately declared their independence from the Comoros. Talks were held between the three islands in April 1999 in the hope of reuniting the Comoros federation. The people of Moheli agreed, but in January 2000, the inhabitants of Anjouan voted overwhelmingly not to rejoin. For the record, the United Nations has not recognized the independence of Anjouan.

### D68C—Comoros 2001

Core members of the 1998 9M0C DXpedition to the Spratly Islands have formed the Five Star DXers Association. The group is closely related to the Chiltern DX Club (CDXC), the UK DX Foundation. Last September the group announced their intentions of launching a major DXpedition to the Comoros Islands as D68C in February 2001. The islands rank # 83 on the ARRL's most wanted list. *The DX Magazine* says it lists as #36 in the US Central Time zone, #58 in the Mountain Time zone and #48 in the Pacific Time zone.

The two stated goals of the group are: "provide the possibility for every Amateur Radio station in the world—even those running QRP or very simple antennas—to make at least one contact with D68" and "to enable top DXers to put D68C in their logs on as many bands and modes as possible."

The timing of this operation couldn't be better because we are still at the top of the current sunspot cycle. The DXpedition will be active on 6 through 160 meters on CW, SSB, RTTY, PSK31, FM and satellite. Six complete stations will be manned 24 hours a day.

The multinational group of operators will include 5B4AGC, 5B4WN, 9H1EL, DL7AKC, G0OPB, G3NUG, G3OZF, G3SED, G3VMW, G3WGV, G3XTT, G4JVG, G4KIU, G4TSH, G4VXE, GU4YOX, JA1RJU, JA3AER, JP1NWZ, M0BJL, M0DXR, N7CQQ, PE9PE, SM5AQD, UT8LL, W3EF and W3WL.

The first crew is expected to arrive on February 6 and spend the first two to three days setting up equipment and antennas. The D68C DXpedition will run over three weekends and wrap up on Monday February 26. The team will also put in a serious effort as a multi-two in the ARRL CW DX Contest, going for the African record, on the weekend of February 17-18.

A DXpedition of this magnitude will need plenty of hardware. On November


K7BHM

**Members of the Central Arizona DX Association (K7UGA) celebrated their 25th anniversary last year. A reunion was held last fall. Pictured from left to right are: N7CW, W7IUV, K7SA, N7US, W7XA, K7BHM, K7NN, AA7A, W7RV, N7RK, K6AIA, K7SP, N7MW, N7RT, NE7X and NN6R.**

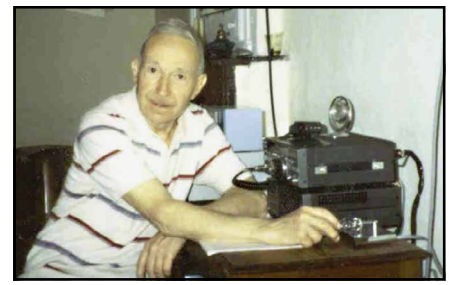

KJ4UY

**Murtadha, A41LZ (seated), recently came to the US and visited the very neat shack of Larry, KJ4UY. Murtadha can be found on or near 14.180 MHz most days starting around 0300Z. He QSLs 100% with a nice photo card.**

Bernie McClenny, W3UR ♦ 3025 Hobbs Rd, Glenwood, MD 21738-9728 ♦ w3ur@arrl.org


JR7TEQ/A52B

**Here are four of the five Japanese operators who were in Bhutan in October and November 2000. From left to right: JK1AFI/A52JA, JH1NBN/A52W, JA1PCY/A52XX and JF1PJK/A52DX.**



F3AT

**Ivan Pastre, F3AT, is just one of 1000+ DXers who read this column and have taken part in the How's DX 2001 survey. He was first licensed in 1931 and has operated as FQ3AT in Chad, FE8AB in Cameroon and FF8AG in Mali. He was last pictured in "How's DX?" in October 1953.**

30, 2000, a 20-foot container was shipped to the Comoros Islands with some 20 cubic meters of equipment weighing over 3000 kilograms. Included in the container were 10 transceivers, 9 amplifiers, 4000 meters of coax, 1600 meters of control cable, 6000 meters of radial wire, 9 beams, 11 masts, four-squares for 40 and 80 meters, verticals for 30 and 160 meters, 11 laptop computers, one generator and more.

An operation of this size also has to have plenty of advanced preparation—and support off the island during the DXpedition. The chief pilot will be Martin, G3ZAY. Ray, HS0/G3NOM, will be the pilot for Asia. Other pilot stations are expected to be announced on the D68C Web site before the DXpedition.

Don Fields, G3XTT, explains, "The purpose of a DXpeditions pilot is to ensure smooth, timely, responsive, two-way communication between the DXpedition team and the 'Deserving.' Topics which the pilot might be asked to communicate are varied and could include: The suitability of chosen transmit and receive frequencies with respect to recurrent QRM and local licensing rules, the width and position of the split frequency listening range, the emphasis given to different bands and modes, the general operating style of team members, optimal timing for each part of the world on each band, antenna improvements, policy on sked times for individuals, the QRT time for the DXpedition and station and band dismantling sequences. Of course, DXers may also offer congratulations and bouquets—a valuable morale booster for the DXpedition team when conditions are poor or when sleep deficits are beginning to accumulate!"

Other important people who will be playing a role off-island include Don, N1DG, and Richard, G4ZFE, who will be handling the on-line logs. The QSL chores will be taken care of by Phil, G3SWH, and Bob, BRS32525 (SWL).

An informative Web site has been established at **www.dxbands.com/comoros/**. It includes pictures, maps, beam headings, operator profiles, and will have an on-line log look-up that will be updated daily. QSL cards will be handled by G3SWH and may be sent via the RSGB QSL bureau or direct to Phil Whitchurch, 21 Dickensons Grove, Congresbury, Bristol, BS49 5HQ, United Kingdom.

## HOW'S DX 2001 SURVEY

Don't forget the deadline for the survey—February 28, 2001. You can complete the survey on-line at **www.dailydx.com/howsdx.html**. The results will be published in a future issue of "How's DX?"

## THANK HEAVEN FOR CW —AND A HAM FRIEND

*By Murray Green, K3BEQ*

I am a 10-meter monomaniac, have been for almost 49 years and not ashamed to admit it. One of the handfuls, (okay, almost 2 handfuls) of "new ones" I still need to work all DXCC entities on 10 is A5. The last two DXpeditions to Bhutan had miserable propagation to the East Coast and Mid-Atlantic states on 10 meters. And it appeared that the present JA operation (October 27—November 3) would be similarly cursed.

Having previously set up my station so that it was tuned for split operation on 10 meter SSB, I patiently waited. The TH-7 was set to 13°, short path, and I waited for a late afternoon or evening opening. Their operation came up on schedule. Day after day, I waited, but no 10-meter activity or spots. It seemed that they were not going to operate 10 at all.

On the evening of November 2, I posted an announcement on the Internet DX Monitor asking that they work 10 meters; a last ditch effort in hopes it would be seen by the operators. I was not optimistic, with one exception: the WWV numbers were improving.

I went to sleep but overslept the next morning. My beautiful redhead spouse woke me at 8:20 AM with the cordless telephone in her hand. "Telephone call for you, Murray." Still groggy, I said "Hello." A voice returned, "Murray, this is Rich, K1HTV. The A52DX is on 28.020 MHz listening up, long path and only for North America!"

As Rich was talking, I was leaping out of bed and heading for the radio shack downstairs. As I did so, the button clip to my pajama bottoms decided to fail. So there I was, cordless phone in one hand talking to Rich, the other hand anxiously holding up my pants. The rest of me was trying not to fall down the stairs, but I made it safely to the shack.

As Murphy's Law has it, I had originally set up for SSB with a short path beam heading of 13°, never thinking I would work them long path in the morning hours through the massive European pileups.

I quickly signed off with Rich, turned on the linear and TS-940S, flipped on the rotator control box and began turning the TH-7 to the long path position. I was still half asleep but coming out of it quickly. Tuning to 28.020 MHz, I heard him immediately—A52DX! The signal wasn't strong, but I'd give it a solid 559. I called a few times on 28.025 MHz without success.

Suddenly, someone jumped in and sent the number 9. I put the transmitter on 28.029 and began calling. After about six attempts, I heard my own call sign coming back to me from Bhutan! There is no sweeter sound in the world. Just to be certain, I gave my call sign twice, a report, and TU twice. He QSLed and returned my TU.

After a 10-year wait for A5, I was on cloud 9+ for the remainder of the day. I never thought adrenaline could flow like this for an old codger.

Another of the DXpedition operators was working SSB on 28.495 MHz at the same time, but I could not hear him. Again, thank heaven for CW and a very unselfish ham friend. Thanks, Rich, I owe you big time.

## MORE DX NEWS FOR FEBRUARY

Don't forget to mark your calendar for the ARRL CW DX Contest, which will take place February 17-18. The week before the contest many of the contest DXpeditions will be testing their antennas and warming up their rigs on all bands and modes. A multinational group will be active as CE0XT from San Felix February 11-21. For more details check out their Web site at **www.qsl.net/ce0xt/ingles.html**, or read your favorite DX bulletin. The dates of the Yugoslavian (YU) and Macedonian (Z3) DXpedition to Conway Reef (3D2/C) have been moved to February 18-27 (see last month's "How's DX?" column).

## WRAP UP

Keep those surveys, letters, pictures, questions and newsletters coming. This month I would like to thank the following people for helping to make this column possible: G3NUG, G3XTT, K3BEQ and *The Daily DX*. Until next month, see you in the pileups!—Bernie, *W3UR*

# W2DST—A Station Lost in Time

Joseph M. Hoffmann was born in 1878 in New York City. He was a bright teenager, studying chemistry and math. He was also interested in telegraphy and went to work for the New York Central Railroad and Western Union as a telegrapher. Sometime between 1898 and 1900 he became interested in wireless and built his own spark-gap ham radio transmitter. Operating as "JMH," he quickly became more knowledgeable and built bigger and better stations.

New York City was a hot bed for early radio. Hoffmann personally knew Tesla, Armstrong and had met Edison. In 1909 he was a charter member of the Wireless Institute along with such notables as Lloyd Espenschied of AT&T; Phillip Farnsworth; Alfred Goldsmith, director of the Radio Research Laboratory; Robert Marriott, Radio Inspector, Department Of Commerce; A. Parkhurst, superintendent of the Tropical Radio Telegraph Company; Greenleaf Pickard, vice president of the Specialty Apparatus Company; and Roy Weagant, design engineer for Marconi Wireless Telegraph Company. This organization of radio pioneers in 1912 became the Institute of Radio Engineers (IRE).

Joseph Hoffman's other hobbies were building motorboats and playing with automobiles. Around 1912, he took over his fathers cooperage business, building large water tanks for city buildings. He continued to expand the business and became financially well off. A researcher, he was one of the principal inventors of the modern spark plug. He manufactured spark plugs during the 1920s and 1930s until AC-Delco bought the patents.

In the mid-1920s Hoffmann designed and built a new home in the country for his family at 57 Grandview Ave, White Plains. There, Joseph M. Hoffmann, now W2DST, would enjoy his hobby of ham radio with his son, Joseph A. Hoffmann, W2DIJ.

Drawing on the knowledge of the IRE engineers and designers, and having access to machine and woodwork shops, he built increasingly advanced ham stations over the years. He would continue operating and building until December 7, 1941, the start of World War II. Then, he immediately went off the air, took down all his antennas, disconnected the power supplies and locked the door to his attic station.

It remained untouched for nearly 55 years.

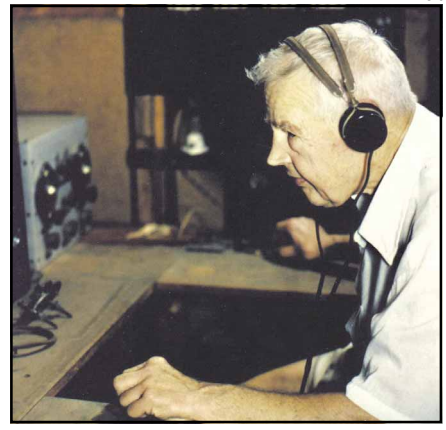
## The Discovery

Sometime after his father died in 1964, Joseph A. moved south and rented out the family home. Eventually deciding to sell it, he wondered what to do with his and his father's beloved ham radio station. Some mutual friends in Florida heard about the problem and called Lou Leonard, W2UIJ. They knew Lou had been seriously collecting radios for about five years and lived near the Hoffmann home. Of course, Lou was interested. He immediately telephoned Joseph A., now almost 80 years old, and made arrangements to see the station.

W2UIJ

**The elder Hoffmann's 40-meter transmitter.**

W2UIJ



**Joseph A. Hoffman, W2DIJ.**

On July 15, 1996, along with his close friends, Bill Henneberry, KN2X, Bob Brannigan, W2EJG, and Bob Handel, WB2ICQ, Lou went to the White Plains home. Met at the front door, Joseph A. Hoffmann took them up to the second floor and pulled down the attic stair. Lou later said, "At the time, I wasn't sure what we would see." They entered the attic with flashlights and after pushing aside the 1869 steamer trunks of Hoffmann's grandfather, Augustus Hoffmann, the ham shack door was unlocked. Joseph A. said, "You are the first persons outside the family to see this since it was turned off in 1941." Then he added, "I'm selling the house in one month. So what are you going to do about it?"

It was a remarkable sight. For a moment, they all were speechless. Before them was an untouched 1920s-1930s ham radio station of significant size and beauty. Almost immediately they noticed the three large transmitters, electrical controls panels with large meters, power supplies built in wooden boxes on the floor, other radio chassis scattered around, and an assortment of homemade test equipment on shelves.

Anticipating a wonderful find like this, Lou had brought his 35-mm slide camera along. He plugged in a drop cord and turned on the floodlights. Joseph A. started to tell the visitors about his father and the history of the station. While this was going on, Lou took hundreds of photographs before anything was disturbed.

## The Transmitters

The three large transmitters appeared identical. Upon closer examination, it was noted that they were for three different bands: 80, 40 and 20 meters. An engineer himself, Lou admired the work of this master builder. "This was a first-class job," Lou said, "He didn't use plug-in coils like many other hams, he switched transmitters instead."

In the late 1920s, when these were built, panel meters were very expensive. Most hams had only one, which they jacked in and out of the various circuits to take readings. These transmitters each had five meters, one for every important

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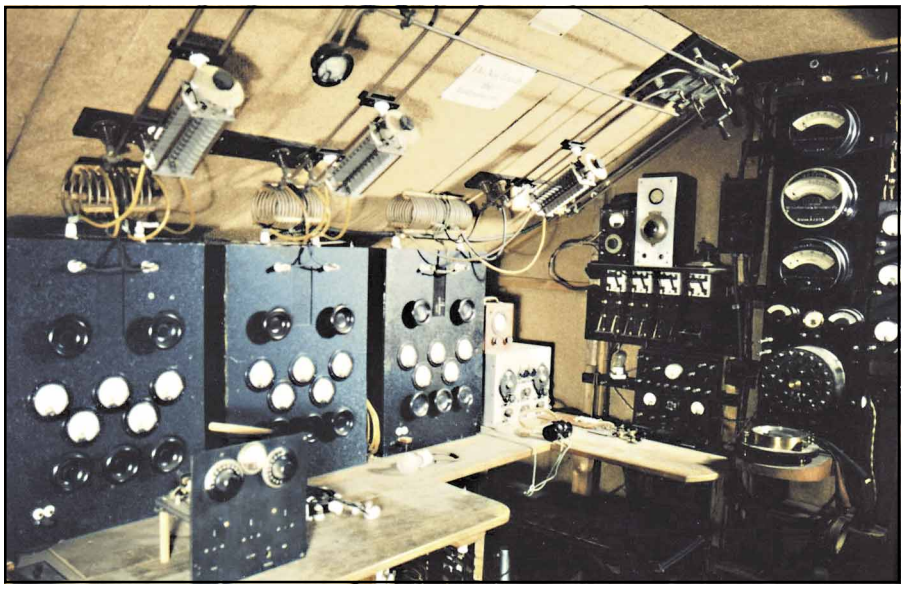

**The W2DST station. This photo was taken only minutes after opening the sealed attic door.**

circuit. The operator could tell at a glance just how everything was performing and make adjustments as necessary.

All three transmitters have similar internal construction. All stages are loop coupled. The crystal controlled oscillator in the 40-meter rig is an RCA 6L6 driving a Taylor T-20. The finals can be viewed through a screened window. They are a pair of General Electric PR-3-B tubes (the GE version of the classic UV-203A). Wired in push-pull, they are link-coupled to the feed-through insulators near the top of the front panel and then to a large coupling coil on top of the transmitter for matching to the antenna lines.

Hoffmann modified the transmitters from time to time, always trying the latest tubes or circuits. The 20-meter rig had been modified in the late 1930s to use an RCA 813 in the final for higher output power.

The cabinets are actually large wooden boxes that have been very carefully lined with copper sheeting, making them well shielded. The front panels are made of heavy aluminum and have been painted black-wrinkle. The two custom chassis inside are carefully cut and bent from sheet aluminum. All of the parts used are top quality and the construction is very professional.

There were no modulators for this station because Hoffmann used CW almost exclusively.

There was quite a switching system for the power. Two large power supplies would provide the high voltage. The smaller one was used for moderate output of 100 W, or for higher power the larger could be switched in for 300 W. A very organized set of knife switches did the job. Everything was well marked and documented. Lou felt that if he wanted to, he could have powered up the station and put it right on the air, if the antenna still existed.

The power supplies are also well built on sturdy wooden breadboards. They are placed into custom-made wooden boxes that open for inspection and to allow the operator to replace the two 866 mercury-vapor rectifiers.

## The Receivers

All of the station's receivers had been earlier relocated to bedrooms or to the garage and cellar. A visit to the cellar revealed a "pile of Pilot Super-Wasps," which Hoffman cherished. Over the years a large number of early commercial and homebrew receivers had been used. In later years an RCA AR-88, as well as several Nationals were in use there.

## Switching Antennas

A series of large "Trumble" knife switches, coupled by copper tubing, allowed each transmitter to be switched in or out of the feed line. An RF power meter was built into the feeders to help adjust each transmitter for maximum output. The feed line ended in yet another antenna matching device, mounted on the outside wall with two large brass feed-through rods to the antenna. Two large light bulbs were also in the circuit. They were probably used for tuning purposes or to act as dummy loads. Another knife switch allowed the antenna to be switched to the receiver while listening.

## The Power Meters

The board with the large meters was a carryover from Hoffmann's early spark transmitters. Due to the noise and the smell that was generated, they were usually located in a cellar or some other remote location. The speculation is that he brought this from his earlier home in the city. It was still functional and an accidental bump of one of the wall-mounted knife switches brought them quickly to life, surprising the visitors. Lou carefully disabled the ac on his next visit.

## 160-Meter Transmitter

In the garage, a carefully constructed breadboard 160-meter transmitter was discovered. It was dirty, but was all there and is restorable. Built by Joseph A., it was featured in *How to Become an Amateur Radio Operator*, by Lt. Myron F. Eddy, a *Short Wave Craft* Publication, 1933-1934. Joseph M. modified it for 160-meter use only.

## Other Treasures

Uncovering layer after layer in the garage and cellar revealed rare and wonderful spark transmitter parts. Antenna resonators, sealed glass capacitors in wooden boxes, a 500-W spark coil, a Massie wireless key and slide potentiometers were found and are presently being restored. Many of these came from the E.I. Company, a well-known manufacturer of spark transmitters and parts. Early tubes were also discovered, such as the Western Electric 205-D and some very early Audions.

The attic revealed Joe's set of *IRE Journals*, starting with Volume 1, Issue 1.

In the station's 1885 oak roll-top desk, a pile of QSL cards were in place, as if waiting to be filled out. The drawers revealed a 1932 radiogram, scientific instruments, receiver plug-in coils and replacement parts for various radios. A Browning-Drake oscillator was on the top and used as a VFO.

A Millen transmitter, in the form of several chassis, was found on the floor. This was believed to be from Joseph M.'s city office. He would use this to contact Joseph A. at home during the week.

This station was truly a "time capsule."

In addition to those mentioned above, Lou Leonard would like to thank Tom Perera, W1TP, Pete Malvasi, W2PM, Stuart Mount, W2AO, and Jim Kreuzer, N2GHD, for their help in researching and identifying items from this station. Lou Leonard provided much of the information used in this article.

## Conclusion

I own the Hoffmann 40-meter transmitter and have it in my Old Radio Museum. To see it, check my spring schedule on my museum page for hamfests I will be attending. Look for my call letters on my hat and say "hello." Also, for more photographs of the W2DST station visit: **www.eht.com/oldradio/arrl/index.html**.—*K2TQN*

# Appalachian Award Fever

Last month Paul Stroud, AA4XX, shared with us his QRP kayaking adventure to the Cape Lookout lighthouse to work one of the Adventure Radio Society's Spartan Sprints. It seems that over the last couple of years QRPers are taking to the bush in record numbers to operate and contest under primitive conditions. QRP lends itself to this type of "Extreme Radio." The rigs are tiny and very battery friendly. Simple antennas are the order of the day. What could be better than a walk in the woods and a little QRP operating? With this in mind, let me tell you about…

## Hams on the "AT"

Since the Appalachian Trail winds 2100 miles through 14 states from Maine to Georgia (Pennsylvania being one of them), Ron Polityka, WB3AAL, El Presidente of the EPA-QRP-Club, thought it would be a great idea for the club to sponsor a series of awards for working stations on the Trail. The idea caught on like wildfire. Soon there were several awards offered with the criteria explained in detail on the EPA-QRP-Club Web page: **www.n3epa.org/at/at.htm**. To keep up with the surge of interest, Ron started a reflector especially for the Appalachian Trail awards: **atrail@lehigh.edu**. Here, QRPers can list the dates, times, location and frequencies when they would be on the trail and operating.

Ken Newman, N2CQ, Craig LaBarge, WB3CGK, Ed Breneiser, WA3WSJ, Ron Polityka, WB3AAL, Brian Riley, N1BQ, Frank Flynn, KM1Z and others (myself included) took to the Appalachian Trail to "light it up" for those who wanted to qualify for one of the awards. Participation exceeded Ron's wildest expectations! Here was a series of awards that people *really* wanted.

## A-Trail Packing List

What does it take to operate from the A-Trail? A QRP rig helps! Although, Ron, WB3AAL, often takes his TS-50 and a deep cycle battery into the woods for Trail operations, the rest of us mere mortals use a cross section of monoband QRP kit rigs (NorCal-40A, SW-40+, OHR, etc) while Ed, WA3WSJ, takes his K2. With the new Elecraft K1s now on the market, it won't be long before many A-Trail QRPers start using these little dual banders.

**Ed Breneiser, WA3WSJ, operating from the Appalachian Trail in October 2000 with his K2 transceiver.**

Antennas are of the wire variety for several reasons. First is portability. Wire antennas can be made very small and extremely lightweight. When you backpack any distance, it quickly becomes apparent that every *ounce* in your pack weighs you down.

Dipoles are the favored wire design. I have used N2CQ's Gusher antennas with good results. Ed, WA3WSJ, makes his own using some #26 copper coated steel wire with black insulation, called "Stealth Wire" (available from Davis RF[1]) at about $.14/foot. This stuff is unbelievably strong, extremely light and practically invisible from more than a couple of feet away. Ed's design consists of a set of 40-meter elements (33.5 ft/each) fed with thin 300-Ω twinlead available from your local RadioShack store. Ed used this antenna when we went out on the A-Trail in early October with fantastic results. His K2 autotuner matched all HF bands except 17 meters. How do we know that this antenna works so well? Ed worked 40 meters exclusively on this trip and generated a pile up on 7040 kHz so large he couldn't take time out to go to the bathroom! Not bad for a dipole erected only 15 feet off the ground!

This brings up the next problem: how to get the antenna into the air. Most QRPers use some sort of "anti-gravity device" such as a slingshot with fishing reel attached, bow and arrow, fishing rod and reel, or the old standby: a 1-inch-deep well socket tied to a piece of nylon parachute cord! Since the trees are quite dense in most places on the A-Trail, using a slingshot or bow and arrow to try to get the antenna high into the trees is counterproductive. In the case of the Trail, lower is better. By erecting the center of the dipole only 15 to 20 feet off the ground, it is much easier to extend the dipole legs to their full length.

Ed begins his antenna raising with a roll of 30-lb test nylon fishing line. First he peels off about 40-50 feet of fishing line and lays it out on the ground. Then he secures the remainder of the line on the reel with a rubber band. Using an underhand tossing method, Ed lofts the reel over a nearby branch, usually about 15-20 feet off the ground. Then he secures the center of the dipole to the free end of the fishing line and pulls the antenna into the trees.

Power for A-Trail QRP rigs is normally provided by gel-cell batteries. Although some rigs run just fine (at reduced power) on a 12 to 15-V AAA alkaline battery pack, the preferred power source is a 6-A/h gel-cell, which will power the average QRP rig for an entire weekend without recharging. Several Trail QRPers also take along a 10-W solar panel to recharge the batteries while on the go.

Some nice Trail accessories include a portable paddle set (try TE-NE-KEY[2] or Whiterook[3] for inexpensive portable paddles), a night light (red LED flashlights work fine and keep the bugs away), a small note pad, and a palm-top computer for logging. Remember, *think light* when selecting accessories to carry along on the A-Trail. Radio gear is secondary to your normal camping gear, so you must pay close attention to bulk and weight when planning QRP operation in conjunction with a hike or multi-day outing on the Trail.

## Take Your Rig Outdoors

I hope this brief foray into Extreme Radio will spark your imagination enough to give it a try this camping season. There is a lot of fun to be had by combining outdoor activities and ham radio. Remember, when you trek into the bush, be a courteous hiker/camper. Remove all your trash and leave only footprints. The natural beauty of the great outdoors is there for all to enjoy. Let's keep it that way.

[1]Davis RF: **www.davisrf.com/ham1/flexweve.htm**

[2]TE-NE-KEY: **www.qsl.net/noarc/Te-Ne-KeyPage.htm**

[3]Whiterook Paddles: **electronicsusa.com/home.html**

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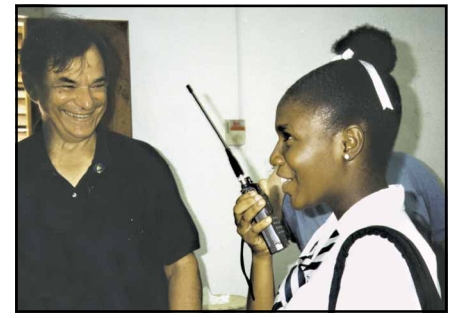
# Meet the Girl Guides of Grenada

A group of young ladies from St Joseph's Convent School of St George's, Grenada, experienced the fun of ham radio first hand last October. Not only did they get to operate on 2 meters and talk to hams on neighboring islands, they also saw an HF multi-multi contest station at the St George's Emergency Operations Center.

St Joseph's is an all-girls Catholic secondary school run by the Sisters of St Joseph of Cluny, an order of nuns that has been in Grenada since 1875. The school is located on a hill overlooking St George's, the main port and capital city of Grenada.

Grenada is located in the West Indies, 12° above the Equator, just north of Trinidad. The average daytime temperatures can reach the mid-90° F range. Even with the hot and humid weather, the schools are comfortable because they are built with many open arches and atriums that allow plenty of cross ventilation. This is essential, since none of the schools are air conditioned, and regardless of the temperature, all students in Grenada must wear uniforms (no shorts or sleeveless attire allowed!).

**Don, K2KQ, shows one of the Rangers how contest logging works at the Emergency Operation Center in St George's.**



**The girls enjoyed making contacts on 2-meter FM. In the background is Don, K2KQ.**

## The Girl Guides

Sister Gabriele, the principal of St Joseph's for more than 15 years, is very proud of the education the students receive at the school and encourages them to participate in a variety of activities. One of the many extracurricular groups at the school is the Girl Guides who meet on Friday afternoons. They have a *Ranger* troop with over 40 members between 14 and 17 years old.

Madeline Scott, one the leaders, or *Guiders* of the group, said the girls are always on the lookout for new and unusual topics and field trips for their meetings. Madeline teaches Business, English, Nutrition and Information Technology at the school. She discovered that there was an active Amateur Radio Club on the island and thought it would be interesting for her group to find out more about it. Cletus St Paul, J39JQ, president of the club, invited them to attend one of their meetings. He also mentioned that a group of ham radio operators from the United States were setting up some stations at the Emergency Operations Center for an upcoming contest. Cletus made the arrangements, and on the Friday afternoon before the CQ WorldWide SSB contest last October, about 30 Rangers and their Guiders took a tour of the setup and got on the air. They were able to see multiple HF stations in operation, complete with Internet packet, computer networking and logging.

Don Toman, K2KQ, president of the Yankee Clipper Contest Club and I gave them a tour of the J3A contest setup, which included separate stations for 10, 15, 20, 40, 80 and 160 meters. There were many different types of radios, amplifiers, computers (laptops and desktop PCs) and headsets, footswitches and accessories of every type. The girls were very impressed that we could talk around the world from the antennas and towers set up at the EOC.

Despite the extensive HF station, like teenagers everywhere, they were most interested in being able to talk to each other using a 1/2-W H-T on 2-meter simplex! There are not too many cell phones available to young people in Grenada, and they were very excited to think that they would be able to communicate with each other across the island—and even into neighboring islands—using the club's 2-meter repeater. The Ranger's president, Janelle Harford, said "It was a fun experience for all of us and we hope to be able to get our Amateur Radio licenses so we can talk all over the world." They plan to attend the local Amateur Radio club meetings and get their licenses.

## "Thinking Day"

Girl Guides around the world will be on the air February 17 and 18 (Saturday/Sunday) to celebrate "Thinking Day." They will be looking for other members of the Girl Guides and Girl Scouts to contact. Currently there are active Amateur Radio Guide groups in Canada, Wales, England, Australia and New Zealand—and now Grenada! Janelle was at the Girl Guides World Camp 1999 at Paxlodge, the Girl Guides headquarters in England, along with a group of 21 other Rangers from St. Joseph's. She said there were Girl Guides from many other countries there and that they gained a wealth of knowledge and experiences. "We look forward to learning about Amateur Radio and making new friends around the globe," she said.

For more information about amateur radio and the Girl Guides, you can go to the Web site set up by CLARA, the Canadian Ladies Amateur Radio Association at **members.tripod.com/~CLARA_YL/CLARA_YL/id8.html**. CLARA has a special initiative to support GOTA. You can also get very detailed information on how to set up your station, QSL information and more at a site set up by Helen Archibald, VE2YAK. Helen is the CLARA liaison for GOTA and a Senior Branches Guider in Quebec. The Australians also have a page set up for GOTA at **www.omen.com.au/~vk6wia/clubs-wa.html**.

## YLRL CONTESTS

Don't forget the YLRL contests this month: YL-OM Contest—February 3-5, 2001 (CW) and February 10-12, 2001 (SSB). In addition, don't miss the DX-YL-to-North-American-YL Contest (CW) 1400 UTC, April 11, 2001, to 0200 UTC, April 13, 2001; (SSB) 1400 UTC, April 25, 2001, to 0200 UTC, April 27, 2001. For full contest rules and information, go to the YLRL Web at **www.qsl.net/ylrl/**.—*33, Diane K2DO*

Diane P. Ortiz, K2DO ♦ PO Box 296, Bellport, NY 11713 ♦ k2do@arrl.org

# COMING CONVENTIONS

## OKLAHOMA SECTION CONVENTION

**February 16-17, Tulsa**

The Oklahoma Section Convention, sponsored by the Green Country Hamfest Committee, will be held at the Maxwell Convention Center, 7th and Houston; downtown Tulsa is accessible via Interstates 44 and 244 connecting to Hwy 75, Hwy 51 (Broken Arrow Expressway) to Houston St. Doors are open Friday 5-9 PM, Saturday 8 AM to 5 PM. Features include flea market, vendors, forums, VE sessions, free test table. Talk-in on 145.11, 443.85 (88.5 Hz). Admission is $8 in advance (by Jan 31) and $10 at the door. Flea market tables are $8 in advance and $10 at the door; commercial $50 in advance and $65 at the door; electricity $20. Contact Merlin Griffin, WB5OSM, Box 470132, Tulsa, OK 74147-0132; 918-622-2277; **megriffin@ionet.net**; **www.greencountryhamfest.org**.

## VERMONT STATE CONVENTION

**February 24, Milton**

The Vermont State Convention, sponsored by the Radio Amateurs of Northern Vermont, will be held at Milton High School, Rte 7, 5 miles N of I-89, Exit 17. Doors are open 8 AM to 2 PM. Features include flea market, vendors (please call for setup information), dealers, book sales, demonstrations, forums (ARRL, QRP, Contesting, Satellites, RF), VE sessions (9AM and 1 PM), commercial radio exams, refreshments. Talk-in on 145.15, bulletins on 146.67. Admission is $3, under 18 free. Tables are free while they last. Contact Mitch Stern, W1SJ, Box 99, Essex, VT 05451-8099; 802-879-6589; **w1sj@arrl.net**; **www.ranv.together.com**.

**February 2-3**
**Mississippi State, Jackson***

**February 3-4**
**Florida State, Miami***

**February 9-11**
**Northern Florida Section, Orlando***

**February 10-11**
**Tennessee State, Memphis***

**March 17-18**
**Texas State, Midland**

**March 30-31**
**Nebraska State, Norfolk**

**March 31-April 1**
**Maryland State, Timonium**

*** See January *QST* for details.**

## ROANOKE DIVISION CONVENTION

**March 10-11, Charlotte, NC**

The Roanoke Division Convention, sponsored by the Mecklenburg ARS, will be held at the Merchandise Mart, 2500 E Independance Blvd; I-77 to Exit 11, Brookshire Freeway E to Independence Blvd at Exit 2B. Doors are open Saturday 8:30 AM to 5 PM, Sunday 8:30 AM to 2 PM. Features include 425 flea market tables (all indoors), 100 dealer booths, forums, VE sessions, discount parking. Talk-in on 145.29. Admission is $6 in advance and $8 at the door. Tables are $22. Contact Tom Hunt, KA3VVJ, 16007 Wynfield Creek Parkway, Huntersville, NC 28078; 704-948-7373; **hamfest@w4bfb.org**; **www.w4bfb.org**.

### Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guar-antee 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 at 860-594-0262.

**Note:** Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. QST

# HAMFEST CALENDAR

*Attention:* The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **February 1** to be listed in the **April** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

**(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)**

†**Arizona (Scottsdale)—Mar 10,** 6 AM. *Spr:* Scottsdale ARC. Scottsdale Community College, 9000 E Chaparral Rd; Interchange of 101 N and Chaparral Rd, SE parking lot. Vendors, VE sessions, RV parking, refreshments. *TI:* 147.18. *Adm:* $2. Tables: $10. Roger Cahoon, KB7ZWI, 8501 E Edward Ave, Scottsdale, AZ 85250; 480-948-1824, 602-725-7256 (mobile); fax 602-943-7651; **rgcahoon@msn.com**.

†**Arkansas (Harrison)—Mar 10,** 8 AM to 1 PM. *Spr:* North Arkansas ARS. Harrison Junior High School, 515 S Pine; located on Hwy 7 near S Harrison City limits. VE sessions. *TI:* 147.0. *Adm:* $5. Tables: $15. Bill Rose, N5VKF, Box 354, Harrison, AR 72601; 870-741-6968; **billrose@cswnet.com**; **www.qsl.net/naars**.

†**Arkansas (Russellville)—Mar 3,** 8 AM to 4 PM. *Spr:* Arkansas River Valley AR Foundation. Hughes Community Center; Hwy 7 to Parkway, go E on Parkway to junction of Parkway and Knoxville. Flea market, dealers, ARRL forum. *TI:* 146.82. *Adm:* $5. Tables: advance $8, door $12 (flea market); $15 (dealers). Margaret Alexander, KC5MCS, 1511 N Jackson, Russellville, AR 72801; 501-968-7270; **ealexand@cswnet.com**; **www.cswnet.com/~arvarf/hamfest.htm**.

†**California (Monterey/Seaside)—Feb 17,** 7 AM to 3 PM. *Spr:* Naval Postgraduate School ARC. General Stilwell Community Center (old Fort Ord), 4260 Gigling Rd, at Moore Blvd; just N of Monterey on Hwy 1. Flea market, seminars, demonstrations (Voice and Morse Code, ATV, packet, APRS, MARS, and more), guest speakers. *TI:* 146.97 (94.8 Hz). *Adm:* donation requested. Tables: inside first $20, additional $15; outside $10. Max Cornell, K0MC, 199 Linde Circle, Marina, CA 93933; 831-883-0491; **cornell@redshift.com**; **www.k6ly.org/radiofest**.

**California (Redding)—Mar 3.** Jim Bremer, KE6OUA; 530-222-8001; **ke6oua@aol.com**.

†**Colorado (Brighton)—Feb 18,** 9 AM to 1 PM. *Spr:* Aurora Repeater Assn. Adams County Fairgrounds, 9755 Henderson Rd; US 85 to 124th Ave, W on 124th Ave which becomes Henderson Rd, continue W to Fairgrounds Complex on N side. VE sessions. *TI:* 147.15. *Adm:* $4. Tables: $10 (plus admission). Wayne Heinen, N0POH, Box 473411, Aurora, CO 80047-3411; 303-699-6335; **n0poh@arrl.net**; **www.qsl.net/n0ara**.

†**Florida (Englewood)—Mar 10,** 8 AM to 1 PM. *Spr:* Englewood ARS. Tringali Community Center; E Englewood, Rte 776, near intersection of Spinnaker Rd. VE sessions. *TI:* 146.7. *Adm:* advance $3, door $4. J. R. House, K9HUY, 6249 Alloway St, Englewood, FL 34224; 941-475-3005.

†**Florida (New Port Richey)—Mar 3;** set up Friday after 4 PM; public Saturday 9 AM to 5 PM. *Spr:* Gulf Coast ARC. Ridgewood High School, 7650 Orchid Lake Rd; take Ridge Rd off US 19, go S on Lemon Rd, or take Little Rd W to Lemon Rd and turn S (left). Amateur Radio and Computer Show, tailgating ($6), vendors, forums, VE sessions (1 PM). *TI:* 146.67. *Adm:* $6. Tables: $6. Don Koerner, KK4VK, 9125 St Clair Ln, Port Richey, FL 34668; 727-848-8000; **koerner@inetmail.att.net**; **www.angelfire.com/fl3/gcarc/hamfest.html**.

†**Florida (Sebring)—Feb 17,** 7 AM to 1 PM. *Spr:* Highlands County ARC. Sebring Civic Center, 301 W Center Ave; from US 27 turn on Ridgewood, go to circle, turn right on W Center, go to Lakeview, turn left, go 50 ft and turn right, behind Library. Free tailgating with admission. *TI:* 147.045. *Adm:* $3. Tables: $10 (includes 1 admission). Darrell Koranda, KB4XJ, 3022 Essex Ct, Sebring, FL 33870-6816; 863-471-0226; **kb4xj@strato.net**.

†**Georgia (Dalton)—Feb 24,** 8 AM to 2 PM. *Spr:* Dalton ARC. N GA Fairgrounds, Legion Dr; Exit 137 off I-75; N Dalton Bypass to Glenwood Ave to Legion Dr. *TI:* 145.23. *Adm:* $5. Tables: $5. Marvin Cooper, N2MC, 144 Danny Cir, Calhoun, GA 30701; 706-629-1480; **n2mc@pointlink.net**.

†**Illinois (Sterling)—Mar 18,** 7:30 AM to 2 PM. *Spr:* Sterling-Rock Falls ARS. Challand Middle School, 1700 6th Ave; LeFevre Rd E to 6th Ave. Large indoor flea market, vendors, radio and electronics items, computers, VE sessions (walk-ins), accomodations for self-contained campers, free parking, refreshments. *TI:* 146.85 (114.8 Hz). *Adm:* advance $3, door $4. Tables: $5 (without electricity), $6 (with electricity, bring your own drop cords). Lloyd Sherman, KB9APW, 25873 Capp Rd, Sterling, IL 61081; 815-336-2434; **lsherman@essexl.com**.

**Indiana (La Porte)—Feb 24.** Neil Straub, WZ9N; 219-324-7525.

**Iowa (Council Bluffs)—Mar 3.** Rich Swig, WA0ZQG; 712-256-7775.

†ARRL Hamfest

Gail Iannone ♦ Convention Program Manager

**Kentucky (Cave City)—Mar 3.** Marty Edwards, KC4BFF; 270-528-2447.

†**Massachusetts (Marlborough)—Feb 17,** 10 AM to 2 PM. *Spr:* Algonquin ARC. Marlborough Middle School, 25 Union St; off Rte 85, behind Marlborough Police Headquarters. Flea market, VE sessions (9-11 AM; walk-ins accepted). *TI:* 146.61, 233.94, 449.925. *Adm:* $3. Tables: advance $12 (before Feb 7), $15 (Feb 7 and after). Ann Weldon, KA1PON, 14A Emmett St, Marlborough, MA 01752; 508-481-4988 (before 9 PM); **annweldon@aol.com**.

†**Michigan (Farmington Hills/Livonia)—Feb 18,** 8 AM to 12:30 PM. *Spr:* Livonia ARC. William M. Costic Activities Center, 28600 W 11 Mile Rd, just E of Middlebelt Rd, 3 miles N of Livonia. Swap 'n Shop; buy or sell Amateur Radio gear, computers, and electronic test equipment; SKYWARN; RACES. *TI:* 145.35, 146.52. *Adm:* $5. Tables: 8-ft reserved $16 (plus advanced $5 admission). Send 4×9 SASE to Neil Coffin, WA8GWL, Livonia ARC, Box 51532, Livonia, MI 48151-5532; 734-261-5486 or 734-427-3905; **swap@larc.mi.org**; **www.larc.mi.org**.

†**New Jersey (Parsippany)—Mar 3;** sellers 6:30 AM, buyers 8 AM. *Spr:* Splitrock ARA. PAL Building, 33 Baldwin Rd; I-80, Exit 42 to US Hwy 46 (E/W), E to Burger King, turn S on Baldwin Rd. Tailgating (weather permitting), VE sessions, handicapped accessible. *TI:* 146.985, 146.52. *Adm:* $6. Tables: $18 (includes 1 admission). Mark Turner, KB2VKO, Box 610, Rockaway, NJ 07866; 888-511-7272; **splitrock@worldnet.att.net**; **ham.hsix.com/sara**.

†**New York (Hicksville)—Feb 25;** set up 8 AM; public 9 AM. *Spr:* Long Island Mobile ARC. Levittown Hall, 201 Levittown Pkwy; located E of Wantagh Pkwy (Exit W2 E), ½ mile S of Old Country Rd. Electronics Hamfair and Flea Market, vendors, equipment, computers, accessories, VHF tune-up clinic, refreshments. *TI:* 146.85 (136.5 Hz). *Adm:* $6, under 12 free (accompanied by a paying parent). Tables: advance 6-ft $20 (register by Feb 14, includes 1 admission); $25 (after Feb 14, if available). Eddie Muro, KC2AYC, Box 392, Levittown, NY 11756-0392; 516-520-9311; **hamfest@limarc.org**; **www.limarc.org**.

**New York (Horseheads)—Feb 24.** Barry Gabriel, N2EUS; 607-737-0626.

†**New York (Lindenhurst)—Mar 4;** set up 7 AM; public 9 AM to 2 PM. *Sprs:* Great South Bay ARC and Suffolk County RC. Knights of Columbus Hall, 400 S Broadway. Flea market, vendors, computers and accessories, software, electronic components, radio equipment, books and technical manuals, ARRL info, free tune-up clinic, VE sessions (noon), refreshments. *TI:* 146.685 (136.5 Hz). *Adm:* $6. Tables: advance $18, door $25 (Walter Wenzel, KA2RGI, 631-957-0218). Lenore Dunlop, N2KYP, Box 1356, W Babylon, NY 11704; 631-785-0826; **info@gsbarc.org**; **www.gsbarc.org/hamfest.htm**.

†**New York (Williamsville)—Feb 18;** set up 6-8 AM; public 8 AM to 3 PM. *Spr:* Lancaster ARC. Main Transit Fire Hall, 6777 Main St (Rte 5); ⅛ mile from Transit Rd (Rte 78). Greater Buffalo Winter Hamfest and Computer Show, vendors, ham radio gear, computers, equipment, VE sessions, refreshments. *TI:* 147.255. *Adm:* $5, under 12 free. Tables: 8-ft $6. Luke Calianno, N2GDU, 1105 Ransom Rd, Lancaster, NY 14086; 716-634-4667 (days) or 716-683-8880 (eves); **luke@towncountryflorist.com**; **hamgate1.sunyerie.edu/~larc**.

**North Carolina (Charlotte)—Mar 10-11,** Roanoke Division Convention. See "Coming Conventions."

**North Dakota (Bismarck)—Feb 24,** 7 AM to 3 PM. *Spr:* Central Dakota ARC. St Mary's Grade School, 807 E Thayer Ave; located between Medcenter One Health Systems and St Alexius Hospitals. Eyeballs and QSOs, VE sessions, refreshments. *TI:* 146.94. *Adm:* advance $5, door $6. Tables: $5. Kurt Carufel, KB0KDG, 941 N 33rd St, Bismarck, ND 58501-3234; 701-222-0938; **carufel@home.com**.

†**Ohio (Cincinnati)—Feb 25;** set up 4-8 AM; public 9 AM to 4 PM. *Spr:* Hamilton County ARPSC. Hartwell Recreation Center, 59 Caldwell Dr; from downtown, take I-75 N to Paddock Rd Exit, turn left, follow through second traffic light onto Vine St, follow Vine St to third traffic light, turn left onto Caldwell Dr, turn left at Hartwell entrance (located below underpass). Flea market, commercial dealers, vendors, VE sessions. *TI:* 145.37. *Adm:* advance $5, door $6. Tables: $20 (flea market), $55 (commercial). Bill Tittle, KA8LAY, 3038 Bracken Woods Ln, Cincinnati, OH 45211-7338; 513-661-1861 or 513-661-1805; fax 513-661-8558 or 513-661-0201; **ka8lay@arrl.net**; **www.arpsc.com**.

†**Ohio (Cuyahoga Falls)—Feb 25;** set up Saturday 3-5 PM; public Sunday 8 AM to 2 PM. *Spr:* Cuyahoga Falls ARC. Emidio and Sons Party Center, 48 E Bath Rd, at corner of State Rd; State Rte 8 N to Graham Rd Exit, travel 1.3 miles W on Graham Rd, turn right on E Bath Rd. Hamfest and Electronics/Computer Show, vendors, major manufacturers, VE sessions, free parking. *TI:* 147.27. *Adm:* advance $4, door $5. Tables: advance first table $14, additional $10; door first table $17, additional $12 (includes 1 admission). Carl Hervol, N8JLQ, 2292 Lake Center St, Uniontown, OH 44685; 330-497-7047; fax 330-497-8489; **carlh@pop.raex.com**; **www.cfarc.org**.

**Ohio (Lorain)—Feb 4.** John Schaaf, K8JWS, 216-696-5709.

†**Ohio (Mansfield)—Feb 11.** *Sprs:* InterCity ARC and MASER. Richland County Fairgrounds, North Home Rd; from Cleveland take I-71 S to US 30 W, exit at Trimble Rd, follow signs to far W side of Fairgrounds. *TI:* 146.94. *Adm:* advance $4, door $5. Tables: $10. Dean Wrasse, KB8MG, 1094 Beal Rd, Mansfield, OH 44905-1605; 419-522-9893; **deanwrasse@yahoo.com**; **www.maser.org**.

†**Oklahoma (Elk City)—Mar 3,** 8:30 AM to 5 PM. *Spr:* West Central Oklahoma ARC. Community Center, Rte 66; 1 mile W of Rte 66 and Hwy 34; I-40, Exit 41. VE sessions. *TI:* 146.76. *Adm:* advance $5, door $8. Tables: $5. Earl Bottom, N5NEB, Rte 1, Box 62A, Hammon, OK 73650; 580-821-0633; **n5neb@logixonline.net**.

**Oklahoma (Tulsa)—Feb 16-17,** Oklahoma Section Convention. See "Coming Conventions."

**Oregon (Rickreall/Salem)—Feb 17.** Richard Smith, KK7OX, 541-997-4074.

†**Pennsylvania (Castle Shannon/Pittsburgh)—Feb 25,** 8 AM to 3 PM. *Spr:* Wireless Assn of South Hills. Castle Shannon VFD Memorial Hall, 3600 Library Rd (Rte 88); Rte 51 to Rte 88, 1¼ miles to Grove Rd. Flea market, vendors, forums, VE sessions (noon), handicapped accessible. *TI:* 146.955. *Adm:* $4. Tables: $15 (with electricity, unlimited number), $10 (without electricity). Steve Lane, W3SRL, 897 Lovingston Dr, Pittsburgh, PA 15216; 412-341-1043; **washarc@yahoo.com**; **www.washarc.org/washfesty2k.htm**.

**Tennessee (Knoxville)—Mar 10.** Paul Baird, K3PB, 865-986-9562.

**Vermont (Milton)—Feb 24,** Vermont State Convention. See "Coming Conventions."

†**Virginia (Annandale)—Feb 25,** 8 AM to 2 PM. *Spr:* Vienna Wireless Society. Northern Virginia Community College, 8333 Little River Turnpike; I-495 (Capital Beltway) to Exit 6 (Rte 236/Little River Turnpike), go W on Rte 236, go 1 mile and take left onto Wakefield Chapel Rd, follow signs. Forums, VE sessions (Saturday, Feb 24). *TI:* 146.91. *Adm:* $5. Tables: $15 (non-commercial), $20 (commercial). Mike Toia, K3MT, 723 Walker Rd, Great Falls, VA 22066; 703-757-7021; **k3mt@erols.com**; **winterfest.home.att.net**.

†**Washington (Puyallup)—Mar 10.** *Spr:* Mike and Key ARC. Western Washington Fairgrounds Pavilion Expo Hall; 14th Ave SW Exit from SR 512, NE corner of Fairgrounds. Vendors, club info, VE sessions, free parking, refreshments. *TI:* 146.82 (103.5 Hz), 146.58. *Adm:* $6. Tables: table and vendor $27, additional tables $22, helpers $7. Michael Dinkelman, N7WA, 22222 148th Ave SE, Kent, WA 98042; 425-867-4797 (days) or 253-631-3756 (eves); **mwdink@eskimo.com**; **www.mikeandkey.com**.

**Attention All Hamfest Committees!**

Get official ARRL sanction for your event and receive special benefits such as free prizes, handouts, and other support.

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to **giannone@arrl.org**. QST

# NEW PRODUCTS

## COMPACTFLASH ADAPTER CARD-II FROM TAPR

◊ Tucson Amateur Packet Radio (TAPR) has recently made available a new and improved version of their CompactFlash Adapter card.

The adapter allows CompactFlash memory cards—typically used as data storage devices for digital cameras—to emulate a personal computer's IDE hard disk or floppy disk drive. Since there are no moving parts, this CompactFlash memory card "drive" is said to be more rugged. This makes it an attractive

choice for storing the PC's operating system, such as *DOS*, *Linux*, *FlexNet* or *NOS*, and other software applications in situations that expose the computer hardware to less-than-ideal environmental conditions.

The adapter consists of a small circuit board with a socket for the user-supplied CompactFlash card, a conventional male IDE ribbon cable socket and a power jack. The latest version of the adapter will accept type-II CompactFlash cards and includes a location on the board for mounting an alternative IDE socket (2.5-inch, 44-pin with a 2 mm pitch). The power supply connector jack accepts the same plug as is used on conventional floppy drives.

Price: $59 ($49 for members of TAPR) plus shipping and handling. For more information contact Tucson Amateur Packet Radio, 8987-309 E Tanque Verde Rd #337, Tucson, AZ 85749; tel 940-383-0000; fax 940-566-2544; **tapr@tapr.org**; **www.tapr.org**. QST

Previous New Products

# CONTEST CORRAL

## Feedback

In the **2000 Field Day** results, **N6SK** was listed as N6SL in category 1B1. The Stanley County ARC call sign **K4OGB** in category 1A was listed as KD4OZI. The SOBARS **K6QM** entry should have been listed from the San Diego Section.

In the **2000 June VHF QSO Party**, **K9YR** should be listed as Low Power instead of High Power in the Illinois section. In the Region Box for Central Region Rover leaders, **VE3NPB's** score should read 93,148 to place first in the region. **KE6FCT** should show as first place in the Region Box for the Western Region in the Single Operator, Low Power category.

In the **2000 August UHF Contest**, the operator in the photograph of the N0QK trailer is actually **KF0Q.**

**W1AW Qualifying Runs** are 7 PM EST, Friday, February 2, and 4 PM EST Tuesday, February 20. The K6YR West Coast Qualifying Run will be at 9 PM PST on Wednesday, February 7 with 10-40 WPM runs. Check the W1AW schedule for details.

## February
## 3-4

**North American Sprint, phone**, sponsored by *NCJ*, 0000-0400Z Feb 4 (local time, Feb 3); CW is 0000-0400Z Feb 11 (local time, Feb 10). Sprints are separate. 80, 40, 20 only. North American stations work everyone; others work NA stations only. Exchange other station's call, your call, serial number, name and state/province/DXCC country. Work stations once per band. QSY rule: Stations calling CQ, QRZ, etc, may only work one station in response to that call; they must then move at least 1 kHz before working another station or 5 kHz before soliciting another call. Once you are required to QSY, you may not make a new QSO on the previous frequency until you have made a contact at least 1 or 5 kHz (as required) away. Team competition. Awards. Electronic entries accepted. Send CW logs to Boring Amateur Radio Club, 15125 Bartell Rd, Boring, OR 97009; **cwsprint@ncjweb.com**; phone logs go to Rick Niswander, PO Box 2701, Greenville, NC 27836; **ssbsprint@ncjweb.com**, no later than 30 days after the end of the contest. **www.ncjweb.com/**.

**Minnesota QSO Party**, sponsored by the Minnesota Wireless Association Contest Club, 1400-2359Z Feb 3. 160 80 40 20 15 10 6 2 meters. Single op QRP, low power (150 W or less), single op high power, single op Technician, multiop single transmitter. Single ops may only operate 8 hours, multiop and mobile stations can operate all 10 hours. Exchange serial number and QTH, Minnesota stations send serial number and county. Multipliers are Minnesota counties (87 max) all bands; for Minnesota stations multiplier is Minnesota counties plus states/provinces on all bands. Score one point for SSB, two points for CW. Final score is QSO points times total multiplier. Awards. Send logs by March 15 to Sean Warner K0XQ, 3385 178th Avenue NW, Andover, MN 55304; **webmaster@rossiya.net**; **www.rossiya.net/mnqso.htm**.

**Delaware QSO Party**, 1700Z Feb 3 to 0500Z Feb 4 and 1300Z Feb 4 to 0100Z Feb 5. Exchange RS(T), and QTH (county for DE stations; state/province/DXCC country for others). CW 1.825 3.550 7.050 14.050 21.050 28.050; phone 1.860 3.960 7.260 14.260 21.360 28.360, Technician frequencies: 25 kHz above the subband edge. Only one class for all stations. Count one point per phone QSO, two points per CW/RTTY/digital QSO. No multipliers. Awards. Contest Chairman FSARC, Inc, PO Box 1050, Newark, DE 19715; **qsoparty@fsarc.org**; **www.fsarc.org/**.

**Vermont QSO Party**, sponsored by the Central Vermont Amateur Radio Club, 0000Z Feb 3 to 2400Z Feb 4. 160 80 40 20 15 10 meters plus VHF/UHF. Single Op, multiop, club or rover. Vermont stations send RST and county; others send RST plus state/province/DXCC country. Frequencies: CW—40 kHz up from bottom of the band. 20 kHz up from the bottom of the Technician subbands. SSB in the first 25 kHz of the General portion of each band; entire Technician 10-meter phone band. VHF: 50.200, 144.200, 146.49, 146.69. VT stations count one point per phone contact, two for CW, RTTY or other digital modes. A station may be worked up to four times per band (different modes). Multiply by number of VT counties, states, provinces, countries, W1BD and legitimate Vermont club stations. Multipliers count only once regardless of the number of bands they might be worked. Other stations count one point per VT phone QSO, 2 per VT CW, RTTY, etc. Multiply by number of VT counties, W1BD and legitimate Vermont Club stations. W1BD is worth a 2000 point bonus. Awards. Send logs postmarked by March 1 to: Bob DeForge, K1HKI, QSO Party Coordinator, Vermont QSO Party, Central Vermont Amateur Radio Club, PO Box 674, Montpelier, VT 05601.

**New Hampshire QSO Party**, sponsored by the NHARA, 0000Z Feb 3 to 2400Z Feb 4. Operate any 24 hours. Off-times must be a minimum of 15 minutes. 160 80 40 20 15 10 meters plus VHF/UHF. Classes: Single Transmitter QRP (less than 5 W), Low Power (150 W or less) and High Power (more than 150 W), Multi Transmitter QRP, Low Power and High Power. New Hampshire stations send RST and W/VE outside NH send RST state/province/. DX stations send RST/serial number. Use of repeaters is not allowed. Use of spotting nets, DX clusters, etc is not allowed. Stations may be worked once per band per mode. Count one point per phone QSO, two points per digital QSO, five points per phone QSO with a NH bonus station, 10 points per digital QSO with a NH bonus station. (Bonus stations: W1FGM, K1BKE, W1FZ, W1WQM, N1FD, K1NCR). Awards. Send logs by March 31 to NHARA, PO Box 119, Goffstown, NH 03045. For information on the Web, see **www.nhara.nhradio.org/qso_index.html**.

**FYBO Winter QRP Field Day**, sponsored by the Arizona ScQRPions, 1400Z February 3 to 0200Z February 4. QRP only. CW and Phone. 160 80 40 20 15 10 meters, standard QRP calling frequencies. No WARC bands. Work stations once per band. Exchange: RS(T), state/province/DXCC country, first name, power output and temperature (Fahrenheit) at operator's position. Indoor stations must report indoor temperature. Example: "579 AZ BOB 5W 42F" Categories: Single op, multiop (single transceiver). Send logs by March 4 to Bob Hightower, NK7M, 1905 N Pennington Dr, Chandler, AZ 85224-2632. Mark face of envelope with "FYBO Log"; **nk7m@extremezone.com**; **www.extremezone.com/~nk7m/fybo01.htm/**.

**Ten Ten International Net Winter Phone QSO Party**, from 0000Z Feb 3 until 2400Z Feb 4. Contacts must be made on phone on 10 meters only. Exchange call/name/state and 10-10 number if member. Score one point per QSO with non-members, two points per QSO with members. Final score is total points. Send logs by Feb 21 to Portland 500 Chapter c/o Leon Hixon, W6NCK, 6936 N Greenwich Ave, Portland OR 97217-5416.

**YL-OM Contest, CW**, sponsored by YLRL, 1400Z Feb 3 to 0200Z Feb 5. (Phone: 1400Z, Feb 12 to 0200Z, Feb 14.) All licensed men and women operators throughout the world are invited to participate. Men call "CQ-YL" and women call "CQ-OM." Participants may work only 24 hours of the 36 hours in each contest. Operating breaks must be indicated in the log. Exchange call signs, QSO number, RS(T), ARRL section, VE province, or country. Entries in log must also show time, band, and date. Scoring: phone and CW will be scored as separate contests. Submit separate logs for each contest. Score each band separately. One point is earned for each different station worked on each band; women count only men and men count only women. Add together the QSO points earned for each band and multiply the number of QSOs by the total number of different ARRL sections, VE provinces, and countries worked. Contestants using 100 W or less on CW and 200 W PEP or less on SSB at all times may multiply the results by 1.5 (the low power multiplier). The maximum power output that may be used at any time during the contest is 750 W on CW and 1500 W PEP on SSB. All logs must show your ARRL section, province, or country to qualify for awards. Logs must also state the power output used and the operating breaks taken. If you have 200 or more QSOs, submit a separate log for each band and submit a dupe sheet. Remember to file separate logs for each contest. Logs must show claimed score. Send logs to Cleo Bracket, K0JFO, 810 Towne Square Dr, Fremont, NE 68025; **cleob@mitec.net**; **www.qsl.net/~ylrl/ylcontst.html/**.

**Spring Classic Radio Exchange**, CW and phone, Sponsored by *CX Newsletter*. 2000Z Feb 4 to 0500Z Feb 5. 80 40 20 15 10 meters. Exchange name, RST, QTH, receiver and transmitter type (home-brewers send final amplifier tube or transistor). Work stations once per band, mode and equipment combination. Nonparticipants may be worked for credit. CW: 3.545, 7.045, 14.045, 21.135, 28.180. Technician: 3.695, 7.120, 21.135, 28.180. Phone: 3.880, 7.290, 14.280, 21.380, 28.320. 7.045 and 3.545 might be the most popular CX frequencies. Score is total QSOs multiplied by the total number of different receivers plus transmitters plus QTHs worked on each band and mode. Multiply that by CX multiplier—the total age, in years, of all receivers and transmitters used, three QSOs minimum per unit (transceiver ×2; homebrew ×25, unless older). Awards. Send logs to Allan Stephens, 106 Bobolink Dr, Richmond, KY 40475; **modsteph@acs.eku.edu**.

**Mexico RTTY International Contest**, sponsored by the Federacion Mexicana de Radioexperimentadores, AC. RTTY only. 1800Z Feb 3 to 2400Z Feb 4. 160 80 40 20 15 10 meters, Single op, multiband only. Exchange RST and QSO serial number (Mexico stations will send RST and State). Count 2 points for each QSO within your country; 3 points for each QSO outside your country. Contacts with Mexico count 4 points. Multipliers are each Mexican state and Distritio Federal (32) and each DXCC country on each band ( do not count Mexico). Final score is QSO points × total multipliers. Send logs by Mar 7 Jose Levy, Direccion De Concursos FMRE, Clavel 333, Colima, Col. 28030 Mexico; **xe1j@palmera.colimanet.com**; **www.fmre.org.mx/concursos/eng-rtty/rules.html**.

## 10-12

**North American Sprint, CW**. See Feb 3-4 listing.

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

**YL-OM Contest, phone**. See the Feb 3-4 listing.

**Winter Fireside SSB Sprint**, sponsored by QRP ARCI, 2000Z to 2400Z Feb 11, SSB, 160 80 40 20 15 10 meters. Entry categories: All Band, High Band (40, 20, 15, 10) or Low Band (160, 80, 40). Work stations once per band. Exchange signal report, state/province/country and ARCI number if member. Count 5 pts/QSO with ARCI members, 4 pts/QSO with nonmembers on a different continent, 2 pts/QSO with nonmember on the same continent. Final score is total QSO points (all bands) multiplied by total of states/provinces/countries (add the total from each band together) multiplied by the power multiplier (> 10 W PEP out = 1; < 10 W PEP out = 7; < 2 W PEP out = 10; < 500 mW PEP out = 15). SSB power is considered to be 2 times the dc output power. Include a description of equipment and antennas used. Mail entry within 30 days to: SSB Sprint, Randy Foltz K7TQ, 809 Leith St, Moscow, ID 83843; **rfoltz@turbonet.com**; **personal.palouse.net/rfoltz/arci/arcitst.htm**.

**CQ World-Wide RTTY WPX Contest**, sponsored by *CQ Magazine* and *The New RTTY Journal*, 0000Z Feb 10 to 2400Z Feb 11. Single op, high (<1500 W)/low (<150 W) power, all band; single op single band; single op Rookie (licensed 3 yrs or less); multi-single (6 band changes per hour max); multi-two (6 band changes per hour per transmitter max); multi-multi; SWL. Single ops operate 30 hours max; offtimes must be at least 60 min. Multiops operate full 48 hours. 80 40 20 15 10 meters. Use of spotting nets or PacketCluster is allowed for all classes. Exchange RST and serial no. starting with 001. Score one point per QSO with your own country, two points per QSO with your own continent, and three points per QSO with different continents. QSOs on 3.5 and 7 MHz are worth double. Multipliers are prefixes; final score is QSO points × multipliers. Awards. Send logs postmarked by Mar 13 to CQ Magazine WPX Contest, 25 Newbridge Rd, Hicksville, NY 11801; email logs to **wpxrtty@kkn.net**; questions to **w6otc@garlic.com**; **www.rttyjournal.com/rules/wpx.html**.

**PACC Contest**, sponsored by the Vereniging voor Experimenteel Radio-Onderzoek in the Netherlands, 1200Z Feb10 until 1200Z Feb 11. 160 80 40 20 15 10 meters, CW and SSB (no SSB QSOs on 160 meters). Single op or multiop. Send RS(T) and serial number, PA/PB/PI stations also send province. Score one point per QSO, work PA/PB/PI stations only, once per band regardless of mode. Final score is QSOs × provinces worked (max 12 per band). Awards. Send log by Mar 31 to Hans P. Timmerman, PA7BT Nieuweweg 21, 4031 MN Ingen, Netherlands; **pa7bt@amsat.org**. You'll find complete PACC contest rules on the Web at **home.wxs.nl/~pa3ebt/pacc/foreign.htm**.

**School Club Roundup.** See Jan *QST*, page 110.

### 12-13

**Novice Round-Up**, sponsored by FISTS CW Club, CW only, 0000Z Feb 12 to 2400Z Feb 13. All contacts must be made in the Novice/Technician bands. Exchange call sign, name, RST, license class and QTH. Count 1 point for each phone contact and 2 points for each CW contact. Work stations once per band/mode. Multipliers count once overall regardless of band or mode. Multipliers are states (50) and Canadian provinces (13). Score is total QSO points × multipliers. Awards. Send logs by March 15th to, Novice Round-Up, c/o Dennis Franklin, K6DF, 4658 Capitan Dr, Fremont, CA 94536-5448; **www.fists.org/~fists/novice.html**.

### 17-18

**ARRL International DX Contest**, CW. See Dec 2000 *QST*, page 110.

### 24-25

**CQ WW 160-meter SSB Contest**. See Jan *QST* page 99.

**REF French Contest**, phone. See Jan *QST* page 99.

**UBA Contest**, CW. See Jan *QST* page 100.

**RSGB 7 MHz Contest**, sponsored by the RSGB, from 1500Z Feb 24 until 0900Z Feb 25. CW only. 7.000-7.030. Single operator and multiop. Exchange RST and serial number. UK stations also exchange three-letter county code. Non UK stations work only UK stations and vice versa. North American stations score 15 points/QSO. Multipliers are UK counties. Final score is QSO points × multipliers. Awards. Send logs postmarked within 16 days to RSGB HF Contest Committee, c/o S. V. Knowles, G3UFY, 77 Bensham Manor Rd, Thornton Heath, Surrey, CR7 7AF, England.

**CQC Winter QRP QSO Party**, sponsored by the Colorado QRP Club, from 2200Z Feb 25 until 0359Z Feb 26. Single band, multiband and Technician. QRP only. Exchange RS(T), state/province/DXCC country, first name and CQC number or power output. CW 1.825 3.560 3.710 7.040 7.110 14.060 21.060 21.110 28.060 28.110; phone 1.910 3.985 7.285 14.285 21.385 28.385. Score 6pts/4 pts/CW QSO with member/nonmember; score 3 pts/2pts/phone QSO w/member/nonmember. Final score is QSO pts states/provinces/DXCC countries number of first names worked, one/letter of the alphabet, 26 max. One thousand bonus points for working W0CQC. Awards. Send logs to Colorado QRP Club, PO Box 371883, Denver, CO 80237-1883; **contest@cqc.org**. See the Colorado QRP Club site on the Web at **www.mtechnologies.com/cqc/**.

**North Carolina QSO Party**, sponsored by the Alamance ARC, from 1200-2400Z Feb 26 and 1200-2400Z Feb 27. NC stations work everyone, others work NC stations only. Work stations once per band and mode. Work mobiles again as they change county lines. Exchange call sign, RST and NC county, state, province or DXCC country. CW: 3.540, 3.740, 7.040, 7.140, 14.040, 21.040, 21.140, 28.040, 28.140; phone: 3.860, 7.260, 14.260, 21.360, 28.360; All VHF/UHF frequencies. No repeater or crossband/mode QSOs. Score one point per phone QSO, two points per CW QSO, three points per NC mobile QSO (either mode), 4 points for QSOs with Novice stations (Novice stations sign /N). NC stations multiply QSO points × NC counties, states and provinces; others × NC counties worked (max 100). Add 100 bonus points for working both Cherokee and Dare counties, and 100 points for working W4NC or K4EG, after all other score calculations. One hundred bonus points for county from where at least 1 QSO was worked. Awards. Send logs (SASE for results) by April 1 to NC QSO Party, c/o K4EG, Box 3064, Burlington, NC 27215. See the Alamance Web site at **www.netpath.net/~n4mio/qsoparty.htm**. QST

# SPECIAL EVENTS

**Tampa, FL:** Tampa Amateur Radio Club, W4G, 0000Z **Jan 15** to 2359Z **Jan 29**, for the Gasparilla Pirate Invasion and Super Bowl 35. 14.235 14.035 21.325 21.035. QSL. Tampa Amateur Radio Club, PO Box 11933, Tampa, FL 33680.

**Punxsutawney, PA:** Punxsutawney Area Amateur Radio Club, K3HWJ, 1400-2100Z **Feb 3**, for the Groundhog Day special event. Lower end of 40- and 20-meter phone bands. Certificate. Sham, W3QOS, PO Box 20, Big Run, PA 15715.

**Saranac Lake, NY:** Tri-Lakes Amateur Radio Club, W2TLR, 1500-2100Z **Feb 3, 4, 10 and 11**, celebrating nation's oldest (103rd) winter carnival and ice palace. 7.250 14.257 21.312 28.473. Certificate. Tri-lakes Amateur Radio Club, PO Box 95, Saranac Lake, NY 12983.

**Brainerd, MN:** Brainerd Area Amateur Radio Club (BAARC), W0UJ, 1500-2300Z **Feb 10**, during the Mid-Minnesota Sled Dog Race. 28.450 21.350 14.250 50.125. Certificate. BAARC, PO Box 801, Brainerd, MN 56401.

**Orlando, FL:** Orlando Amateur Radio Club, K4H, 1400-2100Z **Feb 10** and 1300-2000Z **Feb 11**, celebrating 54 years of the Orlando HamCation. 7.275 14.320 21.375. QSL. John Melchori, K4JBM, 1840 Cleek St, Orlando, FL 32835-5171.

**ND and SD:** QCWA Chapter 102, W0DAK, 1500Z **Feb 11** to 0300Z **Feb 12**, celebrating the 24th anniversary of Chapter 102 QCWA in the Dakotas. 28.505 21.305 14.325 3.889. QSL. Frank Shaw, NU0F, 118 East Van Buren St, Rapid City, SD 57701.

**Myrtle Beach, SC:** Grand Strand ARC, W4GS, 1200-2000Z **Feb 17**, commemorating the fourth year of the Myrtle Beach Marathon. 14.270 21.270. Certificate. Glen Bowden, 703 Connie Ct, Myrtle Beach, SC 29588-6003.

**West Chester, OH:** West Chester Amateur Radio Association, KD8C, 1700-2300Z **Feb 24**, to commemorate the 58th anniversary of the first Voice of America broadcast. 7.270 14.323 28.450 146.55. Certificate. WCARA, PO Box 1759, West Chester, OH 45071.

**Laurel, MS:** Laurel Amateur Radio Club, W5LAR, 1400-2200Z **Feb 24**, celebrating the 25th anniversary of the LARC. 28.450 21.350 14.270 7.275. Certificate. LARC, PO Box 6252, Laurel, MS 39441.

**Oneonta, NY:** Oneonta Amateur Radio Club, W2RGI, 1200Z **Feb 24** to 2200Z **Feb 25**, operating from Otsego and Delaware counties in New York. 14.320 21.400 29.450. Certificate. Bill Holland, AA2RM, PO Box 63, Meridale, NY 13806. QST

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

# SILENT KEYS

**It is with deep regret that we record the passing of these amateurs.**

W1AQM, Clarence C. Margerum, Shrewsbury, MA
W1EOA, Roger P. Smith, Wellesley, MA
W1EPZ, Kenneth R. Cossaboom, New Port Richey, FL
KA1HNU, Richard A. Lewis, Raymond, NH
N1IJC, Irene H. Amann, Zephyrhills, FL
K1IJW, Anthony V. Adams, Fairfield, CT
*WA1IMS, Richard H. McGinn, Bridgewater, MA
W1JIY, Nicholas C. Darchik, Berlin, NH
W1LDA, Andrew W. Madrak, New Britain, CT
K1LVZ, George F. Clinton, New Britain, CT
W1MXC, Donald J. Poulin, Andover, MA
W1RED, Patrick D. Gleason, Marco Island, FL
W1RJ, Ralph J. Henry, Murphysboro, IL
WA1UKV, Robert C. Fair, Bow, NH
W1VOE, Elwyn E. Ayers, Peabody, MA
W1XQ, Paul J. Gregory, Seymour, CT
W1YGC, Leonard R. Hadley, Waltham, MA
W1YHI, Albert F. Haworth, Bedford, NH
KA2ADM, John H. Thomas, Mechanicville, NY
K2DCC, Billy G. Smith, Trenton, NJ
*W2FTO, G. N. Shoop, Mount Laurel, NJ
W2HN, Orion M. Arnold, HoHoKus, NJ
W2MLH, Edwin J. Beck, Sun City, FL
*W2OV, Alexander Magocsi, Leonia, NJ
WB2OZI, Thomas D. Decker, Clementon, NJ
W2QFG, Robert F. Lippacher, St Augustine, FL
N2QWN, Edward D. Goritski, Canstota, NY
KA2YXU, Vernon W. Schroeder, Annandale, NJ
W3ASW, Richard E. Long, Hummelstown, PA
NE3AT, Richard L. Neat, Millersville, MD
W3BBS, James J. Balliet, Palmerton, PA
W3DCR, Lewis C. Ockenhouse, Macungie, PA
WA3OOM, Robert A. Hooper, Erie, PA
W3QZI, Alonzo B. Phillips, Wilmington, DE
K3SE, Francis J. Roddy, Silver Spring, MD
KA3ZJP, William A. Johnson, State College, PA
*WB4BUM, William I. Thomas, Lorain, OH
KB4CJZ, Frank De Mars, Fort Lauderdale, FL
W4EBP, Jasper L. Spain, Atlanta, GA
W4EHO, W. M. Shaup, Saint Petersburg, FL
W4EIN, Frank W. Smith, Hawaii Ntl Park, HI
K4EZS, Donald Perry, Nashville, TN
WA4FCC, Johnny E. Carr, Rockmart, GA
WA4GGN, John L. Stone, Birmingham, AL
N4HEJ, Henry R. Gordon, Sun City Center, FL
WD4KAX, Donald L. Bassler, Palm Beach Gardens, FL
AB4LD, Gordon C. Berry, Roswell, GA
KC4MA, Roger W. Burnham, Sarasota, FL
WB4MBQ, Wilbur D. Yant, Bradenton, FL
WA4NNI, William D. Madison, Pulaski, TN
KM4QR, James H. Darden, Huntsville, AL
KD4RK, Thomas R. Abercrombie, Mineral, VA
WB4SWI, Stephen C. Toth, Murphy, NC
KC4VRZ, Roy M. Snead, Marion, VA
KF4ZNS, Barry McGill, Sarasota, FL
W5CNF, Morris G. Dundee, Tulsa, OK
W5CYF, Edwin B. Robertson, Bastrop, LA
W5DLO, Clarence A. Richter, Alice, TX
*WA5GFC, Jerry Greathouse, Atlanta, GA
W5GHX, Walter J. Ware, North Zulch, TX
K5MDW, Leland L. Fellows, Ruidoso, NM
W5PVQ, Ulric C. Hines, McComb, MS
KD5RX, John H. Gilbert, Waldron, AR
W5VGV, Billy L. Hoffman, San Antonio, TX
WH6AVX, John W. Prugh, Pahoa, HI
KH6BFB, Wayne M. Canevali, Hilo, HI
WA6BLW, Cal D. Stokes, North Highlands, CA
N6BNU, Jack J. Witham, Bishop, CA
WD6BUK, Thomas R. Neece, Bakersfield, CA
N6CQY, Earl C. Jacobson, San Francisco, CA
W6FJY, Marion B. Hall, Yountville, CA
KA6GRN, Ernest L. Matson, El Cajon, CA
KH6GZ, Howard Y. Atebara, Hilo, HI
*W6HAE, Ernest V. Roberts, Carmel, CA
W6IQY, Ernest H. Mason, San Diego, CA
K6JWS, William R. Mieras, Rancho Cucamonga, CA
AE6L, Frank M. Adams, National City, CA
W6LKV, Mark E. Warnock, Cassel, CA
NQ6M, George E. Gastineau, Highland, CA
K6NL, Francis M. Dukat, Los Altos, CA
WB6OOX, Eugene Leary, Sherman Oaks, CA
N6RX, Victor Battani, Castro Valley, CA
K6SUZ, Ernest L. Rothschild, Los Angeles, CA
KD6ULB, Glenn C. Morris, El Monte, CA
WA6URV, Maxworth Cook, Pinedale, CA
WA6WFQ, Bill R. Beard, Crescent City, CA
KD6WWF, F. W. McDonald, Laguna Woods, CA
WL7AJM, La Verle Mabeus, East Peoria, IL
W7EEJ, C. Weldon Lawrence, Bothell, WA
W7FC, William J. Sullivan, Bozeman, MT
W7KTQ, Frank Wakeland, Springfield, OR
*WA7KYZ, Gerald D. Ford, Tombstone, AZ
N7LD, Dick Bostrom, Shelton, WA
KA7LSA, John R. Cameron, Yucaipa, CA
KC7NVF, James T. Moore, Monroe, WA
KC7ODU, William H. Winne, Shelton, WA
KA7ONZ, Edward G. Porter, Saint George, UT
W7YR, John H. Allen, Sun City, AZ
W7ZZZ, W. E. Tice, Sumner, WA
K8CEK, Harvey Teplitz, Dayton, OH
K8DJS, James L. Casto, Huntington, WV
W8IAC, Edward Prested, Indian River, MI
N8ICY, Edward Bevier, Ypsilanti, MI
W8NPF, G. Eugene Ferguson, Columbus, OH
K8RAI, Thomas G. Nancarrow, Royal Oak, MI
W8YNY, Wilbur J. Kuure, Crystal Falls, MI
KB9DV, Carl W. Vinyard, Mountain Home, AR
WD9ERN, William S. Daly, Manitowoc, WI
W9HK, Paul W. Hinkle, Indianapolis, IN
WA9IGW, Charles F. Theamann, Plainfield, IN
KB9IJ, Paul E. Block, Pensacola, FL
W9JTH, Suzanne D. Strickland, Park Forest, IL
N9MFO, James R. Weldon, Columbia City, IN
KB9MZW, Norman D. Woodward, Anderson, IN
WA9NRI, Carl P. Zaruba, Winterhaven, CA
W9OBY, Joseph W. Comella, Woodstock, IL
W9OCQ, Theodore R. Wahlmann, Quincy, IL
KB9QIW, Walter E. Gould, Beaver Dam, WI
W9SQD, Charles H. Marks, Fort Wayne, IN
WB9TPV, Jon I. Gullett, Washington, IL
WA9VAF, Garland E. Wadsworth, Terre Haute, IN
K9YA, Robert F. Heytow, Skokie, IL
KC9YX, Donald E. Wurster, Indianapolis, IN
W0EFZ, Carl E. Schafer, Topeka, KS
N0FFU, Ralph Kephart, Golden, CO
K0HJM, Bill M. Saultz, Woodland Park, CO
KB0JNV, Roy Speier, Hazelwood, MO
W0NE, Robert P. Kauphusman, Winona, MN
NA0Q, Robert Flesch, Bettendorf, IA
W0RPU, Gary L. Roberts, Wellington, KS
*KC0SX, Paul F. Hultquist, Omaha, NE
WA0UHH, Edwin E. Davis, Castlewood, SD
*KC0WH, W. Wayne Wright, Mound City, KS
LA5QK, Alf Almedal, Sola, Norway

*Life Member, ARRL

‡Call sign has been re-issued through the vanity call sign program.

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

Kathy Capodicasa, N1GZO ♦ Silent Key Administrator

# VHF/UHF CENTURY CLUB AWARDS

**Bill Moore, NC1L**
**Century Club Manager**

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations for contacts with the minimum number of Maidenhead grid-square locators (indicated in *italics*) for each band listing. The numbers preceding the call signs indicate total grid squares claimed. The numbers following the call signs indicate the claimed endorsement levels. The totals shown are for credits given from October 14 to December 18, 2000.

The VUCC application form, field sheets and complete list of VHF Awards Managers can be found on the Web at www.arrl.org/awards/vucc/. Please send an SASE if you cannot download the forms online. If you have questions relating to VUCC, send an e-mail to vucc@arrl.org.

**50 MHz**
*100*

| | |
|---|---|
| 1088 | K2JF |
| 1089 | W5HEZ |
| 1090 | N9LF |
| 1091 | AB5SS |
| 1092 | W9VA |
| 1093 | KD4K |
| 1094 | KD5HPT |
| 1095 | KB2WAL |
| 1096 | WA6RAY |
| 1097 | N5JGK |
| 1098 | W4LLP |
| 1099 | K5PI |
| 1100 | K4JRK |
| 1101 | N7AU |
| 1102 | K0DI |
| 1103 | W7TRX |
| 1104 | KM0T |

| | |
|---|---|
| VE3SYK | 225 |
| VE3TMG | 350 |
| XE2EED | 125 |
| KM0T | 150 |
| K0VSV | 225 |
| N1NUM | 125 |
| N1ZUK | 200 |
| KB2WAL | 125 |
| W2YE | 250 |
| N2CG | 200 |
| K2JF | 175 |
| AF2K | 300 |
| K3CWH | 300 |
| K3AX | 450 |
| KF4LVF | 175 |
| N4LXB | 150 |
| KD4K | 225 |
| W4LTJ | 325 |
| K4RWP | 525 |
| KD5HPT | 150 |
| AA5XE | 425 |
| W5HEZ | 125 |
| W5OZI | 825 |
| W5DB | 300 |
| WA5KBH | 200 |
| WA6RAY | 125 |
| N7IJ | 500 |
| W8WG | 225 |
| K8TL | 150 |
| N8KOL | 375 |
| WB9DRB | 200 |
| W9VA | 300 |

**144 MHz**
*100*

| | |
|---|---|
| *581 | N9NJY |
| 587 | N4LGY |
| 588 | KU4WW |
| 589 | KM0T |
| 590 | K0RZ |
| 591 | CT1EEB |

| | |
|---|---|
| VE3TMG | 125 |
| N0KLT | 125 |
| K0VSV | 150 |
| K1SIX | 200 |
| K3AX | 175 |
| N4LGY | 125 |
| K6AAW | 250 |
| N8KOL | 125 |

*Updated listing

**222 MHz**
*50*

| | |
|---|---|
| K1TEO | 90 |
| N8KOL | 70 |

**432 MHz**
*50*

| | |
|---|---|
| 284 | VE3TMG |
| 285 | W9OBG |
| 286 | K5VH |
| 287 | K0VSV |
| 288 | KM0T |

| | |
|---|---|
| K5VH | 60 |
| N8KOL | 60 |

**902 MHz**
*25*

| | |
|---|---|
| 29 | W2DRZ |
| W5LUA | 50 |

**1296**
*25*

| | |
|---|---|
| 132 | N0QJM |

**2.3 GHz**
*10*

| | |
|---|---|
| 63 | NQ2O |
| W5LUA | 85 |
| WB8TGY | 20 |

**3.4 GHz**
*5*

| | |
|---|---|
| 59 | WA8RJF |
| W5LUA | 25 |

**5.7 GHz**
*5*

| | |
|---|---|
| W5LUA | 25 |

**10 GHz**
*5*

| | |
|---|---|
| 105 | W2DRZ |
| W5LUA | 40 |

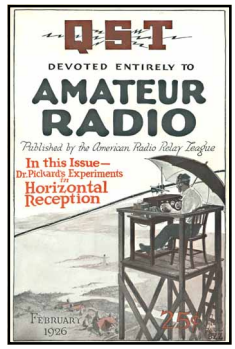
**Satellite**
*100*

| | |
|---|---|
| 95 | N9UUR |
| XE2YVW | 300 |
| KK5DO | 425 |
| K5OE | 350 |
| N7SFI | 675 |
| K8TL | 475 |
| K9HF | 175 |
| N9UUR | 200 |

QST

# 75, 50 AND 25 YEARS AGO

## February 1926

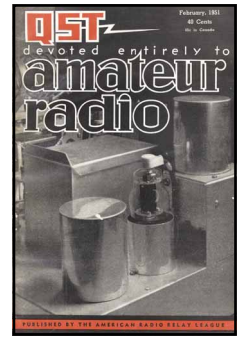



◊ The cover art by Clyde Darr, 8ZZ, shows "Dr. Pickard's Experiments in Horizontal Reception." The editorial becomes nostalgic—in "Looking Backwards a Bit," K. B. Warner tells about spending hours looking through the early issues of *QST*, marveling at the way technology had changed. Another editorial announces that the Department of Commerce has followed the authorization given by the recent National Radio Conference and, effective December 7, 1925, opened 3500 to 3600 kc. for phone operation.

The eight-page lead article, "Horizontal Reception," by Technical Editor Robert Kruse, describes Dr. Greenleaf Pickard's experiments with radio wave polarization on the short waves. F. J. Marco discusses "Short-Wave, Plug-in-Coil, Receiver Design." "A Zero Weather Mast" tells how Don Wallace, 9ZT, and Boyd Phelps erected a 50-foot wooden mast in Minneapolis in 0° weather—good design and planning made the erection possible in 50 minutes! Assistant Technical Editor John Clayton tells about "Calibrated Your Wavemeter from a Quartz Crystal." W. M. Bakewell, G6UZ, describes "Receiving Conditions in England."

"Amateur Radio Stations" leads off with a photo and description of the early amateur station SNY, owned and operated by ARRL President Hiram Percy Maxim. The column goes on to describe current stations 1BAY, Cambridge, Massachusetts, and 5LG-5SC, Alamogordo, New Mexico. "I.A.R.U. News" reports the many countries that are now on the air in the ham bands.

## February 1951




◊ The cover photo shows the 807 section of a new two-stage linear amplifier undergoing performance test in the ARRL Lab, and soon to be featured in QST. The editorial reports on the progress of Civil Defense planning, with amateurs still waiting for word from Washington on how they will fit into the system. The new CD frequencies for hams have been announced by the FCC—small segments in the 160, 80, 75, 10, 6, and 2 meter bands, plus 220-225 Mc.

R. K. Moore, W2SNY, discusses V.H.F. propagation by tropospheric scattering in "Over the Hills and Far Away." With more hams using mobile rigs, Harold Mitchell, W4IBZ, tells about "Loop-Type Antenna for 75-Meter Mobile." Phil Rand, W1DBM, urges the readers, "Don't Pamper Your Harmonics!", telling them how to avoid harmonic resonances in amplifier circuits. John Clements, W9ERN, comes up with a new way to match a coaxial feedline to a balanced driven element of a beam with "The 'Clemens Match'."

Roy Brann, W6DPU, tells of his advances in electronic keyer design in "In Search of the Ideal Electronic Key." Douglas Jordan tells of some new ideas for using the BC-453 low-frequency command receiver as a second IF in "New Life for the Q5-er." In the "Operating News" column, Ellen White, W6YYM, section communications manager of the San Diego Section, is featured under the heading "Meet the SCMs."

## February 1976


◊ The cover photo shows an LED digital readout, set to 1976…a "timely" project, perhaps? The editorial, "Amateur Radio and Sister Cities International," urges hams to provide communication between the people of sister cities, which could provide some good public relations exposure for Amateur Radio.

"Operation Vietnamese Refugee," by Communications Manager George Hart, W1NJM, tells about Amateur Radio's helping with communications among the many thousands of Vietnamese refugees who have come to the US. Howard Berlin, K3NEZ, warns that "Danger Lurks!", warning hams what to beware of when working with electronic equipment. In "To the Moon and Back," Bill Tynan, W3KMV, tells about the powerful EME station of WA6LET, which has worked 19 states, 11 countries, and 4 continents on 432 MHz EME. "Build a Baby Ultimate," by Doug DeMaw, W1CER, tells about a small "ultimate" transmatch for QRP rigs. Layne La Baume, W7HOI, describes "A Multiband Phased Vertical Array." Jay Rusgrove, WA1LNQ, tells how to build "The Cheapie GP" for 10 and 15 meters.

Herman Lukoff, W3HTF, tells how to check your 2-meter receiver with "A 2-Meter Frequency and Sensitivity Calibrator." "Telecom '75," by George Jacobs, W3ASK, and Dick Baldwin, W1RU—a paper presented at the World Telecommunication Forum in Geneva last October—gives a brief history of Amateur Radio. "Overnight Sensation: Heloise," by Bob Halprin, WB2NOM, tells about the damage caused by hurricane Heloise, and how hams provided emergency communication.

QST

Al Brogdon, W1AB ♦ Contributing Editor

# W1AW Schedule

| PACIFIC | MTN | CENT | EAST | MON | TUE | WED | THU | FRI |
|---|---|---|---|---|---|---|---|---|
| 6 AM | 7 AM | 8 AM | 9 AM | | FAST CODE | SLOW CODE | FAST CODE | SLOW CODE |
| 7 AM-1 PM | 8 AM-2 PM | 9 AM-3 PM | 10 AM-4 PM | VISITING OPERATOR TIME (12 PM - 1 PM CLOSED FOR LUNCH) | | | | |
| 1 PM | 2 PM | 3 PM | 4 PM | FAST CODE | SLOW CODE | FAST CODE | SLOW CODE | FAST CODE |
| 2 PM | 3 PM | 4 PM | 5 PM | CODE BULLETIN | | | | |
| 3 PM | 4 PM | 5 PM | 6 PM | TELEPRINTER BULLETIN | | | | |
| 4 PM | 5 PM | 6 PM | 7 PM | SLOW CODE | FAST CODE | SLOW CODE | FAST CODE | SLOW CODE |
| 5 PM | 6 PM | 7 PM | 8 PM | CODE BULLETIN | | | | |
| 6 PM | 7 PM | 8 PM | 9 PM | TELEPRINTER BULLETIN | | | | |
| $6^{45}$ PM | $7^{45}$ PM | $8^{45}$ PM | $9^{45}$ PM | VOICE BULLETIN | | | | |
| 7 PM | 8 PM | 9 PM | 10 PM | FAST CODE | SLOW CODE | FAST CODE | SLOW CODE | FAST CODE |
| 8 PM | 9 PM | 10 PM | 11 PM | CODE BULLETIN | | | | |

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

♦ **Morse code transmissions:**

Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, $7^1/_2$, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 1992 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by K6YR. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Send a 9×12-inch SASE for a certificate, or a business-size SASE for an endorsement.

♦ **Teleprinter transmissions:**

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

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

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

♦ **Voice transmissions:**

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

♦ **Miscellanea:**

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

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

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

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

# SECTION NEWS

## The ARRL Field Organization Forum

### ATLANTIC DIVISION

**DELAWARE**: SM, Randall Carlson,WB0JJX—Many thanks to the SARA club for the kind invitation to their annual awards dinner. Congratulations to all those who received awards. It's always good to see people being recognized for their good works. It's been my opinion that most amateurs do what they do not for personal glory or recognition, but for the simple satisfaction of doing something, that at least to them, is important. But recognition by others is important. It lets people know that we are aware of the things they do and the effort they put into them. I think we all need to take time to let people know that we appreciate their efforts, even if it's just a quiet word of thanks from one ham to another. Traffic (Nov) DTN QNI 197 QTC 16 in 22 sess. DEPN QNI 31 QTC 3 in 4 sess. 73, Randall.

**EASTERN PENNSYLVANIA**: SM, Eric D. Olena, WB3FPL—SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. OOC: Alan Maslin, N3EA. PIC: Robert Josuweit, WA3PZO. STM: Paul Craig, N3YSI. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO, Dave Heller, K3TX, George Law, N3KYZ, James E. Bear, WB3FQY, Harry Thomas, W3KOD. OOPS! already. In last month's article I mentioned the N3IRN's e-mail address. Unfortunately it was an old address. Mike's proper address is n3irn@-sunlink.net or n3irn@arrl.net. New appointments, I feel fortunate to have Bob, WA3PZO, added to the staff as PIC. Bob will be a great asset to the E. Pa. Cabinet. Also, congratulations to Greg KB3CKD in Lehigh County who was recently appointed OES and congratulations to Stephen A. Mahala, KB3FJJ in Schuylkill County also appointed OES. Congratulations, also to the Pottstown Area Amateur Radio Club, new ARRL Affiliated Club. At the November meeting of the Pennsylvania Emergency Management (PEMA) meeting of the Volunteer Organizations Assisting Disasters Committee (VOAD) a familiar point again became evident. A rather high percentage of the personnel who are involved in many disaster type situations do not have the slightest idea of the various types of communications available to them through Amateur Radio. With out a doubt taking a few minutes of time at Emergency Management meeting every so often for a quick review of the capabilities of Amateur Radio would be very beneficial to everyone. Since I was SEC during the month of October 2000, I received several SET reports all of them did a fine job. The capabilities of digital media now so widely available to all of us the SET were pointed out by the report that I received from KA3MOU in Northampton County, which included some excellent pictures. As an example of poor SET performance I can only hold up the example of myself, during N3TVQ's SET in Berks County. Since I have been in Public Service Communications for the past twenty years you would think that I could handle an SET with no trouble at all. Well, that apparently was my mental attitude. However, I provided an outstanding example of poor performance, and it should be a reminder that everyone should participate in a drill as often as possible, if for no other reason, to keep your mind focused on the job at hand. Tfc: N3YSI 342, W3IPX 279, W3HK 175, N3EFW 80, N3SW 77, W3IVS 50, W3JKX 49, W3NNL 46, K3TX 41, W3UAQ 40, W3TWV 24, N3AT 18, AD3X 14, N8JSO 11, W3TI 10, N3AS 9, KB3CVO 8, KA3LVP 7, N3AO 6, N3ZXE 6, KB3BBR 6, K3ARR 4, N3IRN 4, K3AEB 4, N3KYZ 3, W3ROQ 3, W3BNR 3, KB3DCT 2, N3HR 2, W3DAB 1, KB3CKD 1. Net Reports: EPA 60, PTTN 30, EPAEPTN 29, PFN 31, MARCTN 13, D3ARES 9, SEPPTN 9, LCARES 4, MCOES 4, and D4ARES 3.

**MARYLAND/DC**: SM, Bill Howard, WB3V, 410-551-6775 wb3v@arrl.org—SEC: Mike Carr, WA3QAA. MDC Section Web homepage http://users.erols.com/wb3v/mdc. AA EC N3QXW rpts 38 ops, 4 sessions of the ANAR ARES Net which meets on 147.805 and maintains liaison to EPA, NCAC, MEPN, WVA, BTN, and MDD, and 1 training session. Brian met at MEMA for the new EAS system and also arranged AA for SET 2000. All modes were covered, connecting with MSN, MDD, CRN, NTSD, Packet and the AA ARES Net. OES rpts rcvd from N3QXW NU3D and W3VVN. CA EC NJIA rpts 64 ops, 5 sessions of the CARET Net which meets on 145.410 with liaison to MEPN, MDD, and MSN by KE3FL and to BTN, WVPN, DTN, MEPN, CRN, and WRN by W3VK. Rich also rpts one special net session in support of the American Lung Association Bike Ride PSE. Ops providing comms for this event and for the MD Wine Festival included KE34FL WX3F N3JIA N3TOT and W3VK. OES rpts rcvd from KE3FL WX3F and N3JIA. CARR had 11 ops for the SET2000. The American Diabetes Assn. Walk in Westminster was another successful event. WI EC WB3MJR rpts moving to the new QTH, and the .925 Salisbury repeater is back on the air. WA EC KD3JK rpts 43 ops, 9 sessions of the WASH ARES/RACES and Four States Nets which maintains liaison with MEPN, 1 training session with 7 amateurs, and 1 drill. WA ARES ops provided comms for the JFK Ultra-Marathon, a 50 mile run. Spcl recognition should be given to W3YGC, who has been the sweeper for the whole race for over 10 years. CH EC W3TOM rpts 29 ops, 4 sessions of the Chas Co. ARES Net which meets on 145.390 with liaison to MEPN, and 1 training meeting. Tom rpts attending a meeting of the Ch Co. Chap of the Am Red Cross Disaster Svcs Committee during which he updated them on ARES/RACES planned events. 73 from WB3V and with the nets: Net/NM/QND/QTC/QNI: MSN/KC3Y/30/44/306, MEPN/N3WKE/30/63/542, MDD/WJ3K/60/270/306, MDD top brass AA3SB 165, K3JL 156, KJ3E 123, AA3GV 123, BTN/AA3LN/30/36/369, Oct entry MEPN/N3WKE/30/61/500. Tfc: KK3F 3007, N3QA 325, KJ3E 198, W3YVQ 106, AA3GV 102, W3CB 98, AA3SB 96, N3WKE 87, KC3Y 52, WJ3K 46, N3KGM 31, KO4A 29, K3CSX 23, N3WK 19, WA1QAA 15, W3VK 12, N3ZKP 11, KB3AMO 10, WA3WRT 9, WA3GYW 5. PSHR: KK3F 221, KJ3E 165, W3YVQ 149, W3CB 146, N3ZKP 134, W3VK 133, AA3SB 128, N3WKE 128, AA3GV 112, N3WK 101, WA1QAA 97, KC3Y 90, WJ3K 90, K3CSX 78.

**NORTHERN NEW YORK**: SM, Thomas A. Dick, KF2GC, http://www.northnet.org/nnyham, e-mail: kf2gc@arrl.org—ASMs: KD2AJ, WZ2T, WB2KLD, N2ZMS, WA2RLW. ACC: WZ2T. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: WN2F. STM: N2ZGN. TC: N2JKG. NNY-Section is actively working on plans for our first section Hamfest. NNYARA has been busy during the past few months and weeks putting together our Hamfest committee. It will be in Lake Placid, NY, in October and we have plans to include a computer and crafts show along with access to activities for the whole family. Roland Patnode, WA2RP, President of NNYARA will conduct an organizational /planning meeting for the upcoming Lake Placid Hamfest & Computer show. It will be held at the World Famous Lake Placid Horse Show Grounds, home of the "I love New York Horse Shows." More on specifics will follow our Dec 9, 2000, meeting in Saranac Lake, NY. Many thanks to all the NNY Clubs that are making this possible.

**SOUTHERN NEW JERSEY**: SM, Jean Priestley, KA2YKN—(@K2AA) e-mail ka2ykn@voicenet.com. ASM: W2BE, K2WB, W2OB, N2OO, N2YAJ. SEC: KC2GID. STM: K2UL. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. TC: W2EKB. TS: W2PAU. WB2MNF AA2BN KD4HZW WB3IJB WA2NBL N2QNX N2XFM. It's not too early to think about upcoming hamfests. Clubs can put in paperwork for the following year's hamfest as soon as a week after the current hamfest. There is only one DX cards checker in SNJ (that I am aware of) and we need more than one for 9 counties. If you think you would be interested in this job, let me know. It's not hard and you meet interesting hams. Although it originates from Philadelphia, it will benefit all hams. Feb.3, 2001, will be the first Delaware Valley 2 Meter Simplex Contest. Contact WM3PEN @harcnet .org JOTA follow-up. PSK-31 was a great hit with the scouts. Traffic rpt: Nov 2000: QNI: NJPN 207 W2CC, NJSN 206 K2PB, NJM 126 WA2OPY, NJN/E 190 AG2R, NJN/L 151 AG2R, JSARS 387 KC2ATQ, SJVN 284 WB2UVB, SJTN 60 KB2RTZ. Tfc: K2UL 142, KB2RTZ 79, AA2SV 66, K2UL-4 64, N2VQA 42, WB2UVB 39, W2AZ 9, N2WFN 8, KA2CQX 8, N2ZMI 7, KB2YJD 4, WA2NDA 2, KB2VSR KB2YBM KC2ETU 1 PSHR: KB2RTZ 195 K2UL 180, WB2UVB 174, AA2SV 119, KA2CQX 116, N2VQA 75, KB2YJD 42, N2WFN 37 WA2NDA 12. Send some traffic to friends.

**WESTERN NEW YORK**: SM, Scott Bauer, W2LC— Please welcome new Official Observer Coordinator (OOC) AI, N2CCN. Please send all future OO reports to him. The Syracuse Museum of Science and Technology (The "MOST") planning group met, with great ideas and plans for the museum club station. An exhibit where the joys of Amateur Radio are on display and explained to the public. Several Scout troops are planning on doing merit badges in conjunction with the MOST Amateur Radio exhibit. Now the hard part, getting more Hams to volunteer to help staff the exhibit during Museum hours. Volunteers get in for free and can earn some goodies as well! Interested? Call the MOST at 315-425-9068, ext 2155. Congratulations to Sam KG2HA on his first PSHR! A New Year's resolution for WNY Amateurs. Volunteer for a public service event if you haven't in the past. Give your local group a helping hand and help show the public (non Hams) that Hams are a great group after all. For those of you who have never volunteered for a public service event, do it this year at least once! Give something back to Amateur Radio for all those years of enjoyment that you have received. Net Summaries:

| Net | NM | Sess | QNI | QSP | Net | NM | Sess | QNI | QSP |
|---|---|---|---|---|---|---|---|---|---|
| BRVSN | WB2OFU | 30 | 119 | 4 | CHN | W2EAG | 30 | 162 | 33 |
| CNYTN | WA2PUU | 30 | 361 | 48 | EBN | WB2IJZ | 22 | 395 | 0 |
| ESS | W2WSS | 30 | 375 | 89 | NYPHONE | N2LTC | 30 | 217 | 336 |
| NYPON | N2YJZ | 30 | 383 | 116 | NYS/E | WB2QIX | 30 | 332 | 214 |
| NYS/L | W2YGW | 30 | 265 | 240 | NYS/M | KA2GJV | 30 | 171 | 122 |
| NYSCN | W2MTA | 4 | 19 | 4 | NYSPTEN | WB3CUF | 28 | 342 | 43 |
| OARCN | N2KPR | 4 | 42 | 5 | OCTEN/E | KA2ZNZ | 30 | 1535 | 221 |
| OCTEN/L | KA2ZNZ | 30 | 602 | 196 | STAR | N2NCB | 26 | 214 | 18 |
| TIGARDS | W2MTA | 4 | 19 | 3 | WDN/E | N2JRS | 30 | 512 | 66 |
| WDN/L | W2GUT | 30 | 431 | 30 | WDN/M | KB2VVD | 30 | 566 | 69 |

Tfc: * indicates PSHR, # for BPL: N2LTC*# 1421, KA2ZNZ*# 625, KA2GJV* 481, W2MTA* 303, NN2H* 280, WB2QIX* 130, W2FR* 112, KG2D* 97, N2KPR* 92, NY2V* 90, KA2DBD* 88, KC2CWN 76, WI2G* 75, N2CCN* 62, KB2VVD* 62, W2LC* 60, KC2EOT* 59, W2GUT* 40, W2PII* 33, AF2K* 31, K2DN* 31, KB2ETO* 29, AA2ED* 22, N2WDS* 22, KB2WII* 18, WA2GUP* 16, KA2BCE* 15, W2RH 15, WA2UKX* 10, KG2HA*1st PSHR. Digital; Stn Rx/Tx: N2LTC 353/321, KA2GJV 28/16, NY2V 1/5, K2DN 2/0.

**WESTERN PENNSYLVANIA**: SM, John Rodgers, N3MSE. SEC: N3SRJ. ASM-ARES: WB3KGT. ASM-Packet: KE3ED. OOC: W3ZPI. PIC: W3CG. STM: N3WAV. TC: WR4W. DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: N3BZW. DEC-Rapid Response: N3HJY. DEC-OES: K3TB. February is now approaching and with it comes Ground Hog Day. Check the special event's section in this issue for details on this popular special event. By now most of the clubs in the section have had their election for new officers for the year. Please remember to file your club annual report and update the information for your organization. This can be done either electronically at the League Web site www.arrl.org or by filing the paper copy. The section already has a very good selection of hamfests scheduled for the year. The first will be later this month by the Wireless Association of South Hills. At many of the hamfests, the section DXCC Card Checker Mike Lazaroff, K3AIR, will be present with myself at the event. This is a good opportunity to have your cards checked without having to send them off to Headquarters. Many of the special service clubs also have field checkers for vhf century club and also for the worked all states awards. If your club is interested in these appointments or in having a public information officer designated for the club please contact me. There are many positions available for individuals that are willing to help. The featured Web site for this month belongs to the Ellwood City Amateur Radio Association. The Web site address is http://www.qsl.net/ecara/. Be sure to check out their newsletter and other portions of the site. Clubs in need of speakers for meetings should contact me for scheduling. I still have some dates available in my schedule for the year. 73, John Rodgers, N3MSE, WPA-SM, n3mse@arrl.org

### CENTRAL DIVISION

**ILLINOIS**: SM, Bruce Boston, KD9U—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W: KB9AIL. Egyptian RC has resumed their weekly two-meter net on 146.79 each Tuesday evening at 9 PM. The Starved Rock RC was preparing to commemorate the 58th anniversary of the launch of the first LST at Seneca Prairie Shipyard with a Special Event Station on December 9. The SRRC officers for 2001 are Pres KB9JTL, VP KB9TMA, Sec KF9NZ, Trea WB9VLW. SRRC meetings are held the first Monday of the month in Leonore (next to Tabor Grain) at 7 PM. Congratulations to N9PIB on being elected to the LaSalle County Board. Metro AC officers for 2001 are Pres N9BOR, VP N9TN, Sec N9WAT, Trea W9BB. Ten students are enrolled in their radio class. Ogle Co. amateurs hold an ARES net every Tuesday at 7 PM on the KB9DBG repeater, 147.045. The 2001 officers for the Kiswaukee ARC are Pres W9ICU, VP K9TIP, Sec KB9TAR, Trea KB9TVK. KARC provided communications support for the Sycamore Pumpkin Festival. The Western Illinois ARC has been reviewing options for handling a bequest from a silent key of nearly $16,000. The club is also seeking to obtain the use of that call from the FCC through the vanity program. The new officers of the Six Meter Club of Chicago are Pres WA9FIH, VP W9AVB, Sec WA9RIJ, Trea AK9Y. Seventeen SMCC members assisted with the American Cancer Society's annual West Cook Chapter Bike-a-thon on Sept. 17. The group is now planning to help with the Hoops for Life basketball tournament in February. The 2001 officers of the Peoria Area ARC are Pres N9MSG, VP KB9TLF, Sec K9DRF, Trea KB9NW. PAARC reports the final tally on the lighthouse special event was 629. Wheaton Community RA has moved its monthly meeting location to Wheaton College. Clubs wishing to have their activities reported in this column are encourage to add the Section Manager to their newsletter list. See page 12 of this issue for contact information. Nov traffic: K9CNP 71, WB9TVD 32, N9DT 32, W9HLX 29, NN9M 21, NC9T 20, W9FIF 10, WA9APQ 8, KA9IMX 7, WA9RUM 5. Ninth region C4 report for November de W9FC Traffic 178, sessions 60, time 345 min. average 2.96, rate .515, percent rep 95% ILN K9CNP KF9ME NS9F. ISN report de WB9TVD QNI-264, QNI-53, sessions-27. 9RN report de KF9UBX sessions. 60, traffic handled 161, average per session. 2.68, rate of traffic 3.85, percent represented during month IL. 91% NN9M W9HLX N9PM N9PLM. W9VEY Memorial Net report de K9AXS 5 with 173 check-ins.

**INDIANA**: SM, Peggy Coulter, W9JUJ—ASM for Resources & Recruitment, W9IH. SEC: K9ZBM. ASEC: WA9ZCE. STM: W9FU. OOC: KC9V. SGL: K9JZZ. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys: 11/10, Sue Miller, W9YL, Waldron; 11/15, Barbara J. McCoy, N9QYV, Muncie; 11/15, James Bob Myers, K9KTH, Bloomington; 11/15, Gary V. Phillips, KA9ZIE, Muncie; 11/21, Richard E. Van Strien, KF9CQ, Highland; 11/22, Edwin K. Marlin, N9CUK, Evansville; 11/26, Clifford S. Shreve, N9MKB, Fort Wayne; and 11/27, Sylvia Plank, KA9TBO, Muncie. They will be missed. The IRCC presented the IN Outstanding Amateur of the Year Award for 2000 at the Ft. Wayne Hamfest to Jack Parker, W8ISH, who has been a tireless worker in many areas of Amateur Radio for a long time. Also at the ARRL Forum a Special Achievement Award was presented to James Smith, K9APR from New Castle for his outstanding expertise in the Automatic Position Reporting System (APRS) area not only for our state but for Ohio and KY as well. He has spent many hours traveling to club meetings in all three states and giving APRS demonstrations. James has single handedly pursued the creation of packet digi systems in IN for the advancement of APRS. His personal expertise is highly regarded as exceptional in the field. He has provided this capability, without regard for the time and effort required, he has accomplished all of this on his own time and at enormous expense. Also at the forum I was presented with a beautiful award. A Lifetime Achievement Award for 50 years plus of commitment to IN Amateur Radio. It was a big surprise. Announcing a new Staff Member SGL Dennis Gilby, K9JZZ. He will be a great addition to the IN Staff. NMs ITN/W9ZY, QIN/N9PF, ICN/K8LEN, WN/AB9AA, VHF/N9ZZD.

Continued on page122.

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### TS-570DG/TS-570SG DSP Enhanced

- 100w HF, (100w on 6M TS-570SG only)
- QSK, CW Auto Tune • Autotuner incl 6M
- DSP • Large LCD Display • Elect. Keyer
- RCP2 Radio Control Program Compatible

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### TM-D700A 2M//440 Dualband

- 50w VHF 35w UHF • Opt. Voice Synthesizer
- Receives 118-1300 mHz (cell blocked)
- Remote Head Inst. only (kit included)
- 200 Memories • Built In 1200/9600 baud TNC
- Advanced APRS Features
- Dx Packet Cluster
- Tone Scan • GPS/VC-H1/PC Ports

NEW!

### TS-50S HF Transceiver

- TS-50S - World's smallest HF trans.
- SSB, CW, AM, FM, • 12V Gen. Cov. RX,
- 6.4 lbs., 7.16 x 2.4 x 9.32" • 100W out
- 105 db dynamic range, 100 Mems.
- Opt. ext. ant. tuners available

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Optional 1.2GHz, 220 mHz, 6M Modules Available!

### TM742AD 2M/440Mhz

- Optional 3rd band available • Back-lit mic
- Up to 303 memories • 101 per band
- PL Encode Built in • Detachable front panel

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### IC-706MKIIG

**Proven Performance**

- All mode HF/6M/2M/70CM
- 100W HF/6M, 50W/2M, 20W/440 MHz
- AF-DSP
- Plug and Play Filters - No Soldering
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### IC-756PRO All Mode Transceiver

- 100W HF/6M
- Newly designed 32 bit DSP
- 5 inch TFT color LCD
- Digital IF filter with 41 passband widths
- 121 microphone equalized audio settings
- Multiple DSP controlled AGC loops
- Advanced CW functions
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• **Free World Time Clock and Service Manual from ICOM until 1000 units are gone.**


### IC-746 All Mode 160M-2M

$200 COUPON

- 100W output for all bands
- IF-DSP+ twin pass band tuning (PBT)
- Large, multi-function LCD with band scope

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### IC-2100H 2M Mobile Transceiver

- Cool dual display
- 55 watts
- CTCSS encode/decode
- Backlit remote control mic
- Mil spec 810, C/D/E*1


### IC-207H Dual Band Mobile

- 2M/440 MHz
- Wide band rx (includes airband)
- 45W VHF (2M), 35W UHF (440 MHz)
- Remote head capable


$50 COUPON

### IC-2800H Dual Band Mobile

**Mounting Kit Included**

- 2M/440MHz
- Band scope
- 3" TFT LCD disp
- NTSC video input
- CTCSS encode/decode
- Selectable RF attenuator
- 232 alphnumeric memories
- Remote head included

$50 COUPON

### IC-718 HF Transceiver

- 100W (AM 40W)
- 12V Operation
- Simple to Use
- CW Keyer Built-in
- One Touch Band Switching
- Auto Tuning Steps (TS)
- VOX Built-in
- Large Front Firing Speaker


### IC-T7H 6W, Dual Band Transceiver

**Dual Bands at a Single Band Price!**

- 2M/440 MHz
- 70 memories
- Great audio
- CTCSS encode/decode
- Auto repeater
- Easy operation!
- Mil spec 810, C/D/E*1

### IC-T2H 6W, 2M Transceiver

**Commercial Grade Rugged**

- Easy to use
- Customizable keys
- LCD backlight display
- 40 memory channels
- Up to 6W @9.6 V CD
- 500 mW audio
- Mil spec 810, C/D/E*1


### IC-T81A 4 Band Transceiver

**Worlds First 4-bander HT**

- 50, 144, 440 MHz & 1.2 GHz bands
- 5 W at 13.5V DC/W/1.2 GHz
- Ni-MH battery standard
- AM, FM, WFM
- "Joy-stick", multi-function switch
- CTCSS encode/decode
- RIT and VXO for 1200 MHz


### IC-Q7A Dual Band Transceiver

- 2M/440 MHz transceiver
- Wide band receiver - 30 to 1300 MHz**
- 200 memory channels
- Ultra compact
- Monitor function
- Large built-in speaker, 100 mW audio
- Tone squelch with pocket beep
- Mil spec 810, C/D/E*1


### IC-W32A Dual Band Transceiver

- Advanced 2M/440 MHz
- 5W @ 13.5 V
- 200 memories w/alpha naming
- CTCSS encode/decode w/tone scan
- True dual band with V/V, U/U
- Optional PC programmable
- Mil spec 810, C/D/E*1

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* The IC-706MKIIG coupon offers may not be used together in any combination. **Cellular blocked, unblocked OK to FCC approved users. Coupons: Check with HRO dealer for details/restrictions. ✦Coupon offers run through 3/31/01. *For shock & vibration. *Optional. 

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- Gen. Cov. Rx, 100 mem.
- Optional Ext. Auto • Tuners Available

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### FT-1000MP HF Transceiver

- Enhanced Digital Signal Processing
- Dual RX
- Collins SSB filter built-in
- 100W. Power supply built-in

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### FT-100 HF/6M/2M/70CM Transceiver

- Compact Transceiver w/detachable front panel
- Rx 100kHz to 970mHz (cell blocked)
- Tx 100W 160-6M, 50w 2M, 20W 70CM
- Built-in DSP, Vox, CW keyer
- 300 Memories

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### FT-817 HF/VHF/UHF TCVR

- 5W @13.8V ext DC • USB, LSB, CW, AM, FM
- Packet (1200/9600 Baud FM)
- 200 mems, built in CTCSS/DCS
- TX 160-10M, 6M, 2M, 440
- Compact 5.3" x 1.5" x 6.5", 2.6 lbs
- 9.6v Nicad or 8 AA battery capable

NEW!

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### FT-2600M 2M Mobile

- Compact 2M 60W mobile • 12000/9600 baud
- 4 selectable power levels • Built-in CTCSS/DCS
- 175 mems, 8 character alpha-numeric display
- Low intermod Rx, Rugged

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### VR-500

Handheld Receiver

- 100kHz - 1300 mHz
- CW, LSB, USB, AM, FM (narrow and wide)
- Cell blocked in USA
- 1000 memory channels
- 8 character alpha-num display

NEW!

**Great Sound, Call Today!**

### VX-5R

50/2M/440HT

- Wideband RX • 6M-2M-440TX
- 5W output • Li-Ion Battery
- 220 mems, opt. barometer unit
- Alpha Numeric Display
- CTCSS/DCS built-in

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### FT-50RD

2M/440mHz Compact HT

- DVR, Decode, Paging Built-in
- Alpha numeric display
- Wide Band receive
- Battery Saver • 112 Memories
- Mil-Spec • HiSpeed scanning

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### FT-847

Ultimate Base Station, HF, VHF, UHF

- 100w HF/6M, 50w 2M/430 mHz
- DSP • Full Duplex Cross-band
- 1200/9600 Baud Packet Ready

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### FT-90R

2M/440 Mini Dualbander Transceiver

- 50w 2m, 40w 440mHz
- Wide Rx • Detachable Front Panel
- Packet Ready 1200/9600 Baud
- Built-in CTCSS/DCS Encoder/Decoder
- Less than 4" wide!

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### FT-920 HF+6M Transceiver

- 100w 160-6M, 12VDC
- Built-in DVR, CW Memory Keyer
- DSP, Auto-Notch • 99 Memories
- Computer controllable, CAT System

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### FT-8100R 2M/440 Mobile

- Ultra Compact • 50w/35w 2m/440
- 110 memories • Wide Band RX
- Backlit mic • Remotable front panel w/opt. YSK-8100

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### DJ-196T 2M HT

- 5 Watt out
- 40 memories
- Alphanumeric Display
- CTCSS + DCS Built-in
- "S" Meter
- Auto Dialer

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### DJ-V5TDC 2M/440 HT

- 5 Watt out w/optional EBP 46
- Cool Clear Design
- 200 Memories • Dry cell pack incl.
- Rx 76 mHz to 1gHz (cell blocked)
- AM Air Rx • Wide FM Rx

**Lowest Price Full Feature Dual Band!**

$179.95*

* Special price after coupon

### DR-605TQ 2M/440 Dual Band Mobile

- 50W 2M, 35W 440
- Built-in Duplexer
- 9600 Baud ready
- 50 Memory chanels
- RX Range 136-174mHz/420-470mHz
- CTCSS built in

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### DM-330MVT

- Super Compact
- Lightweight Power Supply
- 30 amp, 5-15 VDC output
- Convenient front panel converters

**Low HRO Discount Price!**

NEW!

NEW!

### DR-135TP 2M Mobile

- 50 Watt out • Alpha Numeric Display
- 100 mems • Built-in TNC 1200 & 9600 Baud
- Front Panel GPS in • Rear DB-9 Port
- CTCSS/DCS Encode/Decode built in

### DX-70TH HF Transceiver

- 100W 160-10 Mtrs • 100W 6M, Gencov. Rx
- Full QSK, 100 Mems. • Compact, Remotable
- Dual VFO, 12VDC • 6.2 lbs.

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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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### UHV-6

40M-70cm Mobile Antenna



40/*20/15/10/6/2M/70cm
* optional coil

A 6M/2M/70cm whip that accepts 1,2 or 3 HF coils for up to 6 band operation. Simply screw on any combination of HF coils you choose.

Standard PL-259 connector allows easy mounting. Convenient fold-over hinge for entering garages, parking structures, etc...

HF/VHF/UHF on a single antenna!! Contact any Ham Radio Outlet store for duplexer/ triplexer options.

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High Sunspots= Great HF Mobiling!

NEW!

### MSG Series

2M/70cm Mobile Antennas with spring-loaded whip to absorb impacts. Fold-over hinge included as well.

| MSG-1000C | MSG-1100C |
|---|---|
| Length: 39 inches | Length: 43 inches |
| Max Pwr: 150W | Max Pwr: 150w |
| Conn: PL-259 | Conn: PL-259 |

NEW!

### MH-510

6/2M/70cm HT Antenna w/SMA Connector

The first aftermarket gain antenna for the YAESU VX-5 and the ICOM T8A.

A dramatic improvement over the stock antenna, 20.75 inches of TRIBAND performance.

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- **CN-410** 3.5-150MHz 150W
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- **CN-465M** 140-450MHz 75W
  - Compact, Mobile Meter
  - Cross Needle Design
  - Mounting Bracket Included

- **CN-101** 1.8-150MHz 1.5KW
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  - Economy Lighted Bench Meter
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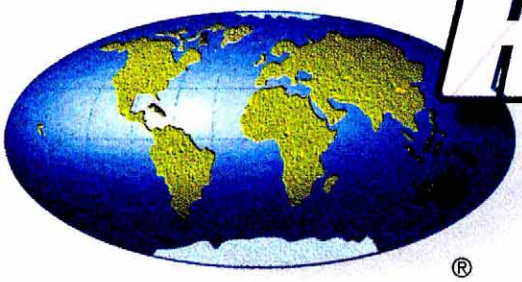

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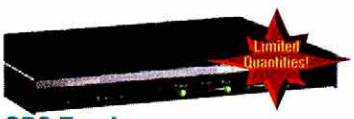
## KANTRONICS

### KAM '98

- Single port VHF or HF
- RTTY, CW, Packet, GTOR, AMTOR, WEFAX
- GPS, NMEA-0183 compatible
- 6-16 VDC, DB-9 connector port

**Call Now For Your Low Price!**




### GPS Tracker

- GARMIN X12 GPS Built in. Active GPS antenna. KPC-3 Plus ALL in Single package!

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### KPC-3 Plus/KPC-9612 Plus

High-performance, low power TNC.
Great for packet, and APRS compatible.

**Call For Special Low Price!**


Detailed illuminated map shows time, time zone, sun position and day of the week at a glance for any place in the world.Continuously moving - areas of day and night change as you watch.• Mounts easily on wall. Size: 34 1/2" x 22 1/2".

**Reg $1295. SALE $999.95**

## CSS

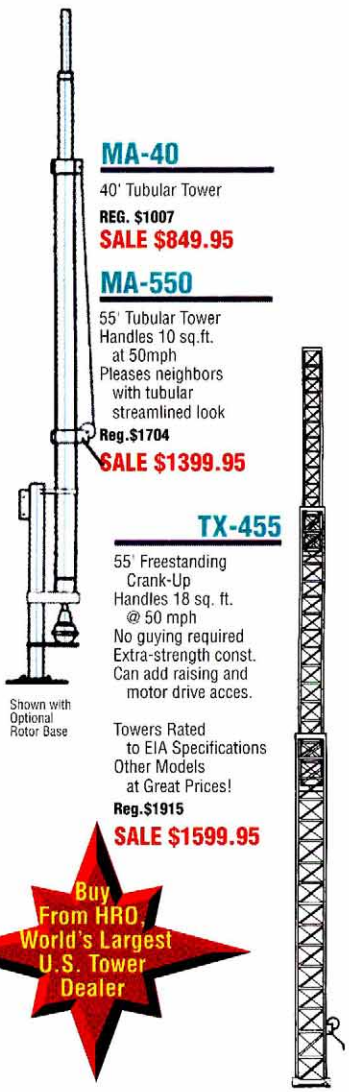

Host mode control program for Kantronics TNCs. Pacterm '98 supports multiple windows for each Packet and HF mode, plus synchronizing with Log Windows. Super support from CSS.


Logwindows The first and best logging program for Windows, Log Windows has been a favorite for nearly a decade. It will be the last logging software you'll ever need. Supports remote antenna switching with TopTen band decoder, TNC control, rotor control, DXCC 2000, DXCC, WPX, WAC, WAS, VUCC, WAS, IOTA Grayline display, Telnet Cluster and more.


Wefax '99 Wefax for your Kantronics KPC or KAM TNCs. Receive real time HF Weatherfax images to keep track of hurricanes, typhoons and other weather events worldwide. If you're a weather fan, you'll enjoy taking advantage of this on option on your Kantronics TNC. Plus, being able to save the images to Windows bitmap files, do automatic scheduling and more.


Digital Trio Get Pacterm '98, Log Windows and Wefax '99 all in one package for a special price. Great for the ham that requires the best. The Digital Trio lets you do all the popular HF modes, and logs your contacts at the same time.

## US TOWER



Shown with Optional Rotor Base

### MA-40

40' Tubular Tower

**REG. $1007**

**SALE $849.95**

### MA-550

55' Tubular Tower
Handles 10 sq.ft. at 50mph
Pleases neighbors with tubular streamlined look

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**SALE $1399.95**

### TX-455

55' Freestanding Crank-Up
Handles 18 sq. ft. @ 50 mph
No guying required
Extra-strength const.
Can add raising and motor drive acces.

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**"2 position UHF Antenna Switch"**

**$49.95/ea**

**On this special only UPS shipping & handling included within the 48 states only.**

Shipping and handling applies to all other products and destinations listed herein. Minimum order: $30.00 in product. Prices subject to change without notice. Sorry, No COD's. Illinois residents 8.25% sales tax added. offer expires 02/28/01.

## COAX (50 OHM"LOW LOSS" GROUP)

| | 100FT/UP | 500FT | 1000FT |
|---|---|---|---|
| "FLEXIBLE" 9913 STRD BC CNTR FOIL + 95% BRAID 2.7dB@ 400MHz NC/DB/UV JKT | .60/FT | .58/FT | .56/FT |
| LMR 400 SOLID CCA CNTR FOIL + BRAID 2.7dB @ 450MHz WP/UV JKT | .64/FT | .62/FT | .60/FT |
| LMR 400 "ULTRA-FLEX" STRD BC CNTR FOIL + BRAID 3.1dB @ 450 MHz TPE JKT | .89/FT | .87/FT | .85/FT |
| LMR 600 (OD.590") SOLID CCA CNTR FOIL + BRAID 1.72dB @ 450 MHz WP/UV JKT | 1.27/FT | 1.25/FT | 1.23/FT |
| LMR 600 "ULTRA-FLEX" STRD BC CNTR FOIL + BRAID 2.1dB @ 450MHz TPE JKT | 1.95/FT | 1.93/FT | 1.90/FT |

## COAX (50 OHM "HF" GROUP)

| | 100FT/UP | 500FT | 1000FT |
|---|---|---|---|
| RG213/U STRD BC MIL-SPEC NC/DB/UV JACKET 1.2 dB/2500WATTS @ 30MHz | .40/FT | .38/FT | .36/FT |
| RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz | .34/FT | .32/FT | .30/FT |
| RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz | .18/FT | .16/FT | .14/FT |
| RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS@ 30MHz | .18/FT | .16/FT | .14/FT |
| RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz | .19/FT | .17/FT | .15/FT |
| RG214/U STRD SC 2 95% BRD NC/DB/UV JKT 1.2dB/1800WATTS @ 30MHz | .25FT/UP | 1.75/FT. | |
| **RG142/U** SOLID SCCS 2-95% SILVER BRAIDS *Teflon®* JKT 8.2dB/1100WATTS @ 400MHz | .25FT/UP | 1.50/FT. | |

## COAX (75 OHM GROUP)

| | 100FT/UP | 500FT | 1000FT |
|---|---|---|---|
| RG11A/U STRD BC (VP-66%) 95% BRAID NC/DB/UV JKT 1.3dB/1000WATTS | .44/FT | .42/FT | .40/FT |
| RG6/U CATV FOAM 18GA CW FOIL + 60% ALUM BRAID | .20/FT | .13/FT | .11/FT |
| RG6/U CATV FOAM 18GA CW FOIL *QUAD SHIELD* | .25/FT | .18/FT | .16/FT |

## LADDER LINE GROUP

| | 100FT/UP | 500FT | 1000FT |
|---|---|---|---|
| "FLEXIBLE" 450 OHM 16GA COMPRESSED STRD CCS(PWR-FULL LEGAL LIMIT+) | .23/FT | .21/FT | .19/FT |
| "FLEXIBLE" 450 OHM 14GA COMPRESSED STRD CCS(PWR-FULL LEGAL LIMIT++) | .28/FT | .26/FT | .24/FT |
| 300 OHM 20GA STRD (POWER: FULL LEGAL LIMIT) | .15/FT | .13/FT | .12/FT |

## ROTOR & CONTROL CABLES

| | 100FT/UP | 500FT | 1000FT |
|---|---|---|---|
| 5971 8/COND (2/18 6/22) BLK UV RES JKT. Recommended up to 125ft | .22/FT | .20/FT | .18/FT |
| 1618 8/COND (2/16 6/18) BLK UV RES JKT. Recommended up to 200ft | .37/FT | .36/FT | .34/FT |
| 1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300ft | .49/FT | .47/FT | .45/FT |
| 1216 8/COND (2/12 6/16) BLK UV RES JKT. Recommended up to 500ft | .80/FT | .76/FT | .72/FT |
| 1806 18GA STRD 6/COND PVC JACKET Recommended for Yaesu Rotors | .25/FT | .23/FT | .21/FT |

## ANTENNA WIRE

| | 100FT | 300FT | 500FT | 1000FT |
|---|---|---|---|---|
| 14GA 168 STRD *"SUPERFLEX" (great for Quads & Portable set-ups etc.)* | 19.00ea | 48.00ea | 60.00ea | 100.00ea |
| 14GA 7 STRD *"HARD DRAWN" (perfect for permanent Dipoles etc.)* | 15.00ea | 36.00ea | 40.00ea | 60.00ea |
| 14GA SOLID *"COPPERWELD" (for long spans etc.)* | 15.00ea | 36.00ea | 40.00ea | 60.00ea |
| 14GA SOLID *"SOFT DRAWN" (for ground radials etc.)* | 15.00ea | 36.00ea | 40.00ea | 60.00ea |

## ANTENNA & TOWER SUPPORT ROPE

| | 100FT | 250FT | 500FT | 1000FT |
|---|---|---|---|---|
| 3/32" DOUBLE BRAID *"POLYESTER"* 260# TEST WEATHERPROOF | 7.00ea | 15.00ea | 22.00ea | 40.00ea |
| 1/8" DOUBLE BRAID *"POLYESTER"* 420# TEST WEATHERPROOF | 10.00ea | 20.00ea | 35.00ea | 57.00ea |
| 3/16" DOUBLE BRAID *"POLYESTER"* 770# TEST WEATHERPROOF | 15.00ea | 30.00ea | 50.00ea | 80.00ea |
| 5/16" DOUBLE BRAID *"POLYESTER"* 1790# TEST WEATHERPROOF | 20.00ea | 42.50ea | 70.00ea | 130.00ea |

## FLEXIBLE 2/COND RED/BLK DC POWER "ZIP" CORD

| | | | |
|---|---|---|---|
| 8GA (rated:40 amps) | 50FT $24.50 | 100FT $44.50 | 250FT $107.50 |
| 10GA (rated:30 amps) | 50FT $15.50 | 100FT $28.00 | 250FT $65.00 |
| 12GA (rated:20 amps) | 50FT $10.50 | 100FT $19.00 | 250FT $42.50 |
| 14GA (rated:15 amps) | 50FT $8.50 | 100FT $15.00 | 250FT $32.50 |

## COAX CABLE ASSEMBLIES

*with USA made Silver/Teflon® Gold Pin PL259 connectors.*

FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT.
200' $136.95 175' $120.95 150' $104.95 125' $88.95 100' $73.95 75' $57.95 50' $41.95
25' $25.95 15' $22.95 10' $19.95 6' $13.95 3' $12.95 1' $11.95

***Assemblies now available at all AES locations***

RG213/U strd BC Mil-Spec NC/BD/UV JKT. 1.2dB 2500 watts @ 30MHz.
200' $94.95 175' $83.95 150' $73.95 125' $62.95 100' $52.95 75' $41.95 60' $36.95
50' $31.95 25' $20.95 15' $18.95 10' $16.95 6' $12.95 3' $10.95 1' $9.95

***Assemblies now available at all AES locations***

RG8/U strd BC foam 95% braid UV resistant JKT. 0.9dB 1350 watts @ 30MHz.
175' $78.95 150' $67.95 125' $57.95 100' $46.95 75' $36.95 50' $25.95
25' $18.95 15' $16.95 10' $14.95 6' $12.95 3' $10.95 1' $9.95

***Assemblies now available at all AES locations***

RG8 MINI(X) strd BC foam 95% braid UV resistant JKT. 2.0dB/875watts@ 30 MHz
150' $35.95 125' $31.95 100' $27.95 75' $23.95 50' $19.95 25' $15.95
CLR JKT: 18' $13.95 12' $12.95 9' $11.95 6' $10.95 3' $9.95 1' $8.95
18' PL259-Mini UHF Fem & PL259. $22.95/ea.

***Assemblies now available at all AES locations***

***With USA made Silver/Teflon®/Gold Pin male "N" connectors.***

FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT.
150' $116.95 125' $98.95 100' $83.95 75' $69.95 50' $56.95
35' $46.95 25' $40.95 15' $33.95 10' $26.95 6' $17.95 3' $16.95 1' $15.95

***Assemblies now available at all AES locations***

***With USA made Silver/Teflon®/Gold Pin PL259 to male "N"***

FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT.
200' $146.95 175' $126.95 150' $107.95 125' $92.95 100' $76.95 75' $61.95
50' $45.95 25' $30.95 15' $27.95 10' $24.95 6' $15.95 3' $14.95 1' $13.95

***Assemblies now available at all AES locations***

***RG142/U 50 OHM COAX ASSEMBLIES***

Double Silver Braid Shields, High Power Teflon® Dielectric & Jacket

PL259 ea end: 1ft $9.95 ea, 3ft $12.95 ea, 6ft $17.95 ea, 9ft $21.95 ea, 12ft $26.95 ea, 18ft $36.95 ea • "N" male ea end: 1ft $13.95 ea. 3ft $18.95 ea, 6ft $21.95 ea • 3 ft jumpers $19.95 ea: RA BNC male-"N" male, RA BNC male-"N" female, SMA, male-BNC female, SMA female-"N" female, RA SMA male-"N" female, SMA female-"N" male, SMA Male-"N" male.

***HT SOLUTION ASSEMBLIES***

These jumpers will help improve the performance and life of your Hand Held Transceiver. RG58A/U Group: 1ft R.A. SMA Male-SO239 (UHF Female) $14.95ea • 1ft R.A. SMA Male-"N" Female $15.95ea • 1ft R.A. SMA Male-BNC Female $14.95ea • 3ft R.A. SMA Male-PL259 $13.95ea. RG58/U Group: 3ft R.A. BNC Male-SO239 (UHF Female) $14.95ea 3ft R.A. BNC Male-PL259 $12.95ea. RG8X Mini Group: 6ft PL259-BNC Male $9.95ea.

All connector terminations are soldered, Hi-Pot® tested @ 5kv for one minute, continuity checked, ultra violet resistant heat shrink tubing, and red protective caps, which can also be used as a boot.

## CONNECTORS

***Both connectors fit 9913 types and LMR400 types*** MADE IN USA

PL 259 SILVER/*Teflon®* /GOLD TIP.....10PC $12.50.....25PC $27.50.....50PC $52.50....100PC $100.00
"N" (2PC) SILVER *Teflon®* /GOLD TIP...10PC $37.50.....25PC $87.50.....50PC $162.50..100PC $300.00

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## TINNED COPPER "FLAT" GROUNDING BRAID

1 INCH WIDE (equivalent to 7ga).....25FT $24.00.....50FT $47.00.....100FT $94.00
1/2 INCH WIDE (equivalent to 10ga)..... 25FT $14.00.....50FT $27.00.....,100FT $53.00
1/2 INCH x 6FT Copper Plated Ground Rod w/clamp.....$20.95/3 pk (sold in packages of 3 only)

## JAKE's Featured Products of the Month

**15 ft Quick-Disconnect Cord:** for all mobile radios

**$9.95/ea**

**"DOGBONES" Porcelain Antenna Insulators**


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**$12.99 per package**


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CABLE X-PERTS, INC.

| Net | Freq | Time/Daily/UTC | QNI | QTC | QTR | Sess |
|---|---|---|---|---|---|---|
| ITN | 3910 | 1330/2130/2300 | 2403 | 456 | 1539 | 90 |
| QIN | 3656 | 1430/0000 | 137 | 69 | 665 | 50 |
| ICN | 3705 | 2315 | 100 | 21 | 309 | 30 |
| IWN | 3910 | 1310 | 2076 | — | 300 | 30 |
| IWN VHF Bloomington | | | 500 | — | 450 | 30 |
| IWN VHF Kokomo | | | 632 | — | 150 | 30 |
| IWN VHF Northeast | | | 1115 | — | 600 | 30 |
| Hoosier VHF nets (10 nets) | | | 531 | 35 | 914 | 45 |

D9RN QTC 161 in 60 sessions IN represented by K9GBR, WB9QPA, N9KNJ, W9UEM, KB9NPU and KA9ILS. 9RN QTC 178 in 60 sessions IN represented by KO9D, K9PUI, WB9UYU and W9FC. Tfc: W9FC 283, K9PUI 107, W9ZY 98, WB9QPA 79, KO9D 72, AB9AA 57, W9JUJ 49, N9KNJ 45, K9GBR 43, KB9NPU 41, W9UEM 34, KA9QWC 29, W9BRW 28, WD9HII 28, KA9EIV 22, K8LEN 21, K9DIY 13, N9HZ 7, K9RPZ 5, WD9NCE 5, W9EHY 5, AB9A 3, WB9OFG 3, W9YB 2, K9CUN 2.

**WISCONSIN**: SM, Don Michalski, W9IXG—BWN 3985 0600 W9RCW. BEN 3985 1200 KE9VU. WSBN 3985 1715 K9FHI. WNN 3723 1800 KB9ROB . WSSN 3645 1830 N9BDL. WIN-E 3662 1900 WB9ICH. WIN-L 3662 2200 W9UW. It is with deep regret to inform you that Mike Graves, 23, N9XJK, passed away. Edward F. Rice, W9NGP, passed away on November 24. Ed was an ORS. Mike Anuta, W8HKY, will be 100 years old on February 4!! Mike lives in Marinette and is active on the M&M Sunday evening net. The long-awaited Web version of *ARRL TC Manual* is now available on the ARRL Website! Go to: www.arrl.org/field/tcm/toc.html. Our thanks to Richard Regent for his hard work in making it available to ARRL members. Congratulations to Dick Isely, W9GIG, for being elected as Central Division Director. We look forward to working with Dick on issues that affect the Wisconsin section. The second annual EC conference in Madison had 71 in attendance! Our thanks to Stan Kaplan and Mack Brophy, N9NTB, for organizing this successful event. We look forward to next year's conference. 9RN report for November shows 100% Wisconsin participation, again! RRRC honored Beryl Pederson, KA9BAC, as Ham of the Month! Well deserved!! HVARC had 100% passing rate for Technician class thanks to KA9BDX and N9NUZ!! When you help an old friend, you may be paying back for something he/she did in the past for you. When you help a stranger or a new Ham, you are paying forward. Lend a hand to a new Ham! If nothing else, invest in the future because he/she will pay you back when you need aid! Want help on your tower? Contact me. I am building a list of Hams that can climb. And help me get my WAT (Worked All Towers) award! 73, Don, W9IXG. Tfc: WZ7V 1009, W9IHW 583, N9VE 557, N9TVT 516, K9JPS 487, WD9GNK 481, W9YPY 384, K9GU 310, W9CBE 220, N9BDL 101, K9FHI 101, K9LGU 95, AG9G 80, W9UW 80, W9YCV 70, WA9ZTY 53, N9KHD 53, KE9VU 53, WD9FLJ 52, N9CK 51, KG9B 44, KB9ROB 38, W9BHL 32, AA9BB 30, W9RCW 30, K9HDF 28, KA9FVX 23, W9ODV 13, N9JIY 11, WB9ICH 11, W9PVD 1.

### DAKOTA DIVISION

**MINNESOTA**: SM, Randy Wendel, KM0D—Computer troubles continue to plague me here, and I am now running off yet a second laptop from the pile. I have been delayed in some ARRL activities from which are stored on my main computer which is down. Documents, e-mail addresses and other electronic and printable items are delayed until I can get the main one going again. When I run out of hair to pull out, maybe I'll throw in the towel! A new year is upon us, the holidays are over and I hope many radio clubs had opportunity to have a holiday get together. I have no pertinent news to pass along this month, but I will remind you if you haven't had a chance since late summer to go to ARRL Web site in your member data page to be sure to check the box to receive Division/Section news. I have sent several e-mails so you should know by now if you still need to check the box. The nsltr is a takeoff from my MN Section Signals some years back, and I call it *eSignals*. My goal was to send it out once a month, but I've been chipping away at it sometimes weekly give or take my computer woes here and available info to include in the *eSignals*. The newsletter is a buffet of sorts...tidbits of various news items of interest from just about anything I can dish up. 73 de KM0D.

| Net | Freq | Time | QNI/QTC/Sess | NM |
|---|---|---|---|---|
| MSPN/E | 3860 | 5:30 P | 719/66/30 | W0WVO |
| MSPN/N | 3860 | 12 P | 397/83/30 | WA0TFC |
| MSSN | 3710 | 6 P | N/A | vacant |
| MSN/1 | 3605 | 6:30 P | 239/70/28 | K0WPK |
| MSN/2 | 3605 | 9:50 P | 127/24/30 | K0PIZ |
| PAW | 3925 | 9A-5P | 2515/121/84 | KA0IZA |

Tfc: W0LAW, WO0A, WA0TFC, KB0AII, K0PIZ, KB0OHI, W0HPD, K0WPK, W3FAF, KA0IZA, K0PSH, W0WVO, KB0AIJ, K0IDO, WD0GUF, KN9U, KC0HAW, N0JP.

**NORTH DAKOTA**: SM, Bill Kurtti, WC0M—The 38th Peace Garden Hamfest is going to be held July 13-15 at the International Peace Gardens. The Station, VE4IHF, will be on the air. Also, meetings, contests, dealers & lots of Ham fellowship, dance and just sitting around the campfires or visiting the flea market. The Totton Trail Swap meet went off well with a lot of ham equipment changing hands. World's greatest hamburgers are available when you get hungry, so plan to be there next year. Section Snowbirds have been active on 14.316, 40 & 15 meters also. Yours truly plans to become one in about 2 weeks. Ham radio sure does add to the enjoyment on the road. I want to thank all the out-of-state checkins we have been having in our HF nets lately. Interesting tornado pictures in the Bismarck newsletter taken by K0ZRT & WA7GVT. Tfc: N0RDJ 6. HF NM KE0XT reports Goose River Net, 8:30 AM Sunday 4/ 62/0; WX net 8:30 AM Mon to Sat 60/1087/11; Data Net 6:30 PM daily 30/ 735/13.

**SOUTH DAKOTA**: SM, R. L. Cory, W0YMB—The Black Hills ARC project is a remote operation of a HF station using a 70 cm HT. In a demonstration by Al Bergman, W0PUF, and Don Schwemle, AA0F. An HF station at Al's home was controlled with a 70 cm HT at the club house, and it worked well. Their annual holiday dinner and auction will be held on Feb 21. They also will have a test session on Feb 17 and Nov 17, 2001. Contact NU0F at 605-745-5927. Testing at Hot Springs will be on March 10 and Oct 13, 2001, contact WS0V at 605-745-5929. KB0HMR, KB0UZJ and KB0QXU of Watertown participated in the Jamboree on the Air with the scouts. LARK of Watertown had hams taking part in the second annual Wal Mart safety day. Condington Co Emergency Management Director advised LARK he has six light sets and 3 generators available to the club if necessary. Aberdeen ARC set up HF equipment for the National Weather Service Special Event held Dec 1 and 2. Total traffic reported for Nov was 255.

### DELTA DIVISION

**ARKANSAS**: SM, Roger Gray, N5QS, e-mail n5qs@arrl.org – It is time for School club roundup and I hope to hear from you on the air from one of the schools in my area this year. Congratulations to Bob Ideker, WB5VUH, who will be taking my place as section manager on April 1. Over the next couple of months we will be working closely together to achieve a smooth transition into the new section leadership. Bob has experience and has done an excellent job as SM in the past so most of our work will be just getting him caught up on the changes. I want to ask everyone to help him as you have helped me for the past 4 years. As I sit here writing this, we are expecting the first ice storm of the season and I have just finished filling all my gas tanks and exercising my generators and checking batteries. I hope that it isn't as bad as predicted. When you read this the winter will not be over and everyone needs to keep up preparations for bad weather. These threats can take many forms such as tornadoes (which we are very familiar with), ice, extended cold, extended heat (we had enough of that this year), and many other varieties. We need to be prepared for any of these or any other natural disaster that could strike us without warning at any time. Tfc: KC5TMU 106, K5BOC 91, K7ZQR 74, W9YCE 12, KO5E 11, W5RXU 9, KA5MGL 8, AD5AM 3, ARN 67, APN 23, AMN 15, OZK 9.

**LOUISIANA**: SM, Mickey Cox, K5MC - New EC appointments are K5DLH (Lincoln Parish) and KD5KZZ (Morehouse Parish). I'm sure that both Daniel and Donnie will do a great job in leading their respective ARES groups. AC5TM reports that few of the currently appointed ECs have responded to his recent efforts (via regular mail and e-mail) of determining the status of ARES activities within our section. It appears that many of our parishes currently have little or no ARES activities because of lack of leadership at the local level. If you are interested in emergency communications training and service, but your parish has no active ARES group, I encourage you to contact AC5TM (LA SEC) for further discussion. The ARRL Certification Program on Emergency Communications and Public Service should soon be available on the League's Web site. Congratulations to my home club (Twin City Ham Club) for sponsoring another successful hamfest. I want to thank W5XX (MS SM/SEC) for describing his section's ARES activities during the ARRL Forum at the Monroe Hamfest. The LA and MS sections are pursuing a variety of efforts, such as the linking of repeaters, aimed at providing more cooperation between the two sections during severe weather and other emergency situations. Tfc: WB5ZED 919 (BPL), W5CDX 134, K5IQZ 128, K5MC 64, W4DLZ 53, KM5YL 22, K5DPG 19, KG5GE 17, N0KWA 12. PSHR: WB5ZED 207, K5IQZ 128, K5DPG 120, W5CDX 119, K5MC 101, KG5GE 89, KM5YL 80. Net Reports: sess/QNI/QTC. LTN: 30/361/80. LCW: 29/224/43.

**MISSISSIPPI**: SM, Malcolm Keown, W5XX—Section Web Page: www.arrlmiss.org. Web Master: K5IBM at k5ibm@arrl.net. Regret to report the passing of N5XGI. Kim was a real leader in Coastal Mississippi ham activities for many years, and we will truly miss him. Don't forget the ARRL State Convention and Capital City Hamfest on February 2-3. Special guest will be Riley Hollingsworth, K4ZDH. Contact ab5wf@arrl.net for more details. The Meridian ARC set up a booth at the Clarke County Forestry and Wildlife Festival which resulted in write ups in the Meridian Star for three days and a lot of interested visitors to the booth. Participants were KD5ASR, W5OQY, W5MAV, K5BFN, and KA5TQV. The Vicksburg ARC again provided communications for the annual Christmas Parade. The MSPN is consistently averaging over 100 checkins per night. WOW! Net Reports: sessions/QNI/QTC. MSPN 30/3306/54, MTN 30/103/42, MSN 30/1132/11, PBRA 30/748/0, Jackson Co ARES/RACES 27/370/28, MSSN 22/90/3, West Coast 2M ARES 12/128/4, NW MS ARES 4/28/0, JARCEN 4/56/0, MCARA 4/40/0, LARC 4/43/0, Stone Co ARES 4/38/0, MBHN 4/29/0, OBARC Net 3/15/0. PSHR: KB5W 146, K5VV 128, W5XX 85, KJ5YY 73. Tfc: KB5W 284, K5VV 45, KJ5YY 15, W5XX 5.

**TENNESSEE**: SM, O.D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. PIC: KE4CES. SEC: WD4JJ. STM: WA4HKU. TC: KB4LJV. WAVES reports that the Chattanooga Hamfest was one of the best ever. Also, WAVES published a very good article on traffic handling in the Nov issue. Get a copy and learn how to handle traffic. CARC Nets, the Sunday night net on 146.790- at 9 PM, TAG SKYWARN Net Tuesday on 146.61- at 8 PM, Packet Net Wednesday 7-9 PM on 145.09 simplex, Emergency Services Net Thursday 8 PM on 146.79 -. MARC members are enjoying working with the Boy Scouts. That is a wonderful way to spread the good news of ham radio to the youth. According to an announcement in both the Zero Beat & Feedline, the Tri-Cities Hamfest will be no more unless a new group of personnel steps forward and assumes the leadership. This hamfest has developed into one of this section's best over the past 18 years. Essentially, the same personnel have done the necessary work in putting on the hamfest year after year, and these folks are burned out. It would be so easy for some new hams to step in and carry on this tradition. The foundation is already there. It will be a great loss to Tennessee, especially in East Tennessee, for this great annual event to cease existence. A big thanks to the following RACK members who participated in the Diabetes Walk America and the KTC Run the Pumpkins: KE4FXC, WI8X, KG4ITP, WD9HQC & wife Cheri, KG4JOU, N4PZT, KC4TRY, KG4HYR. DRN-5 rpt: sess 60, msg 2627, TN rep 72% by KE4GYR and W4OGG. Net Sess/QTC/QNI: TMPN 30/45/2619; TCWN 21/27/185; TEMPN 22/28/781; TEPN 25/58/2586; TSCWN 22/31/122. Tfc: N4PU 103,

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### GREAT LAKES DIVISION

**KENTUCKY**: SM, Bill Uschan, K4MIS—ASM: Tom Lykins, K4LID. SEC: Ron Dodson, KA4MAP. SGL: Bill Burger, WB4KY. ACC: Todd Schrader, KF4WFZ. TC: Scotty Thompson, KI4AT. STM: Mitchell Sparks, KG4EAB. PIC: Steve McCallum, W2ZBY. BM: Ernie Pridemore, KC4IVG. No word yet on the results of "The Great Holiday Traffic Jam". When Mr. Farler gets me that info we will get in the Section News. Remember all net managers, traffic reports go to Mitchell Sparks, kg4eab, at kg4eab@zoomnet.net or as routine traffic. It is the time of the year for all ARES/SKYWARN to begin scheduling severe weather spotter classes. Remember last January when Owensboro got hit by a tornado. If anyone has any news of interest send it to me so that it can be included in the monthly SN. Many thanks to those Hams that were activated for the helicopter search in November. Most of those that were alerted were in Area 13. In early December an earthquake struck in Western Kentucky around the Evansville, Ind. area. Geologists say that a bigger one could come at anytime along that fault. Net QNI/QTC/Sess/NM: KRN 735/22/22/N4AFP; KTN 1064/29/30 K4LID; KTN 1113/32/30/KB4VKS; TSTMN 435/27/30; KG4EAB. CARN 339/32/39/AD4EI; 4ARES 413/27/30/WD4PBF. Tfc: K4AVX 72, KE4JFS 9, WB4ZDU 10.

**MICHIGAN:** SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net). ASM: John Freeman, N8ZE (n8ze@arrl.net). SEC: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). STM: James Wades, WB8SIW (wb8siw@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (dcolangelo@ameritech.net). SGL: Ed Hude, WA8QJE (edhude@juno.com). TC: Dave Smith (DSmith@smithassoc.com). Youth Activities: Steve Lendzion, KC8MCQ (kc8mcq@arrl.net). BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net). Congratulations to the youngest ham from the Copper Country Radio Amateur Assn., 12 year old Scott Trudgeon, KC8PRP from Ewen. The U.P. HAM DIRECTORY-2001 will be published during the month of April, 2001. Please send any additions or changes to: George, W8FWG at: W8FWG@arrl.net or U.S. Mail to: George R. Thurner, W8FWG, 225 Kearsarge St. Laurium, MI 49913-2109. Congratulations to the new officers of the Central Michigan Amateur Radio Club, President Michael Rhew, KC8DBP; V. President Ken Faiver, W8HNI ; Secretary Michael Sanders, KC8FCA ;Treasurer Pamela Denomme, KB8PSF; Director Bruce Rainey, KC8ODP; Director Randall Stortz, KC8IHV; Under 22 Director Emily Shanblatt, W8ELS . Please remember to monitor 3.932/7.232 kHz., our Michigan Emergency Frequencies, during any winter storms to see if you can help with information or traffic. Tfc (Nov): K8GA 396, KB8ZYY 297, KA9EIZ 244, N8FPN 154, WX8Y 153, K8KV 116, K8LJG 103, K8AE 86, AA8SN 67, W8RF 65, AA8PI 60, WI8K 45, W8RNQ 44, N8EXV 43, K8CQF 31, K3UWO 29, K8UPE 27, W8YIQ 24, K8ZJU 24, WB8SIW 22, WA8DHB 18, N8TDE 16, N8UN 10;,WA8DHB 8; N8EXS 4.Please support the following Section Nets:

| Net | QNI | QTC | Sess | NM | Freq | Time | Day |
|---|---|---|---|---|---|---|---|
| QMN | 540 | 490 | 60 | WB8SIW | 3.663 | 6:30&10 PM | Daily |
| MACS | 236 | 126 | 30 | W8RNQ | 3.953 | 11 AM | Daily (1 PM Sun.) |
| MITN | 487 | 304 | 30 | N8FPN | 3.952 | 7 PM | Daily |
| UPN | 1320 | 40 | 34 | AA8SN | 3.921 | 5 PM | Daily (Noon Sun.) |
| GLETN | 373 | 102 | 30 | VE3SCY | 3.932 | 9 PM | Daily |
| SEMTN | 445 | 149 | 30 | WI8K | 146.640 | 10:15 PM | Daily |
| WSSBN | 745 | 35 | 30 | WB8ICN | 3.935 | 7 PM | Daily |
| D8 ARES | 18 | 0 | 12 | VE3EUI | 3.932 | 7:30 PM | Friday |
| VHF Nets | 307 | 7 | 8 | KB8ZYY | Various | | |
| MI-ARPSC | 84 | 3 | 4 | W8FQT | 3.932 | 5 PM | Sunday |

**OHIO**: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12)—The Big Project, announced in 2000 by ARRL President Jim Haynie, W5JBP, plans to place educational materials about ham radio for American Middle Schools. Because this will be funded by financial grants, you can assist by finding private funds and/or foundations in Ohio who may wish to participate. Please pass the name and address of those responsible for these private foundations or grants to Jim W5JBP at his address on page 9 in this edition of QST. He'll do the rest in getting us qualified to win a foundation grant. ...In our congrats section below you will see new officers for 2001 of various clubs. For those listed and other clubs, be sure the Ohio ACC, Brenda Krukowski, KB8IUP, (kb8iup@arrl.net) is aware of the changes and you keep club activities current with the ARRL. By now you are aware of the U.S. postal rate increases. Remember this relates to ham radio newsletters and QSL cards, as well. OHIO SECTION CONGRATS ...(A) To new officers of the 20/9 ARC of Mahoning County; Rich Hamaker, KB8YHC, pres; Jim Sekinger, KC8HSO, veep; Mary Lou Weiss, N8NZT; and Don Stoddard, KE8KT:(B) To new officers of Athens County ARA, Drew McDaniel, Pres; John Biddle, Veep; Eric McFadden, sec and trustee; and Ron Chapman, tres: (C) To new officers for Western Reserve ARA, Roger Stokes, KC8IBK, pres; Drew Dorminy, KC8ICA, veep; Ron Miller, KC8IBR, sec; and Gene Boccia, KC8MMK and (D) To Bill Moore, W8KVU, Hamilton and John Dine, WA8DFD, Cincinnati, for being elected to membership of the Greater Cincinnati Hall of Fame,....FEBRUARY OHIO HAMFEST at Northern Ohio ARS (Lorain County) Feb. 4; Mansfield Hamfest, Feb. 11; Cuyahoga Falls ARC at Feb.25 and Cincinnati Winter Hamfest, Feb. 25. Now for our November traffic reports.

| Net | QNI | QTC | QTR | Sess | Time | Freq | NM |
|---|---|---|---|---|---|---|---|
| BN (E) | 141 | 40 | 252 | 30 | 1845 | 3.577 | WD8KFN |
| BN (L) | 174 | 75 | 244 | 30 | 2200 | 3.577 | NY8V |
| OSN | 180 | 57 | 610 | 31 | 1810 | 3.708 | WB8KQJ |
| OSSBN | 2031 | 402 | 2095 | 91 | 1030, 1615, 1845 | 3.9725 | N8IO |
| OH Section ARES | | | | | 1700 Sn | 3.875 | WD8IHP |

Tfc: N8IO 196, N8IXF 188, WD8KFN 184, W8STX 118, WB8KVM 114, N8BV 98, KA8CXG 95, KA8FCC 95, KD8HB 84, N8DD 83, WA8SSI 80, N8TNV 74, KA8VWE 61, W8VQV 61, N8RRB 57, W9PBX 51, NS8C 51, WA8EYQ 51, KC8HJL 51, KI8IM 50, W8BO 44, WD8KBW 43, K8PJ 35, N8CW 33, WB8PGM 29, K8QIP 29, N8IBR 27, W8RPS 26, NY8V 25, N8WLE 24, N8YWX 24, KC8DWM 21, W8RG 21, KC4IYD 20, KC8JKE 19, N8GOB 18, KX8B 18, K8JMP 17, KB8TIA 17, KD9K 14, KB8SIA 13, KI8O 11, KC8HTP 9, WB8SIQ 8, KB8SBK 7, N8RAK 5, N7CEU 4, N8GP 4, K8WC 1.

### HUDSON DIVISION

**EASTERN NEW YORK**: SM, Rob Leiden, KR2L—STM: Pete Cecere, N2YJZ. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. Net Reports (November 2000) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 29/2 CDN 273/128 CGESN 33/6 ESS 375/177 HVN 581/199 NYPHONE 217/673 NYPON 383/240 NYS/E 332/462 NYS/M 171/276 NYS/L 265/499 NYSPTEN 342/86. I'd like to acknowledge our PSHR members -they're the backbone of our traffic system! Want to get started in APRS? RTTY? PSK31? Satellite Operation? Need help? Just ask! 73 de KR2L. PSHR: N2YJZ 191, KC2DAA 152, N2JBA 143, WB2ZCM 138, W2AKT 132, W2JHO 124, WA2YBM 114, WB2IIV 83. Tfc: N2JBA 73, KC2DAA 58, N2YJZ 53, W2JHO 43, WB2ZCM 42, WB2IIV 30, KC2BUV 26, W2AKT 25, W2CJO 17, N2AWI 10, K2AVV 9, WA2YBM 6, WA2BSS 4, WB2UWU 1, KL7JCQ 1, KC2BUW 1.

**NEW YORK CITY / LONG ISLAND**: SM, George Tranos, N2GA—ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SGL: N2TX. SEC: KA2D. ACC: N2MUN. PIC-East: N2RBU. PIC-West: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. Congrats to new club officers: South Shore ARC: President - K2VUH, VP - KA2D, Secretary - KA2EYR, Treas - KB2UR. Congrats to Joe AB2M and the 15 hams who made the ARRL/National Weather Service Special Event in December a success. Hamfests: LIMARC on Feb. 25 in Hicksville, GSBARC on Mar. 4 in Lindenhurst. Classes: LIMARC one day Tech class on Apr. 28 in Levittown. Check the NLI Web page at www.arrlhudson.org/nli for more information. NYC/LI VE exam list follows: Manhattan: BEARS, ABC Cafeteria, 125 West End Ave at 66th Street, Contact Jerry Cudmore W2JRC at 212-456-5224 for dates & times; East Village ARC, 2nd Friday at 7 PM, Laguardia HS, Amsterdam Ave and West 65th Street, Manhattan. Contact Robina Asti, KD2IZ, at 212-838-5995; Columbia University VE Team, 3rd Monday at 6:30 PM, Watson Lab, 6th Floor, 612 West 115th Street, Manhattan. Contact Alan Crosswell, N2YGK, at 212-854-3754; Queens: Hellenic ARC, 4th Tuesday at 6:30 PM, Pontion Society, 31-25 23rd Ave, Astoria, NY. Contact George Anastasiadis, KF2PG, at 516-937-0775. Nassau County: Grumman ARC (W5YI), 2nd Tuesday at 5 PM, Northrop-Grumman Plant 5, South Oyster Bay Road via Hazel Street, Bethpage, NY. Contact Bob Wexelbaum, W2ILP, at 631-499-2214; LIMARC, Exams every 2nd Saturday only on odd months (Jan, Mar, May, Jul, Sep, Nov) at 9 AM, NY Institute of Technology, 300 Building, Room 311, Northern Blvd, Greenvale, NY. Contact Al Bender W2QZ at 516-623-6449. Suffolk County: Great South Bay ARC, Normally, 4th Sunday at 12 noon, Babylon Town Hall, ARES/RACES Room, 200 East Sunrise Hwy, North Lindenhurst. Contact Tom Carrubba at 631-422-9594; Larkfield ARC, 2nd Saturday in Feb, May, Sep, Nov, Huntington Town Hall, Room 114. Contact Stan Mehlman, N2YKT, at 631-423-7132; Peconic ARC, exams held January, April, July, and October on next to last Friday at 6:30 PM at Southold School, Oaklawn Ave, Southold, NY. Contact Ralph Williams N3VT at 631-323-3646. Mid Island ARC, last Weds of each month at 7 PM at 36 Dew Flag Rd, Ridge NY 11961, Contact: Mike Christopher W2IW at 631-924-3535. Report all changes to N2GA before the 12th of the month. Tfc: WB2GTG 519, N2AKZ 127, KB2KLH 80, W2RJL 80, WA2YOW 49, KA2D 21, KA2YDW 16, WA2VKZ 9, KC2FWD 7, N2TEE 5.

**NORTHERN NEW JERSEY**: SM, Jeff Friedman, K3JF—This month I want to simply indicate that our Assembly Bill A1593, for a change in the Ham License Plate, is very much in jeopardy. Assemblyman DeCroce, who chairs the Assembly Committee and several of his Committee Members feel that changing the plate will be too costly and therefore his committee has not allowed it to pass on to the next step. If it is not released from this Committee, it can not be voted upon and we will not have our new plate. On this subject it seems that the Assembly Committee does not recognize the great service that NJ Hams provide during the state emergencies or community services. As an example, the Cherryville Repeater Association alone provided more than 500 hours of community service this year. This is just one NJ club out of the many clubs we have whose members are out there serving the public good. If NJ Hams really want this bill passed, we need to make ourselves heard by Assemblyman DeCroce. Finally, I would like to congratulate Steve Mendelsohn on his return to the ARRL Hudson Division as Vice Director. I am sure his prior experience and dedication will be greatly appreciated. For our outgoing Vice-Director JP Kleinhaus, I am sure JP will continue to add value to our Division. Tfc: W2MTO 62, N2OPJ 59, K2VX 45, KB2VRO 43, KC2AHS 43, N2RPI 39, K2PB 22, W2CC 21, N2GJ 16, KC2ANN15, K2DBK 6.

### MIDWEST DIVISION

**IOWA**: SM, Jim Lasley, N0JL—ASM: N0LDD—SEC: NA0R. ACC: N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. Need to get this in quickly! SW Iowa Fest is March 3 at Travelodge at exit 55 from I29. The Tri-State club in Cresco received a nice photo and write-up of their efforts in two local papers. Nice pic, Lee! I have been hearing of lots of holiday dinner meetings. OARC has postponed their holiday dinner until March! Wow! Talk about stretching the season. W0DIA, K0CVT, and W0DGZ have been in the hospital recently. There are probably others of which I am not aware. Best of all to those and any others. SEITS has a problem that many clubs seem to have. Finding those to serve as officers of the club. If given the opportunity, share the burden and the fun of helping the club and your community. Thanks to FMARC for their listing of Iowa

# MFJ *Speech Intelligibility* Enhancer™
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### *"As I got older, my high frequency hearing loss was destroying my ham radio for me . . ."*

-- Martin F. Jue, K5FLU
President and Founder
MFJ Enterprises, Inc.

***I know I'm not the only ham who can't understand all the speech in a QSO caused by high frequency hearing loss. I developed a solution that I want to share with my fellow hams.***

### *I almost gave up my ham radio hobby*

**I** have been a passionate ham radio operator for over 40 years ever since I was a teenager. I loved every minute of it. Still do, but I almost had to give it up.

**As** I grew older (I'm 56 now) I found myself asking "*What did you say?*" so often it got downright embarrassing. I can hear pretty good most of the time. I just can't always understand what people are saying and my left ear is weaker than my right ear.

**It** got to where I was having trouble carrying on QSOs. I could hear, but I just couldn't quite make out all the words.

**My** hearing problem almost put a stop to my lifelong hobby.

**There** was no way I was going to give up ham radio . . .

### *Research showed me what to do*

**I** searched the literature and spoke to hearing and speech experts.

**According** to their research on the intelligibility of speech in hearing English words:

**1.** The frequencies important for speech intelligibility are the consonant sounds from 500 to 4000 Hz. They contribute 83% of word intelligibility.

Frequencies from 500 to 1000 Hz contributes 35% of word intelligibility and 35% of sound energy.

Frequencies from 1000 to 4000 Hz contributes *48% of intelligibility* but has *only 4% of sound energy!*

**2.** In contrast, frequencies from 125 to 500 Hz contributes 55% of sound energy but only 4% to word intelligibility.

***In** other words, nearly half the speech intelligibility is contained in 1000 to 4000 Hz frequency range with only 4% of the speech sound energy.*

**On** the other hand, the low frequencies 125 to 500 Hz have most of the speech energy but contribute very little to intelligibility.

### *How I improved my ability to hear and understand QSOs*

**The** research showed me what to do.

**First**, drastically increase the speech energy above 500 Hz where 83% of intelligibility is concentrated.

**Second**, drastically reduce the speech energy below 500 Hz that contributes only 4% of intelligibility.

**Amateur** radio communications limit audio to about 300 to 2700 Hz.

**I** split the audio band into four overlapping octave ranges centered at 300, 600, 1200, 2400 Hz.

**I** could boost or cut each range by nearly 20 db to give me full control. This let me maximize speech intelligibility for most kinds of frequency loss.

**My** left ear is weaker than my right ear so I split the output audio into left and right channels with separate 2½ watt amplifiers. A balance control lets me equalize the perceived loudness to each ear. *Now both ears help in improving speech intelligibility!*

### *I couldn't believe my ears!*

**I** built one and hooked it to my rig.

**I** boosted the high frequencies, cut the low frequencies, set the volume and adjusted the balanced control so I could hear each side equally loud.

*I couldn't believe my ears! Speech that I could hear but barely understand before was now highly understandable. I got my ham radio back!*

**With** this concept, you'll *understand* QSOs better and enjoy ragchewing and contesting more, even if you don't have high frequency hearing loss.

### *It helped me so much I wanted to share this with my fellow hams*

**I** developed this into an accessory that any ham can use.

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clubs and individual and club scores for FD. They list 17 and admit some may have been missed. The Davenport group did quite well in the NWS weekend. They worked 244 of the stations participating. I also understand that several did SS (Sweep Stakes... not Dave) and did well. I sure hope you are ready for the new exam charges. DMRAA did Operation Santa Claus again. Since I am writing in early December, I don't know how it went! Well, I bet. Thanks gang. Davenport's "Willis Otto Award" went to WM0D and N0BFJ. Congrats! DARC has named their 2001 hamfest chairman... "Amtrak Style." NIARC has made some major improvements (higher, 8X the power!) to their 440 repeater. It will also be linked. Well another SM election is over. I will be your SM for another term. Thanks to each of you. 73 de N0JL. Newsletters were received from TSARCN, DARC, OARC, MPARC, DMRAA, NIARC. Tfc: W0SS 160, KA0ADF 59, N0JL 23.

**KANSAS**: SM, Orlan Cook, W0YH— ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. STM: Ron Cowan, KB0DTI. PIC: Scott Slocum, KC0DYA, and TC: Frank Neal, N8FN. Please welcome Carl, N0ORS, new EC for Dist 5 zone 27 in Barton County. If you have a net you would like to get listed in the ARRL Net Directory or one updated, PLEASE go to http://www.arrl.org/field/nets/. Randy, WL7YM, has been trying to rid us of the very strong carrier on 1.892 Mc. I alerted 4 SMs in OK & TX and I want to thank Charlie, K5TTT, for replying and getting involved. See my Jan KAR newsletter for more. I have just received copies of ARRL approval to the Mine Creek ARC to hold an ARRL hamfest in La Cygne Feb 3 and for the Central KS ARC to hold the ARRL State Convention Aug 19 in Salina. Put it on your calendar! Thanks to all the members of the ARRL Ks Field Svc for FB job http://www.col;ossus.org/kar/ Oct. Kansas Nets: sessions/QNI/QTC, KSBN 31/1108/132KPN 22/287/21 KMWN 31/587/480 KWN 31/906/586 CSTN26/1960/94 QKS 61/313/71 QKS-SS 8/17/2 SEC 68/915/27 QNS KB0AMY N0BTH K0BXF KC0CIG WD0DDG WD0DMV/SEC AA0IQ W0PBV WA0SSR KB0DTI TEN 279 msgs 62 sessions Kans 85% w/KB0DTI KX0I W0WWR NB0Z WB0ZNY W0SS mgr. BBS AA0HJ rec/sent 46 W1AW Bulletins R/S 338 Personal NTS tfc 0. Ks stns tfc W0WWR 120, WB0ZNY 78, KB0DTI 50, NB0Z 44, N0RZ 26, K0RY 16, W0OYH 15, K0XK 11, N0ZIZ 5, OBS WA0DTH 14. Room 4 UR report here.

**MISSOURI**: SM, Dale Bagley, K0KY—For more news, check-out ARRL MO Web page http://www.qsl.net/arrl-mo. MO Traffic Nets, Daily: SSB 3.963 MHz 5:45 PM. CW 7:00 PM and 9:45 PM. 3.585 MHz Amateur Radio activity in the MO Section is on the increase. In SW Missouri, St Louis, Kansas City, and else where in the State, Packet systems and APRS systems are growing. The participation in Field Day was up, as is the number of MO Amateurs taking part in Nov. SS and other contests. The ARRL DX 2000 Phone Contest produced the following results for the Section. Congratulations go to Class B first place operator, KI0MB, and to the Class C top gun, KI9A. Thanks to all of the other MO Section Operators that participated in the event. The State Emergency Management Agency is once again conducting a Communications Conference in Feb at the Inn at Grand Glaize. This conference will focus on the emerging technologies, Frequency Coordination and FCC rules proposals and communications emergency alerts. There are always some interesting Breakout Sessions to interest all attending. A large number of MO Section Amateurs will be attending this year. Virgil Eaton, K0IPM, long time net manager of the MO Traffic Net, has stepped down for personal reasons. Virgil has done an outstanding job as NM and his replacement will have some big shoes to fill. The Scout Communications Jamboree and JOTA was held at the MO State Fairgrounds in Sedalia, MO. Under the leadership of Alan Braun, NS0B, the Mid Missouri ARC provided an exhibit on Amateur Radio which covered many aspects of operating. They Demonstrated HF, 2-M FM, Packet, ATV, APRS, and other modes for the Scouts. The response from the Scouts was excellent. Congratulations on a job well done. Net/Sess/QNI/QTC: N0ATH Rptr78/0/; MTN 30/504/55; WAARCI 4/84/0. Jackson Co ARES 4/47/2. Rolla Billboard 29/321/9; Audrain ARC 4/36/0; Tfc: KE0K 65. PSHR: KE0K 103.

**NEBRASKA**: SM, Bill McCollum, KE0XQ—ASMs: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. It is with deep regret to inform you that Bill Prell, N7FAQ, has become a Silent Key. He passed away November 15 and was a member of the Lincoln ARC. Nice to see that Skip Miller, W0KVM, up and around on his new knee. Congratulations to John Ragsdale, N0NF, for scoring 200,000+ point score in the CQWW contest. The Bellevue ARC put over 600 man hours in public service for 2000. This doesn't seem to be a lot, but 2000 was pretty quiet in terms of severe WX. Buffalo County ARES has a new Web page. Point your browser to: www.bcares.homestead.com. Several clubs participated in the NWS Special Event. On December 9th, Members of the AK-SAR-BEN participated in the "North Pole Net." This is an annual event that allows children in area hospitals to see and talk to Santa via Amateur Radio. A big "Thank You" goes to our SEC, Jim KF0FO (HO HO HO) for filling in for Santa. Net Reports: WNE Net: QNI 1996, QTC 16 & 26 sessions. W0IRZ Memorial Net: QNI 70, QTC 5 & 4 sessions. NMPN: QNI 1712, QTC 9 and 30 sessions. Mid NE 2M ARES: QNI 377, QTC 4 & 30 sessions. NE Storm Net: QNI 1078, QTC 13 & 30 sessions. NE 40M: QNI 515, QTC 25 & 29 sessions. Tfc: K0PTK 112, KE0XQ 14, WY0F 6, KA0DOC 2, W0EXK 2, W0UJI 2, W0WHY 2.

### NEW ENGLAND DIVISION

**CONNECTICUT**: SM, Betsey Doane, K1EIC— BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: WA1D. SGL: K1AH. STM: K1HEJ. TC: W1FAI. On behalf of everyone on the Section cabinet, I wish you and your family a very Happy New Year filled with lots of good things in life! Take time to enjoy your hobby and if you can, consider a leadership role in your club. Visiting with the members of our newest youth club, The CT Amateur Radio League of Youth was a special treat. It was really fun presenting their certificate of ARRL affiliation—Dan, K3UFG has a good club going! If the chance comes along, give a hand to younger newcomers. Their enthusiasm is unbounded! Those of you who can hit the 145.29 Shoreline re-

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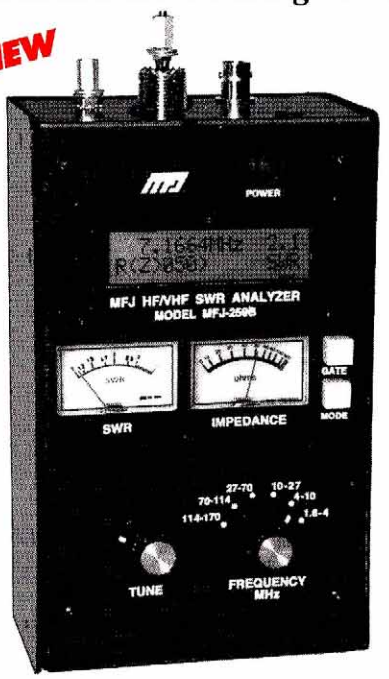


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peater, please note that the weekly SKYWARN Training Net is meeting each Thursday evening 7:30 PM on 145.29 and 147.505 repeater. Hope to see you there. Condolences to the members of the Greater Norwalk ARC on the loss of their friend, Ed, WT1Y, who recently became a Silent Key at a young age. Ed was instrumental in coordinating the special event station commemorating the Healing Wall of Vietnam. Just want to say a special thank you to all of our Field appointees for their efforts. It is fitting that I specially acknowledge the leaders among you-the ECs, DECs, NMs, members of the cabinet, club officers, hamfest chairs, VEs, etc. Volunteers and leaders nationally are much less available now than in years past. Let me hear from you about new ideas. I am the coordinator, you are the creators! Net sess/QNI/QTC/NM: NVTN 27/97/29/KB1CTC; WESCON 31/249/74/KA1GWE; ECTN 30/234/30/WA4QXT; CPN 30/246/90/N1DIIO; CN 30/112/67/N1AEH. Tfc: NM1K 2045, KE1AI 172, KA1GWE 153, KB1CTC 58, WA4QXT 42.

**EASTERN MASSACHUSETTS**: [This column was authored by SM-elect Phil Temples, K9HI.] I want to thank everyone for the kind words of congratulation and encouragement following the recent SM election. Kudos to SEC W3EVE, DEC N1VUX, State RACES Officer N1CPE and others for helping to make this year's ARRL SET a tremendous success! SET publicity was obtained through an AP wire story, and articles in the Worcester Daily Telegram, Sun Chronicle, and the Providence Journal. SEMCARES and the Massasoit ARA conducted a SET drill in Myles Standish State Forest. Minuteman RA staged its local SET with a VHF AM aircraft foxhunt with CAP & FEMA equipment and FAA approval. My apologies to those groups and clubs participating in SET whom I failed to acknowledge. N1QZY is donating his time to mentor two Chelsea HS students in science. Tim's pupils took 1st place in their high school science fair last year, and went on to compete in the finals at MIT. A traffic handler's training net is scheduled as of this writing on the Waltham 146.64 repeater on Tuesday nights at 2030. Contact W2EAG for more details. WA1GEP and the Waltham ARA crew have been busy with repeater repairs. Congrats to WA1IDA, elected as Chairman of the MA Voluntary Organizations Active in Disaster. He and KB1EKN attended the recent Emergency Management 2000 Conference, where ARES and RACES were exhibited to 700 emergency managers and disaster officials. Happy anniversary, Police Amateur Radio Team of Westford! PART will be 25 years old this February. Billerica ARS reports the Hoss Traders was great as always, though the overall attendance was disappointing. BARS sports an official presence at each Rochester flea. North Shore RA held its Annual Holiday Party and Yankee Swap. For those who live on Cape Ann, the "coffee pot is on" every Sunday morning from 1000-1200 at CAARA's club house in Gloucester. Check in to their Monday net on 145.13 at 1930 or visit http://www.qsl.net/w1glo/ for more info. Norwood ARC is pleased to announce its new QTH: the Willett Room of the Norwood Civic Center. Yankee Clipper Contest Club has created an intra-club competition called the YCCC Challenge Competition to promote teamwork, foster inclusion, and make contesting more fun during the Fall/Winter DX contest season. The newly reactivated SWAT (SATERN, Weather, ARES and Technical matters) net holds forth on the Boston 145.23 repeater at 2100 Friday evenings. Speaking of nets, be sure to check into the EMA ARES Net each Sunday evening at 2130 on the Minuteman RA linked repeater system. Tfc: KB1AJ 310, W2EAG 310, NZ1D 152, WA1FNM 106, WA1NPO 95, N1SGB 65, N1TPU 54, KD1LE 46, WA1LPM 31, KB1EB 30, N1IST 29, N1LAH 15, N1TDF 10.

**MAINE**: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: N1JBD. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: W1KX, KA1TKS, K1NIT. Web Site: N1WFO. The long anticipation of installation of Amateur Radio equipment at the 10 Maine chapters of the American Red Cross has finally come to fruition. At the time of writing, a check for $57,000 has been sent to the purveyor of the radio equipment, Ham Radio Outlet. Seeing this will happen in the middle of winter, the old adage (that in order for antennae to work well, they must be installed in a blizzard), will be put to the test. The Red Cross is encouraging Amateurs to put this equipment on the air, not only just for official Red Cross business, but also for Amateurs to become familiar with the operations of the station. Future events may include "Worked All Maine Red Cross Chapters," which may become part of a National event, "Worked All States' Red Cross Stations." Hope to see all of you at the Maine State ARRL Convention, March 30, 31 at the Ramada Conference Center in Lewiston, ME, exit 13 from the Maine Turnpike. 73, Bill, N1KAT. Tfc: W1KX 135, N1BJD 62, KA2ZKM 52, W1QU 43, W1JX 30, W1BLT 29, KA1RFD 21, W1JTH 19.

**NEW HAMPSHIRE**: SM, Al Shuman, N1FIK (n1fik@arrl.org)—Web site (www.nhradio.org). I am pleased to announce that our work re-building the Field Org is progressing nicely. NH held a SET debrief meeting on 12/2, and by all accounts the test went well. Thanks to all ARES participating stations. NHARA's sponsored NH-QSO Party is scheduled for the weekend of Feb 3-4. Check the NH Web page www.nhradio.org for specifics. Back by popular demand is NH-ARRL patches & hat give-a-ways for active Field Organization participation. Also added is a colorful coffee mug produced by Curiosity Sales of ME. NH has developed its own specific ARES ID card with the first issued in Dec. If you are an active ARES member and have not yet received your ID card, contact your local EC. A listing of NH ECs can be found on the NH web site. Info on NH Field Org activity is available through the NH List Servers. To join the lists, follow the directions on the Web page. Bill, K1BD, is doing well after his quintuplet heart bypass surgery. Three days later, Bill was up checking VUCC cards for Fred, N1ZUK. I have the picture to prove it. Simply amazing! Drive safely 73, Al. Net NM/Sess/QNI/QTC: GSFM N1RCQ 30/191/35; GSPN WB1GXM 30/121/74; VTNH WA1JVV 30/148/148. Tfc: W1PEX 1038, N1NH 160, WA1JVV 158, W1ALE 84, WB1GXM 24, N1CPX 10.

**RHODE ISLAND**: SM, Armand Lambert, K1FLD—ASM: W1YRC. OOC: W1AOM. STM: KA1JXH. TC: N1DKF. PIC: WB1P. SEC: N1JMA. The Newport County Radio Club elections have provided the following leadership for 2001: Pres Ellis W3PDK, VP Doris KB1EEG, Treas Rich N1ZSR, Sec Jeff WA1OYN. At their installation banquet/meeting, the coveted TANK award was passed according to tradition from Mike, W1MFS, to Charley, W1CG, accepting for the repeater maintenance group that has been very busy this year. In addition Bob Gunning, W1IIC was presented with lifetime membership in the NCRC for the many years of devoted service to the Club. Yours truly and Simone, KA1YVF, are proud and honored to have been in attendance. Great company and terrific food! // The PVARC has been working with the Saratoga committee to make restorations to the Aircraft Carrier Radio room. The club is now holding regular VE sessions; contact Ken Carr, KB1AWV. // On a sad note we regretfully log the passing of Joe St Germaine, W1SNT, as a favorite on many local repeaters. He will be missed. // Just a reminder to get your committees going for this year's Field Day. It's just around the corner.

**VERMONT**: SM, Bob DeVarney, WE1U—BARC had a "rededication" of their club station, W1KOO, along with the EOC at the Red Cross. BARC's tower and beam antenna had problems starting last year when the mast slipped in the rotor, damaging all the coax runs. Starting in late fall, and continuing through December, they worked hard to get the rotor replaced, the beam serviced, and get everything back in the air before old man winter really got serious. RANV has worked hard on the 145.150 repeater, and it shows. Now it can be worked where it wasn't able to be before. This involved replacing the antenna, and a second trip up the mountain when the transmitter failed a mere 10 days later. Great work guys; it sounds super! Twin State now has their Communications Van on the road!! This will undoubtedly be invaluable during times of emergency. The Center for Technology at Essex has 4 new technician class amateurs in their Telecommunications class after a VE session in December. As of press time, they didn't have their calls yet. Congratulations everyone!! 73 de WE1U. Tfc: KB1DSB 219, K1YLB 24, KB1EPQ 12, W1DEC 9, KB1EYP 7, AA1PR 6, K1BVT 2.

**WESTERN MASSACHUSETTS**: SM, William C. Voedisch, W1UD, w1ud@arrl.org— ASM (digital) KD1SM. STM: NZ1D. SEC: K1VSG. OOC: WT1W. I want to thank Cliff, W1SJ, for doing an excellent job as STM. Our new STM is Bill Wornham, NZ1D, of Townsend, MA. All net reports and other matters pertaining to net operations are to be directed to him. Bill's e-mail address is NZ1D@juno.com. The emergency department, under the able direction of Dennis Zonia, K1VSG, is to be congratulated. When the numbers are tabulated, it looks like we will be the top section in New England again for the SET. This is your section, and it certainly shows by the cooperation you have given Dennis. Thank you! Winter will pass and spring will be here before we know it. It's not too early to think of Field Day. Do you remember the things that could have been improved during last Field Day? Now is the time to get a committee formed and get the bugs ironed out. Field Day is our day to demonstrate to the public that Amateur Radio is ready in case of an emergency. 73, Bill.

## NORTHWESTERN DIVISION

**ALASKA:** SM, Kent Petty, KL5T — Iditarod Sled Dog Race communicators are needed for this year's race in early March. Contact John Wolfe, AA0NN via e-mail at aa0nn@yahoo.com. We are still looking for a sponsor for our state PRB-1 effort. Will your state representative be willing to help? Contact your State Government Liaison, Rob Wilson, AL7KK for input. HF nets: Sniper's Net 3920 1800 AST, Bush Net 7093 2000 AST, Motley Group 3933 2100 AST, and Alaska Pacific Net 14292 M-F 0830 AST. Please report communication drills and exercises, emergency communication activations, and public service activities on FSD-157 to KL5T.

**EASTERN WASHINGTON**: SM, Kyle Pugh, KA7CSP—On December 1 & 2 the Spokane Co. ARES/RACES station W7GBU joined 84 other stations across the nation in the 2nd annual NWS on-the-air Special Event. The purpose of the 24-hour special event is to recognize the contributions that amateur operators make to the NWS during severe weather, to make a high-profile on-the-air showing, and to provide contacts to all amateurs wishing to qualify for a certificate. In memoriam: John W. Noffsker, N7BHP, of Inchelium became a Silent Key on 11-1. There were 7 out of 10 OO stations reporting monitoring activity for November. 73, KA7CSP. Net Activity: WSN: QNI 838, tfc 235; Noontime Net: QNI 8793, tfc 389; WARTS: QNI 3195, tfc 87. Tfc: K7GXZ 289, W7GB 207, KA7EKL 110, K7BFL 77, KK7T 17. PSHR: W7GB 138, K7GXZ 120.

**IDAHO**: SM, M.P. Elliott, K7BOI — OOC: N7GHV, SEC: AA7VR, STM: W7GHT. Congratulations are due for Greg Milnes, W7OZ, and Jim Fenstermaker, K9JF, as they were successful in their re-election bids for NW Director and Vice Director. Idaho looks forward to working with you both during your next term. As you read this, a bill is working its way through the Idaho legislature addressing Idaho tower requirements. This effort was lead by John Cline, K7BDS, and his staff at the Idaho Bureau of Disaster services. Let's all hope that our legislators will recognize the value of ham radio and allow the bill to pass. More on this issue in a later column. 73, Mike, K7BOI. Tfc: W7GHT 487, KB7GZU 92, KB7GZU 29, N7MPS 10, W6ZOH 9. PSHR: W7GHT 120, WB7VYH 73, N7MPS 50. Nets: FARM 30/2733/ 24/W7WJH; NWTN 30/1022/73/KC7UND. IDACD-22/ 489/8/WB7VYH; IMN 30/380/331/W6ZOH. http://id_arrl.homestead.com/mainpage.html

**MONTANA**: SM, Darrell L Thomas, N7KOR—The month of November was a pretty quiet time for the MT Section. I did not receive any news items. Plans are under way to again provide communications for the Race to the Sky Dog Sled Race in February. This annual event has given the amateurs an opportunity to earn great respect for their ability to pass traffic and provide safety for the many mushers along the mountain trails. I am nearing the possible end to my term as Section Manager. I would like to thank all of those who have shown such great support to the program for the past six years. Net/QNI/QTC/NM MSN 102/0 W7OW, MTN 2184/39 N7AIK, IMN 380/331 W6ZOH. PSHR: N7AIK 124.

# MFJ TUNERS

## MFJ-989C *Legal Limit* Antenna Tuner

***MFJ uses super heavy duty components to make the world's finest legal limit tuner***

***MFJ uses super heavy duty components -- roller inductor, variable capacitors, antenna switch and balun -- to build the world's most popular high power antenna tuner.***

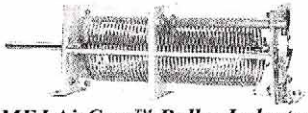
**The** rugged world famous MFJ-989C handles 3 KW PEP SSB amplifier input power (1500 Watts PEP SSB output power). Covers 1.8 to 30 MHz, including MARS and WARC bands.

**MFJ's** *AirCore*™ roller inductor, new *gear-driven* turns counter and weighted spinner knob gives you exact inductance control for absolute minimum SWR.

**You** can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax, random wire or balanced lines.


MFJ-989C **$359.95**

**You** get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-Needle SWR/Wattmeter, massive transmitting variable capacitors, ceramic antenna switch, built-in dummy load, *TrueCurrent*™ Balun, *scratch-proof* Lexan front panel -- all in a sleek compact cabinet (10¾Wx4½Hx15D in).



***MFJ AirCore™ Roller Inductor*** gives high-Q, low loss, high efficiency and high power handling.

**MFJ's** exclusive *Self-Resonance Killer*™ keeps damaging self-resonances away from your operating frequency.

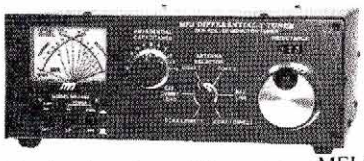
**Large**, self-cleaning wiping contact gives good low-resistance connection. Solid 1/4 inch brass shaft, self-align bearings give smooth non-binding rotation.

**MFJ *No Matter What*™ Warranty**

**MFJ** will repair or replace your MFJ-989C (at our option) *no matter what* for one year.

## *More hams use MFJ tuners than all other tuners in the world!*

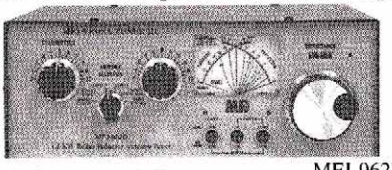
### MFJ-986 Two knob *Differential-T*™



MFJ-986 **$329.95**

***Two*** knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10¾Wx4½Hx15 in.

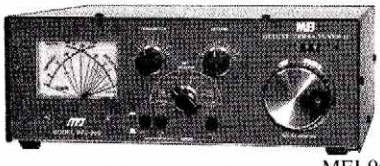
### MFJ-962D *compact* Tuner for Amps



MFJ-962D **$269.95**

**A** few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10¾x4½x10⅞ in.

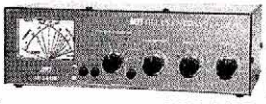
### MFJ-969 300W *Roller Inductor* Tuner



MFJ-969 **$199.95**

**Superb** *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

### MFJ-949E *deluxe* 300 Watt Tuner



MFJ-949E **$149.95**

*More hams use MFJ-949s than any other antenna tuner in the world!* Handles 300 Watts. Full 1.8 to 30 MHz coverage, 48 position *Precision48*™ inductor, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

### MFJ-941E *super value* Tuner

MFJ-941E **$129.95**

*The most for your money!* Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10½Wx2½Hx7D in.

### MFJ-945E HF+6 Meter *mobile* Tuner

MFJ-945E **$119.95**

**Extends** your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $4.95,** mobile mount.

### MFJ-971 *portable/QRP* Tuner

MFJ-971 **$99.95**

**Tunes** coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6½x2½ inches.

### MFJ-901B *smallest* Versa Tuner

MFJ-901B **$79.95**

**MFJ's** smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

### MFJ-16010 *random* wire Tuner

MFJ-16010 **$49.95**

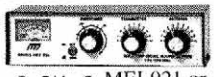
**Operate** all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

### MFJ-906/903 *6 Meter* Tuners

MFJ-906 **$79.95**

**MFJ-906** has lighted Cross-Needle SWR/wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $49.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

### MFJ-921/924 *VHF/UHF* Tuners



MFJ-921 or MFJ-924 **$69.95**

**MFJ-921** covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

### MFJ-922 144/440 MHz Tuner

MFJ-922 **$79.95**

**Ultra** tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

### MFJ-931 *artificial* RF Ground

MFJ-931 **$89.95**

**Creates** artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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**OREGON**: SM, Bill Sawders, K7ZM—ASM: KK7CW. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. TC: AB7HB. ACC: K7SQ. New club officers have been installed at several clubs. The Hoodview Amateur Radio Club has installed Buck Layton, W7SEA, as President. Vice-President is Perry Hopkins, KD7EYM. Secretary is Vivian Hagood, N7VH, and the new Treasurer is Cory Schoch, KA7IUG. The McMinnville Amateur Radio Club has announced their 2001 Officers. President is Bonnie Altus, AB7ZQ. Vice-President is Jack Fidler, N7UQS. Secretary is Bob Kuhn, KC7YN, and Treasurer is Darlene Burgess, KC7QAS. At the Radio Amateurs of the Gorge, newly installed Officers include President, Jim Keightley, K7NPS. Vice-President is Terry Shellman, KB7DRX, and Kevin Kyte, KC7QOO is Secretary/Treasurer. Medford's, the Rogue Valley Amateur Radio Club has elected John Luthy, N7JL, as President. Don Montgomery, KD7AUC, is Vice-President. Connie Miller, KC7RQS is Secretary, and Bob Deuel, K2GLO, Treasurer. Congratulations to all of you. The "big one" happens February 17th. If you like swapfests...this is it! Oregon's largest swapfest will be held at Rickreall. Go west of Salem on Highway 22 to the "blinking light." Go south one-half mile to the Polk County fairgrounds. Doors open at 9 AM. See you there, and keep in touch. NTS traffic totals for November: N7DRP 169, W7IZ 124, N7YSS 97, K7NLM 93, W7VSE 90, KC7ZZB 57, KC7SRL 55, KC7SGM 42, K6AGD 33, KK1A 6.

**WESTERN WASHINGTON**: SM, Harry Lewis, W7JWJ—Now that you have upgraded or obtained a new license by passing the 5 wpm code test would you like to try the next higher speed? Then check out the WCN CW net that holds the CW speed to just 10 wpm. The net exchanges training messages and *QST*s to enable the newcomer to quickly become proficient, not only in CW, but in traffic handling. For more information drop an e-mail to David Robins, K7WCN, the net manager at david23@valint.net. Should we mention that George, K7BDU, made the Brass Pounders League (BPL) again? Ok, we won't. One of the best traffic handlers of all times was the late W7BA who made BPL every month for over 22 years. The Official Observers have sent few reports to stations whose emissions have been out of the assigned ham bands. Better an OO than the FCC. A new OO is Ralph Lucier, KA7VEC of Mount Vernon. Hopefully Ralph will only have to send out good operator card reports. Perhaps you would like to become an Official Observer. If so, drop an e-mail to Renee, AA7KE@arrl.net and the process will be set in motion. There are now three DXCC Card Checkers in Western Washington, K7AR of Vancouver, N7UX of Whidbey Island and just undergoing confirmation the latest entry, Wayne Bailey, NX7K of 13407 SE 235th Kent 98042. For information about the Western Washington DX Club contact; webmaster@wwdx.org. The Mike and Key Club flea market will be held the second weekend March 2001. It's the biggest and the first in the area so collect those goodies that you wish to swap, trade or sell. For info see www.mikeandkey.com.

### PACIFIC DIVISION

**EAST BAY**: SM, Andy Oppel, KF6RCO—ACSCT announced election results: W6RGG/Chief, KC6TYB/Asst. Chief, KF6RCO/Planning, AD6ME/Logistics, KE6QJV/Operations, KF6CRZ/Admin. At their holiday dinner, ACSCT thanked K6JNW for 23 years of service as Asst Chief. HRC welcomes new member K6BAW. SARS reports the following VIPs were called out to assist with the "Hidden" fire (one of several that occurred during the final day of the Pacificon convention): KO6GM, AC6FJ, KI6QA, N6DDK, W6ZAP, N6APA, KD6KME, KO6FR and AC6LE. CCCC elected Board Members: KE6ZWO, KD6JCT and KA6OFR. VVRC elected new officers: WH6AB/Pres., K6DME/VP, KF6KFP/Sec. and KF6VBJ/Treas. The new VVRC Board of Directors will be N6ZGB, KD6FZY, K6ZU and K6HEW. NALCO has a new EC, KF6OBQ, assisted by KFAPW, W6WXO, WA2UNP and W6WTI. EBARC mourns the loss of KC6JCQ. Congrats to EBARC member KD6FVI on his upgrade to General. I enjoyed meeting ORCA members at their December meeting. Tfc: W6DOB 903, WB6UZX 60. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7PM; NCN2-Slow Sess/3705/9PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM.

**NEVADA**: SM, Jan Welsh, NK7N—ASM: Dick, W6OLD. SEC: Paul, NN7B. STM: Bruce, N7CPP. NM: Joe Giraudo, N7JEH. Thanks go to N7JEH, our new net manager. Also thanks to Joe for resurrecting the W7LKO ARC newsletter, and note his request for items. The club reports around NV are filled with party plans. New Years Eve in Las Vegas includes ARES/RACES exercise preparations for those not brave enough to join the massive crowds we expect. Certain streets and interstate accesses will be unusable and may require our assistance. Amateur Radio exam sessions are conducted regularly by SIERA, SNARS and CVRC. RARA has its net Saturdays at 7:30 AM, 3965 kHz, e-mail purdy@sierra.net to find their next meeting location (different spots in NV). ARES Net follows at 8:30 AM, 3965 kHz. Don't forget SKN - January 1, 2001. Contact Jim Frye, nw7o@anv.net, 702-565-0242 for WAS and VUCC. Met several from Reno area at RACES meeting in Las Vegas this month. Can't remember all the names but enjoyed seeing them. Congratulations Carson Valley Radio Club on SSC status. Please take care of yourselves this holiday season so you can enjoy Amateur Radio next year. Happy Holidays. 73, Jan, NK7N. Tfc: W7VPK 86, N7CPP 71, K7NPH 8.

**PACIFIC**: SM, Ron Phillips, AH6HN—I am sad to report the passing of Clayton Caughill, KH6EL, on 11/10/00 and Harold Yoshikawa, WH6CQA, Nov 2. They will be missed by all. Lee Wical, KH6BZF, reports the Honolulu ARC met for the last time at the Columbia Inn in Honolulu on 18th November 2000. This has been a long standing meeting place for many years. HARC will relocate. Mike Gibson, KH6ND, has returned from Palmyra Is. where he worked for the Nature's Conservatory. Mike logged nearly 30,000 QSOs as KH6ND/KH5 on HF including both 160-meters and 6-meters, mostly giving out CW QSOs and some SSB. Thanks Mike for the DX. The Oahu Hamfest sponsored by the Koolau ARC was a great success. Much thanks goes to Walt, AH6OZ, and Clem, KH7HO, plus the Koolau gang. The date for the next year's hamfest is scheduled for 13 October. The Big Island ARC has elected new officers for 2001. They are Pres: Bob Schneider, AH6J, VP: Dennis Carvalho,AH7H,

# MFJ *Switching* Power Supplies

## *Power your HF transceiver, 2 meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!*

## *No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .*

**MFJ's** new adjustable voltage switching power supplies do it all! Power your HF or 2M/440 MHz radio and accessories.

**MFJ's** *MightyLites*™ are so light and small you can carry them in the palm of your hand! Take them with you anywhere.

**No** more picking up and hauling around heavy, bulky supplies that can give you a painful backache, pulled muscle or hernia.

**MFJ's** 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

### *No RF hash!*

**These** babies are clean . . . Your buddies won't hear *any* RF hash on your signal! *None* in your receiver either!

**Some** competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

**These** super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

### *Low Ripple . . . Highly Regulated*

**Less** than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

### *Fully Protected*

**You** won't burn up our power supplies!

*No RF Hash!*


MFJ-4225MV
25 Amp
**$149.95**
plus s&h

MFJ-4245MV
45 Amp
**$199.95**
plus s&h

*No RF Hash!*


They are fully protected with Over Voltage and Over Current protection circuits.

### *Worldwide Versatility*

**MFJ** *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Replaceable fuse.

### *MightyLites™ . . . Mighty Features*

**Front-panel** control lets you vary output from 9 to 15 Volts DC.

**Front-panel** has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

**Brightly** illuminated 3 inch meters let you monitor load voltage and current.

**A** whisper quiet internal fan efficiently cools your power supply for long life.

### *Two models to choose from . . .*

**MFJ-4225MV, $149.95.** 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D in.

**MFJ-4245MV, $199.95.** 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

### *NEW! 25 Amp MightyLite™*

MFJ-4125
25 Amp
**$109.95**
plus s&h

**Super** light, super compact switching power supply delivers 25 Amps maximum/ 22 Amps continuous at 13.8 Volts DC. Low ripple, highly regulated. ***No RF Hash!*** Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 3.5 lbs. 5½Wx2½Hx10¾D in.

## MFJ 35/30 Amp Adjustable Regulated DC Power Supply

### *Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .*


MFJ-4035MV
**$149.95**
plus s&h

**MFJ's** heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

**A** massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

**It's** highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

**Fully** protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

**You** get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

**Three** sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

**A** front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

## MFJ *High Current* Multiple DC Power Outlets

### *Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply*

MFJ-1118
**$74.95**
plus s&h

MFJ-1116
**$49.95**
plus s&h

MFJ-1112
**$34.95**
plus s&h

***New!***
MFJ-1117
**$54.95**

**MFJ-1118, $74.95.** This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

**Two** pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

**Built-in** 0-25 VDC voltmeter. Six feet super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs. Heavy duty aluminum construction. 12½x2¾x2½ in.

**MFJ-1116, $49.95.** Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

**MFJ-1112, $34.95.** Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

**NEW! MFJ-1117, $54.95.** For powering four HF /VHF radios (two at 35 Amps each and two at 35 Amps combined) simultaneously. Tiny 8x2x3 inches.

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Sec: Barbara Magnuson, N7UQX, Treasurer: Ron Phillips, AH6HN, Directors, Ham Kaneshiro, AH6HB; Francis Brown, NH6RW; Harvey Motomura, AH6JA; Curtis Nakayama, KH6LE; and Harry Nishiyama, KH6FKG. Mahalo & 73. Ron, AH6HN.

**SACRAMENTO VALLEY**: SM, Jerry Boyd, K6BZ—A number of League members in the Section have recently expressed interest in field appointments, particularly in the OO, OES, and PIO positions. This interest is most welcome. Ours is a large Section particularly in terms of distance between the northern and southern portions of the Section. We need to balance out the responsibilities and having people in key positions (like OO, PIO, etc) distributed throughout the Section is very helpful. A number of clubs in the Section are reporting increases in membership no doubt due to restructuring. Not only are there new hams looking to belong to a club, but hams who have upgraded to General Class or above are now experiencing renewed interest in the hobby and therefore club membership. When they come to our clubs we need to make the experience interesting so they keep coming! For the second year in a row, our Section will be holding an emergency communications conference (EMCOMM 2001). It will be held near Redding on March 31st. All amateurs (and others) interested in emergency communications are invited. Amateurs from adjacent Sections are especially welcome. It will be an outstanding event. For information contact SEC/N K6SOJ or SEC/S WA6SLA. Until next month, 73 de K6BZ.

**SAN FRANCISCO**: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. TC: N1AL. It is the start of a new year and congratulations go to the newly-elected club officers as they get started on their jobs for the year. ASM Bill Hillendahl, KH6GJV, has been making the rounds of the clubs in the southern part of the Section recently visiting the Willits and Lake County ARCs. Bill reports that the clubs are working hard on developing new Hams and programs. The Humbolt ARC is gearing up for the SF Section convention in June. Visit their Web site at www.humbolt-arc.org. The Redwood ARC recently raised funds for their treasury by selling hats. The Lambda ARC/Golden Gate completed a banner year in 2000, which included many new events, a successful Technician class license class and a gain of members. They are planning more classes for 2001. They have built a good relationship with the SF Mayor's OES office. The Marin ARC continues to enjoy their "home" in the converted fire station and is busy installing a new heating system. The Redwood Empire DX Association made another generous donation to the NCDXF, their second for the year. The Sonoma County Radio Amateurs bestowed Life Membership on Marie Mappus, KI6QY, at their annual Christmas dinner for her many years of devotion to the club and the Ham community. Visit the Pacific Division Web site at www.pdarrl.org for information about the area clubs. Happy New Year to all!

**SAN JOAQUIN VALLEY**: SM, Donald Costello, W7WN— April 20-22 are important dates to remember since SJV Section will once again be the host section for the International DX Convention in Visalia. I would like to encourage everyone in the Section who is interested in DXing to attend this world-class event. It is time once again to remind all that winter and early spring months can bring harsh conditions so, be prepared. Have a grab and go bag in the trunk of your car which should contain, comfortable shoes, first aid kit, pocket knife, flash light, matches, extra socks, food items with long storage capability and a radio. Should you not be able to use your vehicle during an emergency you will be able to walk out with relative comfort. Remember also to have an article of warm outerwear in the trunk of the vehicle as well. At home everyone should have at least 72 hours worth of water and nonperishable food. Your family should have an emergency plan in place and network with neighbors especially the senior citizens. Those who are prepared for emergencies will better survive them. Those of you who would be interested in serving the communications needs of your communities during emergencies can do so by volunteering for the Amateur Radio Emergency Service (ARES). If you would like more information please contact Kent LeBarts, K6IN, by e-mail at: k6in@elite.net or by telephone at 209-723-2020.

**SANTA CLARA VALLEY:** SM, Glenn Thomas, WB6W—SEC: KM6GE. BM: WB6MRQ. TC: WA6PWW. OOC: KB6FPW. It is my pleasure to welcome Larry Murphy, KE6PPE, the new AEC for the American Red Cross - Salinas Chapter. I visited the Chaverim ARC in Palo Alto. A small group but very friendly (and smart!) people. Hopefully I'll be able to go again. Is your club planning a Field Day operation? If so, I'd like to do a bit of publicity for you. What I need is to know where your operation will be so that I can include it with lots of other FD sites in a Field Day Press release. The press release has two purposes. First, I'll have it up on the SCV section Web site (http://www.pdarrl.org/scvsec/index.html) so that anyone who is looking for a FD group will learn where to fine one. Those who show up are potential new members in your group. The PR is also intended to show the media just how big FD is. I plan to send it to as many media outlets as I can find. The more FD operations it identifies, the more effective it will be. In the event that your group is visited by a reporter and makes it into print, that's bonus points for FD publicity. Another source of FD bonus points is the message to your SM. The details will be in the FD rules. After FD, I will list the calls and club names from all of the messages I actually receive in this column. Watch for it in August *QST*. If you'd like to see your club mentioned in these pages, send me a copy of your club newsletter to me at home (address on page 12 of this issue of *QST*) or via e-mail (wb6w@arrl.org). I can't report it if you don't send it! See you next month! 73 de Glenn, WB6W. Tfc: W6PRI 2.

## ROANOKE DIVISION

**NORTH CAROLINA**: SM, John Covington, W4CC— SEC: KE4JH. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC - vacant. http://www.ncarrl.org. Just a reminder that all affiliated clubs need to send an annual report to ARRL HQ no less frequently than every two years. I encourage you to update your club's information after every officer election. This is now very easy with the online club report form at www.arrl.org. It's important to resubmit this every year even if your officers do not change, so we will be certain to have the correct phone and address information on hand. In North Carolina it has been especially problematic because we have gone from two to seven area codes in the course of just a few years. With the new 980 overlay area code it will be even more difficult to determine phone numbers by geographic location. Congratulations to the Montgomery County ARS on becoming an affiliated club. Jim Aderholt, KI4DH, has worked very hard to put a group together for Montgomery County and has done an outstanding job. Congratulations is also in order for our newest ARRL Special Service Club, the Robeson County ARC. This club has shown you don't have to be a large club in order to be a Special Service Club, you just need an active program and dedicated members. I regret to report that Bus, K4INR, has become a Silent Key. Many of you on the Tar Heel Emergency Net remember Bus as a long-time participant. Bus recently moved to Cary and was hoping to get back on the air soon. He will definitely be missed. We also lost "Miss Frances" Krepp, W4KYI of Kannapolis. Elkin Hamfest is Sunday February 11th. Nov Tfc: W4EAT 549 (BPL), NC4ML 300, AB4E 274, K4IWW 166, AA4YW 118, KE4JHJ 114, KI4YV 90, W4IRE 72, AD4XV 39, KE4AHC 32, W3HL 26, WA2EDN 24, W4CC 22, WA4SRD 17, KB8VCZ 13, AE4HJ 12, N0SU 10, KE4YMA 9, NT4K 7, KR4OE 6, KT4CD 3.

**SOUTH CAROLINA**: SM, Patricia M. Hensley, N4ROS—May I express my sincere appreciation to those who supported me for SM in the recent election, and may I invite everyone to support ARRL in SC. Our state goals will reflect the national ARRL initiatives: expanded emergency communications and implementation of an Amateur Radio curriculum for youngsters in our schools. A successful outcome can only be accomplished by an energetic and knowledgeable staff. Applications or suggestions for these positions and/or assistants are invited. A new agenda item will be the formation of a statewide Radio Club Presidents' Advisory Council. It is requested that all club presidents, regardless of ARRL affiliation, contact me as soon as possible. Thanks to everyone who participated in the recent SET. We must continue to be prepared. I have enjoyed meeting and speaking with many of you at the Union and Greenwood hamfests. I look forward to the same at the upcoming Charleston Hamfest. Tfc: AF4QZ 74, KA4LRM 70, W4DRF 67, WA4UGD 37, KA4UIV 32, WD4BUH 20, K4BG 17, KG4IGE 15, K4JMV 4.

**VIRGINIA**: SM, Lynn Gahagan, AF4CD—SEC, OOC: KR4UQ. STM: W4CAC. ASM/A: KE4NBX. ASM/B: W4TLM. ASM/C. TC: W4IN. ASM/D: KC4ASF. PIC: W2MG. Greetings to everyone! I hope that everyone enjoyed the past holiday season. I had the pleasure of attending the Franklin County ARC Christmas dinner and meeting in Rocky Mount VA. It was nice seeing many of the members that I often hear and talk to on the bands. Many from out of the area attended the fellowship dinner. On December 5th the VOPEX 1-00 drill for the Virginia Power Nuclear Power plant located at North Anna took place. This Nuclear Power plant exercise is one of two that Virginia ARES/RACES is requested to participate in. Federal law requires the VOPEX nuclear power plant drills. This is one of our most important drills supporting VDEM/NRC/FEMA and, it is important that we always strive to do the best job that we can for our clients. I know of one instance that problems with an Instaphone in Caroline County required our back up communications. Although we did encounter problems with our communications at certain locations, experience in simulated emergencies helps us hone our skills, and discover where improvement can be made to our systems. In the exercise we were able to utilize packet on 2m/70cm; voice on; HF, 70cm, and 2m. The following locations were involved with the exercise: Sterling NWS, Wakefield NWS, Caroline, Hanover, Louisa, Orange, and Spotsylvania Counties. All played an important role in the drill. On behalf of the Virginia Department of Emergency Management, Nuclear Regulatory Commission and the Federal Emergency Management Agency, I thank the almost 100 amateurs who participated, for a job well done! For those who were unable to attend this years VOPEX, we do it all over again at Surry VOPEX in 2001. W4TLM reports that W4PAJ has stepped up to take over the District 13 position of DEC. Thanks Brian, I am sure Terry is glad to pass on one of his "hats" over to you! Dave Damon, K4DND, will host a Live Training Session in Charlottesville on February 10th. See www.aresva.org for details. Tfc: W3BBQ 286, WA4DOX 189, N4ABM 164, KR4MU 153, KV4AP 129, K4MTX 94, AA4AT 85, K4YVX 82, KV4AN 81, W4CAC 79, K0IBS 68, WB4UHC 24, W4SEE 23, AF4CD 23, WB4ZNB 22, KU4TM 16, W4JLS 15, K4JM 13, W4YE 13, W4MWC 13, KB4CAU 7, KU4MF 6, N4FNT 2.

**WEST VIRGINIA**: SM, O.N. (Olie) Rinehart, WD8V— STM: KC8CON. SEC: W8XF. ASEC: KA8ZOO. SGL: K8BS. TC: K8LG. OOC: N8OYY. ACC: WD8MKS. APRSC: W8XF. PIC: N8TMW. Very busy holiday season so very little news from your Section Manager. The Hamfest season is upon us and plan to see you all in my travels around the section and region. The following information was furnished by Section Traffic Manager, KC8CON. God bless you all and 73. Tfc: KA8WNO 272, WD8DHC 209, W8YS 173, W8WWF 93, KC8CON 60, WW8D 46, WD8V 45, N9MNA 17, N8BP 12. PSHR: WD8V 196, W8YS 176, WD8DHC 129, KC8CON 122, KA8WNO 118, WW8D 121, N8MNA 51; WVFN: 12341/173/30 KC8CON; WVMDN: 839/41/30 WW8D; WVN E 124/78/30 W8WWF; WVN L 125/47/30 W8WWF.

## ROCKY MOUNTAIN DIVISION

**COLORADO**: SM, Tim Armagost, WB0TUB—ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0*0MYY. Early December brought a nationwide Special Event co-sponsored by the ARRL and the National Weather Service (NWS). Two of the Colorado NWS offices, Boulder and Pueblo, participated with Special Event stations. Elke, KB0YWO, coordinated efforts at the Boulder office with participation by Ian, KC0GDN, Jane, AA0ZR, Bill, W0LVI,

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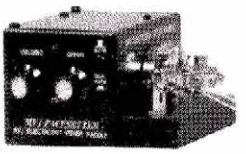

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Dave, KI0ND, and Ben, KB0UBZ. At the Pueblo office Russ, WB0GSU and Wes, K0HBZ led the efforts assisted by Mike, K0TER, Jeff, KB0YCI, Dean, KA0PII, Kit, KA0WUC, Mike, N0MIK, Carol, KC0DTQ, Sid, K4ARM, Alan, KB0TLS and Dwight, N0OUH. The Pueblo office reportedly made approximately 325 contacts— including contacts to numerous other NWS Special Event stations. I worked the event from home, and heard many pile-ups on the various NWS stations. It sounded like a very popular event and next year's should be bigger and better. Congrats and thanks to all participants. The Mountain States Net (MSN— but not to be confused with an internet service provided by a very large Seattle area company) is a slow-speed CW net which meets on 3715 kHz at 0245Z, and is supported by 12th Region NTS stations to encourage improved CW operating abilities, familiarity with traffic net procedures, and increased support of Section Nets in AZ, CO, NM, UT and WY. Check in and keep your CW *and* NTS skills sharp. E-mail news to me: n0wpa@arrl.net 73, de N0WPA. NTS traffic: AD0A 148, K0TER 107, KI0RP 90. CAWN: W0WPD 895, W0GGP 576, K0HBZ 517, K4ARM 464, W0LVI 438, N0NMP 421, WB0VET 364, N0FCR 330, AA0ZR 325, AB0PG 324, WD0CKP 283, W0NCD 212, KI0ND 104.

**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 109 msgs with 1175 checkins. New Mexico Breakfast Club handled 217 msgs with 1049 checkins. Yucca Net handled 13 msgs with 574 checkins. Caravan Club net handled 2 msgs with 38 checkins. SCAT Net handled 10 msgs with 500 checkins. Four Corners Net handled 15 msgs with 353 checkins. GARS Net handled 6 msgs with 31 checkins. Rusty's Net handled 69 msgs with 781 checkins. Valencia County Net handled 16 msgs with 41 checkins. Deming ARC Net handled 19 msgs with 118 checkins. Holiday parties are in full swing, and we wish we could attend all of them. So many good newsletters from all the clubs, some by e-mail and many by other mail. WS7W, our Vice Director, has started a very nice Division Web page at "trib.com/~arrlrm/." N5ART is doing a fine job on our NM Section Web Page at "qsl.net/nmsec/." Art needs input as the new club officers are elected. Please e-mail or send him all club details, n5art@arrl.net. Our SAR teams and ARES/RACES teams have certainly had a workout this month with all the public service activities and the SAR missions. Tnx to all for these valuable efforts in public service! Vy sorry to report the passing of K6HJ. Best 73, W5PDY.

**UTAH**: SM, Mel Parkes, AC7CP— Welcome to the Year 2001! Happy New Year! Lots of neat things are already planned for this year. We were saddened to hear that Duane Allen Peters, AB7LG, from Brigham became a Silent Key on 28 Nov 2000. He was the Assistant USAF MARS Director for the state. Our thoughts go out to his family and friends. If you have an interest in supporting the 2002 Winter Olympics, please contact Brent Thomas, AC7H, or go to the Web site for more info, http://www.cem.state.ut.us/Radio/2002Quest.htm. The Utah VHF Society will hold their annual meeting and Swap Meet in February at a new location that will be announced. Please watch for announcements concerning this annual event. Plan now to attend Utah Hamfest 2000, July 13-15, at Rubys Inn. For more info, see the Web site at http:\\www.utahhamfest.org.

**WYOMING**: SM Bob Williams, N7LKH—The results of Field Day are in and the winner is University ARC with a score of 5425 points, the most I have seen from WY Section. The next runner-up was Campbell County ARC/Tri County ARC, W7CW, with 2990 points. There were a total of 8 association entries and 3 individual entries. The NWS Event 2000 was fully supported at the Cheyenne NWS station with 47 offices contacted and 196 contacts made. The support was organized by Shy-Wy ARC ARES/RACES. The participants were: Wilson Sellner, WB7RRZ; Frank Bumgarner, KD7AN; Tom Lee, WA7WYW; Jim McKiethen AC7KF; Tom Dodson, KF7VR; Bill Rideout, N7CLV; Scott Harris, W7WRO; Brian McNutt, KD7KXD; Burdette Reed, KD7KXC; Joe Dolwick, KA7VIS and Ken Andrews, WA7HQX. The communications exercise sponsored by STM Duane Shillinger, NN7H, is beginning to show some useful results. We have at least one additional traffic report from Don Miller, K7TFW, with 16 points for the month of November. It is a great start but we still need more participants. Tfc: NN7H 292, K7TFW 16.

## SOUTHEASTERN DIVISION

**ALABAMA**: SM, Bill Cleveland, KR4TZ —Since it's February and Valentines Day is near, I thought it would be appropriate to talk about what we love about Amateur Radio. I know a large portion of us love to talk to our growing circle of friends. On any given night, I can tune to 3.965 MHz and listen to friends and acquaintances having interesting conversations. Some of us enjoy talking to others that live in other countries. The seasoned DX chaser is always polite on the air, and promotes their specialty by proudly showing their collected QSL cards to others. The overwhelming majority of us love to use our skills in Amateur Radio for public service. It is emergency communications that justifies our existence to the FCC and our Government. But its more than that - as a group, we are more likely to help our fellow man. The Internet can not make this claim. I'm never surprised to find that hams also volunteer for the American Red Cross, Salvation Army, Soup Kitchens, Civil Air Patrol, and other organizations. I haven't seen any evidence of people belonging to an Internet chat room doing the same. This is what I love about Amateur Radio, and I think we can improve on it. The time to better organize our efforts is now, but I need your help. We need to develop a section-wide plan to handle emergencies and a method to educate our ARES volunteers. Next month, I'm planning a section-wide meeting to go over our emergency plan, but I need to have as much of the new plan finished before then. During the weeks leading to our meeting, we'll discuss the plan during our Alabama Emergency Net that operates on 3.965 MHz on Tuesday Nights at 7:30 PM (CST), and on our Web site at www.kr4tz.org/al-arrl.

**GEORGIA**: SM: Sandy Donahue, W4RU—ASM/South Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. Asst SM/IT: Mike Boatright, KO4WX, SEC: Lowry Rouse, KM4Z. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JNL. ACC: Susan Swiderski, AF4FO. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. It's February and the start of a new hamfest season. As usual, it kicks off with the popular Dalton hamfest Feb 24, followed by the Kennehochee hamfest March 17. A number of clubs announced their amateur of the year. Atlanta RC named Charles Golson, N4TZM, Gwinnett ARS tapped Barry Zoll, N1TOQ, and North Fulton ARL selected David Ziskind, KE4QLH. Congratulations to these active amateurs who contribute so much to their local clubs. GARS Techfest is Jan 27 at the Lawrenceville Central Baptist Church. Conyers club elected new officers. Pres. KF4ASC, V Pres. AG4BG, Sec. KD4SLT, Tres KE4ELV. Weak signal VHF-UHFers will gather in Nashville Tenn. April 20-21 for the annual Southeastern VHF Society Conference. Moved out of Atlanta for the first time, the event is slated for the Holiday Inn-Select in suburban Brentwood. Congrats to the OMIK club our newest affiliated club. 73 Sandy. Tfc Nov: W4WXA 212, AF4NS 118, WB4GGS 114, W4AET 96, AF4PX 60, WU4C 56, KG4FXG 43, K4ZC 35, K4WKT 25, K4BEH 15, KA4HHE 14, K1FP 2.

**NORTHERN FLORIDA**: SM, Rudy Hubbard, WA4PUP—ACC: WA4B. BM: N4GMU. OOC: W4QV. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. I commend the editors of local clubs for including comments on the June 4th meeting in Tallahassee at the SEOC. It would be great if the facilities would accommodate more people. However, that is impossible. One of the topics presented was by Paula Churchwell, in charge of the States' Grant Program. Several of you have begun the process of applying for grants using the ARES program as a basis. Thus far, the State has been approving grants if requested thru the local EOCs. There has also been some approved if submitted thru a Club having a 501.(3)c status. Don't forget to express one of the main reasons and purposes is to provide emergency communication to disaster agencies, and especially the State of Florida. Those attending the meeting heard both John Fleming and Crag Fugate comment on the need for Amateur Radio. While we in Northern Florida got thru the season without a hurricane, we should not rest easy and expect next year to offer the same. Let's keep our systems and programs current and up to date as we never know when our services may be needed. This was one of the things Craig Fugate caution us at the State Meeting. Keep Prepared and Ready. One of the reasons for appointing ASMs in each District of the Section is to be available to speak at club meetings. May I encourage you to invite them to your meetings as well as any of the Staff. Net Control Stations are needed for the various Nets. Why don't you offer your services to the Net Managers? They need alternates as well. It doesn't take much time, and the experience and joy you receive will be more than you expect. de 73 Rudy. Tfc: WX4H 1688, AG4DL 263, KE4DNO 257, NR2F 186, AF4PU 156, KB2EV 92, KG4EZQ 90, K1JPG 86, N9MN 80, WB2FGL 61, K4DMH 55, AF4GF 51, KF4WIJ 46, K4JTD 35, AB4PG 30, W8IM 26, KB4DXN 23, W4KIX 20, WA1VLP 17, KC4FL 16, N4JAQ 14, WX4J 13, KB4DCR 12, N4EC 10, WB2IMO 9, KJ4HS 8, WB4GIU 7, WD4LIF 8, WA4EYU 4.

**PUERTO RICO**: SM, Víctor Madera, KP4PQ—Pasadas las elecciones generales la actividad tomó ímpetu nuevamente. Tuvimos la oportunidad de participar en una novel actividad preparada por FRA y el PRARL que unieron fuerzas para llevar a cabo un "hamfest" conmemorando la instalación de la primera línea de telégrafos en P.R. por Samuel Morse. Además de la actividad común de este tipo de fiesta, los visitantes tuvieron la oportunidad de pasear por el pueblo en "trolley", visitar el museo y escuchar una charla por KP4UN sobre la estadía de Morse en PR. La FRA tiene programada su fiesta de Navidad para enero del 2001 y el grupo de "Las Arandelas" pasará un fin de semana en la playa de Salinas gracias a WP4AZT. La Asamblea Anual del PRARL será el 21 de enero en el Albergue Olímpico. Ya se están completando los trabajos para comenzar el curso para "OOs" y posiblemente se ofrezca por primera vez en español. El Section Manger tiene una nueva página para escuchar la opinión de todos. Escríbele visitándola en <http://prarl.org/PR_Soundboard.html> Todos los interesados en el curso de "OOs" deben comunicarse con el SM por correo o email a kp4pq@arrl.org

**SOUTHERN FLORIDA**: SM, Phyllisan West, KA4FZI—SEC: W4SS. STM: KJ4N. ACC: WA4AW. PIC: W4STB. OOC: K4GP. BM: KC4ZHF. SGL: KC4N. DEC/ASM: N4LEM, WB9SHT, AA4BN, KD4GR, WB2WPA. For expanded Section News, see www.sflarrl.org or request e-mail. Thanks to Collier ARA, Dade ARC and ARPSC, Ft. Myers ARC, Indian River ARC, Orlando ARC, South Brevard ARC, Vero Beach ARC, WA4AW ACC, W4STB PIC, and section EC's for the newsletters and activity information. The South Brevard ARC assisted the Space Coast Runners' Club Marathon Nov. 26. Kudos to W4JBL, KI4IS, KG4CAN, KI4TD and N4FIZ for their work on the Boy Scout Food drive. KT4TX sent several photos of our November appointee meeting and tour of the Broward EOC. See their state-of-the-art EOC on our SFL Web page (www.sflarrl.org) and read W4STB's notes of the meeting. Collier County will miss K2VMD, now a SK. He was a great supporter of scouting for 70 years and a ham for over 50 years. Dade County ARPSC plans a Dec 20 net devoted to young people. There will be a teenage NCS. The goal is to expose children and youth to ham radio. A great project, Dade. The Indian River ARC will miss SK, KM4ND, former Director of Electronic Engineering at KSC where he made numerous contributions to the space program. He also was co-owner of area repeaters. More than 20 Vero Beach ARC hams again assisted in the Sun Runners annual 5-K run, a project for over 20 years. Way to go! SK Jim O'Keefe, WA1COA, will be missed at their club events and on the Treasure Coast nets. We welcome back the Fort Pierce Radio Club to ARRL as they reactivate their affiliation. Congratulations to the Okeechobee Club for a very successful hamfest at their new location. Palm Beach amateurs assisted in the annual "Food for Families" drive Led by AF4OR, AEC, 33 amateurs collected food from 60 Publix supermarkets in PBC. Over 27,500 lbs. of food was collected for distribution. PBC ARES and local clubs worked 429 man-hours over 2 weekends on

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### *Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna Separate full size radiators . . . End loading . . . Elevated top feed . . . Low Radiation Angle . . . Very wide bandwidth . . . Highest performance no ground vertical ever . . .*

**Operate** 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

**Full** size performance gives high efficiency for more power radiated. Results? Stronger signals and more Q-5 QSOs.

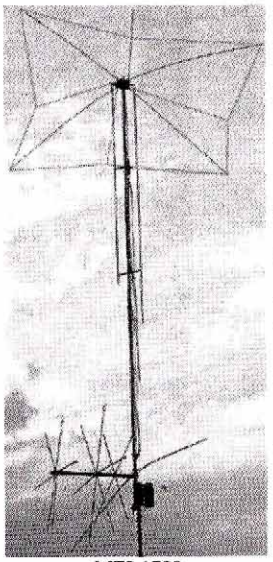
**Full** size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

**Full** size performance is achieved using separate full size radiators for 2-20 Meters and highly efficient end loading for 30, 40, 75/80 Meters.

**Get** very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR. Handles 1500 Watts PEP SSB.

**MFJ's** unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

**It's** easy to tune because adjusting one band has minimum effect on the resonant frequencies of other bands.



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**Separate** *full size* quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

**The** active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows in all parallel radiators.

**This** forms a very large equivalent radiator and gives you incredible bandwidths.

**Radiator** stubs provide automatic bandswitching -- absolutely *no loss* due to loading coils or traps.

#### *End Loading*

**On** 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

**MFJ's** unique *Frequency Adaptive L-Network*™ provides automatic impedance matching for lowest SWR on these low bands.

**Tuning** to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

#### *No Ground or Radials Needed*

**You** don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

**You** can mount it from ground level to roof top and get awesome performance.

#### *No Feedline Radiation to Waste Power*

**The** feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

#### *Built to Last*

**Incredibly** strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is in the main structure.

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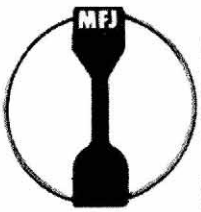


MFJ-1786
**$379.95**
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**MFJ's** *tiny* 36 inch diameter loop antenna lets you operate 10 through 30 MHz *continuously* -- including the WARC bands!

**Ideal** for limited space -- apartments, small lots, motor homes, attics, or mobile homes.

**Enjoy** both DX and local contacts mounted vertically. Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

**Super** easy-to-use! Only MFJ's super remote control has *Auto Band Selection*™. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

**Fast**/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

**All** welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- *gives you highest possible efficiency.*

**Each** plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

**Heavy** duty thick ABS plastic housing has ultraviolet inhibitor protection.

***NEW!*** **MFJ-1788, $429.95.** Same as MFJ-1786 but covers 40 Meters-15 Meters continuous. Includes super remote control.

**MFJ-1782, $339.95.** Like MFJ-1786 but control has only fast/slow tune buttons.

**MFJ-1780, $249.95.** *Box Fan* Portable Loop is about the same size (2x2 foot) as a box fan, complete with handle. Covers 14-30 MHz. Control has fast/slow tunes.

### *MFJ Portable Antenna*

MFJ-1621 **$89.95** Ship Code A

**MFJ-1621** lets you operate in most any electrically free area -- apartment, campsite, hotel, the beach, etc. DXCC, WAZ, WAC, WAS have been won with MFJ-1621! Work 40, 30, 20, 17, 15, 12 and 10 Meters with a telescopic whip that extends to 54 inches. Mounted on a sturdy 6x3x6 inch cabinet. Built-in antenna tuner, field strength meter, and 50 feet of RG-58 coax cable. Handles 200 Watts.

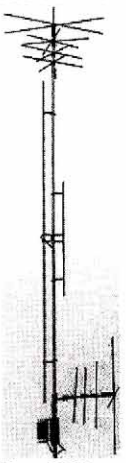
### *MFJ's G5RV Antenna*

MFJ-1778, Ship Code A **$39.95**

**Covers** all bands, 160-10 Meters with antenna tuner. 102 feet long, shorter than 80 Meter dipole. Use as inverted vee or sloper to be more compact. Use on 160 Meters as Marconi with tuner and ground. Handles full legal limit power. Add coax feedline and some rope or other nonconductor and you're *on the air!*

## *MFJ halfwave vertical*

***6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed***



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**Only** 12 feet high and has a tiny 24 inch footprint! Mount anywhere -- ground level to tower top -- apartments,small lots, trailers. Perfect for vacations, field day, DXpedition, camping.

**Efficient** end-loading, no lossy traps. Entire length is always radiating. Full size halfwave on 2/6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting 1 band has minimum effect on others.

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this worthwhile project. NOTE: There will be a SFL appointee/leadership workshop on Saturday Feb. 4 at the Miami Hamboree beginning at 11:30. Lunch will be provided. Club presidents and assistant ECs are welcomed as part of the section leadership group. November Traffic by KJ4N STM: WA9VND 725, KA4FZI 426, KB4WBY 255, KJ4N 224, KC4ZHF 216, KD4HGU 178, KD4GR 146, KE4IFD 127, K4FQU 106, WB4PAM 98, AA4BN 85, WA4EIC 58, W8SZU 48, W4DWN 46, KT4XK 43, WA4CSQ 35, W6VIF 34, WD4JNM 32, KG4CHW 26, KE4WBI 19, KA4GZL 9, W4WYR 9, K4OVC 9, AF4NR 5, W3JI 1 Best wishes to all for a happy and healthy 2001! Phyllisan West, KA4FZI, Section Manager, Southern Florida

**VIRGIN ISLANDS**: SM, John Ellis, NP2B, St Croix. ASM: Drew, NP2E, St Thomas. ASM: Mal, NP2L, St John. SEC: Duane, NP2CY, St Thomas. PIC: Lou KV4JC,St Croix, SW: Jeanette, NP2C, St Croix. ACC: Debbie, NP2DJ, St Thomas. NM: Bob, VP2VI/W0DX Tortola. As this is being written, the ARRL 10 M contest is over. The VI was well represented by KP2D in St Thomas (multi-op with Ron KP2N, Bernie NP2W, Debbie NP2DJ and Drew NP2E). Manny, NP2KW, was doing well along with contest station WP2Z. Even yours truly was on, QRP (where was North Dakota?)! Mal, NP2L, still active with AMSAT. Anyone coming down interested in using the birds would be wise to contact Mal at NP2L@worldnet.att.net. Several folks on for the phone sweepstakes, it's nice when the storms don't take out the power grid! Next big contests will be the ARRL DX contests in February and March. The Virgin Islands will be well represented! V.I. Section Web site www.viaccess.net/~jellis, e-mail to section manager with news at np2b@atthehelm.com. 73, John NP2B.

**WEST CENTRAL FLORIDA**: SM, Dave Armbrust, AE4MR ae4mr@arrl.org http://www.wcfarrl.org—ASM: NA4AR. ASM-Web: N4PK. ASM-Legal: K4LAW. SEC: KD4E. TC: KT4WX. BM: KE4WU. STM: AB4XK. SGL: KC4N. ACC: AC4MK. PIC: AB2V. Manatee ARC names Frank Morton, AC4MK, ham of the year. SEC KD4E reports an increase of 14 ARES members. Sarasota ERC gives NA4AR Mort Award. New ECs: Charlotte: Wyatt McDaniel, W8HTD, Manatee: Frank Morton, AC4MK, Pasco: Norm Daerda, N4NRM. Hamfests: Sarasota 1/20-21, DeSoto 1/27, Sebring 2/17. November:

| *Net/NM* | *QNI* | *QTC* | *Bulls* | *QND* | *Sess* |
|---|---|---|---|---|---|
| AIN/WA4ATF | 74 | 3 | 6 | 99 | 3 |
| PIN. ARES/WB2LEZ | 91 | 4 | 6 | 199 | 8 |
| POLK ARES/KE4VBA | 65 | 0 | 2 | 93 | 4 |
| SPARC/KF4FCW | 412 | 26 | 0 | 751 | 30 |
| TURTLE/KT4TD | 354 | 57 | 0 | 387 | 30 |
| FMSN/KT4PM | 268 | 37 | 0 | 452 | 30 |
| TPTN/AD4IH | 731 | 103 | 0 | 416 | 30 |
| QFNS/KF4KSN | 182 | 56 | 0 | 666 | 30 |
| QFN/AB4XK | 836 | 388 | 0 | 1,047 | 60 |

PSHR: K4RBR 161, K4SCL 150, KT4TD 142, AB4XK 132, AD4IH 129, KF4KSN 113, W4AUN 113, WB2LEZ 101, KE4VBA 83. SAR: K4SCL 204, AB4XK 202, KT4TD 83, AD4IH 59, KF4KSN 54, K4RBR 25, KE4VBA 23, WB2LEZ 6, W4HCS 5 W4AUN 4. 73, Dave, AE4MR.

## SOUTHWESTERN DIVISION

**ARIZONA**: SM, Clifford E. Hauser, KD6XH—The 2001 Amateur Radio club listing has been mailed to 65 clubs. If your club has not received this mailing, please contact me and I will add it to the list and provide you with the necessary paperwork make sure it gets added to mine. Is your club affiliated with the ARRL? If not, then please consider going through the process and getting your club affiliated either as special service club or just affiliated. It still takes over 50% of the club membership belonging to the ARRL to achieve this status. The Northern Arizona DX club has 100% ARRL membership and they are listed as a special service club. The fall hamfest at Mesa community college was a success. The Scorpion club did a good job and everyone seemed to have a good time. The next hamfest is the spring hamfest at Scottsdale Community college on 10 March 2000. The Arizona Amateur Radio Association will hold their annual hamfest event at DeVry on 10 April 2000. At the present time, I plan to be at both of these events. The Arizona Web site is alive and doing well. Tom Fagan, WB7NXH, has developed this Web site for the Arizona section. The address is "www.qsl.net\arrlaz\". If you have questions or ideas on how to improve the Web site, contact Tom at wb7nxh@arrl.net. Please keep your newsletters coming so I can keep up with the activities around the state. I receive newsletters from Dolan Springs, Yuma, Payson, Sierra Vista, and all points in-between. Next year the ARRL SW Convention will be in Riverside at the Holiday Inn. Start reserving this time slot and make the necessary arrangements before you forget. For some reason, no one ran against me so I was re-elected to another two (2) year term as your section manager. My e-mail address is "kd6xh@arrl.org", (see page 12 of this magazine under Arizona) and my home telephone number is 520-744-9095. 73, Clifford Hauser, KD6XH. Net: ATEN 1003 QNI; 39 QTC; 30 sess. Tfc: K7VVC 769, W7EP 112.

**LOS ANGELES:** SM, Phineas J. Icenbice, Jr. W6BF – It should be well known that the Northridge earthquake taught us a few good lessons about emergency communications, that we should never forget. (1) Never depend upon the "cellular phone," system because it will be overloaded just as it was during the Northridge shaker. (2) Never depend upon the "landline," it was and will be overloaded too. – These systems are not designed so that all of the customers can talk at once. In fact, if you knew the percentage of customers that could talk at the same time, you would soon realize that you could have a serious problem. The big emergency situation is even worse, when you realize that a high percentage of these panic calls are trying to call the same emergency number (fire/police/common relative). Good emergency back up systems like ARES and other radio systems do provide this back up capability. – What can you do to help? You can join ARES &/or other RADIO groups that can help. You may need a little practice but if you are a "real-DX'er," you are already trained and almost ready to roll. My definition of a "real-Dxer" is some one who has worked over 300 countries. – Hank, K6YMJ, our SEC and his assistant Dennis, KA6GSE, are ready to help you get into the ARES and ACS, systems if your are so inclined. Our Web site contains all of the addresses and phone numbers: qsl.net/arrlsw/lax. If you are wondering about ACS, This is Chief Bisson's (KF6XX) baby. The Chief is a great guy and runs a great "Auxiliary Communications System" for Los Angeles. Hank and Dennis will be glad to fill in the details of our Emergency Systems if you should want to help. 73 de Phineas, W6BF.

**ORANGE**: SM Joe Brown, W6UBQ, 909-687-8394. ASM Riv Co: Joe, KO6XB, 909-685-7531. ASM: Orange Co Art, W6XD, 714-556-4396. ASM: SB Co. James, KE6LWU. Congratulations to all the new officers in 2001. CORONA NORCO ARC: Pres. Norm, KN6CV; VP Perry, KE6IVP; Sec. Ed, KE6DOL. TASMA: Board Chair. Bob, NO6B; Vice Chair. Pat Finke; Sec. Howard, KG6GI; Treas. Jim, K6IYK. RCARA: Pres. George, W6RPD; VP Don, KD6UVT; Sec. Joanell, KD6MAO; Treas. Harold, KD6MAN. SPARC: Pres. Ron, WB6MSS; VP Bill, KG6AJC; Sec. Charlene, KQ6HG. We look forward to great things from all these organizations. With all the club news about ARC Xmas activities, two standout. HDSCS activated a communications team into Children's Hospital of Orange County, to make contact with NP0LE ... the North Pole station. And CNARC dispatched Santa's elves to Peppermint Ridge, a home for mentally challenged, with the goal of talking to Santa. RCARA Monitor: Don, KD6UVT, said it all, "It used to be simple; almost every one we personally knew celebrated Christmas or Hanukkah. Now we live in a smaller world. Religion, politics, government, heritage, life style and culture are a blending, mixing and hopefully co-existing in our new world order. In the not too distant past, it was only those that traveled abroad who needed to acknowledge our different cultures. Well, nowadays the world is as evidenced in our work place, religious and family gatherings and neighborhoods. Amateur Radio allows many throughout the world to transcend those differences through our common hobby far earlier than those in our work place and neighborhoods." It would be hard for anyone to say it better, Don. From the SM: You all have a great 2001, and don't forget to be an Elmer to someone who needs your help ... if you can't find anyone, just ask and someone will raise his/her hand. NTS Traffic: W6JPH 154, KC6SKK 153, W6QZ 132, K6CTW 58, W6QZ NTS BBS 319. PSHR: W6QZ 161, W6JPH 111, KC6SKK 83. SCNV/NET MGR. W6JPH reports 21 sessions, QNI 171, QTC 74, Avg. Net time 18 minutes.

**SAN DIEGO**: SM, Tuck Miller, NZ6T, 619-475-7333. A special thanks goes to Rick, N6NKJ, for his years of service and dedication to the ARES. Rich recently resigned as a DEC due to health reasons. We wish him all the best. Stepping up to the plate as the new DEC for San Diego's Eastern District is Dick McCready, AC6RZ. Welcome aboard, Dick. On the 1st Monday of each month, RACES meets at 6:30 PM at the Sheriff's Comm Center on Overland Dr. On the first Tuesday of each month, the North Shores ARC meets at the South Clairemont Rec Center on Clairemont Dr at 7, and the East County Repeater Association meets at Casa Machado's at Montgomery Field. The 1st Wednesday of each month has the Elks Ham club meeting at the El Cajon Lodge 1812 at 11:30 AM. The Palomar ARC meets at the Carlsbad Safety Center on Faraday Rd. Meeting starts at 7:30. The 1st Thursday of each month is also busy with both the 220/Convair Club, and the Southbay ARS meeting. 220/Convair meet at 7 PM at the Kearny Mesa Rec Center, while SOBARS meets at 7 at the Norman Park Senior Center in Chula Vista. The 2nd Wednesday features the ARC of El Cajon. They meet at the La Mesa Masonic Lodge on Date St in La Mesa. The Metro Club meets at Jimmy's in National City at 9 AM on the 3rd Saturday. The 4th week of the month is also very busy. On Tuesday, the Escondido ARC meets at 7 at the Escondido Chamber of Commerce. On Wednesday, the San Diego DX Club meets at 7 at the Hindquarter Restaurant. The Ramona Outback ARS meets at 7:30 at the Ramona Library. On the last Thursday of each month the San Diego AR Council meets at 7 PM at the Kearny Mesa Rec Center. Tfc: KT6A 988, KD6YJB 190, KO6BU 10, WA6IIK 1 BPL: KT6A 988 PSHR: KT6A 138, KD6YJB 55, KO6BU 38. 73, Tuck, NZ6T.

**SANTA BARBARA**: SM, Robert Griffin, K6YR (k6yr@arrl.org or k6yr@arrl.net)—SEC: Jack Hunter, KD6HHG (kd6hhg@arrl.net). STM: Ed Shaw, KF6SHU (kf6shu@arrl.net). SGL: Paul Lonnquist, NS6V (paul@dock.net). ACC: Michael Atmore, KE6DKU (ke6dku@aol.com). OOC: Howard Coleman, W6HQA (w6hqa@arrl.net). PIC: Jeff Reinhardt, AA6JR (jreinh@ix.netcom.com). TC: Warren Glenn, KM6RZ, (wglennrz@ix.netcom.com). ASMs: Ventura, Don Milbury, W6YN (w6yn@arrl.net). San Luis Obisipo, Bill Palmerston, K6BWJ, (bpalmers@fix.net) & for Internet, Jack Bankson, AD6AD (ad6ad@arrl.net); & DECs: Santa Barb-Dave Lamb, WA6BRW (wa6brw@arrl.net); SLO-Bill Peirce, KE6FKS (ke6fks@arrl.net) & Ven-Dave Gilmore, AA6VH (aa6vh@arrl.net). Make early plans for the ARRL 2001 Southwestern Division Convention! Set for September 7-9 in Riverside at the Convention Center, registration info is available several sources, including the Convention Chair, W6YBS, and off either the ARRL Orange or Santa Barbara Section Web sites. Let's make a good showing! FREE instant Section news updates? Join the SB Reflector! E-mail majordomo@qth.net the message subscribe arrlsb. SB Sec Web: www.qsl.net/arrlsb/. Join in our Section NTS traffic nets: SCN slow speed NTS Net, M-F, at 1915 local on 3598 kHz & SCN/SB at 2100 local on 147.000+(131.8), 224.90- (131.8) & 449.300-(131.8). Thats 30! Rob, K6YR.

## WEST GULF DIVISION

**NORTH TEXAS**: SM, Don Mathis, KB5YAM—STM: KC5OZT. BM: KC5OZT. SEC: K5MWC. SGL: N5GAR. OOC: WB5UDA. ACC: WN5PFI. ASMs: KX5K, K5RE, KK5QA, KK5NA, N5JZ, KB5LWZ, N5JL, KD5HIS, AD5X, W5GPO. Visit the section Web page at http://www.lsic.net/net/ntexas.html for the most current information. As I am putting together this month's entry, I am reminded of the annual Christmas Mall Watches. This public service aspect of Ham Radio has certainly become very

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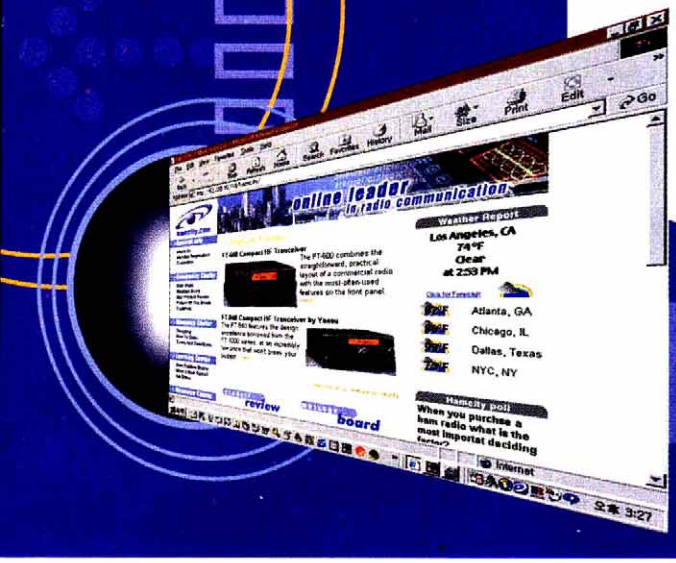


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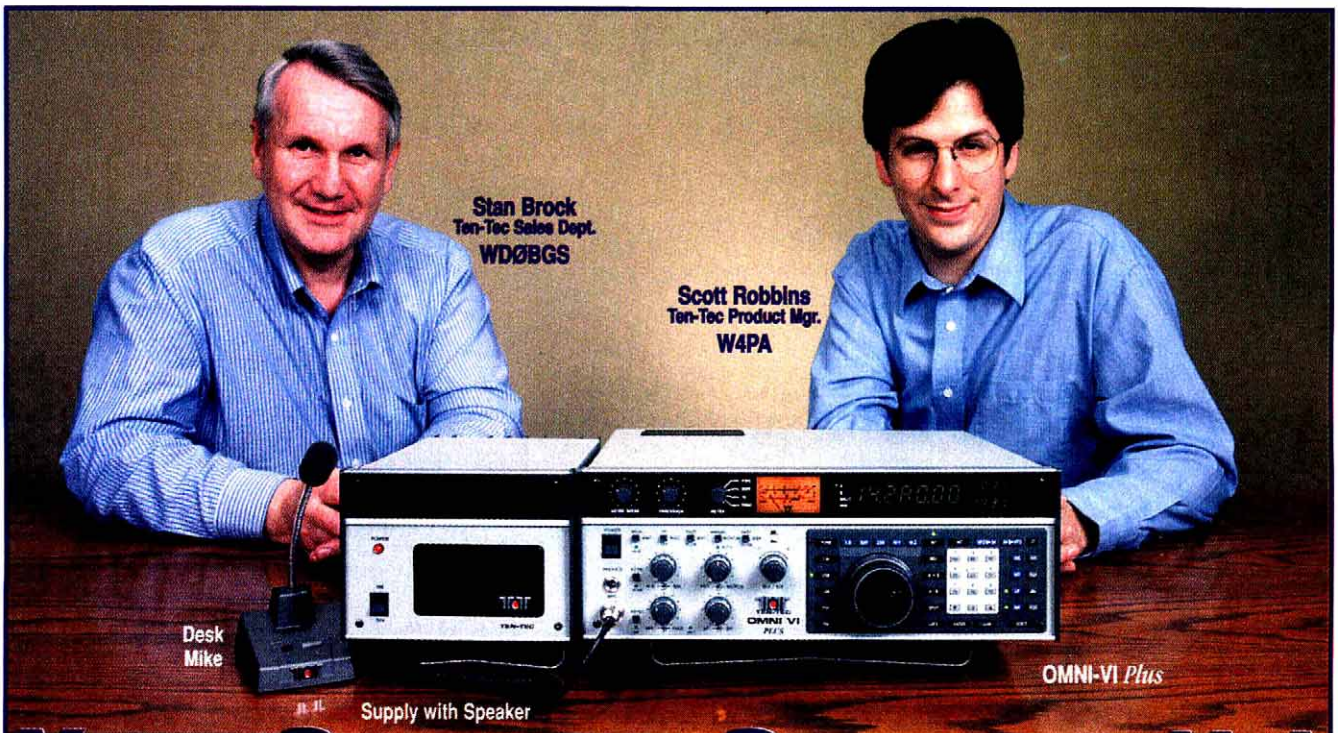
popular and well received. I would again like to thank all of the Hams that spend great amounts of their time and effort in the various areas of Public Service provided during the last year. This effort goes a long ways into helping us keep our frequencies. All of these provide good practice just in case we should become needed in a real emergency. I was very excited over the successful launch of Phase III D (AO-40). It has been a long time in the making. Those in the amateur radio community that gave so much to produce this bird deserves a great big 'congratulations'. A very technical job well done. I look forward to making contacts with it. It is also a very good item to interest young people in the hobby. Tfc: (Nov) K5NHJ 500, KC5OZT 431, N5JZ 363, WA5I 68, KB5TCH 56, KC5VLW 41, N5GG 37, AC5Z 16, K5TEK 4, N8QVT 1. BPL: K5NHJ and N5JZ.

**OKLAHOMA:** SM, Charlie Calhoun, K5TTT. ASMs: N6CL, W6CL, W5ZTN. SEC: KA7GLA. ACC: KB5BOB. PIC: WA9AFM. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL. Congratulations to the South Canadian ARS on becoming an ARRL affiliated club again. Consider your club becoming an ARRL affiliated club. If you need information let me know. It's coming a little earlier this year. This month the Green Country Hamfest is back at the Tulsa Convention Center. Hope to see many of you down there. We had quite a snowfall in Oklahoma back in December. I had 12-14" here in Owasso. This prevented me from making it to a couple of Christmas parties. I apologize for not being able to make it. I'm sure you had good times and hopefully I'll be able to make it next year. The Family Motor Coach Association is holding their semi-annual convention in Oklahoma City, at the Oklahoma State Fair Park, on April 3, 4, 5. The Amateur Radio chapter of FMCA will conduct an informational seminar as well as a testing session. I hope each and every one of you had a wonderful holiday season and look forward to a great 2001. That's it for now. 73, Charlie. Tfc: N5IKN 640, K5GY 351, KF5A 307, WA5OUV 305, WB5NKC 230, WB5NKD 184, K5KXL 146, KE5JE 134, KI5LQ 97, WA5IMO 75, W5REC 25, N5FM 3.

**SOUTH TEXAS**: SM, Ray Taylor, N5NAV—ASMs: NR5ED, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX,WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV and K5SBU. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. February and winter is almost over. November was a rough month for tornadoes here in South Texas. We had more tornadoes for one month than recorded. We had plenty of rain, flooding, damage and SKYWARN events. December is now bringing some of the coldest weather for this time of the year in many years. Most all of the leaves are now on the ground to be raked and put in the garden, so something good does come from this cold weather with all the ice on the roads and grounds. We have been asked to be ready to provide communications in case of power outages due to overloads in the systems. Larry Eblen, at the weather station, and I were discussing this storm on the phone, and he is going to spend a night or two at the weather, due to the danger of trying to get home. As I'm writing this we are having a true ice storm. Schools have closed for tomorrow along with a lot of business places. This is very unusual for South Texas. We had a great turnout for the NWS event. Everyone at the weather station had a great time. The operators made 300 contacts during the 24 hour period, including several DX contacts, Canada, Costa Rica, Japan, Argentina, England, Italy, Switzerland, Cuba, Yugoslavia, and Germany. One of the most gratifying moments on Saturday afternoon, was when W3HBC, a sightless ham arrived and ask if he could make a couple of contacts. He made several and just to watch his excitement as he operated, made the whole operation worth it all. Now some comments on CW. We really need some participation in the Texas Slow CW net on 3719 at 8 PM every night of the year. If you would like to better yourself in CW this is your chance. They will work with so you can build up your speed, and teach you how to handle traffic by CW at the same time. The art of CW will always be around for those who wish to operate CW. The clubs are all having their Christmas parties. All of the menus all sound great, however, the main thing is the fellowship with other hams. I've heard a lot of new radios on the air, some of them must have been a real job to push down the chimney. Have a good February. Enjoy the upcoming summer. Tfc: W5SEG 1241, KA5KLU 383, W5KLV 171, N5OUJ 80, W5GKH 77, W5ZX 75, N5NAV 36, K0YNW 36, W5ZIN 20, W5OYY 15, N5JUU 2.

**WEST TEXAS**: SM, Charlie Royall, WB5T, 915-944-0469, WB5T@arrl.org. ASMs: Cley, K5TRW. Ron, KB5HGM. Jerome, K5IS. Fred, W6VPI. Sandy, W5MVJ. SEC: Alex, N5LRH. OOC: John, KO5D. OBM: Frank, N5WT. Things "they are a changing." The good US of A has a new President, and soon you'll be voting for a new West Texas Section Manager. This first year of the millennium is off to a good start with a new slate. It's up to you and your elected representatives what will be written on it. We gained 24 new licensed amateurs between November and December 2000: Amarillo, 1; El Paso, 6; Lubbock, 14; Midland, 2; and San Angelo, 1. A special pat on the back goes out to Larry Springsteen, WB8LBZ, of Sun City ARC, for his electronic listing of happenings in the El Paso area. He is always on top of everything and posts events regularly. You have been a big help—thanks Larry! Getting info on happenings to an SM is critical to the performance of their duties. The next hamfest is just around the corner. I look forward to seeing you in Midland in March. Until next time, 73 de Charlie, WB5T.

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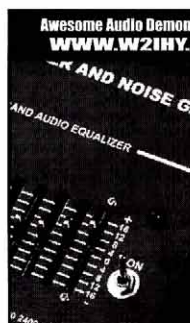


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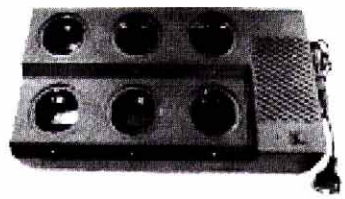

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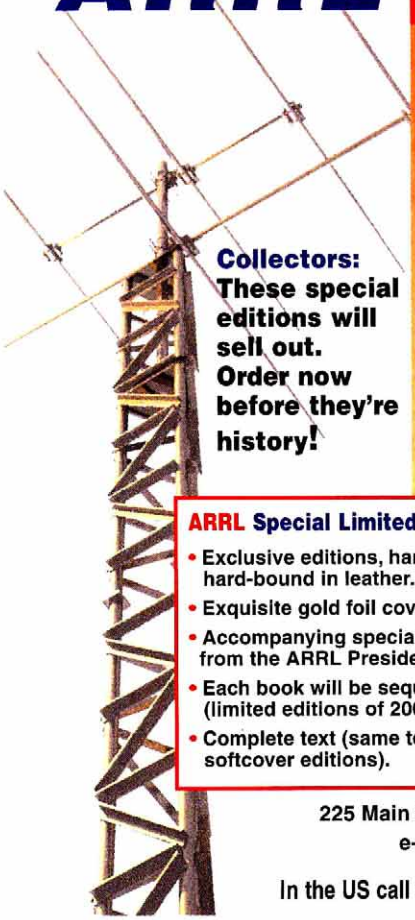

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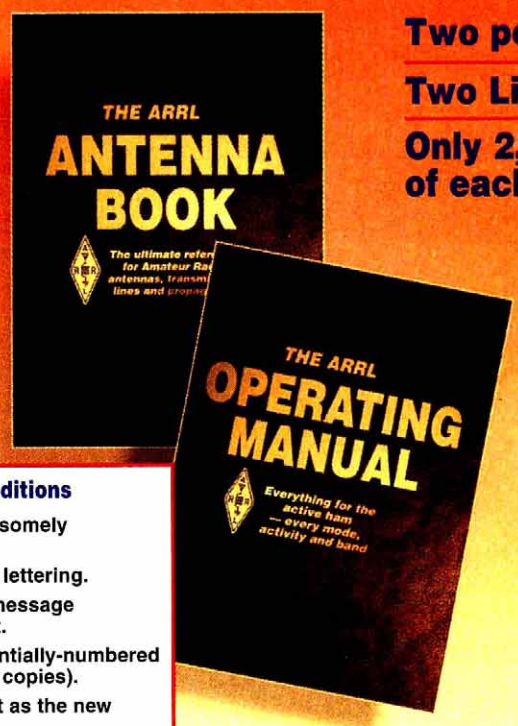


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| **Kenwood** | |
| **BC11** *Charger* | 29.00 |
| **KSC7** *Charger* | 29.00 |
| **R5000** *Gen Cov Rcvr* | 595.00 |
| **TMV7A** *2m/70cm mobile* | 350.00 |
| **TS140S** *HF xcvr* | 525.00 |
| **TS440SAT** *HF xcvr* | 625.00 |
| **TS50S** *HF xcvr* | 575.00 |
| **TS60S** *6m rig* | 650.00 |
| **TS830S** *HF rig* | 475.00 |
| **TS850SAT** *HF rig* | 850.00 |
| **TS870S** *HF rig* | 1695.00 |
| **MFJ** | |
| **MFJ462B** *reader* | 89.00 |
| **MFJ906** *6m antenna tuner* | 49.00 |
| **Mirage** | |
| **B1016G** *2m 10w/160w* | 225.00 |
| **Standard** | |
| **C558A** *2m/70cm HT* | 275.00 |
| **Uniden** | |
| **SC150B** *Sportcat Scnr* | 125.00 |
| **Yaesu** | |
| **FRG7700** *Gen Cov Rec* | 350.00 |
| **FT1000D** *HF Rig* | 2695.00 |
| **FT1000MP** *HF Rig* | 1795.00 |
| **FT208R** *2m HT* | 89.00 |
| **FT736R** *2m/70cm all mode* | 895.00 |
| **FT757GX** *HF rig* | 525.00 |
| **FT757GXII** *HF rig* | 650.00 |
| **FT840** *HF rig* | 575.00 |
| **VX1R** *2m/70cm HT* | 125.00 |

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| **MH36E8J** *DTMF Mic* | 54.95 |
| **NC72B** *Ni-Cd Battery Charger* | 16.95 |
| **TCXO9** *TCXO Unit* | 89.95 |
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### $924.95

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

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

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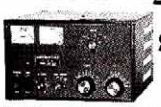
A quiet, powerful computer grade blower draws in plenty of cool air. It *pressurizes* the cabinet and efficiently cools your 811A tubes. Our air flow is so quiet, you'll hardly know it's there--unlike noisy, poorly chosen blowers.

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

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

## Near Legal Limit ™ Amplifier



AL-572
**$1395**
Suggested Retail

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

## HF Linears with Eimac 3CX800A7

AL-800H
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Two tubes, 1500 W plus

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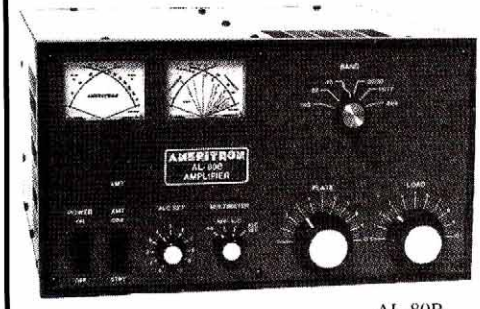
Single tube, 1250 Watts

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

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



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

AL-80B
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Suggested Retail

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

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

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

**Made in the U.S.A.**

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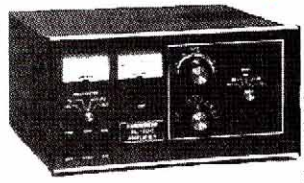
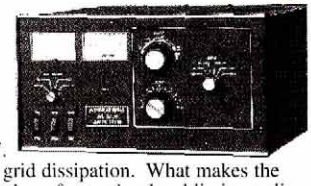


AL-1500
**$2945**
Suggested Retail

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

### Ameritron's 3CX1200A7 linear Amp



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

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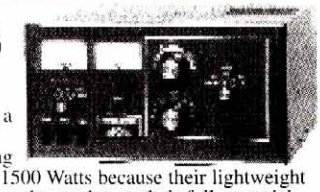

AL-82
**$2395**
Suggested Retail

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

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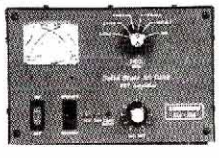
**Ideal** Mobile amplifier uses 13.8 VDC mobile electrical system, very compact 31/2x9x15 inches, extremely quiet, 500 Watts output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm-up, no tubes, SWR protected.

### ALS-600 Base 600 Watt Amp



AL-600
**$1299**
Suggested Retail

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

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

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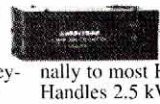

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**tx:** 160–10m **rx:** 100kHz-30MHz • 200w • 100 mem. • Dual receive • Antenna tuner • Dual bandpass filter • Temp. compensated crystal oscillator • 2.4kHz & 2kHz SSB filters, 500Hz CW crystal filter 6"h x 16"w x 15"d, 58 lbs.....**Special $3699.99**

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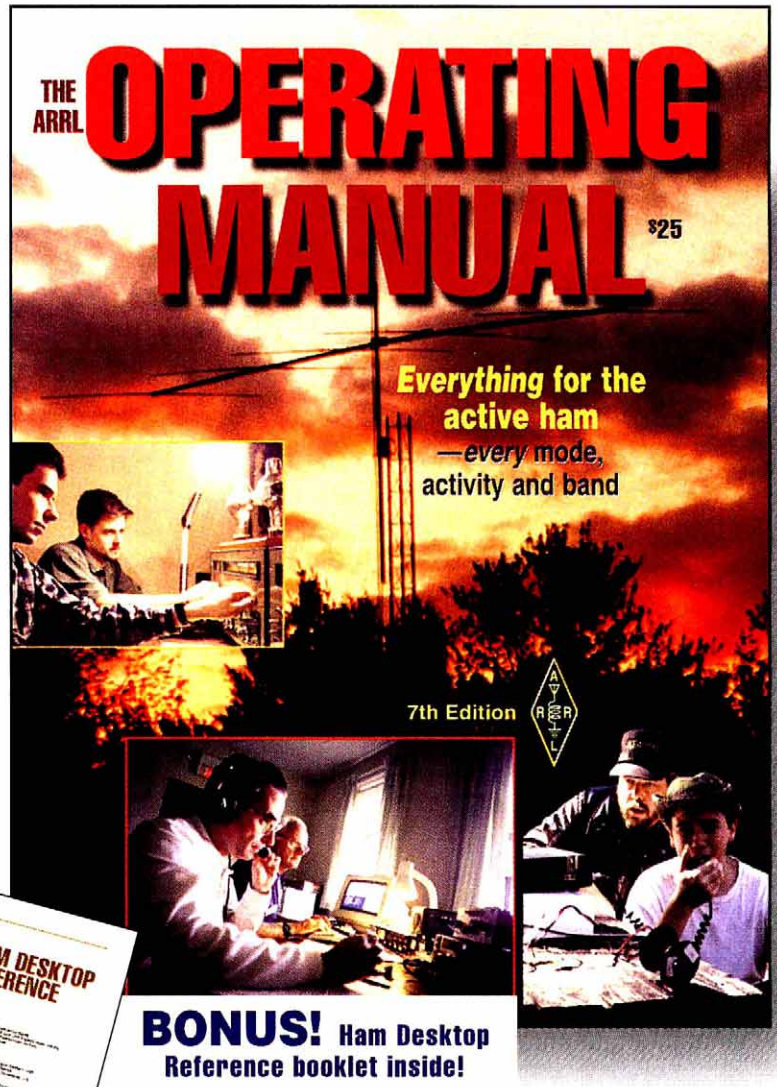


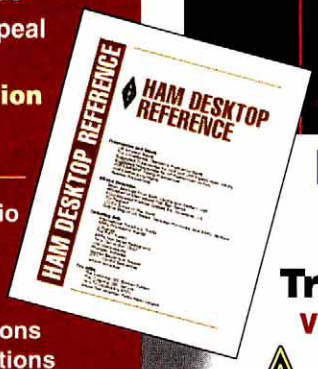


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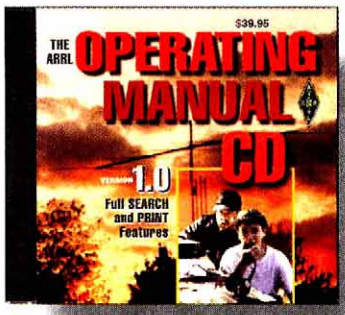


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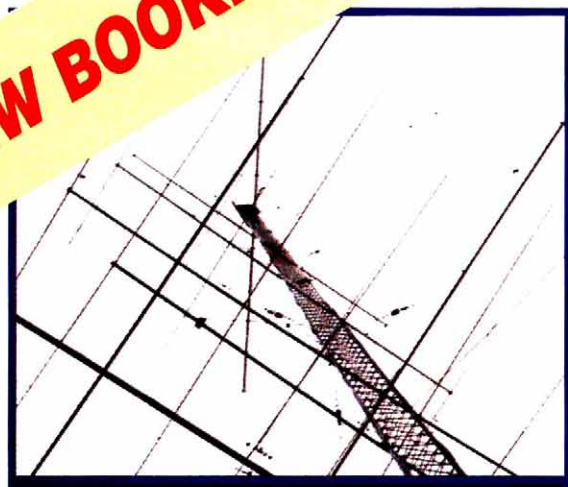

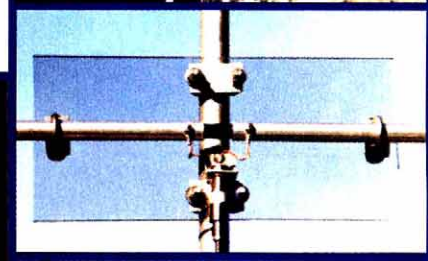

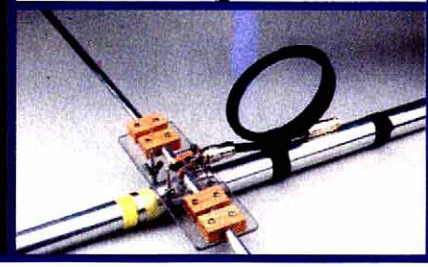

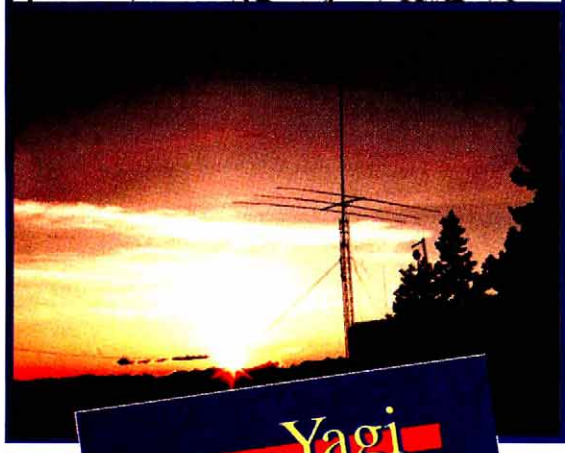

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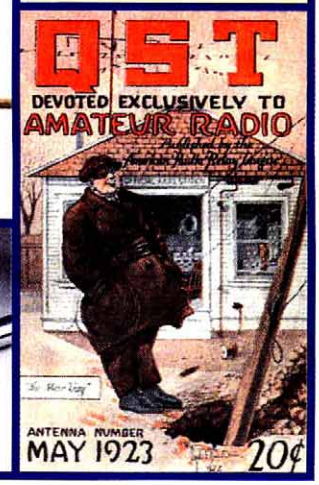


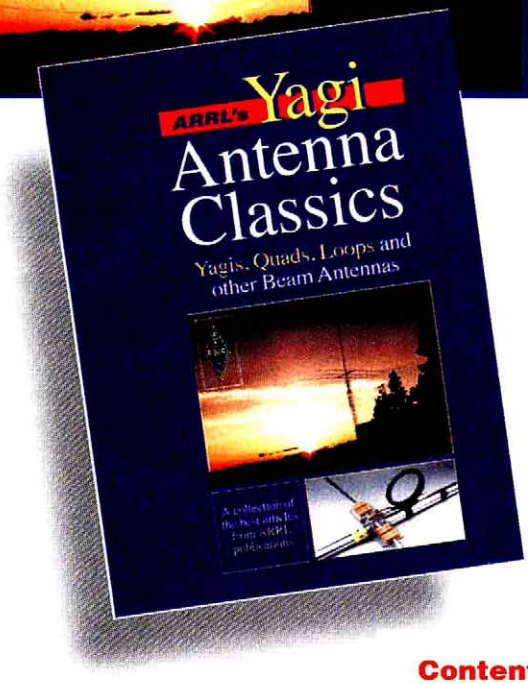


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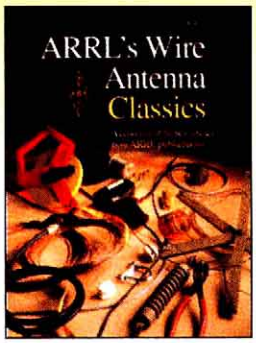


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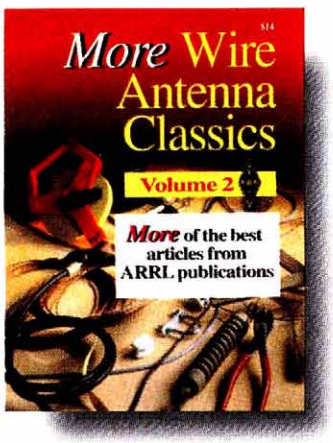


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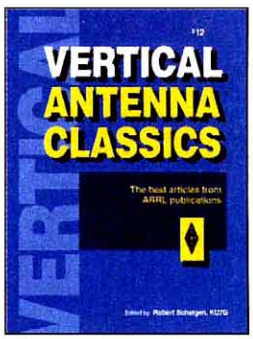


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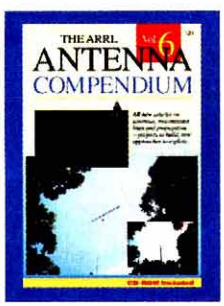


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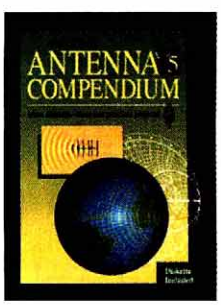


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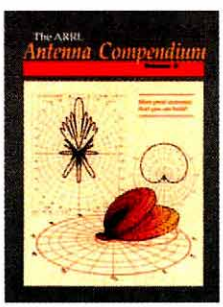


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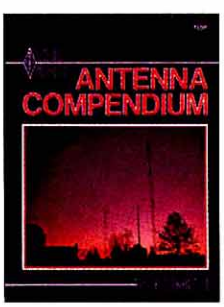


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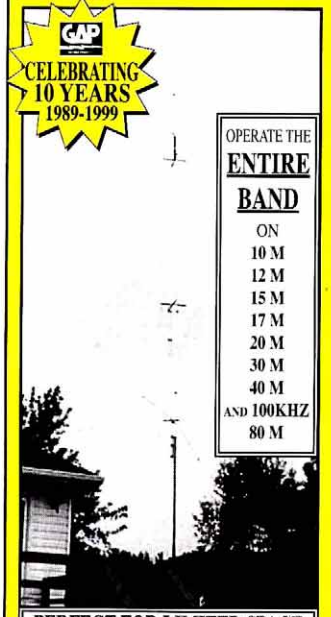

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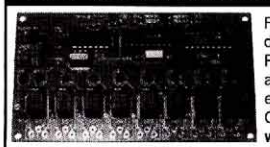

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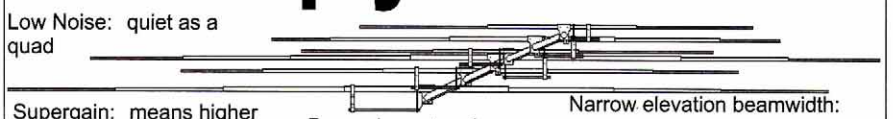

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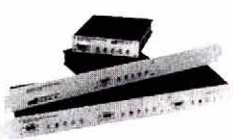

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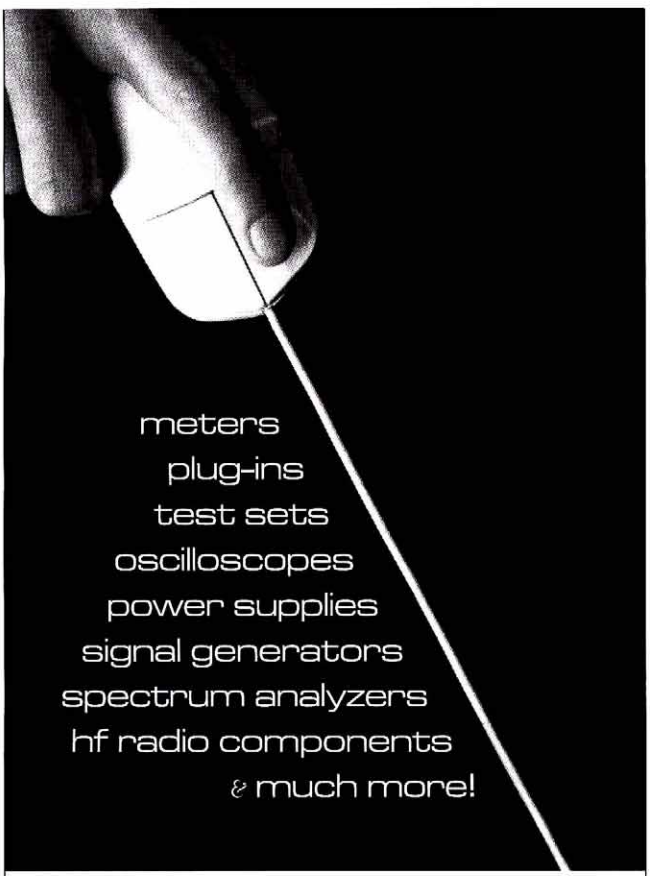

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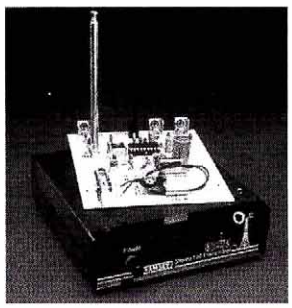

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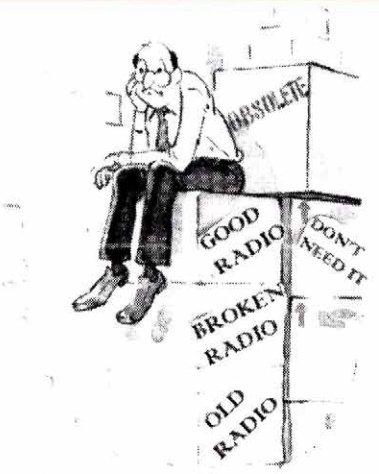


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| 1410 RG58/U mil type 50 ohm 95% shield | .12 |

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| PL259AM Amphenol PL259 | .99 |
| PL259TS PL259 teflon ins/silver plated | 1.39 |
| PL258AM Amphenol female-female (barrel) | 2.25 |
| UG175/UG176 reducer for RG58/59 (specify) | .22 |
| UG21D N plug for RG8,213,214 | 3.30 |
| UG83B N jack to PL259 adapter, teflon | 6.50 |
| UG146A SO239 to N plug adapter, teflon | 5.75 |
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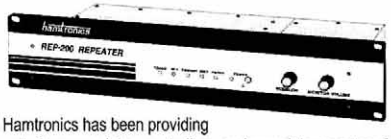


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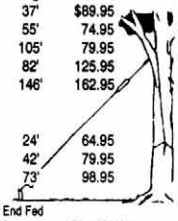

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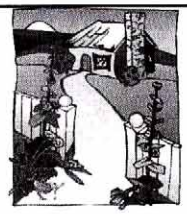

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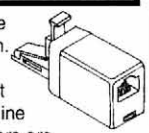

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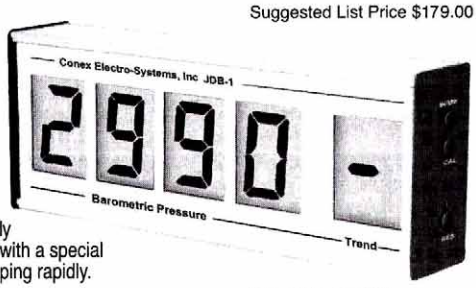


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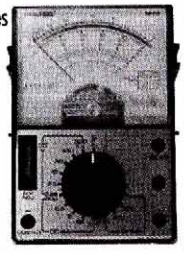

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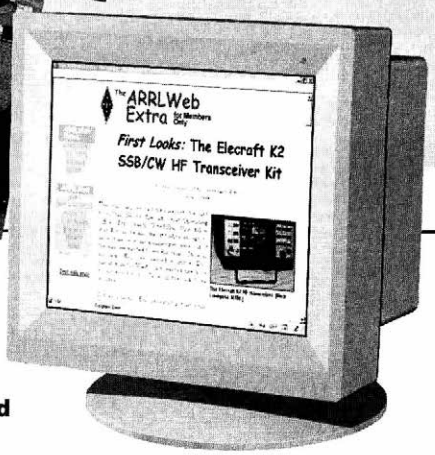


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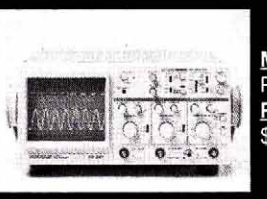

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| Model | Pin (W) | Pout (W) | Ic (A) | Gain/NF (dB)(dB) | (+13.8V) Type | $ Price |
|---|---|---|---|---|---|---|
| **50 MHz** | | | | | | |
| 0503G | 1-5 | 10-50 | 6 | 15/0.7 | LPA | 208 |
| 0508G | 1 | 170 | 28 | 15/0.7 | Standard | 367 |
| 0510G | 10 | 170 | 25 | 15/0.7 | Standard | 319 |
| 0550G | 5-10 | 375 | 59 | 15/0.7 | HPA | 524 |
| 0552G | 20-25 | 375 | 54 | 15/0.7 | HPA | 486 |
| **144 MHz** | | | | | | |
| 1403G | 1-5 | 10-50 | 6 | 15/0.7 | LPA | 163 |
| 1405G | 1-2 | 100 | 14 | 15/0.7 | Standard | 295 |
| 1410G | 5-10 | 160-200 | 28 | 15/0.7 | Standard | 328 |
| 1412G | 25-45 | 160-200 | 22 | 15/0.7 | Standard | 286 |
| 1450G | 5-10 | 350+ | 56 | 15/0.7 | HPA | 572 |
| 1452G | 10-25 | 350+ | 52 | 15/0.7 | HPA | 525 |
| **220 MHz** | | | | | | |
| 2203G | 1-5 | 8-35 | 5 | 14/0.8 | LPA | 168 |
| 2210G | 5-10 | 130 | 20 | 14/0.8 | Standard | 346 |
| 2212G | 25-45 | 130 | 16 | 14/0.8 | Standard | 316 |
| 2250G | 5-10 | 225 | 40 | 14/0.8 | HPA | 579 |
| 2252G | 10-25 | 225 | 36 | 14/0.8 | HPA | 537 |
| 2254 | 75 | 225 | 32 | | HPA | 494 |
| **440MHz** | | | | | | |
| 4405G | 1-5 | 15-50 | 9 | 12/1.2 | LPA | 309 |
| 4410G | 10 | 100 | 19 | 12/1.2 | Standard | 367 |
| 4412G | 15-30 | 100 | 19 | 12/1.2 | Standard | 355 |
| 4448G | 1-5 | 75-100 | 25 | 12/1.2 | HPA | 429 |
| 4450G | 5-10 | 185 | 35 | 12/1.2 | HPA | 585 |
| 4452G | 25 | 185 | 30 | 12/1.2 | HPA | 547 |

| Description | Size | Wt | Connectors |
|---|---|---|---|
| **LPA**=Low-power amp | 3x6x5 | 4lbs | UHF |
| **Standard**=Mobile/Base | 3x6x11 | 6lbs | UHF or N |
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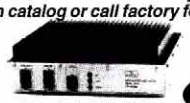

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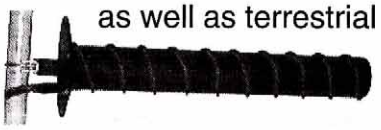

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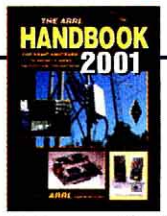


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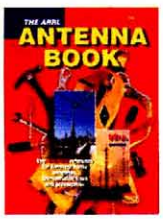


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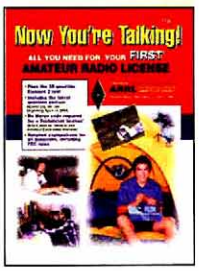


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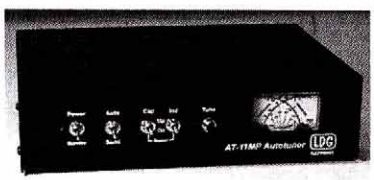

## AT-11MP Desktop Autotuner

Assembled: $239
Kit: $199

**Remote**
Assembled: $39
Kit: $29

**Cable:** $5

- Cross Needle Power and SWR Meter
- Microprocessor Controlled
- 160 to 10 meters
- 5 to 150 Watts
- 11 to 15 VDC Input Power
- Optional Remote Head
- Optional Icom and Alinco Cable

## Contact Your Favorite Dealer or Visit: www.ldgelectronics.com

ALINCO

**DJ-V5TH VHF/UHF Dual Band HT**

2m and UHF Amateur • 700 mAh NiCad battery pack – up to 5W output • 3 output settings • 76–999MHz (cell blocked), includes wide FM capability • Split-band operation capability • 8 tuning steps • 200 memory channels • CTCSS enc/dec • DTMF • 4 scan modes • 5 program. scan banks • Up to 13.8V DC input ..... **$209.99**

**DJ-V5TDCH** All features of DJ-V5TH housed in a blue, see-thru case. • See-thru batt. case, black NiCad and charger ..... **$229.99**

**DJ-G5TH VHF/UHF Twin Band HT**

144–147.995/438–449.995MHz tx, 108– 173.995 (including AM)/438–449.995MHz rx • 5W @ 13.8V DC • CTCSS tone squelch • Memory channels: VHF 80, UHF 80 • Scanning: memory, band or programmed • ChannelScope™ • DSQ selective call • 20 auto-dialer memories • Full duplex cross band repeater and cloning func. • Low battery indicator..... **$279.99**

**Handhelds**

**DJ-C5T** 2m/440 300mw w/spkr .... **$149.99**
**DJ-S11T** 340mw 2m/batt. holder..... **79.99**
**DJ-S41T** 340mw 440, batt holder..... **79.99**
**DJ-X10T** .1MHz-2GHz HT rcvr ..... **309.99**
**DJ-X2T** Credit card size receiver..... **219.99**
**DJ-180TH** 5w 2m FM HT/TTP ..... **149.99**
**DJ-196T** 5w 2m FM HT/TTP ..... **139.99**
**DJ-280TH** 5w 220 FM/TTP..... **169.99**
**DJ-496T** 5w 440 HT/TTP ..... **149.99**

**FRS**

**DJ-S46** Handheld family radio ..... **$89.99**

**Mobiles**

**DR-M03SX** 10w 10m FM/enc ..... **$159.99**
**DR-M06TH** 20w 6m FM/TTP..... **259.99**
**DR-135T** 50w 2m FM/TTP..... **169.99**
**DR-135TP** above w/TNC ..... **269.99**
**DR-150TQ** 50w 2m/CTCSS **Closeout** **229.99**

**HF Radios**

**DX-70TH** (pictured) HF/100w 6m.... **$749.99**
**DX-77T** 160-10m HF transceiver..... **699.99**
**DM-330MVT** 30A switching ps ..... **189.99**
**DM-340MVT** 30 Amp power supply... **179.99**

**Antenna Tuners**

**EDX-1** Manual coax antenna tuner.. **$269.99**
**EDX-2** Automatic wire ant. tuner..... **319.99**

**Prices subject to change without notice.**

**DR-605TQ 144/430MHZ FM Dual Band Mobile Transceiver**

144–147.995MHz, 430-449.995MHz tx; 136–173.995MHz, 420–470MHz rx • 50w 2m/35w 440 • 50 mem. channels • Cross band repeat & full duplex • Direct freq. via DTMF mic • Multiple scan func. • CTCSS enc • 1200/9600bps packet compatible • Cable cloning func..... **$329.99**

**DR-610TQ 144/430MHZ FM Dual Band Mobile Transceiver**

144–147.995MHz, 438-449.995MHz tx; 108–173.995MHz, 420–470 MHz rx • Full duplex • 50w 2m/35w 440 • 2 VFOs per band • Direct freq. via DTMF mic • Channel scope™ monitors 7 freq. • 120 mem. channels • Multiple scan func. • CTCSS enc • 1200/9600bps packet compatible • Over-air cloning function..... **$429.99**

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# SAVE BIG ON ANTENNAS , TOWERS & CABLE

## TELESCOPING ALUMINUM TUBING

DRA WN 6063-T832

| | | | |
|---|---|---|---|
| .375 | $.60/ft | 1.250" | $1.40/ft |
| .500" | $.70/ft | 1.375" | $1.55/ft |
| .625" | $.80/ft | 1.500" | $1.75/ft |
| .750" | $.90/ft | 1.625" | $2.00/ft |
| .875" | $1.00/ft | 1.750" | $2.25/ft |
| 1.000" | $1.10/ft | 1.875" | $2.50/ft |
| 1.125" | $1.25/ft | 2.000" | $2.75/ft |
| | | 2.125" | $3.00/ft |

**In 6' or 12' lengths, 6' lengths ship UPS. Call for 3/16"& 1/4" rod, bar stock, and extruded tubing.**

## CUSHCRAFT ANTENNAS

| | |
|---|---|
| X7/X740 | $569/229 |
| XM240 | $599 |
| R6000/R8 | $269/389 |
| A50-3S/5S/6S | $89/139/219 |
| AR2/ARX2B | $45/65 |
| AR270/AR270B | $69/99 |
| ARX270N/ARX-450B | $219/65 |
| 13B2/17B2 | $119/199 |
| 26B2/719B | $329/115 |
| A270-6S/A270-10S | $59/79 |

**Please call for more Cushcraft items**

## FORCE 12–MUL TIBAND

| | | |
|---|---|---|
| C3 | 10/12/15/17/20m, 7 el | $559 |
| C3E | 10/12/15/17/20m, 8 el | $599 |
| C3S | 10/12/15/17/20m, 6 el | $479 |
| C3SS | 10/12/15/17/20m, 6 el | $479 |
| C4 | 10/12/15/17/20/40m, 8 el | $699 |
| C4S | 10/12/15/17/20/40m, 7 el | $629 |
| C4SXL | 10/12/15/17/20/40m, 8 el | $899 |
| C4XL | 10/12/15/17/20/40m, 9 el | $999 |
| C19XR | 10/15/20m, 11 el | $879 |
| C31XR | 10/15/20m, 14 el | $1169 |

**Please call for more Force 12 items**

## TRYLON "TIT AN" TOWERS

**SELF-SUPPORTING STEEL TOWERS**

| | | |
|---|---|---|
| T200-64 | 64', 15 square feet | $989 |
| T200-72 | 72', 15 square feet | $1199 |
| T200-80 | 80', 15 square feet | $1439 |
| T200-88 | 88', 15 square feet | $1689 |
| T200-96 | 96', 15 square feet | $1999 |
| T300-88 | 88', 22 square feet | $1989 |
| T400-80 | 80', 34 square feet | $1939 |
| T500-72 | 72', 45 square feet | $1879 |
| T600-64 | 64', 60 square feet | $1799 |

**Many more Trylon towers in stock!**

## BENCHER / BUTTERNUT

| | |
|---|---|
| Skyhawk, Triband Beam | $1129 |
| HF2V, 2 Band Vertical | $219 |
| HF5B, 5 Band Minibeam | $429 |
| HF6VX, 6 Band Vertical | $299 |
| HF9VX, 9 Band Vertical | $349 |
| A1712, 12/17m Kit | $54 |
| CPK, Counterpoise Kit | $129 |
| RMKII, Roof Mount Kit | $159 |
| STRII, Roof Radial Kit | $125 |
| TBR160S, 160m Kit | $119 |

**More Bencher/Butternut–call**

## M2 VHF/UHF ANTENNAS

**144–148 MHz**

| | |
|---|---|
| 2M4/2M7/2M9 | $89/109/119 |
| 2M12/2M5WL | $149/189 |
| 2M5-440XP, 2m/70cm | $159 |

**420–450 MHz**

| | |
|---|---|
| 440-470-5W/420-450-11 | $129/89 |
| 432-9WL/432-13WL | $169/219 |
| 440-18/440-21ATV | $119/139 |

**Satellite Antennas**

| | |
|---|---|
| 2MCP14/2MCP22 | $169/219 |
| 436CP30/436CP42UG | $219/259 |

## ROHN TOWER

| | |
|---|---|
| 25G/45G/55G | $79/179/229 |
| AS25G/AS455G | $39/89 |
| GA25GD/45/55 | $68/89/115 |
| GAR30/GAS604 | $35/24 |
| SB25G/45/55 | $39/89/109 |
| TB3/TB4 | $85/99 |
| HBX32/HBX40 | $349/439 |
| HBX48/HBX56 | $589/699 |
| HDBX40/HDBX48 | $549/699 |
| BXB5/6/7-8 | $39/49/59/59 |

**Please call for more Rohn prices**

## US TOWER

| | |
|---|---|
| MA40/MA550 | $849/1399 |
| MA770/MA850 | $2359/3649 |
| TMM433SS/HD | $1139/1379 |
| TMM541SS | $1499 |
| TX438/TX455 | $1069/1599 |
| TX472/TX489 | $2649/4599 |
| HDX538/HDX555 | $1379/2399 |
| HDX572MDPL | $6329 |

**Please call for help selecting a US Tower for your needs. Shipped factory direct to save you money!**

## COMET ANTENNAS

| | |
|---|---|
| GP15, 6m/2m/70cm Vertical | $149 |
| GP6, 2m/70cm Vertical | $139 |
| GP9, 2m/70cm Vertical | $179 |
| B10NMO, 2m/70cm Mobile | $36 |
| B20NMO, 2m/70cm Mobile | $49 |
| SBB2NMO, 2m/70cm Mobile | $39 |
| SBB5NMO, 2m/70cm Mobile | $49 |
| SBB7NMO, 2m/70cm Mobile | $75 |
| Z750, 2m/70cm Mobile | $55 |
| Z780, 2m/70cm Mobile | $69 |

**Much more Comet in stock–call**

## M2 ANTENNAS

**50–54 MHz**

| | |
|---|---|
| 6M5X/6M7JHV | $199/239 |
| 6M2WLC/6M2.5WLC | $419/449 |

**10/12/15/17/20m HF**

| | |
|---|---|
| 10M4DX, 4 Element 10m | $379 |
| 12M4DX, 4 Element 12m | $379 |
| 15M4DX, 4 Element 15m | $419 |
| 17M3DX, 3 Element 17m | $379 |
| 20M4DX, 4 Element 20m | $499 |

**More M2 models in stock–please call**

## GLEN MARTIN ENGINEERING

**Hazer Elevators for 25G**

| | |
|---|---|
| H2, Aluminum Hazer, 12 sq ft | $359 |
| H3, Aluminum Hazer, 8 sq ft | $269 |
| H4, HD Steel Hazer, 16 sq ft | $339 |

**Aluminum Roof Towers**

| | |
|---|---|
| RT424, 4 Foot, 6 sq ft | $159 |
| RT832, 8 Foot, 8 sq ft | $229 |
| RT936, 9 Foot, 18 sq ft | $389 |
| RT1832, 17 Foot, 12 sq ft | $499 |

**Please call for Glen Martin info**

## UNIVERSAL ALUMINUM TOWERS

| | |
|---|---|
| **4**-40'/50'/60' | $519/739/1049 |
| **7**-50'/60'/70' | $939/1369/1789 |
| **9**-40'/50'/60' | $729/1049/1469 |
| **12**-30'/40' | $559/869 |
| **15**-40'/50' | $969/1399 |
| **23**-30'/40' | $869/1289 |
| **35**-30'/40' | $979/1509 |

**Bold in part number shows wind-load capacity. Please call for more Universal models. All are shipped factory direct to save you money!**

## DIAMOND ANTENNAS

| | |
|---|---|
| D130J/DPGH62 | $79/139 |
| F22A/F23A | $89/119 |
| NR72BNMO/NR73BNMO | $39/54 |
| NR770HBNMO/NR770RA | $55/49 |
| X200A/X3200A | $129/210 |
| X500HNA/700HNA | $229/369 |
| X510MA/510NA | $189/189 |
| X50A/V2000A | $99/149 |
| CR627B/SG2000HD | $99/79 |
| SG7500NMO/SG7900A | $75/112 |

**More Diamond antennas in stock**

## MFJ ANTENNAS

| | |
|---|---|
| 259B/269 | $219/299 |
| 1798, 80–2m Vertical | $239 |
| 1796, 40/20/15/10/6/2m Vert. | $179 |
| 1793, 80/40/20m Vertical | $159 |
| 1792, 80/40m Vertical | $145 |
| 1788, 40–15m Loop | $399 |
| 1786, 30–10m Loop | $349 |
| 1780, 14–30 MHz Loop | $229 |
| 1768, 2m/70cm Beam | $65 |
| 1762, 3 Element 6m Beam | $65 |

**Big MFJ inventory–please call**

## COAX CABLE

| | |
|---|---|
| RG-213/U, (#8267 Equiv.) | $.36/ft |
| RG-8X, Mini RG-8 Foam | $.19/ft |
| RG-213/U Jumpers | Please Call |
| RG-8X Jumpers | Please Call |

**Please call for more coax/connectors**

## TIMES MICROW AVE LMR® COAX

| | |
|---|---|
| LMR-400 | $.59/ft |
| LMR-400 Ultraflex | $.89/ft |
| LMR-600 | $1.19/ft |
| LMR600 Ultraflex | $1.95/ft |

## TOWER HARDW ARE

| | |
|---|---|
| 3/8"EE / EJ Turnbuckle | $10/11 |
| 1/2"x9"EE / EJ Turnbuckle | $15/16 |
| 1/2"x12"EE / EJ Turnbuckle | $17/18 |
| 3/16" / 1/4" Preformed Grips | $4/5 |

**Please call for more hardware items**

## HIGH CARBON STEEL MASTS

| | |
|---|---|
| 5 FTx .12" / .18" | $35/59 |
| 10 FT x .12" / 11 FT x .18" | $65/120 |
| 15 FT x .12" / 17 FT x .18" | $95/180 |
| 20 FT x .12" / 22 FT x .18" | $120/219 |
| 12 FT x .25" / 17 FT x .25" | $189/267 |

## GAP ANTENNAS

| | |
|---|---|
| Challenger DX | $259 |
| Challenger Counterpoise | $25 |
| Challenger Guy Kit | $14 |
| Eagle DX | $269 |
| Eagle Guy Kit | $22 |
| Titan DX | $299 |
| Titan Guy Kit | $22 |
| Voyager DX | $389 |
| Voyager Counterpoise | $49 |
| Voyager Guy Kit | $38 |

**Please Call for Delivery Information**

## LAKEVIEW HAMSTICKS

| | | |
|---|---|---|
| 9106 ... 6m | 9115 ... 15m | 9130 ... 30m |
| 9110 ... 10m | 9117 ... 17m | 9140 ... 40m |
| 9112 ... 12m | 9120 ... 20m | 9175 ... 75m |

**All handle 600W, 7' approximate length, 2:1 typical VSWR ... $24.95**

## HUSTLER ANTENNAS

| | |
|---|---|
| 4BTV/5BTV/6BTV | $129/169/189 |
| G6-270R, 2m/70cm Vertical | $149 |
| G6-144B/G7-144B | $109/159 |

**Hustler Resonators in stock–call**

## ANTENNA ROT ATORS

| | |
|---|---|
| M2 OR-2800P | $1095 |
| Yaesu G-450A | $239 |
| Yaesu G-800SA/DXA | $319/399 |
| Yaesu G-1000DXA | $479 |
| Yaesu G-2800SDX | $1069 |
| Yaesu G-550/G-5500 | $289/589 |

## ROT ATOR CABLE

| | |
|---|---|
| R51(#20)/R52 (#18) | $.22/.32/ft |
| R61 (#20)/R62 (#18) | $.28/32/ft. |
| R81/82/83/84 | $.25/.39/.52/.85/ft |

## PHIL YSTRAN GUY CABLE

| | |
|---|---|
| HPTG1200I | $.39/ft |
| HPTG2100I | $.52/ft |
| PLP2738 Big Grip (2100) | $5.50 |
| HPTG4000I | $.79/ft |
| PLP2739 Big Grip (4000) | $7.65 |
| HPTG6700I | $1.15/ft |
| PLP2755 Big Grip (6700) | $10.95 |
| HPTG11200 | $1.55/ft |
| PLP2558 Big Grip (11200) | $16.50 |

**Please call for more info or help selecting the Phillystran size you need.**

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# HUGE ICOM DEALS ★ HUGE YAESU DEALS

**IC-775 DSP ..New Lower Price!**
The Icom IC-775DSP is a competition class HF transceiver featuring 200 watt RF output, digital signal processing, automatic antenna tuner, true dual RX, CW memory keyer, CTCSS tone encode, twin pass band tuning, dual antenna inputs, 101 memory chanels, built-in power supply, and much more. Supplied with AC power cord.

**PW-1 .....New Lower Price!**
The Icom PW-1 is a 1000 watt solid state linear amplifier for HF and 6m operation, featuring a high power automatic antenna tuner, built-in power supply, and a removable front control panel, and more.

**IC-746 .....Icom Special!**
The Icom IC-746 is an all mode transceiver covering HF/6m/2m. The radio features digital signal processing, 100 watt RF output on all bands, twin PBT, a 4.9"multifunction LCD display with band scope, automatic antenna tuner, and more. Supplied with a hand mic and DC power cord.

**IC-756PRO .....New!**
The Icom IC-756 PRO is an all mode HF/6m transceiver featuring DSP, automatic antenna tuner, 100 watts RF output, digital twin PBT, a 5" multifunction LCD display with band scope function, and more. Supplied with hand mic and DC power cord.

**IC-706MK2G .....Icom Special!**
The Icom IC-706MK2G is a compact HF/6m/2m/70cm all mode transceiver with digital signal processing, automatic repeater offset, built-in CW keyer, built-in CTCSS tone encode/decode/scan, 107 memory channels and more. A detachable front panel offers convenient mounting, even in compact vehicles.

**IC-718 .....New!**
The Icom IC-718 is an all mode HF transceiver featuring a front panel mounted speaker, IF shift, optional DSP module, multiple scanning modes, noise blanker, RIT, and more.

**IC-2800H .....Icom Special!**
The Icom IC-2800H is a 2m/70cm dual band mobile FM transceiver with a 3" color TFT display. The radio features a separate control face, video input, bandscope display, 9600 bps Packet jack, CTCSS tone encode/decode/scan, 232 memories, cross band duplex, and more. With DTMF hand mic, mounting brackets, and power cord.

**IC-2100H .....Great Low Price!**
The IC-2100H is a rugged 2m mobile XCVR with CTCSS tone encode/decode/scan, DTMF paging/squelch, 113 memory channels, switchable display color and more.

**IC-W32A .....New Lower Price!**
**IC-Q7A .....Icom Special!**
**IC-T7H .....Icom Special!**
**IC-T81A .....New QuadBand HT!**
**IC-T2H .....Amazing Low Price!**
**IC-R3 .....Video RX, In Stock!**

**IC-207H .....Great Low Price!**
The Icom IC-207H is a 2m/70cm dual band mobile transceiver featuring CTCSS tone encode/decode, 182 memory channels, removable front control panel, and more. Supplied with a back-lit DTMF hand mic, mounting bracket, and a DC power cord.

**IC-PCR1000 .....Icom Special!**
**IC-PCR100 .....Icom Special!**
**IC-R8500 .....In Stock!**
**IC-R75 .....New, In Stock!**
**IC-R2 .....In Stock!**
**IC-R10 .....Icom Special!**

**FT-1000MP Mark-V .....New!**
The Yaesu FT-1000MP Mark-V is a competition class HF DSP transceiver with auto tuner, 200 Watts RF output, and more!

**FT-1000MP ..Closeout Special!**
Competition class HF DSP transceiver.

**FT-1000D .....In Stock!**
The FT-1000D is a competition class HF XCVR featuring true dual RX, automatic tuner, 200 watts RF output, and more.

**Quadra System ...Lower Price!**
Solid state 1 kW autotuning amplifier.

**FT-847 .....Yaesu Special!**
The Yaesu FT-847 is an all mode transceiver covering HF/6m/2m/70cm! The radio is perfect for satellite operation, and features digital signal processing, built-in RS-232 interface, tone encode/decode, and more. Supplied with an up/down microphone and DC power cord.

**FT-920 .....Yaesu Special!**
The Yaesu FT-920 is an all mode HF/6m transceiver featuring digital signal processing, automatic antenna tuner, CW memory keyer, CTCSS tone encode/decode, 127 memories, and more. Supplied with up/down hand mic and DC power cord.

**FT-90R .....New!**
New ultra-compact 2m/70cm dual band mobile transceiver with detachable control panel, and huge extended RX range.

**FT-2600M ...New Lower Price!**
Rugged 2m mobile with intermod-proof receiver, big display, and an illuminated DTMF mic. Built to MIL-STD 810.

**FT-8100 .....New Lower Price!**
Great 2m/70cm dual band mobile, 45/35 Watts, removable front panel, and more!

**FT-100D .....New!**
Ultra-compact all mode XCVR for HF/6m/2m/70cm.Features DSP, CW memory keyer, tone encode/decode, 200 memories, VOX, and more. Supplied with a DTMF hand mic, DC power cord and mounting bracket.

**FT-817 .....Now In Stock!**
A truly tiny self-contained all mode HF/6m/2m/70cm QRP XCVR featuring DSP, tone encode/decode, 200 memories, VOX, and more! With hand mic, DC cord and bracket.

**G-2800SDX .....$1069**
Heavy duty antenna rotator handles 34 sq. ft. of antenna load, and features 450° rotation, preset and variable speed.

**G-1000DXA .....$479**
**G-800SA/DXA .....$319/399**
**G-450A .....$239**
**G-5500 .....$589**
**G-550 .....$289.**

**VX-5R .....Now In Stock!**
Tiny 6m/2m/70cm triband HT, with CTCSS tone encode/decode/scan, high capacity Lithium-Ion battery pack, extended RX with AM/FM and FW Wide modes, and more.

**FT-50RD .....Yaesu Special!**
**VX-1R .....Yaesu Special!**

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# The Ultimate Backpacker!

## Ham Radio in the Great Outdoors: It's the Best with Yaesu's FT-817!




Actual Size

**Bring Ham Radio along on your next hiking, camping, or business trip with Yaesu's amazing new FT-817 Multimode HF/ VHF/UHF Portable Transceiver!**

●ULTRA COMPACT: Measuring just 1.5" x 6.5" WHD (135 x 38 x 165 mm) and weighing about 2 1/2 pounds (1.2 kg, including the supplied antenna and alkaline cells), the FT-817 is small and light enough to take along wherever you're going.

●WIDE FREQUENCY COVERAGE: 160-10 meters on HF, plus the 50, 144, and 430 MHz Amateur bands. Plus FM Broadcast, AM Aircraft, and Public Safety receiver coverage.

●MULTIMODE DESIGN: Ready for action on SSB, CW, AM, FM, FM-Wide (Rx), 1200/9600 bps Packet, and Digital, including dedicated USB and LSB PSK-31 configurations.

●5 WATTS POWER OUTPUT: Using a new-technology all-band MOS FET power amplifier, the FT-817 provides 5 Watts of power output when using a 13.8 Volt DC source. When using Alkaline batteries or the optional FNB-72 Ni-Cd Battery Pack, power is automatically set to 2.5 Watts; via Menu, this can be changed to 0.5 Watt, 1 Watt, or up to 5 Watts.

●WIDE CHOICE OF POWER SOURCES: The FT-817 is equipped with an alkaline "AA" cell battery case, and a 13.8 volt DC cable is also supplied. Available as an option is the FNB-72 Ni-Cd Battery Pack (9.6 V, 1000 mAh), which can be recharged using a 13.8 Volt power supply while the radio is being operated.

●TWO ANTENNA PORTS: A "BNC" connector is provided on the front panel, and a type "M" connector on the rear panel, with Menu selection of which connector will be assigned for operation on HF, 50 MHz, 144 MHz, and 430 MHz.

●OPTIONAL 10-POLE COLLINS MECHANICAL FILTERS: An optional filter slot is provided, accommodating either the YF-122S (2.3 kHz) SSB filter or the YF-122C(500 Hz) CW filter. You get "base station" performance even from a mountain top.

●INCREDIBLE MEMORY RESOURCES:You get a total of 208 memories, including 200 "regular" memories which may be separated into ten groups of up to 20 channels each. And you can append an Alpha-Numeric "Tag" to each memory to aid in channel identification.

●A CW OPERATOR'S DREAM MACHINE: You get a built-in Electronic Keyer with adjustable weighting, adjustable CW Pitch, CW Normal/Reverse frequency tuning, and you can even use the microphone's UP and DOWN keys to send CW via the Keyer.

●BUILT-IN CTCSS AND DCS: The built-in CTCSS and DCS Encoder/Decoder systems provide you with the versatility you need for repeater access or selective calling.

●DUAL - COLOR LIQUID CRYSTAL DISPLAY: Select from Blue or Amber display illumination, which can also be switched off to conserve battery life. And while you're away, the Spectrum Scope will provide you with a visual record of activity ±5 channels from your current operating frequency.

ALL MODE PORTABLE TRANSCEIVER

# FT-817

HF/50/144/430 MHz Multimode Transceiver

YAESU
*Choice of the World's top DX'ers*℠

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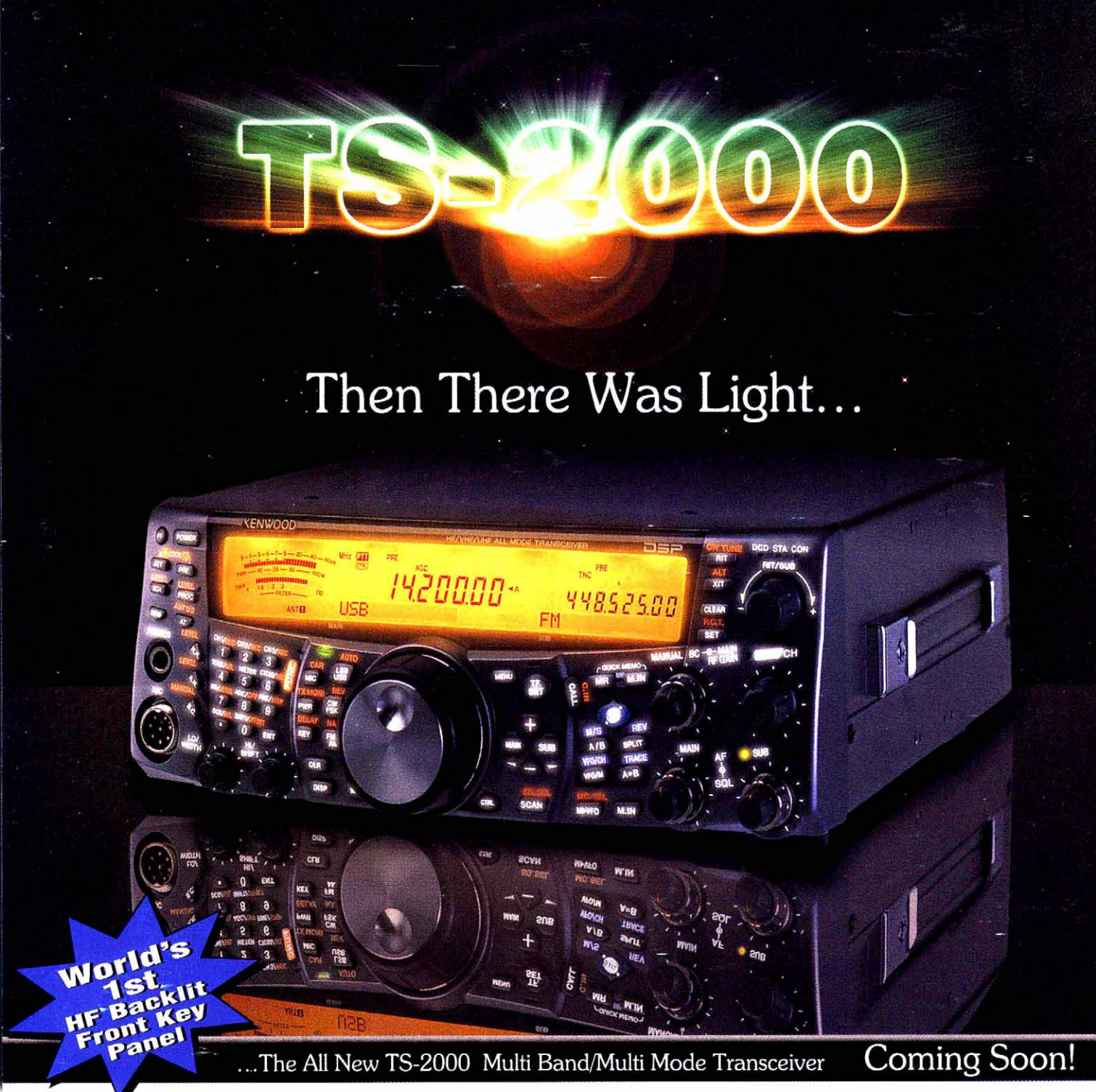
**See the exciting new FT-817 at your Yaesu Dealer's showroom today!**

# TS-2000

## Then There Was Light...




**World's 1st HF Backlit Front Key Panel**

...The All New TS-2000 Multi Band/Multi Mode Transceiver

**Coming Soon!**

The all new Kenwood **TS-2000** series transceiver offers today's demanding Amateur operator high performance standards without the compromising limitations found in other similar multi-band, multi-mode transceivers. The **TS-2000** offers users three distinct operation platforms, the traditional transceiver with full function front panel, or the high-tech looking "silver box" version that allows mobile operation with the new RC-2000 compact control head, or the ARCP-2000 computer control program making the **TS-B2000** functional from your personal computer. The new **TS-2000** offers 100 watts on HF, 6 meters and 2 meters, 50 watts on 70cm, and when you install the optional UT-20 1.2 GHz module at 10 watts, you will have assembled the most complete dual receiver multi-mode transceiver ever produced. If you are waiting for PH3D, you will be happy to know the **TS-2000** is transverter frequency display function ready to work the latest satellite frequencies available.

IF stage DSP in the main band and AF stage DSP in the sub-band provide unparalleled noise reduction performance. Because the **TS-2000** has a built-in TNC, DX Packet cluster is available on the sub-band and can automatically shift the desired HF or 6 Meter frequencies direct to the main band for instant contacts. A weekend DXer's dream come true. You will also be sure to enjoy the built-in antenna tuner, 5+1 antenna ports, RS-232 terminal and the world's first HF fully backlighted front control panel.

The **TS-2000** multi-band multi-mode transceiver, the most high performance Amateur Radio ever produced.

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