Official Journal of
ARRL
The national association for AMATEUR RADIO

QST

devoted entirely to
AMATEUR RADIO

January 2002

QST reviews

- WiNRADiO 1550i receiver
- Yaesu VL-1000 HF/6-meter linear amplifier

A digital voice primer

Vintage Radio

6 meters from your easy chair

$4.99 U.S. $6.99 Can.

IC-R75

Pull out the weak signals

30 kHz - 60.0 MHz†

Commercial grade • synchronous AM detection (S-AM) • optional DSP with auto notch filter • all mode • triple conversion • twin passband tuning (PBT) • large 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

IC-R10

Advanced performance and features

500 kHz – 1.3 GHz†

All mode • alphanumeric backlit display • attenuator • 7 different scan modes • beginner mode • 1000 memory channels; band scope • includes AA Ni-Cds and charger.

IC-R2

Excellent audio, tiny package

500 kHz – 1.3 GHz†

AM, FM, WFM • easy band switching • CTCSS decode • 400 memory channels • priority watch • MIL SPEC 810C/D/E • weather resistant • includes 2 AA Ni-Cds and charger.

IC-R3 AUDIO/VIDEO SCANNER

See and Hear all the action.

500 kHz – 2.45 GHz†

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

"Wide tuning range allows you to see and hear the excitement behind the scenes. Large easy to read color display for frequency settings and video reception. All in a compact easy to carry package. Perfect for sporting events and commercial uses."

This holiday season,

'tis better to give and receive

IC-PCR1000

The original "black box" is still best

100 kHz – 1.3 GHz†

AM, FM, WFM, USB, LSB, CW • unlimited memory channels • real time band scope • IF shift • noise blanker • digital AFC • "VSC" voice scan control (when activated, stops only on modulated signals) • attenuator • tunable bandpass filters • AGC function • S meter squelch • CTCSS tone squelch • large selection of tuning steps and scans • external speaker level control • DSP optional • download and demo the latest software for free at <www.icomamerica.com>

"The PCR1000 has something to intrigue and satisfy everyone. This is a fun product."— QST, 7/98

IC-PCR100

Much like its big brother, but for less

100 kHz – 1.3 GHz†

AM, FM, WFM • many of the same features and performance as the IC-PCR1000 • designed for Windows® 95 or 98 • download and demo the latest free, full version software today: <www.icomamerica.com>

IC-R8500

The experts choice

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— Passport to World Band Radio, 1998

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REVVVVV up your HF/6M + 2M ops with ICOMs new IC-746PRO. This Hot Rod combines the latest cutting edge technology from the digital and analog world! The new, all mode, 746PRO has the familiar look and feel of the '746 - but that's where the similarity ends! Sharing the same powerplant as the '756PROII, the 746PRO offers great 32 bit IF-DSP performance and many new features not normally found on rigs in this class. Features like selectable IF Filter Shape characteristics; SSB/CW Synchronous Tuning; Rx Equalizer for great audio; Variable Level Noise Blanker; and much more. Pick up a '746PRO and leave the competition in the dust. Coming soon to your authorized ICOM dealer.

IC-746PRO. Leave the competition in the dust.

HF/6M/2M • 100W • All Mode • Enhanced Rx • 9600 Baud Ready • 32 Bit IF-DSP & 24 Bit AD/DA Converter • Independently Selectable IF Filter Shapes For SSB & CW • SSB/CW Synchronous Tuning • Built-in RTTY • Variable Level Noise Blanker • Auto & Manual Notch Filter • Digital Twin Passband Tuning • Mic Equalizer • CW Memory Keyer • VOX • Auto Antenna Tuner

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- **32 BIT FLOATING POINT DSP & 24 BIT AD/DA CONVERTER.** At the heart of the '746PRO, the DSP is an incredible tool for handling the QRM found on the bands.
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- **AGC LOOP MANAGEMENT.** Multiple AGC loops, controlled by the 32 bit DSP, filter out unwanted interfering signals, eliminating pumping of the AGC.
- **AUTOMATIC NOTCH FILTER.** Perfect for SSB operation to eliminate annoying heterodynes and "tune up", without effecting the receive audio.
- **MANUAL NOTCH FILTER.** Perfect for CW or digital operations, the 70db manual notch filter eliminates unwanted signal without effecting the actual passband of your filters.
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CHANGE FILTER SHAPES WITH THE PUSH OF A BUTTON AND THE TURN OF A KNOB - IT'S THAT EASY!

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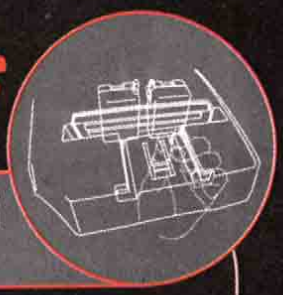

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Sample LCD read out during discharging, showing current voltage, time, and discharging capacity.

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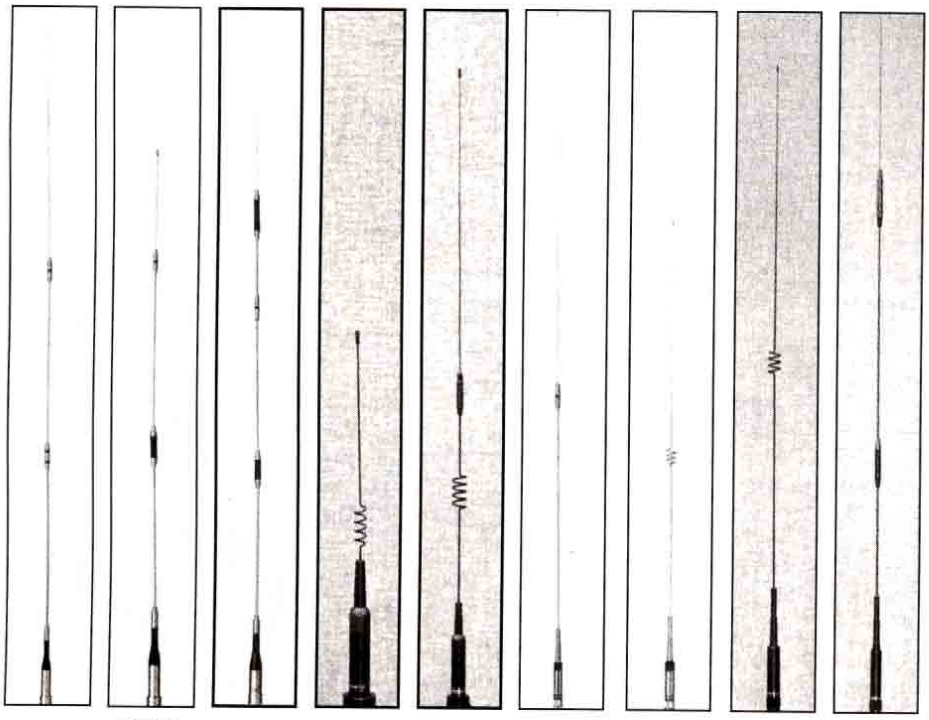


SG2000HD | SG7500A SG7500NMO | SG7900A | NR72BNMO | NR73BNMO | NR2C | NR770HA NR770HB | NR770HNMO NR770HBNMO | CR627B CR627BNMO

HV7A Mobile Antenna System

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

Optional Loading Coils

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

Recommended Antenna Mounts: K400C or K600M

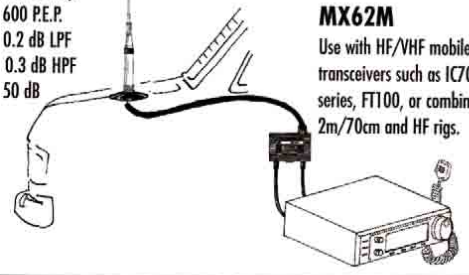
MX62M Duplexer

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

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

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

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



MX62M

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

SPECIAL FEATURES:

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

FOLD-OVER

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

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

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

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

1/4λ rated in dBi.

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January 2002 ♦ Volume 86 Number 1

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News and Features

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QST Workbench

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Operating

Departments

Our Cover:
Our Vintage Radio issue is brimming with articles and columns describing classic radios and the radio theory that made today's all-mode, all-band transceivers possible. The photo, by Al Klase, N3FRQ, was taken inside K2TQN's Old Radio Museum (**www.eht.com/oldradio/museum/**).

US & Possessions: Membership in the ARRL, including a one year subscription to *QST*, is available to individuals at $39. Age 65 and over, with proof of age, $34. Licensed radio amateurs age 21 and under and the eldest licensee in the household may qualify for the rate of $20. Life Membership, including a subscription to *QST* is available at $975.* Age 65 and over, $850.* Membership and *QST* cannot be separated. Fifty percent of dues is allocated to *QST*, the balance for membership. Subscription rate for libraries and institutions is $39 per year. Single copies $5.

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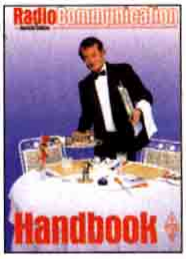

Radio Communication Handbook

One of the most comprehensive guides to the theory and practice of Amateur Radio communication. Find the latest technical innovations and techniques, from LF (including a new chapter for LowFERS!) to the GHz bands. For professionals and students alike. 820 pages.

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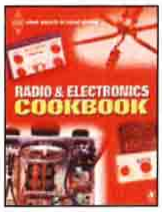

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Build up your electronics skills and knowledge with this unique collection of electronic projects, ideal for all levels of experimenters. Quick, rewarding construction projects. 319 pages.

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RSGB Technical Compendium

A collection of proven and experimental radio equipment designs, and practical advice (articles from 12 editions of *RadCom* 1999). 288 pages.

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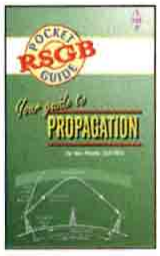

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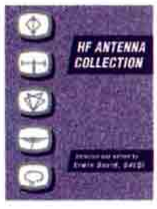

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Articles from RSGB's *RadCom* magazine. Single- and multi-element horizontal and vertical antennas, very small transmitting and receiving antennas, feeders, tuners and more. 240 pages.

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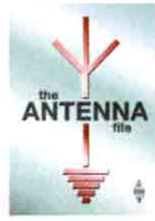

The Antenna File

The best work from the last ten years of RSGB's *RadCom* magazine. 50 HF antennas, 14 VHF/UHF/SHF, 3 on receiving, 6 articles on masts and supports, 9 on tuning and measuring, 4 on antenna construction, 5 on design and theory. Beams, wire antennas, verticals, loops, mobile whips and more. 288 pages.

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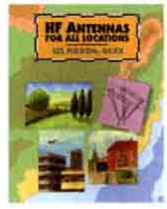

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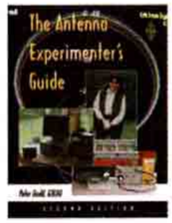

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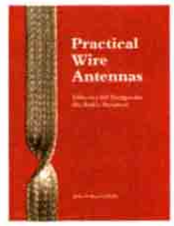

Practical Wire Antennas

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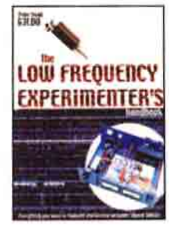

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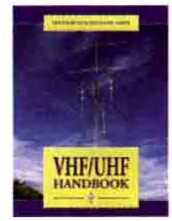

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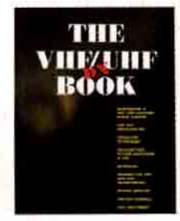

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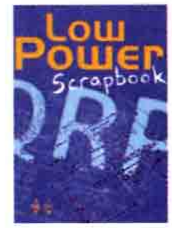

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[1] Note that certain frequencies are unavailable. [2] 5W output

"Specifications subject to change without notice."

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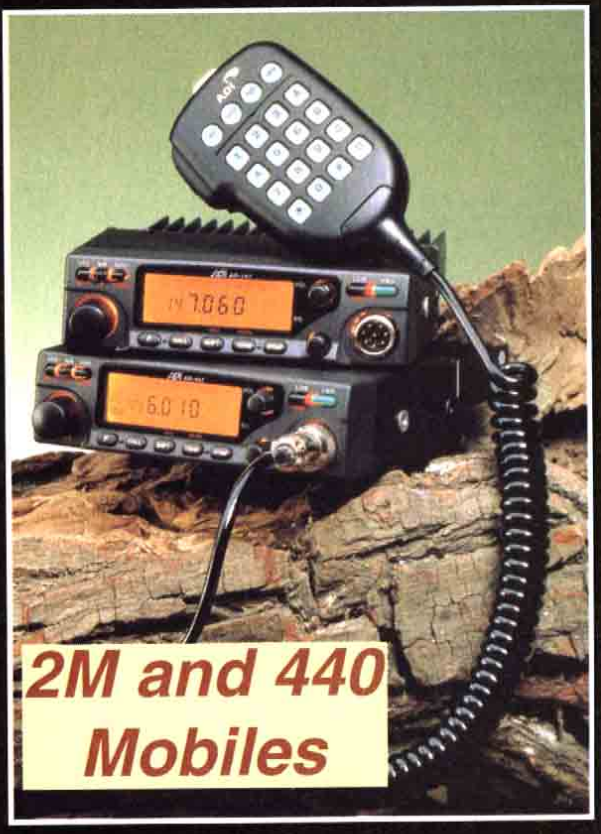

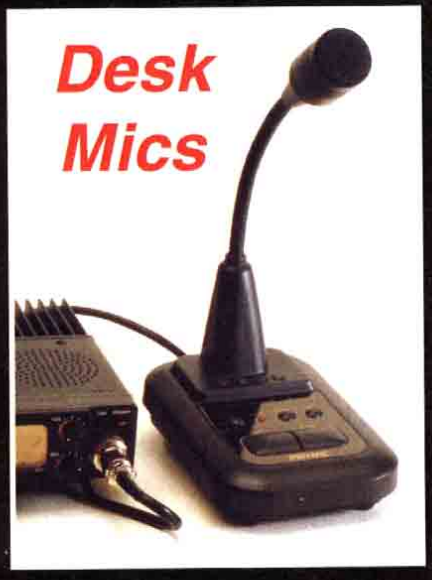

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Forty Meter Update

The start of a new year is an appropriate time to stop and take stock of progress. Our most important objective for the June 2003 World Radiocommunication Conference (WRC-03) is an improved 40-meter band, and both ARRL and IARU representatives are working steadily toward that end. We seek a band in which amateurs here in the Americas do not have to contend with high-powered broadcasters from Europe, Africa, Asia, and the Pacific, and amateurs in the rest of the world can access the same 300 kHz of bandwidth that we enjoy here.

The August 2000 *QST* editorial gave the history of the 40-meter band since 1927 and how it got to be the way it is today. It described two earlier efforts by the United States at international conferences to restore a 300-kHz worldwide allocation, in 1979 by shifting the amateur band down by 50 kHz and in 1992 by shifting it down by 100 kHz (with broadcasting shifted upward in each case). Three months later in November 2000 we explained how the aspirations of HF broadcasters for more spectrum between 4 and 10 MHz and their desire to introduce digital broadcasting might complicate the effort to harmonize the 7-MHz amateur and broadcasting allocations at WRC-03.

Nine months ago in April 2001 *QST* we described the preparations underway in the ITU to develop the technical basis for consideration of the 7-MHz agenda item at WRC-03, and in the regional telecommunications organizations—CEPT, CITEL and APT—to develop common proposals. In May the IARU published a 26-page booklet, *Amateur Service Spectrum Requirements at 7 MHz*, and made it available at its Web site: **www.iaru.org/iaru-index.html#wrc2003**. Paul Rinaldo's article in the July 2001 issue laid out the role of the ARRL Technical Relations Office in domestic as well as international preparations.

Quite a lot has happened since then, although we are no closer to knowing what the conference will decide a year and a half from now. Conferences of this kind involve more than 2000 people representing virtually every country and telecommunications entity in the world and their outcomes are impossible to predict.

One of the key deadlines in the preparatory process is May 31, 2002. This is the date by which draft text for the Conference Preparatory Meeting (CPM) Report must be submitted by the responsible Working Parties of the ITU Radiocommunication Sector (ITU-R). The CPM will take place in Geneva November 18-29, 2002. It will be practically a "mini-WRC" with more than 1000 attendees. Its purpose is to agree on the contents of what is expected to be a 500-page technical report analyzing the advantages and disadvantages of various options for addressing each of the 39 WRC-03 agenda items.

Working Party 8A is responsible for the draft CPM text on 7 MHz. The regular participants in WP 8A are involved in the land mobile, amateur, and amateur-satellite services although any administration or ITU-R Sector Member is eligible to participate. Input has been received from two other ITU-R Working Parties representing broadcasting and fixed service interests respectively. While only a small minority of administrations participates in the Working Parties, fixed and land mobile interests already have made it clear that they are quite sensitive about their band just below 7 MHz. For example, Canada, a strong supporter of the amateur service on most issues, is concerned about protecting national and international data and voice networks operating in the 6.9-7.0 MHz band. Brazil says it has thousands of private stations operating in the bands just below 7 MHz and just above 7.35 MHz. Military interests in Europe and elsewhere are expressing renewed interest in HF and seem less inclined to relinquish HF spectrum than they were just a few years ago. To the extent that spectrum access is a zero sum game—access by one service reduces or may even eliminate the possibility of access by another—it is clear that finding a solution to the 7-MHz dilemma that is acceptable to all of the affected interests will be very difficult indeed.

If there is an encouraging development it is that the broadcasters who are actively participating in the preparatory process are more inclined to accept an upward shift in their allocation than in times past. The general rule governing spectrum issues is that no one wants to give up anything and no one wants to move. However, broadcasters now see some advantage in increasing the spacing between their bands at 6 and 7 MHz and decreasing the spacing between their bands at 7 and 9 MHz in order to allow greater flexibility in adapting to variations in propagation. Some of the fixed service people cite this as one of the reasons why the band below 7 MHz is more important to them than the lower part of their much wider band above 7.35 MHz. This is reflected in the preliminary draft CPM text, which cites more advantages and fewer disadvantages arising from keeping the amateur allocation at 7.0-7.3 MHz and shifting the broadcasters up than from shifting amateurs down and broadcasters up by a lesser amount. Of course, whether this draft will survive the rest of the CPM process and whether WRC-03 will act accordingly remains to be seen.

Good results don't happen by accident. We have gotten this far through a team effort involving weeks of meetings in Geneva and elsewhere. There's more to come in 2002. My own schedule for the year calls for six weeks in Geneva on five separate occasions on behalf of the IARU. Even that is less time than what several others on the IARU/ARRL team—some of whom are volunteers—will be devoting on your behalf to this and other WRC-03 issues.—*David Sumner, K1ZZ* QST

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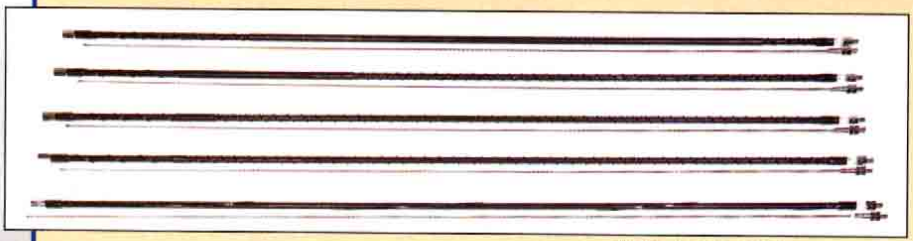

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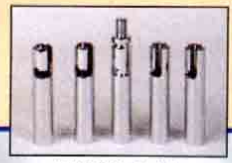

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Santa Clara Valley	Glenn Thomas, WB6W, 502 Walnut Dr, Milpitas, CA 95035-4133 (408-263-9450); **wb6w@arrl.org**

Roanoke Division

North Carolina	John Covington, W4CC, PO Box 217122, Charlotte, NC 28221(704-577-9405); **w4cc@arrl.org**
South Carolina	Patricia Hensley, N4ROS, 164 N Main St PO Box 70, Richburg, SC 29729-0070 (803-789-5810); **n4ros@arrl.org**
Virginia	Carl Clements, W4CAC, 4405 Wake Forest Rd, Portsmouth, VA 23703 (757-484-0569); **w4cac@arrl.org**
West Virginia	Hal L. Turley, KC8FS, 657 Forest Circle, S Charleston, WV 25503 (304-744-5949); **kc8fs@arrl.org**

Rocky Mountain Division

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Wyoming	Robert Williams, N7LKH, PO Box 130, Wapiti, WY 82450 (307-527-7758); **n7lkh@arrl.org**

Southeastern Division

Alabama	Bill Cleveland, KR4TZ, 2113 Wildwood Place, Mobile, AL 36609-2583 (334-661-3892); **kr4tz@arrl.org**
Georgia	Sandy Donahue, W4RU, 15010 Briarhill Ln, Atlanta, GA 30324 (404-315-1443); **w4ru@arrl.org**
Northern Florida	Rudy Hubbard, WA4PUP, PO Box 843, Milton, FL 32572-0843 (850-626-0620); **wa4pup@arrl.org**
Puerto Rico	Victor Madera, KP4PQ, PO Box 191917, San Juan, PR 00919-1917 (787-789-4998); **kp4pq@arrl.org**
Southern Florida	Phyllisan West, KA4FZI, 1410 Shelby Parkway, Cape Coral, FL 33904 (941-574-3467); **ka4fzi@arrl.org**
Virgin Islands	John Ellis, NP2B, PO Box 24492, Christiansted, St Croix, VI 00824 (340-773-9643); **np2b@arrl.org**
West Central Florida	Dave Armbrust, AE4MR, 3024 Salem Ave, Sarasota, FL 34232 (941-378-1701); **ae4mr@arrl.org**

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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 (619-434-4211); **nz6t@arrl.org**
Santa Barbara	Robert Griffin, K6YR, 1436 Johnson Ave, San Luis Obispo, CA 93401-3734 (805-543-3346); **k6yr@arrl.org**

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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**
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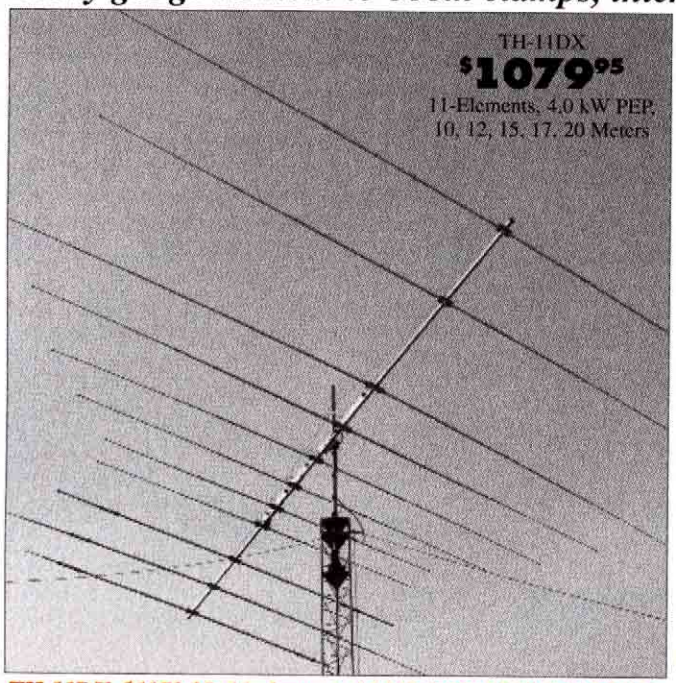

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With 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!*

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Dual driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands.

Uniquely combining monoband and trapped parasitic elements give you an excellent F/B ratio.

Includes *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

TH-5MK2, $699.95. 5-element, 1.5 kW PEP, 10,15,20 Meters

The broadband *five element* TH5-MK2 gives you outstanding gain.

Separate air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band.

Also standard is *Hy-Gain's* exclusive *BetaMATCH*™, stainless steel hardware and compression clamps and BN-86 balun.

TH-3MK4, $439.95. 3-element, 1.5 kW PEP, 10,15,20 Meters

The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

You get an impressive average gain and a whopping average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival.

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

Features *Hy-Gain BetaMatch*™ for DC ground, full power *Hy-Q*™ traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

TH-2MK3, $339.95. 2-element, 1.5 kW PEP, 10,15,20 Meters

The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander.

For just $339.95 you can greatly increase your effective radiated power and hear far better!

Ruggedly constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

EXP-14, $549.95. 4-element, 1.5 kW PEP, 10,15,20 Meters

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

Hy-Gain's *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP.

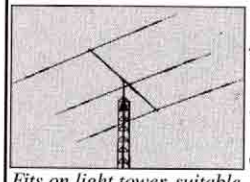
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

***Truly** competitive against giant tri-banders at half the cost!*

QK-710, $169.95. 30/40 Meter option kit for EXP-14.

Compact 3-element 10, 15, 20 Meter Tri-Bander

For limited space . . . Installs anywhere . . . 14.75 ft turning radius . . . weighs 21 lbs . . . Rotate with CD-45II, HAM-IV



Fits on light tower, suitable guyed TV pole, roof tri-pod

TH-3JRS, $329.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

Excellent gain and F/B ratio let *you* compete with the "big guns".

Tooled manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	• Hy-Gain catalog		**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	• Call toll-free		600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	800-973-6572		**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4			1500	10,15,20 opt. 30/40	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

Tooled Manufacturing . . . Highest Quality Materials

1. Hy-Gain's famous super strong *tooled* die cast *Boom-to-Mast Clamp*

2. ***Tooled*** *Boom-to-Element Clamp*

3. Thick-wall *swaged* aluminum tubing

***Tooled** manufacturing* is the difference between Hy-Gain antennas and the others -- they just don't have it (it's expensive!).

Die-cast aluminum boom-to-mast bracket and element-to-boom compression clamps are made with specially *tooled* machinery.

Hy-Gain antennas feature *tooled* swaged tubing that is easily and securedly clamped in place. All tubing is deburred and cleaned for smooth and easy assembly.

Durable precision injection molded parts.

***Hy-Gain** antennas are stronger, lighter, have less wind surface area, better wind survival, need no adjustments, look professional and last years longer.*

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

We have the answer.

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

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

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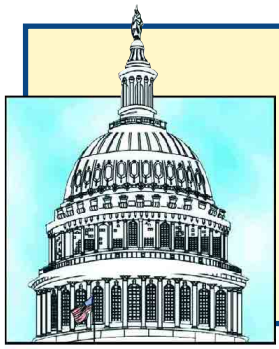

DC Currents

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.

First Half of 107th Congress Over and Second Half Begins

The September 11 attacks in New York and subsequent episodes of bio-terrorism around the US not only changed the mood of the country, but also the political landscape (see "DC Currents," December 2001). While the President, federal agencies and most members of Congress tried to operate under the rubric of "The Show Must Go On," the underlying offices, staff support and other superstructure that supports our federal government in Washington continued to limp along, forcing lawmakers to stick around the Capitol building to concentrate their efforts on the biggest issues of the day instead of hitting the daily workpile back at the office. While most of the Congressional office buildings are now open, business was slow to return to usual.

Since the September 11 catastrophe, subsequent anthrax incidents, and the US military action in Afghanistan, the focus on Capitol Hill has been almost exclusively on the necessary twin issues of Appropriations (i.e., the federal budget) and what to do about terrorism on our shores.

As we went to press, 8 of the 13 appropriations bills had passed Congress, and 5 had been signed into law. It is likely, however, that as you read this all 13 bills will have passed and been signed. Little, if any, appropriations legislation seemed to affect Amateur Radio, although some hams were concerned about a "demilitarized equipment" section of the Department of Defense portion of the budget, which ARRL determined was probably not a threat. When it came to financing the FCC's activities for the coming year, the House and Senate seemed inclined merely to split the difference and end up with a $245 million appropriation for FCC salaries and expenses, with much left for the FCC to collect through offsetting fees.

On the national security front, there was no shortage of legislation at all. Of the House and Senate Bills that were pending approval, many were some form of concurring resolution expressing sympathy or support for various affected parties, while many condemned terrorist activity and anti-social activity such as price gouging or discrimination, or bigotry against Americans with foreign backgrounds. There was also legislation aimed at increasing aviation security, as well as bills attempting to lay the groundwork for improved internal security in the US, such as the widely publicized Homeland Security Act.

ARRL Counsel Speaks out on Proliferation of Unlicensed Devices

ARRL General Counsel Chris Imlay, W3KD, told the Technological Advisory Council II (TAC II) of the Federal Communications Commission that, given the dramatic proliferation of consumer and other unlicensed devices, largely in the same bands allocated to the Amateur Service, a study needed to commence immediately to assess the effects of these devices on Amateur and other communication. He noted to the Council that ARRL was ready to conduct its own study, tentatively called the "Amateur Radio Interference Assessment" (ARIA), pending the long awaited TAC study. The regular ARRL representative to the Council is Greg Lapin, N9GL, and ARRL's Technical Relations Manager Paul Rinaldo, W4RI, also often attends.

"Looking at the group of participants in the TAC, it was difficult not to be impressed," Imlay said. "This is a first-rate bunch of technologists." Imlay said he attempted to impress on the group the need for a study to understand the effect, particularly, of Part 15 devices, which seem to be coming onto the market with remarkable speed, giving many in the amateur community a sense of urgency.

"However," Imlay added, "I wanted to avoid an 'Amateur Radio versus part 15 devices' posture, as the TAC is, of course, largely interested in commercial technology, especially including unlicensed technology." Imlay reports that the biggest stumbling block on the issue right now with the committee seems to be exactly what frequency ranges to be studied, with the dividing line seeming to be above or below 1 GHz.

"I told the Council that perhaps our study title was not the most objective label for what was, after all, an objective effort," Imlay said. "I assured them that the study would be objective and did not presuppose noise levels in which Part 15 devices operated sufficiently high as to cause interference to amateur receivers. However, noise in these bands is a potential source of interference, and any recommendations made would be done following the conclusion of the study, and not as a premise for it. The group seemed satisfied with that, and complimented ARRL at the end."

Bug Threats Slow License Processing at FCC

FCC license processing was temporarily disrupted in October due to the rash of bio-terrorism threats at federal office locations.

In the aftermath of the recent problems with anthrax infections involving the mails, the FCC began diverting mail deliveries for its Washington, DC, Headquarters to a mail-handling site in Maryland. The FCC said the changes were necessary "to protect the health and safety of its employees," and that it would also divert overnight courier deliveries to the new handling site.

"As the Commission continues to balance its efforts to be accessible to its customers with the need for heightened security measures, the Commission encourages its customers to make full use of the Commission's electronic filing systems to facilitate the filing of documents," the FCC said in a *Public Notice*. The Gettysburg office is where Amateur Radio applications are processed and licenses issued by the Wireless Telecommunications Bureau. It's also where Special Counsel for Amateur Radio Enforcement Riley Hollingsworth has his office.

ARRL's VEC Manager Bart Jahnke, W9JJ, reports disruption of vanity call sign applications and delays in some license renewals. "Renewals received on or after October 15 may still be pending and residing in unopened mail," Jahnke says. Until that mail is opened (in order of date received, for vanity call signs) and the mail in limbo is caught up, the FCC won't be processing any vanity applications." The FCC's *Public Notice* said, "Feeable filings should be sent

to the address as noted in the Wireless Telecommunications Bureau Fee Filing Guide." Unless paid on-line using a credit card, amateur vanity call sign fees go to the FCC's contractor in Pittsburgh. The "Amateur Radio Vanity Call Signs" page on *ARRLWeb,* **www.arrl.org/arrlvec/vanity.html** has specific information. Requests for amateur fee refunds, however, are sent to Gettysburg.

The FCC also said the staff at the Gettysburg filing counter at 35 York Street will not accept hand-delivered documents enclosed in envelopes. The filing counter is open weekdays 8 AM until 4:30 PM. Originals and copies of each official filing must continue to be addressed to the Commission and held together with rubber bands or fasteners. "Stamp and return" copies will be provided as long as they clearly accompany each individual filing.

Documents intended to be received by specific staff members must be clearly labeled on the first page of the document or with a cover sheet indicating the destination. As appropriate, originals and copies must be held together with rubber bands or fasteners.

Filings requesting confidential treatment under the Commission's rules must also be filed without envelopes. As long as the request for confidential treatment is clearly indicated on the first page of the filing, the staff at the filing counter will enclose the filing in a Commission envelope labeled "confidential" to signal that the filing contains material that is subject to a request for confidential treatment.

Questions concerning the FCC *Public Notice* should be directed to the Building and Facility Management Specialist, **rhewitt@fcc.gov** or 717-338-2535.

Update on CC&R Effort

• In an effort to get the FCC to act quickly and favorably on ARRL's efforts to have private land use regulations on antenna installations (also known as CC&Rs) treated the same way as under state and municipal authority (which is to say, with "reasonable accommodation"), ARRL asked our members to write to their members of Congress for assistance. So far, we have received several hundred confirmations of members having written, and about 20 confirmations from Representatives or members of Congress that they, as asked, wrote to the FCC to urge prompt and favorable action.

Oops!

In the lead article of the December 2001 DC Currents, we inadvertently accelerated the pace of Congress by claiming that "the new 108th Congress convenes sometime after the November elections." Oops. A slip of the mind through time. The Congress in session in 2002 is the second session of the 107th Congress.

Status on House and Senate Amateur Radio Spectrum Bills

• ARRL's persistent efforts to ensure the availability of spectrum to Amateur Radio operators through legislation continues to be an uphill struggle as the 107th first session heads toward the end without any dramatic movement. But, in spite of the turmoil, the Amateur Radio Spectrum Protection Act, introduced by Rep Michael Bilirakis (R-FL-9th), currently has 44 cosponsors.

House cosponsors, in addition to the original sponsor Rep Michael Bilirakis (R-FL-9th):

John E. Baldacci (D-ME-2nd)
Tammy Baldwin (D-WI-2nd)
Roscoe G. Bartlett (R-MD-6th)
David E. Bonior (D-MI-10th)
Rick Boucher (D-VA-9th)
Sherrod Brown (D-OH-13th)
Dan Burton (R-IN-6th)
Steve Buyer (R-IN-5th)
Sonny Callahan (R-AL-1st)
John Conyers, Jr (D-MI-14th)
Nathan Deal (R-GA-9th)
Norman Dicks (D-WA-6th)
John T. Doolittle (R-CA-4th)
Sam Farr (D-CA-17th)
Bob Filner (D-CA-50th)
Paul E. Gillmor (R-OH-5th)
Virgil H. Goode, Jr (I-VA-5th)
Doc Hastings (R-WA-4th)
Baron P. Hill (D-In-9th)
Joe Hoeffel (D-PA-13th)
Johnny Isakson (R-GA-6th)
William L. Jenkins (R-TN-1st)
Walter B. Jones, Jr (R-NC-3rd)
Mike McIntyre (D-NC-7th)
Gary G. Miller (R-CA-41st)
Dennis Moore (D-KS-3rd)
Jerry Moran (R-KS-1st)
George R. Nethercutt, Jr (R-WA-5th)
Anne Northrup (R-KY-3rd)
Collin C. Peterson (DFL-MN-7th)
Deborah Pryce (R-OH-15th)
Ronnie Shows (D-MS-4th)
Fortney Pete Stark (D-CA-13th)
Charles W. Stenholm (D-TX-17th)
Ted Strickland (D-OH-6th)
Gene Taylor (D-MS-5th)
Lee Terry (R-NE-2nd)
Karen L. Thurman (D-FL-5th)
Patrick J. Tiberi (R-OH-12th)
Edolphus Towns (D-NY-10th)
Greg Walden (R-OR-2nd)
Dave Weldon (R-FL-15th)
Dave Whitfield (R-KY-1st)

The seven Senate cosponsors of S. 549, in addition to the original sponsor, Idaho Senator Michael Crapo:

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

Media Hits

• Dr Mike Perozzi, N3TJH, of Charleroi, Pennsylvania was featured as one of the "Hams quick to serve when disaster strikes," in an article in *The Valley Independent* of Monessen, Pennsylvania. The article outlined many of the activities of the Monessen Amateur Radio Club, as well as presenting a brief history of Amateur Radio service to communities. Also highlighted were Mark Haywood, N3IQS, John Moran, KA3JHB, and Amel Tuprinko.

• Amateur Radio in Pueblo, Colorado got full-page treatment in the *Pueblo Chieftan* with a story of how hams from Colorado helped out in a variety of emergencies, including the 1997 blizzard, and more recently maintaining radio communications after the September 11 outrage in New York, as well as more routine special events such as local events. Featured in the story were Pueblo Ham Club members Bob Miller, WA0MEX, and Russ McGee, WB0GSU. A "sidebar" story extolls the involvement of Amateur Radio in scouting, and another reveals the fun (and knowledge of propagation) to be had through DXing.

• "Amateur Radio is not just a hobby," *The Chronicle*, of Chehalis, Washington informs us, and many hams will nod in agreement, especially after reading the fine presentation of all the benefits of Amateur Radio Emergency communication discovered by reporter Amy Emerson after September 11. The article, which highlights Fred Mason, K7OVN, gives plenty of information on how the reader can become acquainted with Amateur Radio through classes sponsored by the Chehalis Valley Amateur Radio Society. Also mentioned was Glenn Litteer, K7PG, identified as a licensing class instructor.

• NASA Astronaut and crew commander Frank Culbertson, KD5OPQ, in orbit aboard the International Space Station (ISS), had a soothing conversation with students from a New York City elementary school on the ground only a few blocks from "ground zero." The conversation took place by virtue of the Amateur Radio on the International Space Station (ARISS) program, and Culbertson told the kids things in the world were going to be "all right." He told the kids it had been his dream since the age of 13 to be an astronaut, and urged them never to let go of their own dreams. The contact was transmitted live over the Internet by MSNBC.

• *Boy's Life* magazine also carried a story about the ISS and Amateur Radio contact from space, but this time featuring the accomplishments of Troop 277 of George West, Texas in setting up the appropriate equipment and contacting the speeding space station as it passed overhead. Life Scout Bradley Henicke, KD5FAL, is credited with helping 16 fellow students make a space station QSO.

• Mississippi hams involved in Skywarn got front page exposure in the *Clarion Ledger* of Jackson, Mississippi. The story extensively explored Skywarn activities and benefits in the area, and featured Ron Brown, AB5WF, District Emergency Coordinator; Sheila Bullock, KD5NHJ; Michael Allen, KD4NLP, and Jim Stefkovich, KD5HLE. Bill Bob Sekul, N5XXX, Skywarn Committee Chairman, arranged the newspaper coverage. QST

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The all new Kenwood **TS-2000** series transceiver offers today's demanding Amateur operator high performance operation without the compromising limitations found in other similar multi-band, multi-mode transceivers. The **TS-2000** offers three distinct operation platforms, the traditional transceiver with full 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. **TS-2000X** will also include 1.2GHz. (available March 2001) You will be happy to know the **TS-2000** is transverter frequency display function ready to work the latest satellite frequencies available.

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HAM-IV, $529.95. *The heavy duty Ham-IV is the most popular rotator in the world!* It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower mast bracket. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New low temperature grease permits normal operation down to -30 degrees Fahrenheit. New wire-wound potentiometer gives reliable and precision directional indication, new ferrite beads reduce RF susceptibility, new Cinch plug connector plus 8-pin plug at control box (no screwdriver needed). Dual 98 ball bearing race for load bearing strength. Strong electric locking steel wedge brake prevents wind induced antenna movement. Easy-to-use Control Box has illuminated directional meter with North or South center of rotation scale, separate snap-action brake and rotation switches. Uses low voltage control for safe operation. Accepts masts up to $2^{1}/_{16}$ inches diameter. Rotator size is $13^{1}/_{2}$Hx8D inches.

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

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

AR-40, $269.95. *Lightweight antenna rotator.* Handles smaller ham antennas and large TV/FM antennas up to 3.0 square feet windload area when mounted in-tower, or 1.5 square feet when mast mounted using the supplied lower support bracket. Dual 12 ball bearing race, disc brake system. Silent, automatic control box -- just dial and touch for desired direction. Accepts mast sizes up to $2^{1}/_{8}$ diameter. Includes light duty mast support. Rotator size is $17^{3}/_{8}$Hx8D inches.

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Rotator Specifications	T2X	HAM-IV	CD-45II	AR-40
Wind Load capacity (inside tower)	20 sq. ft.	15 sq. ft.	8.5 sq. ft.	3.0 sq. ft.
Wind Load (with mast adapter)	10 sq. ft.	7.5 sq. ft.	5.0 sq. ft.	1.5 sq. ft.
Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
Brake Construction	Electric wedge	Electric wedge	Disc brake	Disc brake
Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
Mounting Hardware	Clamp plate	Clamp plate	Clamp plate	Clamp plate
Control Cable Conductors	8	8	8	5
Shipping Weight (pounds)	28	24	22	14
Effective Moment (in tower)	3400 ft/lbs.	2800 ft/lbs.	1200 ft/lbs.	300 ft/lbs.

HAM IV

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JOTA 2001

The 2001 Jamboree on the Air October 20-21 was again a rousing success, as hams involved with Scouting, along with hundreds of other volunteers, made it possible for Scouts to experience the excitement of Amateur Radio.

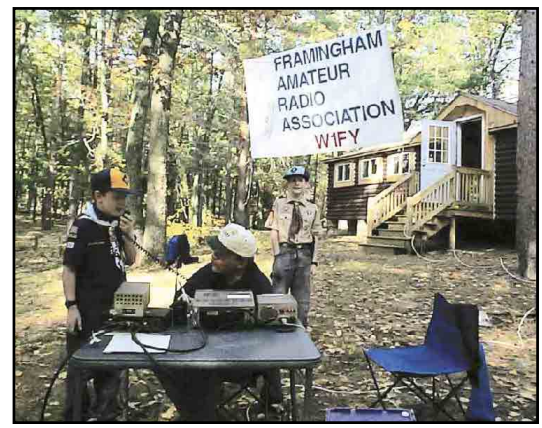
TERRY MATZKIN, KE6WRE

At Pacificon, in Concord, California, a group of Boy Scouts in front of the van housing the Amateur Radio station.

Surrounded by a pileup of Scouts, WB5ZGA (at the mike), and N2IVQ, of Melbourne, Florida, contact special event station K7UGA.

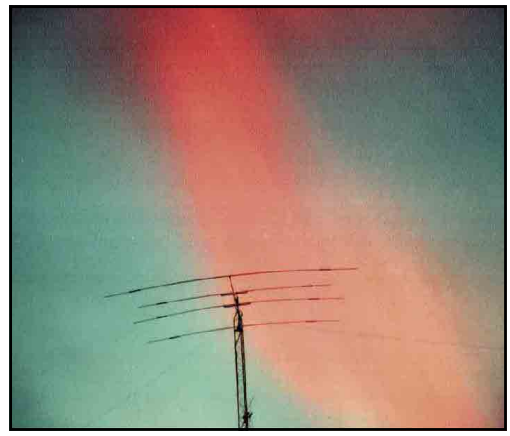
TERRY MATZKIN, KE6WRE

A Cub Scout makes his first Amateur Radio contact at Pacificon 2001.



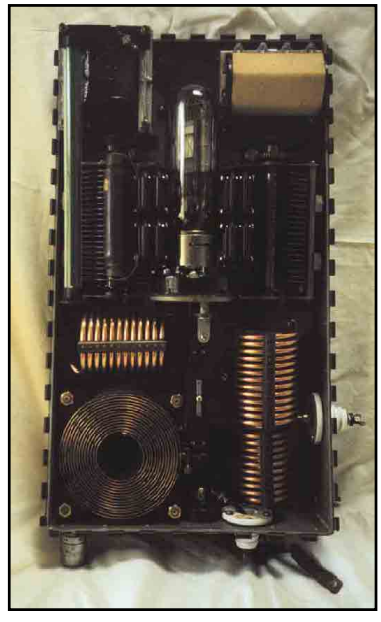
The club sponsoring this JOTA event at the Nobscot Scout Reservation in Massachusetts isn't shy about letting the world know who they are. Control op is KA1AXY.

Don Blasdell, W4HJL, of Manassas, Virginia, tunes in a station as two Webelos from Pack 1195 anxiously await their turn at the mike. The event, which attracted Boy Scouts, Cub Scouts and Webelos, was co-hosted by the Ole Virginia Hams ARC and the Urbanna Swim Club.

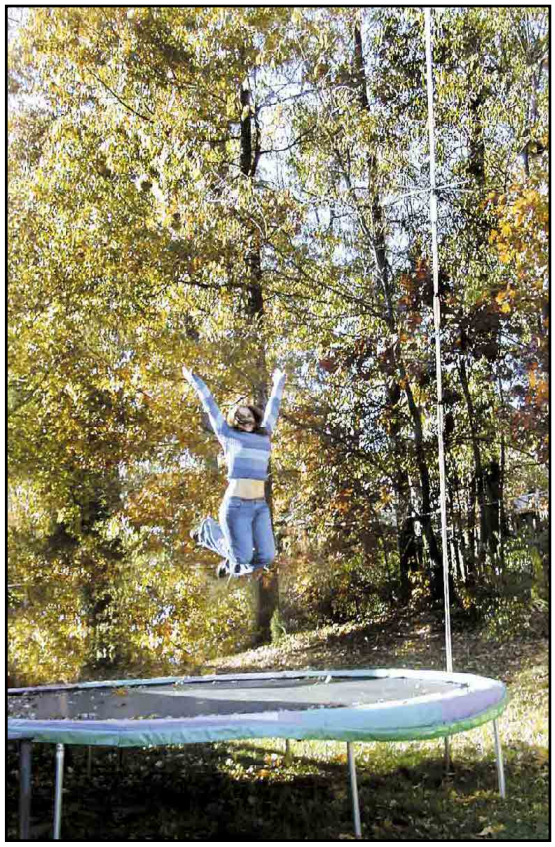


Have weather phenomena? Peter Venlet, N8YEL, of Zeeland, Michigan, does! He captured these impressive images of his Mosley TA-33jr, enhanced by (left) a rainbow that formed during a late-September evening shower, and (right) the intense aurora that was visible over much of the US November 5.

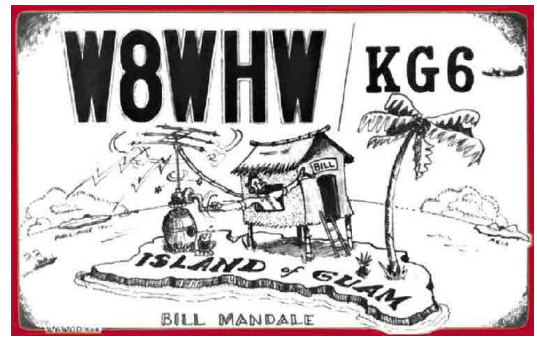
A canned message, if there ever was one: John W. Fleming, WA9ALS, of Shelbyville, Indiana, writes that his family ran a canning factory in Morristown in 1968. "They used various labels on the cans of pumpkin, tomatoes, corn, and peas, but I sure don't remember RADIO corn!"



Jim Konop, AB7NW, of Sumner, Washington, writes: "As you can see, I have a bit of a radio collection." One recent addition is a transmitter used by adventurer Richard E. Byrd on his first Antarctic expedition, which spanned 1928-30. The three transmitters used in the three planes were specially designed by the Heintz and Kaufman Co. Jim describes his transmitter this way: "The case was constructed of aluminum to save weight. It was also capable of two frequency bands, 4000-15000 kcs and 450-750 kcs. The transmitter, strictly CW, utilized a single type-211 electron tube. It was said that the operators at the base station could evaluate the airplane's motors from generator noise modulated onto the carrier while the transmitter was keyed down—just like the rig in my car!" Jim is looking for Byrd expedition QSLs, with the call signs WFC, WFF and WFB (the three aircraft), WFD and WFE (the advance ground parties), WFA (master station) and KFK (general expedition call).



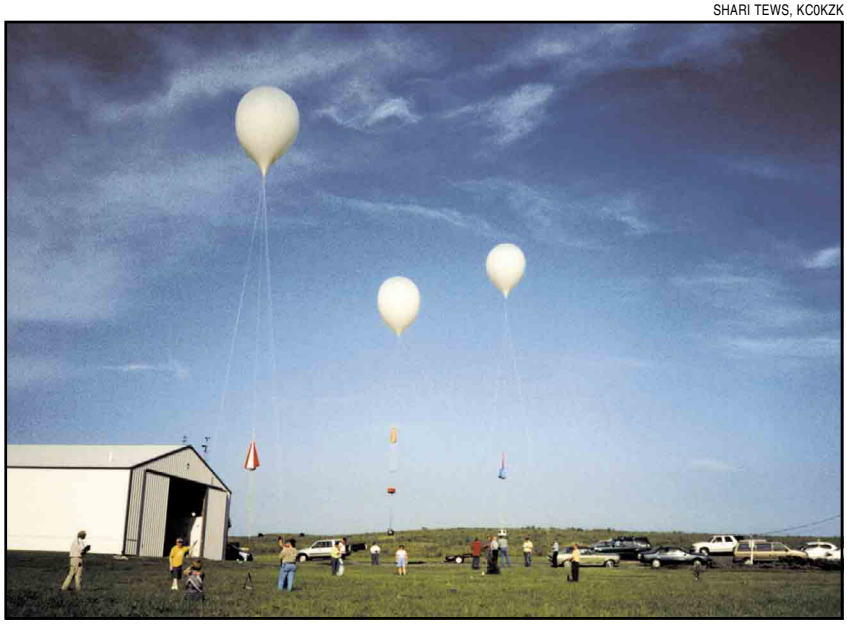
As his daughter Michelle demonstrates, Mike White, N4PDY, of Sterling, Virginia, has devised a unique means of bouncing his signals. He writes: "Circumstances forced me to take down my trusty G5RV, so I was casting about for a replacement. I had an old vertical, but no good place to put it. In desperation, I clamped it to the frame of the kids' trampoline, and it works great! It's plenty rigid, and the frame is a pretty good counterpoise—the SWR is flat. Of course, I never transmit when someone's on the trampoline—too much Bounce Modulation!"



"QTH here is a Quonset hut." Bill Mandale, W2WHW, of Wayne, Pennsylvania, provided this distinctive QSL to "many, many hams around the world" from his decidedly downscale shack on the island of Guam immediately following World War II. Assigned to repair military police radio equipment, Bill was housed in his own quarters with repair shop, living accommodations and fully equipped ham station. The station boasted two BC-610 transmitters, two Hallicrafters SX-28s and a great deal of other ham gear. He operated extensively on 10 and 20 meters using a 10-meter 4-element Yagi and a 20-meter two-section 8JK at 65 feet. Still active today, Bill is looking to replace his first rig, a Stancor 10-P transmitter. He can be reached at **w2whw@msn.com**.

Racking up the mobile QSOs: Randy Hargenrader, WJ4P, of Summerville, South Carolina, reports that he's been having a ball with this homebrew mobile antenna. "It's a magnetic loop made from aluminum stock obtained from Lowe's. It is 2 square feet and it tunes 20 through 10 meters. It uses the luggage rack as part of the support to keep it clear of the roof. I'm working the world on 17 meters with 100 watts and when conditions are good, 5 watts."

SHARI TEWS, KC0KZK



Three Amateur Radio-equipped balloons take flight at the first Great Plains Super Launch.

Mark Conner, N9XTN, and Leonard Vasey, KC0DOQ, check out their Amateur Radio payloads before the first "Great Plains Super Launch," held near Manhattan, Kansas, on June 30, 2001. Several groups of balloon enthusiasts fly Amateur Radio and scientific experiments to altitudes of 60,000 to 100,000 ft, using GPS and APRS telemetry to track the payloads from launch to landing. Paul Verhage, KD4STH, is organizing a second "Super Launch" for early July.

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

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

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FT-100D

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I. Interlocked Digital Bandwidth Tracking System (IDBT)

II. Variable RF Front-End Filter (VRF)

III. 200 Watts of Transmitter Power Output

IV. Class-A SSB Operation

V. Multi-Function Shuttle Jog Tuning/ Control Ring

Features

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

HF 200 W All-Mode Transceiver

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VSPC (Variable Side Pressure Control)

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

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

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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.

TEARS OF JOY AND PRIDE

♦ I just received my November issue of *QST*, and as I scanned through it, I came across the Correspondence section. My eyes filled up with tears, joy and pride as I read the letters from all our fellow hams around the world, especially the ones that said "We are all Americans at this time." God bless America and our friends around the world.—*Joseph Pittman, KG4IQB, Birmingham, Alabama*

♦ A photo in a recent news magazine showed screaming demonstrators in a Middle East country with a sign that read something like "Americans—think why you are hated throughout the world!" However, the messages of condolences and support in the November *QST* Correspondence section show indeed that we are not alone. I have not read anything more moving and powerful than those heartfelt letters.—*Bill Cote, WD8NYW, Lansing, Michigan*

CORES MADE EASY

♦ Well, golly gee—FCC announces that CORES has replaced ULS and we all need to get an FRN instead of a TIN, ATIN or SSN because the ULS is the key to WTB. Unless, of course, you are a club, in which case you need the trustee's TIN/SSN or an IRS-assigned EIN. We learn about this in ARLB046 which, presumably, comes from the horse's mouth but frankly, I think it comes from another part of that animal's anatomy. Since the last time I dealt with FCC, the entire system has changed three times and has become so convoluted that not even a child can understand it. We have almost eliminated paper in communication with the Friendly Candy Company but the so-called automation that replaces it is so user-hostile that I am tempted not even to bother renewing my license when it expires in 2006. But of course, by then the system will have been rearranged six more times and we will need attorneys just to read the instructions. It doesn't have to be this way; witness how easy it is to shop online. The FCC is out of control, folks. Bring back Form 610.—*Rick Tavan, N6XI, Saratoga, California*

♦ Regarding: "FCC Clarifies Details of CORES Amateur Implementation." Have you counted the number of acronyms used in this article? The key word the FCC used is "Clarifies." WTB FCC CORES FRN ULS ID TIN SSN ATIN IRS EIN TIN/SSN CORES/FRN

And this was just a quick scan. I'm glad it's clarified.—*Arnold Harding, KQ6DI, Livermore, California*

KEEP THE CODE

♦ I have been a member of ARRL for 51 of my 52 years in Amateur Radio. Ending the Morse 5 wpm code requirement for licensed amateur radio operation below 30 MHz will be a blow to this wonderful hobby from which it will degenerate into a pseudo citizens band and eventually oblivion.

In the area of the USA that borders on the Gulf of Mexico, the high static level generated by a hurricane makes communication difficult to impossible other than via CW.

I urge ARRL to fight to keep the minimum CW requirement at least in the USA regardless of what the other countries do.—*H. Eddie Bertram, W5PIL, Beeville, Texas*

HANG IN THERE, STEVE

♦ In reply to Steven Cornett's letter (Correspondence, Oct 2001 *QST*), I can only say it has happened to most of us. Hang in there, Steven! I am an 83 year old and after a lifetime in electronics I got into ham radio in 1997 and am now able to operate on all ham frequencies.

Two of our local repeaters are sadly underused; if you are mobile and just give your call letters, adding the word "mobile," you are apt to be greeted with a thunderous silence. Try asking for a signal check and see what happens.

You mentioned that you joined your local radio club. If your work schedule allows:

1. Attend all meetings including "coffee klatches" if they have them.

2. Get to know the executive and talk to as many members as possible so that they know you.

3. If there are Search and Rescue exercises, try to get involved in them.

My feeling is that ham operators have a duty to society, and when we are too old to get involved it is time to "pat us in the face with a shovel."

I would be the last to say that there is no politics in an Amateur Radio club; there always has been. But try to join them rather than beat them.

By the way, I live on the third floor of a retirement center which has a MedicAlert system operating on 17 MHz. I have a 20 meter dipole bent around the balcony and have to run pretty close to QRP, but I have had very pleasant contacts with the Alaska Pacific Emergency Net at about 1630Z on 14.292 and when I can get through they sure make me welcome. Maybe it is Western hospitality but I doubt it—people are people wherever you are—some easily forgettable but most in my experience are great and I have had some great contacts on 2 meters from south of the 49th parallel.

Don't give up so soon. Persevere and always widen your contacts. Join more than one club. I belong to four!—*Art Bleue, VE7BPV, Penticton, BC, Canada*

♦ Steven, your letter could just as easily had my name and call at the bottom, and I'm probably what you referred to as a "super ham." I cannot tell you how many times I have called CQ on a 2-meter repeater only to be met with silence.

I recently moved from the Denver, Colorado area to Roswell, New Mexico. On one of our trips through northern New Mexico, I needed directions and waited for a conversation to finish. I then called one of the parties who didn't answer. So, a general call was made asking for directions. No response. Not 30 seconds later yet another person started up and I tried to break in to ask my question, only to be rebuffed with a "…it's not polite to break in"!

My answer is not to forget about Amateur Radio and move on to another hobby, but to express my feelings by setting an example. Next time you hear someone ask for a chat regardless of their political correctness ("CQ," "KB1XXX listening," whatever), jump in!

And may I suggest you try the 146.52, 55 or 58 simplex frequencies. It might take you a few calls to get an answer, but most folks who use the frequencies love to talk. I know I do.—*Alan Applegate, K0BG, Roswell, New Mexico*

♦ Steve, please don't give up on studying for your General class license. We need thoughtful, articulate and dedicated

people like you in the hobby. On top of that, getting your General will open up a marvelous world where you can make friends all over the planet, and above the planet as well.—*Bernie Poskus, KF0QS, Westminster, Colorado*

♦ I think Steve, KB1FOP, hit a nail right on the head. I've been a repeater owner/operator longer than most of your readers have been around. I've always maintained that getting someone interested in ham radio, then encouraging him to buy an HT and get on some local repeaters is not helping him.

Every repeater sort of has a character of its own as a result of the users. Repeaters are supposed to be an extension of a mobile, to increase the range one can talk on VHF/UHF. They tend to be used mostly during commuter hours and by hams who are friends due to long association.

Their QSOs sometimes are continued from "yesterday." None of this is an excuse for not helping out a new ham. But that is the way it appears to be. I try to talk to newcomers when I hear them.

If you operate on, say, 10 meters when the band is open, almost every contact is a new ham to you. Strangers talking to strangers. Now the ability to talk and find a mutual ground comes into play. A new ham would have a much happier beginning experience than in the sometimes cold world of repeaters.

New hams should look at a 45 watt unit and a decent antenna, mobile or at home. This won't solve the rudeness problem, but at least there will be a good strong signal emanating from the station.

The new ham needs to understand that he/she should become part of the club, and a club has the obligation to befriend the new ham by on-the-air welcoming as well as at a meeting.

Flowers seldom grow and bloom in rocks; they need rich soil. Let's plant our new hams in some of that rich soil of a friendly club or group.—*Van Field, W2OQI, Center Moriches, New York*

MESSED UP

♦ Where is your "Shack of Excellence" Award? Instead of glorifying the messiest shack ("2001 Messy Shack Contest," Nov 2001), *QST* should be calling us all to safety in building our radio stations. Why don't you recognize excellence in the pages of *QST* instead of slobbery? Funny, we used to have a sense of pride in our work.

The photos would be funny if they weren't so scary. Heaven knows how many electrical fire hazards, shock hazards, RF exposure hazards and imminent collapses exist in those "winning" shacks, putting those "operators" and their families in danger. C'mon, guys...we should demonstrate to ourselves and others that we are more than a bunch of idiots with a soldering gun and an extra room in our house.—*Darrell Gordon, W4CX, Raleigh, North Carolina*

♦ The article "Results, 2001 Messy Shack Contest" is a nice and very useful article. For the 27 years I'm a ham, my mother tells me "What a mess! How can you work in such a room?" Well, with *QST* I can prove that I'm not the only ham with this problem.

Not worse than N3WLP's shack but in good position. For the next contest I will send a picture.—*Jean-Marc Leclere, F1DFR, Viry-Chatillon, France*

NEW CODE TESTS: BRAVO!

♦ I certainly was skeptical when the FCC announced the code speed reduction to 5 words per minute for all classes of licensed hams. As a Volunteer Examiner for the last 10 years, I thought the latest changes would bring large amounts of applicants, and passing the code exam certainly looked as if it would be a piece of cake!

I must applaud the changes from the old system of maybe copying 25 characters in a row, then taking a 10 question quiz as an alternative. Although the code speed has dwindled to 5 words per minute, the idea is comprehension of the message being sent. Filling in the blank with the precise answer, correctly spelled and copied, is indeed a vast improvement.

We should have used this method long before we did, instead of the guesswork method employed in the past and perhaps lucky guesses on the part of the applicants.

Some were still under the false impression they could scribble down an indecipherable mess, stare at it for 20 minutes or longer and then by some miracle guess the right answers. The code test as it is now provides all the characters of the alphabet, use of numbers, slash bars, rigs, model numbers of radios and power levels of the transmitter—standard information of all ham QSOs, yet you must get it right to pass the exam!

My congratulations to the person or persons who designed the new exam—they were thinking in the right direction. Perhaps one in 10 will pass the new exam, but one day that person will come into the exam room, sit down and copy the message in its entirety. That will bring a smile to my face and I will feel good once again that a truly dedicated and proud person left the exam room.—*William L. Hilyerd, K4LRX, Henderson, Kentucky* QST

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A sturdy hand cranked roller inductor lets you quickly fly from band to band. A precision 5-digit gear driven turns counter lets you accurately return to your previous settings.

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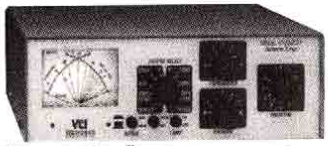

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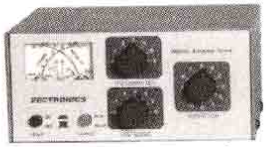

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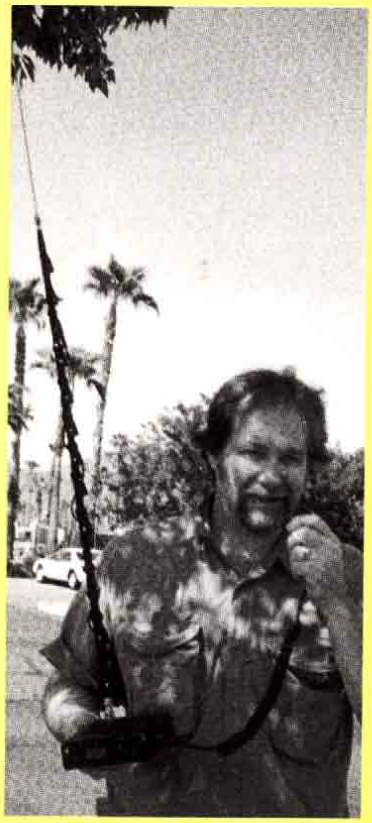

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By Doug Smith, KF6DX

Digital Voice: The Next New Mode?

Interest in digital voice systems is on the rise. Do they have a place in Amateur Radio? Come on a brief tour of the technology and see for yourself.

Why Digital Speech?

These days, it seems communications systems are going digital everywhere they can. Why are we doing it? What's wrong with well-established analog techniques?

Well, nothing much is wrong with them; in fact, they will always represent the most straightforward ways for the transmission and perfect reproduction of speech signals. But propagation paths for radio signals may be far from perfect and that's where digital voice comes in.

Digital modes offer certain advantages over their analog counterparts. Foremost among those is that digital detectors have a very clear-cut decision to make. In principle, it's easier to decide whether a received signal represents a binary zero or one than to decide exactly what analog voltage it represents. With appropriate restrictions, that's also true in practice. A second big advantage of digital modes is that errors in transmission may be made relatively easy to detect and correct. Coding schemes have been devised that produce very robust performance, even through poor propagation media. Finally, digital signals lend themselves to some advanced processing techniques that would be incredibly complex in analog. Those techniques generally achieve performance levels not otherwise possible.

In many cases, the advantages mentioned above have made it very worthwhile to employ digital transmission and processing of analog signals. Commercially, digital high-definition TV (DTV) and cellular phones have begun to show that. The resounding surge in DSP-based transceivers is certainly evidence of what's possible with signal processing; but here, I'd like to discuss how analog signals—specifically speech signals—may be transmitted and received in digital format. A look back at the history of digital speech modes reveals a lot about both how and why.

A Brief History of Digital Voice Modes

The public switched telephone network (PSTN), the communications medium to which the most people have access, went digital a long time ago. Engineers realized that to obtain the best performance over a large area, many repeaters and switches are required. Analog amplifiers, repeaters and switches introduce noise; that makes it difficult to maintain acceptable signal-to-noise ratios (SNRs) over long distances. As against that, digital signals received at a repeater or amplifier may be cleanly detected and a new, noise-free copy of those signals may be retransmitted. A digital transmission format was therefore chosen for the PSTN around WW2 time.

The first task for those working on the problem was to decide on a way to convert analog speech signals to digital. The device doing that job is aptly known as an *analog-to-digital converter (ADC)*. The job itself is called *sampling*. Samples are taken at regularly spaced intervals and the result is a string of numbers that represent the analog voltage at those discrete

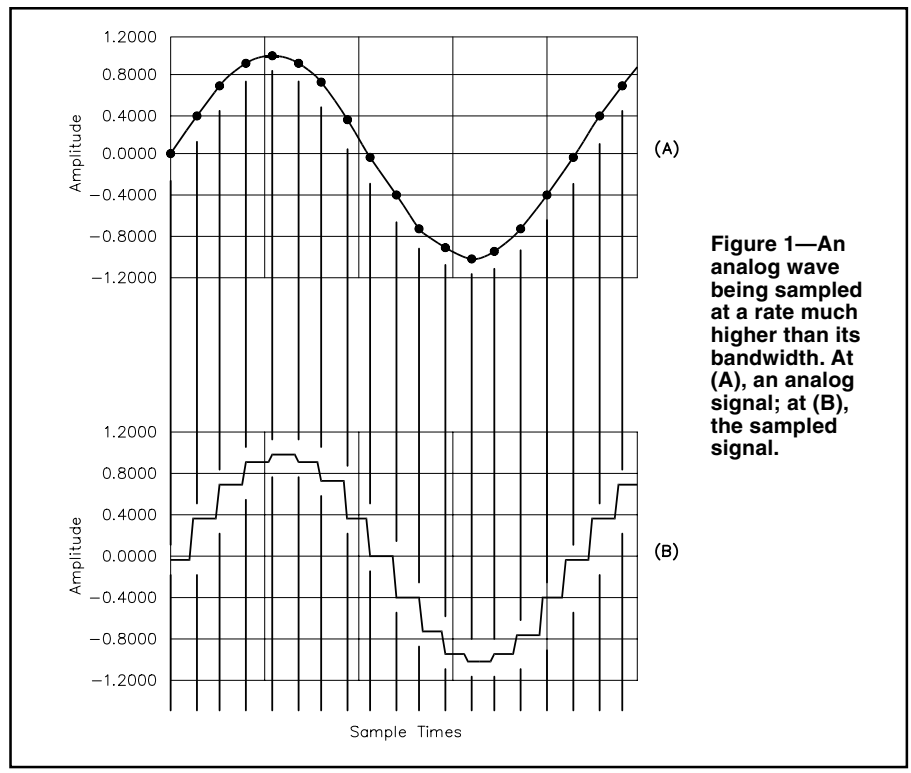

Figure 1—An analog wave being sampled at a rate much higher than its bandwidth. At (A), an analog signal; at (B), the sampled signal.

times. Each voltage sample is converted to a binary number proportional to the voltage. To get an accurate representation, many samples per second must be taken so that the voltage doesn't change much between samples. See Figure 1. The number of voltages that can be represented, therefore, is determined by the number of binary digits or *bits* available. For example, if eight bits are available, then 2^8 or 256 voltage levels are possible.

One of the first things discovered about such a scheme is that since only 256 levels are possible, the binary number chosen at any particular sample time may not correspond exactly to the actual analog voltage; it's only the closest of those available. For a large signal over time, errors are just as likely to be positive as negative; they are also just as likely to be small as large, within certain limits. Errors therefore show up as *quantization noise* in the sampled signal, which limits the total range of signal amplitudes. That range is called the *dynamic range*.

Telephone engineers recognized that if they used more bits for the smaller signals, and fewer for the large, they could achieve an increase in dynamic range. The system now in use on the PSTN in North America and Japan, called *μ-law coding*, does exactly that and extends dynamic range by quite a lot.[1] The chief penalty is that the maximum SNR is reduced slightly—not a bad trade-off. Other countries use *A-law coding*, which is slightly different.

The sampling rate must be at least twice the bandwidth of the signal being sampled.[2] The phone company decided that about 3 kHz of bandwidth was good enough for speech and so chose a sampling rate of 8000 samples per second. With eight bits per sample, the transmission rate is 8×8000=64,000 bits/second (bps). The system provides what is generally known as *toll-quality* speech and it preserves most of the important characteristics of a person's voice.

The US space program also had need for voice communications and NASA, too, recognized the value of digital transmission modes. During the 1960s, designers found that certain digital coding schemes gave them the ability to determine the transit time between transmitter and receiver, hence the distance between the two, while using a continuously transmitted digital signal. They also knew that square-wave limiting (clipping) of human voice signals increases the talk power of those signals. Clipped speech signals resemble digital waveforms, so they reasoned that they could use them as such. Combined with range-determining codes to produce a single digital bit stream, they found that gave them both voice communications and the distance information they sought.

Such a system was used by NASA for the Apollo program.[3] It's very clever; but if you think it crude by today's standards, remember that at the time, LED displays had not yet been perfected and digital numerical readouts aboard the spacecraft were provided by Nixie tubes! Since then other, more-sophisticated schemes have been developed and some even existed before the space age.

Just after WW2, researchers discovered a waveform-coding system known as *delta modulation (DM)*. In it, when an analog input wave's voltage is increasing, a binary one is transmitted; when the analog voltage is decreasing, a zero is transmitted. See Figure 2. A fixed amount of voltage change is associated with each bit so that the analog waveform may be reconstructed at the receiver through integration. It's a very simple system and it works reasonably well, but it has an inherent problem: It can't represent analog

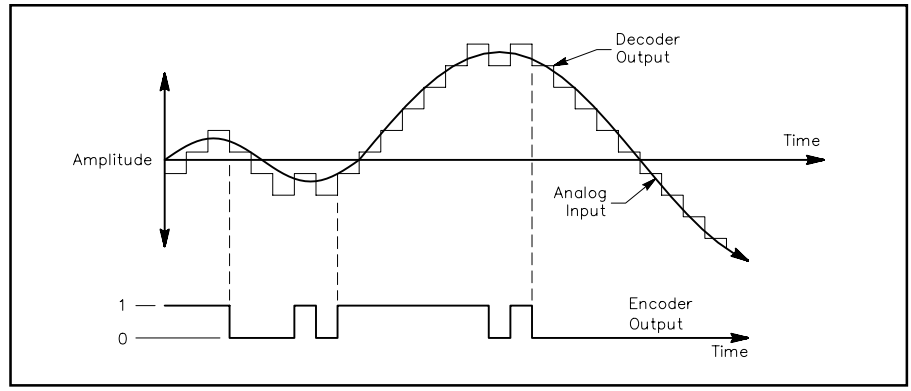

Figure 2—A representation of delta modulation (DM).

How Do I Sound?

That seems like an innocent question and it's easy to slip into non-technical terms, like "scratchy," "warm" and so forth. If you are serious about giving a meaningful response, though, some forethought is required. For scientific voice-quality evaluation, a uniform system that gauges subjective responses is necessary.

A wide variety of factors influences perceived voice quality, including amplitude and frequency distortion, echoes and noise. Anything detracting from the naturalness of speech increases the effort a listener must exert to understand what is being said. For signals that are significantly impaired, the annoyance experienced by a listener may be rated on a linear scale called *mean opinion score (MOS)*.

The MOS scale is shown below:

MOS	*Quality*	*Impairment*
5	Excellent	Imperceptible
4	Good	Perceptible, but not annoying
3	Fair	Slightly annoying
2	Poor	Annoying
1	Bad	Very annoying
0	Unusable	Total

Non-integer scores like 3.5 are possible. An MOS of 3.0 is generally referred to as "toll quality," meaning "good enough to pay for." Digital voice users may tolerate MOS levels less than three if they get additional benefits, such as simultaneous voice and data services.

While evaluation of voice systems may be made based on test-bench measurements, they must ultimately relate to the perception of the listener. A large body of voice-system evaluations exists based on MOS. Comparisons among systems are therefore readily made. MOS relates well to the readability figures commonly used in Amateur Radio signal reports.

Comparison is always part of subjective analysis. In fact, comparison is absolutely necessary to remove all bias in voice-quality evaluation. Most often, a listener is presented with two audio samples in succession; he or she is not informed beforehand which sample is the one being evaluated. Several repetitions using many different listeners may be averaged to mitigate the effects of individual listening talents. For digital voice systems, MOS may be correlated with the bit error rate (BER) on the communications link. Performance in hostile environments—those containing high levels of environmental and man-made noise—may thereby be quantified.—*Doug Smith, KF6DX*

[1]Notes appear on page 32.

waves having slopes exceeding the maximum voltage change per bit. In the 1970s, others found that limitation could be overcome by incorporating a greater slope when several ones or zeros occurred in a row.[4] Their system, called continuously variable slope-delta modulation (CVSD), produces toll quality at bit rates significantly lower than those on the PSTN and it's more immune to errors in the bit stream. Its maximum SNR, though, is generally not as good as what you get over the telephone.

Other schemes, such as adaptive differential pulse code modulation (ADPCM), have achieved some measure of success.[5] Over the last 30 years, a lot of experimentation has gone into finding better ways to characterize voice signals than those of the *waveform coders* described above. Driving that research is the need to minimize the number of bits transmitted and thus, the occupied bandwidth of digital voice signals, as well as the complexity of modems used to do it.

Intense investigation about the nature of human speech production and hearing began in earnest in the 1930s.[6] Many things discovered then remain relevant to this day.

On the Nature of Human Speech and Hearing

Investigators of human speech have found that it may be modeled as a source of excitation (wind from the lungs) followed by a filter (the voice tract).[7] They've also discovered that certain properties of a person's voice may be characterized and extracted from voice signals that lend themselves to efficient digital coding.[8] Those characteristics relate to the basic nature of human speech sounds and physical factors in their production.

Some voice coders make use of a source-filter model to achieve good speech reproduction at low bit rates. Instead of transmitting information about the wave shape of speech, they transmit spectral information about the source and the frequency response of the vocal-tract filter. That approach is a winner, largely because the spectrum of speech changes relatively slowly. That is, the frequency content of speech may be considered constant over short time frames of, say, 20 ms or so. Even over time frames longer than that, the source spectrum may remain reasonably constant. Those sorts of speech characteristics allow *parametric* speech coders a large measure of efficiency.

Human hearing has evolved so that it's good at distinguishing human speech sounds. Auditory research has revealed some interesting things about the ear-brain combination that are relevant to speech coders and decoders (codecs). Such research is conducted subjectively; that is, what someone hears (or doesn't hear) can only be determined by asking questions of the observer and attempting to infer something from his or her answers. For that reason, we define physical and perceptual parameters of sounds differently and separately.[9]

Intensity is the physical measure of sound amplitude. *Loudness* is the corresponding perceptual magnitude; it is arbitrarily defined with respect to a fixed-frequency tone at a certain intensity. We have no guarantee that two listeners will say that any particular sound has the same loudness; however, controlled experiments have shown that observers agree closely on whether one sound is twice as loud as another. So the perception of loudness may be scaled in an orderly way from soft to loud.

Frequency is, of course, the physical measure of cycles per second of a sound. The corresponding perceptual measure is known as *pitch*. This term is not to be confused with the base frequency of a person's voice. Pitch is to frequency as loudness is to intensity.

Having separate perceptual measures for sound characteristics might seem useless at first, but research has shown that loudness is not independent of frequency.[10] By now, it's fairly well-known that human hearing is most sensitive to frequencies in the range of 2-3 kHz. For instance, a 2-kHz tone sounds louder than a 500-Hz tone of the same intensity. Also, pitch is not independent of intensity. You may demonstrate that to yourself by turning up the intensity on a pair of headphones and comparing the pitch of what you hear when they're on your head to what you hear as you move them away. Don't turn the intensity up too much, though, because researchers have also found that permanent hearing loss may occur at intensity levels far below those causing significant discomfort.[11]

Human hearing seems to have certain thresholds that come into play during recognition of speech, music and other sounds. One important threshold of hearing is the ability to tell whether one sound is louder than another. In the presence of multi-frequency or *polyphonic* sounds, that threshold is influenced by how close in frequency the sounds are. For example, a quiet sound that is close in frequency to a louder sound might not be audible at all. Such *masking* is important in speech coding because it implies that the number of discrete intensities and frequencies to be represented may be reduced.

Another threshold of hearing is the ability to tell whether one sound is higher or lower in frequency than another. Although it's influenced by intensity, experiments generally find that threshold increases as the frequencies of sounds increase. In other words, it's harder to discern subtle differences in frequency among higher-frequency sounds. The significance of that in speech coders is that the number of discrete frequencies that have to be represented may be reduced.[12]

Much of the energy in human speech above 3 kHz is produced by sounds like "p" and "f," which are inherently noisy. It's therefore no surprise that our hearing has not developed good frequency discernment up there: Not much useful information is contained in those frequencies. There may be physical reasons for that as well, but it's interesting that our ability to understand speech closely matches our ability to communicate verbally.[13] For example: The fastest talker can go about 300 wpm, which is about the limit of most listeners' comprehension.

Technical Goals of Digital Voice Systems

All the above directly relates to our desire and ability to reduce the data rate of digital speech signals. Lower data rates are good because they may be transmitted in smaller bandwidths and recovered with higher SNRs using narrower receiver bandwidths. A definite trade-off exists, though, between data rate and speech quality. To illustrate what's possible, consider the following example that draws on several key concepts in speech coding.

Let's say we want to build a speech coder—for a single language only—that uses a bit rate approaching the minimum possible bit rate. We may not know what that minimum is, but we want to see if we can find it. Let's also say that cost and complexity aren't big concerns. Occupied bandwidth is our chief concern; other goals are secondary.

We decide to employ a speech-recognition engine at the transmitter that identifies individual words from the talker. That's already being done with much success, so it's not a big technical leap of faith. We assume that a vocabulary of about 65,000 words is enough to support all the sentences the speaker is likely to construct. Each word may then be represented by a 16-bit code, since $65{,}000 \approx 2^{16}$. The speech-recognition engine looks up a 16-bit code for each word and puts them together into a serial bit stream. Ignoring the requirements for synchronization, pauses between words, error detection and correction, a person talking at 150 wpm generates data at a rate of (150 wpm)(16 bits/word)(1/60 minutes/second) = 40 bps. Many languages have a heck of a lot more words than just 65,000 and some people might talk faster, but you get the idea.

Now that signal can be coded into an

analog format that occupies very little bandwidth. The inverse process is employed at the receiver, terminating in a speech synthesizer that drives an audio power amplifier and loudspeaker. See Figure 3.

What are the drawbacks of this scheme? Well first of all, it's rather elaborate and expensive. Secondly, the software has to be different for each language supported. You'd have to know which language was being used ahead of time to correctly decode messages. Finally, the listener at the receiver can't tell who is speaking unless he or she reveals it; none of the speaker's emotions or inflection is transmitted. The listener can't tell if the person has a stuffy nose or whether there are any other voices or sounds in the background. Speech from the decoder sounds robotic and it's difficult to listen to; comprehension has been sacrificed to some extent because of the lack of important speech properties. The conclusion is that we have reduced the bit rate too much and traded off too many important speech characteristics. The bit rate must obviously be increased to improve things. That brings us to some definitions about what is acceptable for digital speech in Amateur Radio. The following restrictions ultimately determine the lower bit-rate limit.

For Apollo astronauts or military personnel, it's not always very important to be able to tell who is speaking, so long as the information is communicated. Amateur Radio is a different story, because how something is said and how it sounds is sometimes as important as what's being said. We may deduce, then, that digital voice for hams must be of high quality so that it's difficult to tell the speech was coded.

Amateurs often work with signals near the SNR limit of detection. In that regard, digital voice systems need to perform at least as well as existing analog formats to become popular. Digital coding opens some interesting possibilities for redundant transmission, such as sending the data many times and comparing data sets to achieve a large measure of forward error correction. Data transmission rates may also be artificially slowed to aid reception, then sped back up at the receiver after all the data have been received. How that kind of thing will affect phone contests and distance records is open to speculation.

I suspect that many hams would like to try digital voice without having to buy a new transceiver. That means digital voice systems may initially take the form of external boxes that interface to existing transceivers at the audio level. Such boxes are already being developed.[14] Aside from speech-quality goals, certain other benefits may come to digital voice users. The ability to embed certain identifiers in a digital voice transmission provides significant benefits. Transmissions may be automatically identified as to their source, destination, protocol, and other parameters. As that kind of thing is made possible, cellular and trunking systems come within reach.

Is Digital Voice Legal on the Amateur Bands? If So, What Frequencies and Emissions May Be Used?

Part 97 of the FCC rules states that phone signals—whether analog or digital—must remain in the phone subbands.[15] That's mainly a concern for the eight HF bands where phone is used. In the VHF bands above 10 meters, phone is legal for US-licensed amateurs at all allocated frequencies, with the exception of 50-50.1, 144-144.1 and 219-220 MHz. The rules also say that no transmission "... shall occupy more bandwidth than necessary for the information rate and emission type being transmitted, in accordance with good amateur practice."[16] That's purposefully vague: The Amateur Radio Service is free to experiment with almost any mode you can think of, as long as it's not wasteful of bandwidth. You can take it to mean that a digital voice transmission should not occupy more than the equivalent SSB transmission on congested bands or the equivalent AM or FM transmission on sparsely occupied bands, such as 10 meters. While the symbol rate (baud rate) of digital data transmissions is limited on many US ham bands, the baud rate of digital phone transmissions is unlimited![17]

What is the emission designator for digital voice? Well, the first symbol of an emission designator tells what modulation format is being used. For an SSB transmitter, that is letter "J." For an FM or PM transmitter, the letter is "F" or "G." The second symbol tells about the nature of the modulating (baseband) signal. The most likely situation in amateur operation is the application of a modulated audio signal to the input of a transmitter. The symbol for that is numeral "2." The third symbol tells about the type of information being transmitted. That would be letter "E" for phone. So the most likely emission designators for digital voice would be J2E or F2E.

It may be weird to hear digital signals on the phone bands and courtesy dictates that operators explain—using analog phone—what's going on until general understanding is reached on the use of digital phone. The same kind of situation occurs during HF slow-scan television operation (SSTV, designator J3F) and it's been handled admirably by practitioners. Note that digital video is also perfectly legal on the HF phone bands (designator J2F), although it hasn't seen much use.

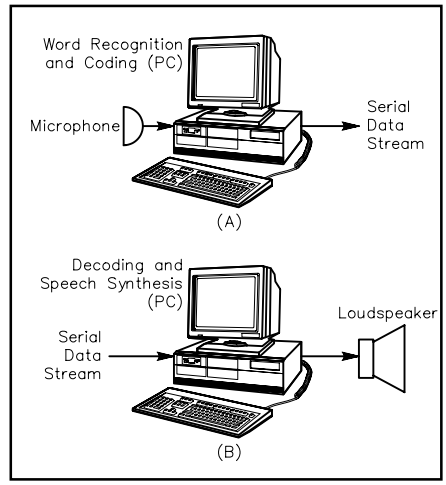

Figure 3—A digital speech system occupying very little bandwidth in transmission—but you have to know what language is in use.

What is the State of the Art Now? Where Does Amateur Radio Come In?

International bodies have drafted several standards for audio codecs and modems; many are seeing use on the Internet and elsewhere.[18] Work continues in commercial and academic sectors, as well as in Amateur Radio. Those efforts are making it easier for more amateurs to get involved—and involved we are.

The ARRL is making a significant commitment to digital voice and several other developing technologies. Those technologies relate to one another well; they reflect global trends toward more effective use of our radio communications spectrum. They also represent excellent opportunities for Amateur Radio to make significant contributions to the advancement of the communications art. The possibilities are very exciting, since they may constitute the next big changes in our service.

The FCC is very interested in amateur work in this field. They recognize that the Amateur Radio Service is an ideal place for experimentation with and testing of those concepts. Since we're a large and organized force of dedicated communicators, we belong at the forefront of their development. That notion is alive and well.

Considerable work is already being done by amateurs. A couple of years ago, Charles Brain, G4GUO, and Andy Talbot, G4JNT, started working with it. They produced a system satisfying the technical goals outlined above that was described in a paper summarizing their accomplishments (see Note 17). Tucson Amateur Packet Radio (TAPR) is producing a kit of this digital voice codec that's now available.[19] It helps you to get started in digital voice with a minimal invest-

ment in time and hardware.

The system employs a digital speech coding scheme known as *advanced multiband excitation coding (AMBE)*.[20] Data rates up to 9600 bps are supported and the rate may be changed for experimentation. Coupled to a suitable modem and transceiver, it supports digital voice operation in both half-duplex and full-duplex modes. While AMBE is a complex algorithm, the significant details of its operation are in the public domain.

AMBE codecs provide high recovered speech quality and they've won spots in some very prominent systems, including Iridium and APCO 25. APCO 25 is a project to provide reliable digital voice communications to the public-service community.

Where Do We Go From Here?

Even with a digital voice codec in hand, you're going to need a modem that supports 2400-9600 bps: Many TNCs can do it. Those rates are relatively easy to achieve using audio frequency-shift keying (AFSK) and audio phase-shift keying (APSK) when 15 kHz or more of bandwidth is available, such as at VHF and above. Because of dispersive propagation on HF, though, those rates are difficult to sustain and some innovative techniques must be employed. Therefore, high-speed HF modem design is one area that invites further work.

Some of us are working toward a single DSP system for digital voice that incorporates both the codec and the modem in software or firmware. The work is being undertaken on DSP development platforms that have data-conversion hardware (ADCs and DACs) included. Others have suggested that fast PCs, equipped with sound cards, might be capable of digital voice operation meeting the goals outlined above. That is another area ripe for experimentation.

Digital repeaters or "digipeaters" may be desirable on VHF and above to extend the range of digital voice communications. It might even be possible to build digipeaters that simultaneously handle more than one QSO.

Summary

I guess there's no going back now that we've identified and proven the benefits of digital communications technology. There may be other, as-yet-unidentified fruits to harvest in the quest for practical digital voice systems.

For more information about digital voice, point your browser to **www.arrl.org/tis/info/digivoice.html** and take a look at some of the information and links provided there. Reports of the TTF, TWG and DVC are available at **www.arrl.org/announce/reports-01/tt.html**. League comments on so-called "software-defined radios" may be found at **www.arrl.org/fcc/arrldocs/et-0047.pdf**.

Doug Smith, KF6DX, a member of the engineering staff of Ten-Tec Corporation, serves as chair of the ARRL Digital Voice Committee. He is also editor of QEX/Communications Quarterly *and author of the DSP chapter of* The ARRL Handbook for Radio Amateurs. *He can be reached c/o ARRL Headquarters, 225 Main St, Newington, CT 06111;* **kf6dx@arrl.org**.

Notes

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[16]47 CFR 97.307(a).
[17]P. Rinaldo, W4RI, "Is Digital Voice Permissible under Part 97?" sidebar to C. Brain, G4GUO, and A. Talbot, G4JNT, "Practical HF Digital Voice," *QEX/Communications Quarterly*, May/Jun 2000. The article may be found on *ARRLWeb*, **www.arrl.org/tis/info/digivoice.html**. "The Help Desk," elsewhere in this issue, contains an updated list of HF band plans.
[18]See, for example, *G.723.1*, ITU.
[19]For details, visit the TAPR Web site, **www.tapr.org**.
[20]Information and audio samples are available at **www.dvsinc.com**.

A Continuing Legacy of Innovation

Around the turn of the last century, experimenters began working with electromagnetic waves. This gave birth to Amateur Radio and wireless communications by a mode known as "spark."

It didn't take long for amateurs to find better and more efficient modes of communicating via wireless. Spark soon gave way to CW, then to AM voice. As time progressed, technology advanced and SSB brought spectral efficiency beyond the capabilities of AM. While amateurs have utilized RTTY techniques for many years, the explosion in interest did not occur until the computer became a popular tool in amateur stations, spawning a variety of digital modes. Now, at the turn of another century, it is time for us once again to lead the challenge for new modes in the Amateur Radio Service.

Early in 2000, the ARRL Board of Directors unanimously approved a recommendation from its Technology Task Force to create a Digital Voice Working Group. The TTF's Technology Working Group had performed a survey of radio amateurs throughout the world, seeking input on new technologies for the Amateur Service. The survey revealed that digital voice was one of the top recommendations. Subsequently, ARRL President Jim Haynie, W5JBP, appointed a Digital Voice Working Group with the objective of paving the road for digital voice to become a reality in the Amateur Service.

For a new mode to be widely accepted, participation from a wide geographical area must be sought. The working group involves radio amateurs knowledgeable in relevant techniques from the United States and Europe, where significant digital-voice work in the Amateur Service has already been performed.

Under the guidance of this working group, many amateurs should soon be enjoying yet another new mode of communication. Yet to come will be two additional working groups with similar objective assignments: high-speed digital networks and multimedia, and software-defined radio.

Moving from spark to CW and from AM to SSB were important events. The next generation of changes should be equally outstanding. For those who say nothing new comes from our Service anymore, and that the technology train left the amateur station years ago, I say "Listen up!" The interesting thing about that train is that it always comes back to the station looking for new passengers, and the Amateur Service has a long, continuing tradition of loading the train to capacity each time!—*Joel Harrison, W5ZN, ARRL First Vice President, Chair, Technology Task Force*

By Dick Stroud, W9SR

Six Meters from Your Easy Chair

Take one abandoned lawn chair, add some ham ingenuity, and voilà: an effective 6 meter squalo.

If you have a discarded aluminum folding lawn chair, chances are you have the essential elements of an effective 6 meter antenna. After one of our lawn chairs was scrapped because of deteriorating fabric, the aluminum legs were given a rebirth as the elements for a 6 meter squalo. See Figures 1 and 2.

The thin wall tubing measures 0.975 inch OD and the critical 90 degree bends have been neatly done by the chair manufacturer. You will only need to cut the tubing to the dimensions shown. A 12 inch length of 1 inch ID tubing telescopes over the elements to join the two sections. A 3 inch length of Teflon is inserted inside the tubes at the opposite side to stabilize the assembly. One inch Teflon rod (available from Small Parts, Inc[1]) can be turned down as necessary by any machine shop. The entire assembly is bolted together with stainless-steel hardware.

The two capacitance discs are of 0.050 inch aluminum sheet and are cut to a diameter of $3^3/_4$ inches. A center hole is cut in each disc to just clear the tubing OD. Small L brackets hold the fixed disc to the tubing using the same screw that attaches the Teflon spacer. The other disc, which is adjustable, also uses two brackets but one leg of each bracket is extended parallel to the element and clamped in place with a stainless steel hose clamp. The capacitor plates should be parallel and will be about $^{15}/_{16}$ inch apart if the dimensions are followed.

The gamma assembly is made from a

[1]Small Parts, Inc, 13980 NW 58th Ct, PO Box 4650, Miami Lakes, FL 33014-0650, tel 800-220-4242 (orders), 305-557-7955 (customer service), smlparts@smallparts.com; www.smallparts.com/.

Figure 1—Before: The humble lawn chair, soon to be transformed.

Figure 2—After: The 6 meter squalo, ready for action.

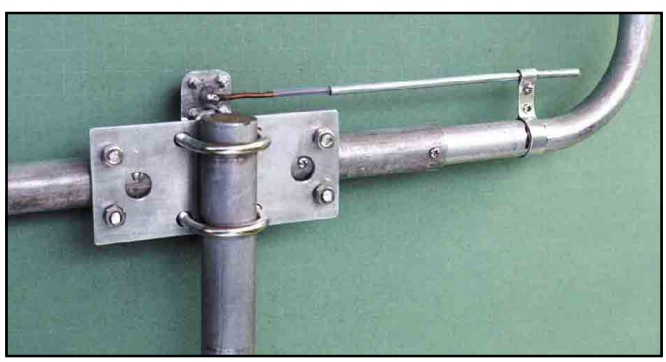


Figure 3—Gamma tuning assembly and mounting system. Two $^1/_2$ inch holes are drilled through the aluminum mounting plate to clear the screw heads when the antenna is in the vertical plane.

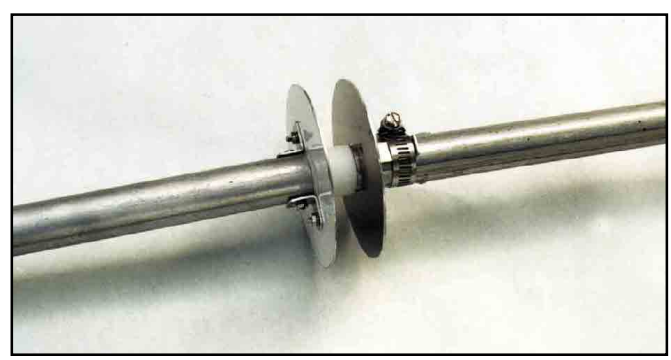


Figure 4—Detail of the tuning disk construction. The fixed disk is held in place with a screw through the assembly, and the movable disk is clamped using a stainless hose clamp. A Teflon spacer provides support and high voltage insulation.

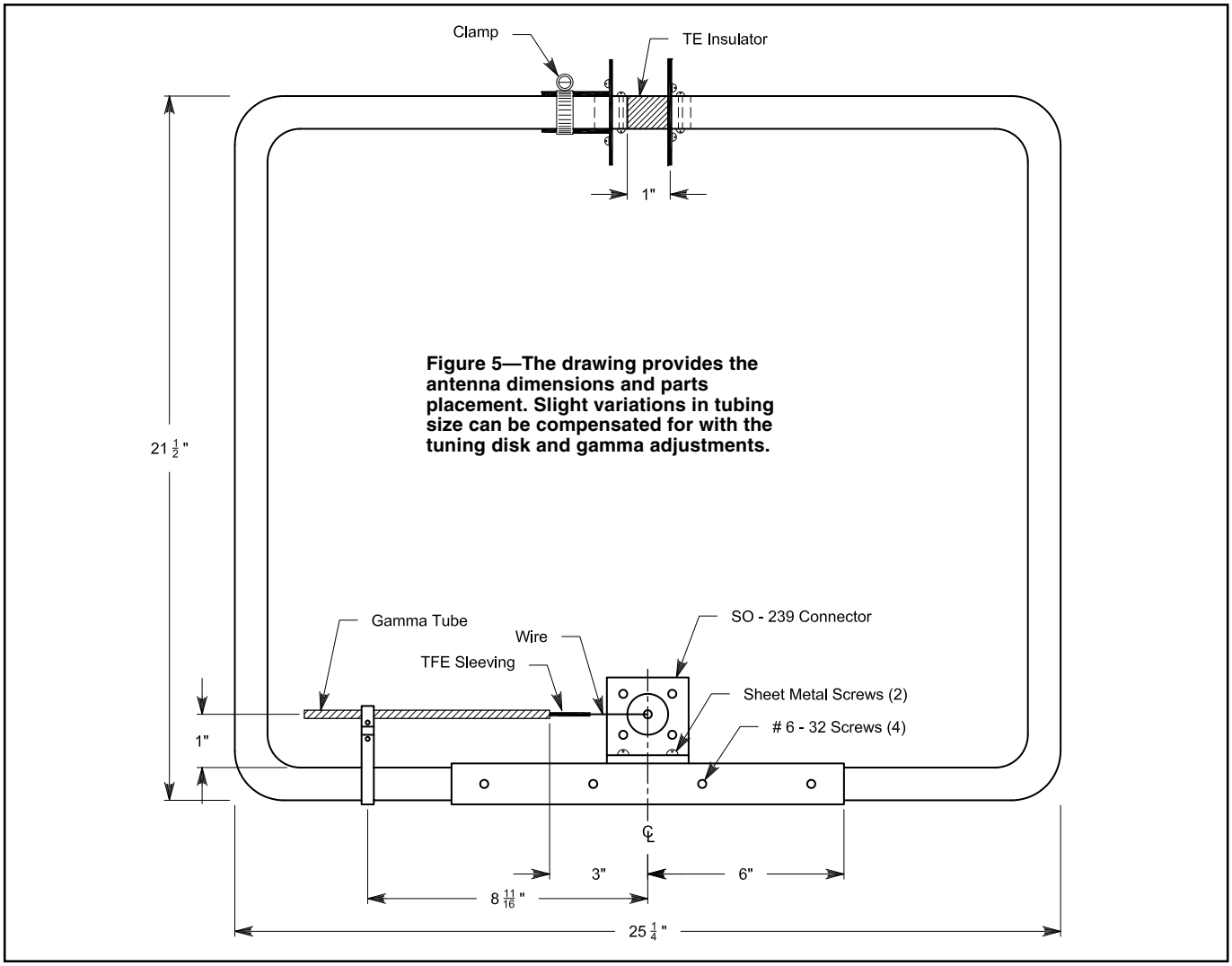


Figure 5—The drawing provides the antenna dimensions and parts placement. Slight variations in tubing size can be compensated for with the tuning disk and gamma adjustments.

7 1/4 inch length of 0.225 in OD thin-wall aluminum hobby tubing with the center element being a 9 3/8 inch length of 0.125 inch diameter (8 gauge) soft copper wire. Teflon sleeving over the wire makes for a good fit inside the aluminum tube. The sleeving should extend 1/2 inch beyond the length of the wire to provide necessary insulation. A 1/2 inch wide double clamp is formed of 0.030-inch aluminum sheet to support the gamma tube 1 inch above the element. The wire is soldered to the center pin of an SO-239 connector mounted in an aluminum bracket at the center of the assembly (see Figure 2). The bracket is fastened to the tubing at the center with sheet metal screws.

Adjustment is made using an MFJ-259B antenna meter with the antenna supported on a mast, in the clear and away from metal objects. Adjust the tuning discs by temporarily loosening the hose clamp and sliding the adjustable disc as necessary. (See Figure 3.) This is a critical adjustment and should be done carefully. If the minimum SWR is above your desired frequency, the discs should be moved closer together and if the frequency is below the desired frequency they should be moved farther apart. Because of the high Q this will probably take several attempts. The hose clamp should be tightened when the frequency is properly set. The next step is to adjust the gamma rod, if necessary, to lower the SWR to 1:1. This is done by moving the gamma attach point and by sliding the tube through the clamp to change the series capacitance. Chances are you will be at a very low SWR with the dimensions shown. After alignment the 2:1 SWR bandwidth is 333 kHz.

The 0.125 inch thick aluminum mounting bracket is 2 3/4 inches by 6 inches and stainless U bolts are used to attach the antenna to a mast. (See Figure 4.) The antenna can be used vertically or horizontally by turning the bracket 90 degrees. The antenna is ideal for mounting horizontal on one leg of a triangular tower, in which case the coax should enter from the top with the connector sealed to prevent moisture entry. Construction details are provided in Figure 5.

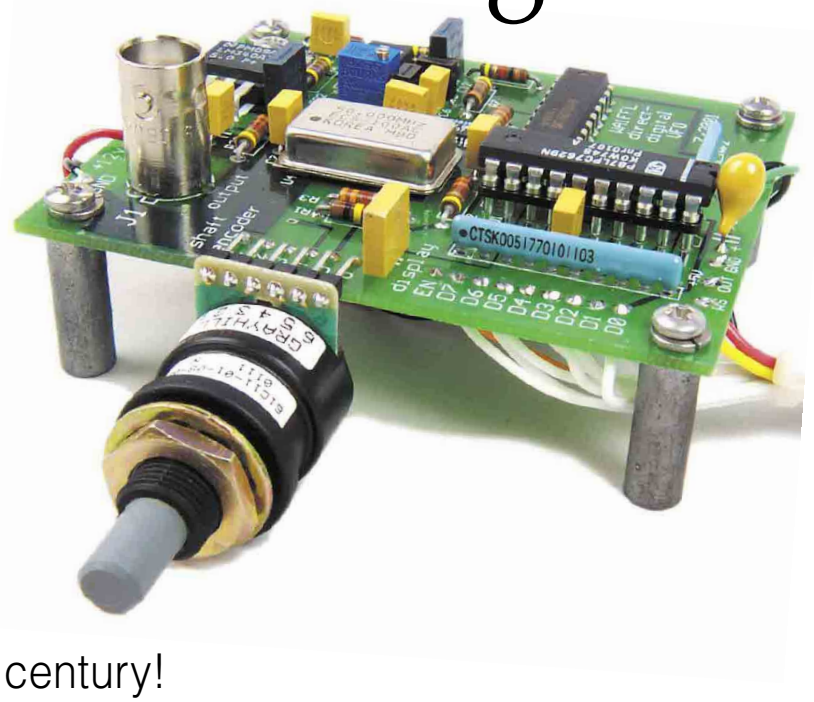
The antenna was tested in the vertical plane during the July CQ VHF contest and 47 grids were worked including Cuba and Puerto Rico. This was with the antenna on a test stand at 20 ft above ground and with 40 W output. If placed higher, such as on an existing station tower, the antenna would do an outstanding job. Since it is not directional it is good for monitoring for surprise band openings that could be missed with the station Yagi.

It could be used for mobile operation with a suitable support. Without the mounting hardware, the antenna weighs less than 1/2 pound.

Dick Stroud, W9SR, is a retired electrical engineer who spent over 30 years designing military electronics equipment. He was first licensed in 1939 and obtained the Extra class ticket in 1952. You can contact the author at PO Box 73, Liberty Center, IN 46766-0073; **dikw9sr@citznet.com**.

By James D. Hagerty, WA1FFL

A Compact, Direct-Digital VFO



Once available only in expensive commercial transceivers, the DDS VFO—with its accuracy, flexibility and precision—is now a home-brew reality. The VFO described here is compact, has a low parts count and is the perfect way to bring your homemade gear into the 21st century!

If you've been home-brewing radio projects for any length of time, you know that, until quite recently, the thought of using a DDS VFO for your next radio project was only a dream. But thanks to the march of technology, reduced pricing of single-quantity DDS ICs and their ever-increasing integration and performance, DDS technology is now within just about every builder's reach.

The DDS VFO described here is a complete, digitally tuned, variable-frequency oscillator (VFO) with six tuning step sizes—100 kHz, 10 kHz, 1 kHz, 100 Hz, 10 Hz and 1 Hz. The compact unit features a software-controlled spot/key line, a 50-Ω output driver using an RF op amp, a BNC output connector and a compact (2.5 × 3.0-inch) board size. The shaft encoder that tunes the VFO also has an integral pushbutton switch to select step sizes.

The VFO uses a tiny DDS (direct digital synthesis) integrated circuit that generates a digitally derived sine wave with a high-speed clock, cosine look-up table, 32-bit phase accumulator, frequency register and a digital-to-analog converter (DAC). (To brush up on the subject before you dig in, a well-written and interesting tutorial on direct-digital synthesis is available on CD-ROM from Analog Devices.[1])

Originally designed to replace the analog VFO in the W7ZOI/K5IRK high-performance receiver detailed in the 1990 *ARRL Handbook*,[2] the VFO tunes downward from 5.5 to 5.0 MHz to mix with a 3.5 to 4.0 MHz signal to produce a 9-MHz intermediate frequency (IF). The *Handbook* receiver is a real classic that is still viable today. It's an excellent foundation for building multi-band receivers. For added versatility, I've also programmed the single-band VFO for conventional tuning on 80, 40, 30 or 20 meters. The displayed frequency range could be extended by modifying the display software, which simulates a 0-500 "digital dial" (with three places after the decimal).

In the March 1996 issue of *QST*, Jay Craswell described a VFO controlled by a Harris DDS chip.[3] Like many other readers, I built one of Jay's kit VFOs. His design, one of the first published DDS VFO circuits, stimulated my interest in learning about this new technology.

[1]Notes appear on page 38.

In the same time period, several new DDS processors were introduced by Analog Devices. Some of the larger chips had staggering levels of integration. For example, the AD9854 (a big brother of the chip used here) features a 300-MHz clock rating and two built-in, 12-bit D/A converters, and multiple frequency- and phase-control registers.

More recently, other advances in integrated circuits have included microprocessors with integrated clock oscillators, LCDs with integrated, on-board data conversion circuitry and further strides in RF op-amp technology, simplifying DDS VFO design even further.

As I started the design process, a smaller device, the AD9835, appeared to be ideal for an amateur VFO. It has a 50-MHz clock speed rating, a built-in 10-bit DAC and two frequency registers. Unlike the Harris chip, it uses serial control signals. I decided to design a scratch-built VFO that used the new technology, banking on its potential for improved miniaturization, better close-in spurious energy suppression and simplified circuit architecture. [Editor's note: The ARRL Lab measured phase noise at a level about as low as the Lab can measure. Frequency

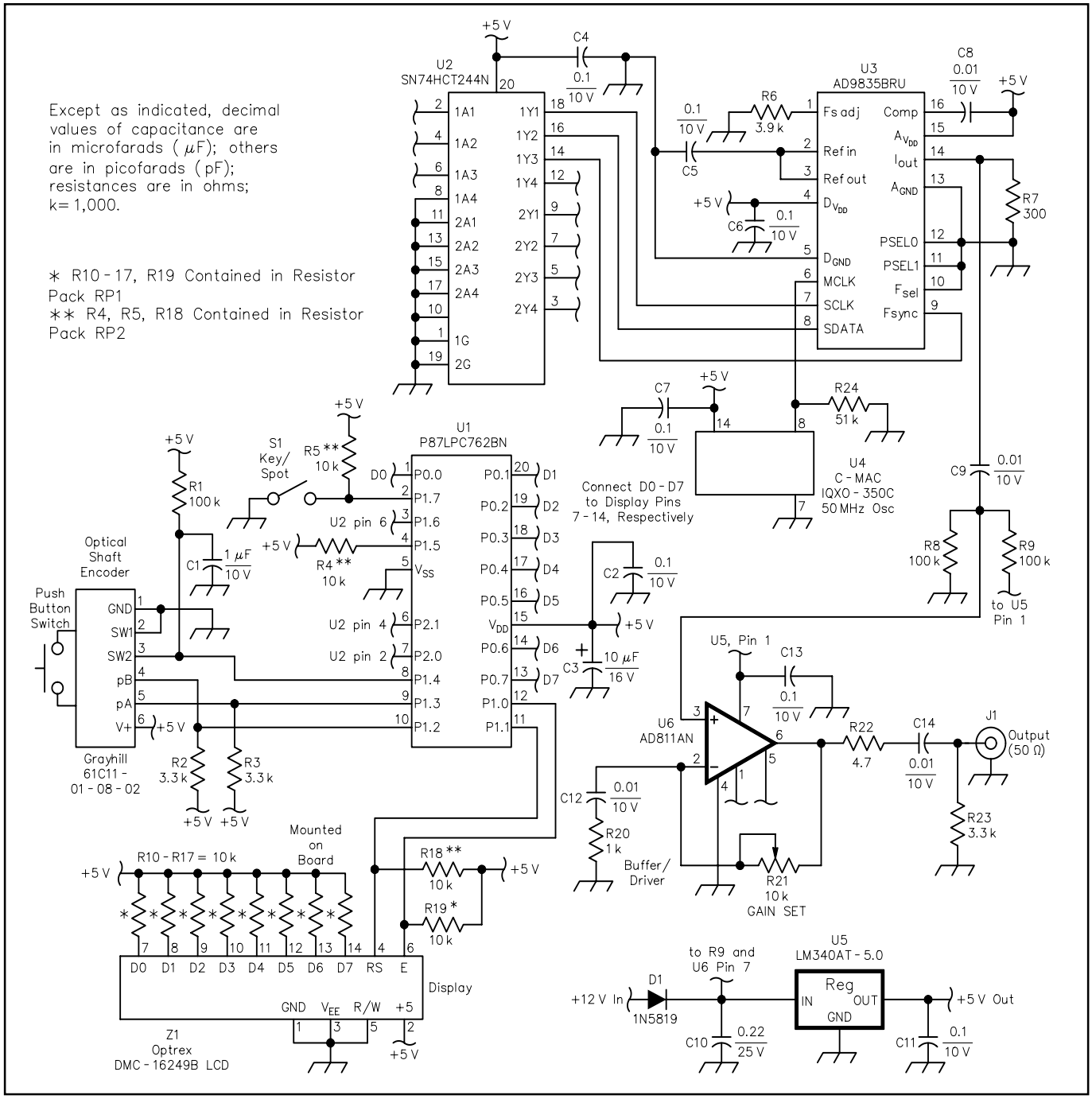
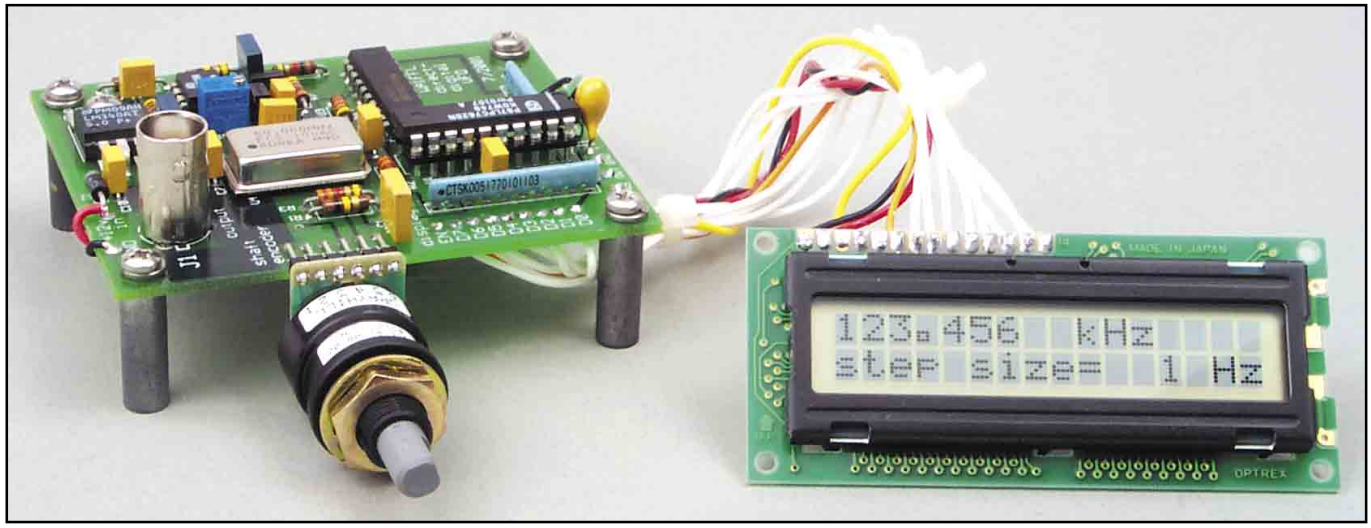


Figure 1—The Digital VFO schematic diagram and parts list.

C1—1 μF ceramic, 10 V or higher.
C3—10 μF tantalum, 16 V.
C2, C4, C5, C6, C7, C11, C13—0.1 μF, 10 V or higher, ceramic.
C8, C9, C12, C14—0.01 μF, 10 V or higher, ceramic.
C10—0.22 μF, 25 V or higher, ceramic.
D1—1N5819 Schottky diode (General Semiconductor), Digi-Key.
J1—PC-mount BNC connector, Amphenol 31-5329, Digi-Key.
R21—10 kΩ potentiometer, Bourns 3266W, Digi-Key 3266W103-ND.
RP1, RP2—10 kΩ resistor arrays (nine- and five-resistor versions, respectively) made by CTS, Digi-Key part numbers: RP1: 770-101-R10K-ND; RP2: 770-61-R10K-ND. These are used for R10-17, R19, R4, R5, and R18.
R1, R8, R9—100 kΩ, ½-W carbon film, 5% tolerance.
R2, R3, R23—3.3 kΩ, ¼-W carbon, 5%.
R6—3.9 kΩ, 5%, ¼-W carbon.
R7—300 Ω, ¼-W, 5%, carbon.
R20—1 kΩ, 5%, ¼-W, carbon.
R22—4.7 Ω, ¼-W, 5%, carbon.
R24—51 kΩ, ¼-W, 5%, carbon.
S1—SPST switch, C&K, Digi-Key (use surplus if available).
U1—Philips P87LPC762BN microprocessor. Available from New Tech Solutions, 781-229-8888.
U2—TI SN74HCT244N digital buffer.
U3—Analog Devices AD9835BRU direct-digital synthesizer (available in surface-mount package only). For distributors, call Analog Devices, 781-329-4700.
U4—50-MHz DIP oscillator, 10-TTL-load capability (C-MAC IQXO-350C, Advanced Component Group, Shrewsbury, MA, tel 508-845-2023; or ECS ECS-100AC).
U5—National LM340-AT-5.0 regulator.
U6—Analog Devices AD811AN operational amplifier.
Z1—LCD, 2×16 lines, Optrex DMC-16249B or DMC-16204 or Varitronix MDL-16265-LV, all available from Digi-Key. The Daewoo 16216L-5-VSO will also work and is available from All Electronics (catalog part no. LCD-53). Note: This display has an LED backlight: Pin 15 = +5 V; pin 16 = GND (place a 20-Ω, ½-W resistor in series with pin 15).
Optical Shaft Encoder—Grayhill 61C11-01-08-02.
20-pin IC socket for microprocessor—Digi-Key no. ED3120-ND.



The Direct-Digital VFO, with 2×16 LCD display. Any of several displays will work with this project. See the parts list in the caption for Figure 1.

accuracy was about 4 ppm, or 31 Hz at 7 MHz. Power output was measured at +13 dBm, more than enough to drive common mixers. Close-in spectral plots provided by the author showed spurious output well within FCC standards.]

The AD9835 data sheet specifies a maximum output frequency of 25 MHz with a 50-MHz master clock frequency. Because outputting a 25-MHz signal with the chip itself running at 50 MHz tends to produce a pretty ragged carrier, Analog Devices actually recommends programming the chip for a carrier frequency of 20 MHz or less.

In this VFO design the output frequency is also limited by the frequency response of U6. Interestingly, because the output frequency is controlled by 32-bit numbers that are loaded into the DDS phase accumulator, some output frequencies across a given 500-kHz band will appear noisier than others on an oscilloscope. This is normal and expected behavior with this type of numerically controlled oscillator.

The Microprocessor

As detailed in the schematic shown in Figure 1, the microprocessor is a critical component of any DDS system. It decodes the shaft encoder, sends updated information to the display, selects the tuning step size and calculates the new 32-bit constant for the frequency-control register inside the DDS (AD9835), thus "tuning" the output signal.

Because I had a reliable (although 10-year-old) 8051 assembler at my disposal, I chose to use an 8051-family subset. The Philips P87LPC762BN is a new chip design that is code-compatible with the time-proven 8051 instruction set. The "LPC" stands for "low pin count."

I was able to develop all of the software for the VFO's microprocessor using my trusty old 8051 assembler made by American Automation (no longer supported). If you don't happen to have access to a similar device, many 8051 assemblers are still available, including a deluxe model by Keil that's sold by Ceibo (**www.ceibo.com**). The Keil unit, recommended by Philips for its new microprocessors, supports virtually any 8051 variation. Other 8051 assemblers are available as shareware on the internet, but be careful of viruses when downloading unfamiliar products. Another Philips recommended 8051 development tool is available from Raisonance (**www.amrai.com**). All 8051-family derivatives are supported. The product I used to program the microprocessor was a Philips 8xC76x programmer, which cost about $100. It's PC-controlled, menu-driven, convenient and worked well.

In the process I discovered that many microprocessors are now available only as write-once programmable chips. The windowed, UV-erasable parts are becoming rather rare. This is the case for the Philips unit. Manufacturers say that it costs more to make the ceramic windowed case than it does to make the microprocessor itself. Still, I miss the flexibility of UV-erasable parts.

The Philips micro has only 20 pins and some unique, appealing features, including an internal 6-MHz clock oscillator and a built-in initial reset circuit, which makes it possible to configure the chip to execute code with no external components—a boon to miniaturization and EMI reduction.

The Circuit

The DDS control signals generated by the microprocessor (enable, clock and serial data) were all probed with a logic analyzer to confirm that they produced the correct timing and data waveforms.

The microprocessor (U1) reads the Grayhill shaft encoder and determines the direction of the coded "clicks." It translates these tuning inputs into a higher or lower tuning number for the direct-digital synthesizer, the AD9835, generating the proper serial control signals to download the new constant.

U2 is a buffer/line driver recommended by Analog Devices to provide the fast-rise-time signals needed by the AD9835. The '9835 is clocked by U4, a 50-MHz, TTL-compatible, dual-inline-package (DIP) oscillator. The two types that I used (C-MAC and ECS) were specified for 10 TTL loads.

The C-MAC oscillator (part no. IQXO-350C) has a stability tolerance of ±100 parts per million (ppm) and an accuracy spec of ±25 ppm. This particular part is also available in ±5 ppm and ±10 ppm tolerances (contact C-MAC, 919-474-3500, ext 3554.) The Analog Devices AD9835 evaluation board actually used one of the IQXO-350C units, which was terminated with a 51 kΩ resistor.[5]

A software-controlled keying line is provided in the VFO package. The DDS can be initialized and even tuned in "sleep" mode until the operator is ready to turn on the AD9835's output stage. This is accomplished by polling one of the microprocessor port lines and providing the correct control signals to enable the DDS output.

The display is an affordable, parallel-loaded unit made by Optrex.[6] Serial-loaded displays were investigated, and several were available with on-board conversion circuitry, but the price of these units approached $50. The parallel dis-

play worked quite well, the only compromise being the number of pins that are tied up by the microprocessor driving it. The software was written around timing diagrams provided by the manufacturer.

Optrex recommends the use of pull-up resistors, which I implemented with an integrated resistor pack. The displays mentioned in the parts list, including an older Varitronix unit, all worked well.

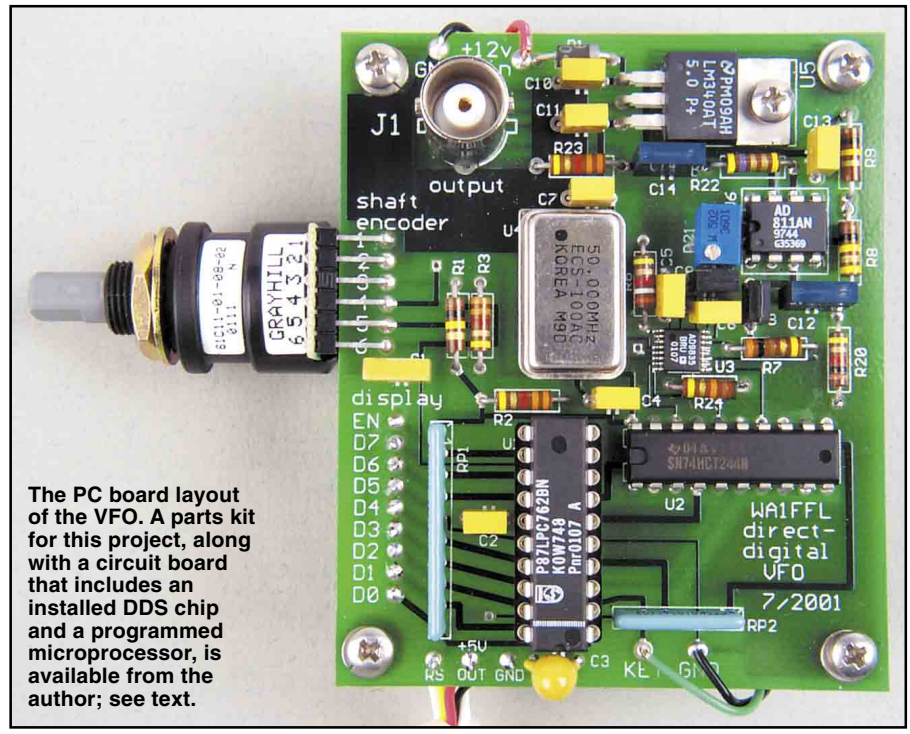
Finally, U6 buffers the DDS output and provides a small amount of gain in the lower HF region. This op amp, an Analog Devices AD811, can drive a 50-Ω load. In the output stage, R22 provides extra load stability and C14 gets rid of the dc offset. R23 provides a discharge path for C14 during testing, but is still large enough to avoid loading down a 50-Ω connection. A BNC output connector is provided for easy cabling to mixers, etc.

A number of frequency bands were programmed up to 14 MHz. At frequencies approaching 10 MHz, the output waveform begins to look a bit triangular. Analog's Bill Chestnut suggested I use some output filtering if the signal is amplified as-is with no conditioning. On the other hand, if the signal drives a diode-ring mixer (used in the W7ZOI/K5IRK design and many home-brew circuits), it will be clipped, anyway.

Once again, the application will determine whether filtering is required. Following the VFO with a high-Q tuned amplifier may be sufficient. The buffered VFO output stage will make it easier to drive a 50-Ω filter, if necessary. One approach is shown in the AD9850 data sheet (a cousin of the '9835), available at **www.analog.com**. The applications note shows an elliptical, low-pass output filter that can be scaled to provide the desired cutoff frequency.

Other filter circuits are available in the *ARRL Handbook*. A set of excellent bandpass filter designs is provided by Wes Hayward, W7ZOI, and John Lawson, K5IRK, in their "High-Performance Communications Receiver," which ran in the 1983-1990 editions of *The ARRL Handbook*.[2] The first section of this bandpass filter contains a five-pole low-pass filter that I used at the output of Jay Craswell's VFO circuit. Another amplifier stage might be necessary to offset the filter's insertion loss.

The VFO's double-sided printed circuit board was laid out using *Eagle* layout software. The completed board, along with a display and shaft encoder, is shown in the photographs. A parts kit for this project, along with a circuit board that includes an installed DDS chip and a programmed microprocessor is available. Please send me a note via e-mail or postal mail, and I will supply the details.



The PC board layout of the VFO. A parts kit for this project, along with a circuit board that includes an installed DDS chip and a programmed microprocessor, is available from the author; see text.

As with any VFO, I strongly recommend mounting the board inside a shielded enclosure. A rectangular window cut out of one side of the enclosure will allow the display to be mounted while preserving the shielding effect as much as possible.

Thanks

I'd like to acknowledge the help of Bill Chestnut and Chuck Kitchin of Analog Devices for their advice on the AD9835 and AD811, respectively, and Tom Riley for his significant advice on the PCB layout. His salary: a free VFO kit! Paul Mileski provided generous assistance in making spectrum measurements and plots.

I hope that this article has made DDS technology more accessible. It's not an exaggeration to say that this VFO has the tuning agility of an LC oscillator, the stability of a crystal and the precision of a 32-bit computer!

Notes

[1]Analog Devices, Norwood, MA 02062, "A Technical Tutorial on Digital Signal Synthesis" (CD-ROM).

[2]Wes Hayward, W7ZOI, and John Lawson, K5IRK, "A High-Performance Communications Receiver," *The ARRL Handbook for Radio Amateurs*, 1990, pp 30-8 through 30-15.

[3]James Craswell, "Weekend DigiBrain," *QST*, Mar 1996, pp 32-34.

[4]Data Sheet, Philips 87LPC762 Microprocessor, Philips Semiconductors, Sunnyvale, California (available at **www.philips.com**).

[5]Data Sheet, Analog Devices AD9835 Direct-Digital Synthesizer, Analog Devices, Norwood, MA 01062 (available at **www.analog.com**).

[6]Optrex LCD User Manual, Optrex America, Inc, Plymouth, Michigan (available at **www.optrex.com**).

James Hagerty, WA1FFL, was first licensed in 1965 as WN1FFL and became a 15-year-old Amateur Extra in 1968. He is an electrical engineering graduate of Cornell University and holds an MSEE degree from the University of Rhode Island. Jim has been a design engineer in Newport, Rhode Island for the past 26 years. He can be reached at 64 Nonquit Ln, Tiverton, RI 02878; **wa1ffl@arrl.net**. QST

STRAYS

QST Congratulates...

◊ John Cunningham, WB4JUN, of Columbus, Georgia. John made news recently when he donated $2 million to Columbus State University (CSU) for a new building that will be the first phase of a 60,000-square-foot conference center. The gift was the third largest in CSU's history and will establish the John Cunningham Sales and Leadership Institute. John, now retired, owned Radio Wholesale in Columbus that provided equipment to hams in the southeast and in many foreign countries.

I would like to get in touch with . . .

◊ hams in the New York Metropolitan Area that have ANSI IEEE 802.11b based computer subnets, or are interested in forming such subnets.—*Dr M. Bitetto, Cybernetic-ist/Roboticist, 113 E 13 St, Ste 8C, New York, NY 10003, tel 212-995-9488*

Next Strays QST

By Dave Patton, NT1N

Tokyo Ham Fair 2001

As one of the world's largest Amateur Radio gatherings, the Tokyo Ham Fair, sponsored by the Japan Amateur Radio League (JARL), is at the top of the list of events-to-attend for someone on the ARRL staff. In addition to representing the ARRL at the Fair's opening ceremony and other events, the lucky staffer also checks QSL cards for DXCC and other ARRL-sponsored awards. I was invited to go this year—my first opportunity to attend Ham Fair.

Hong Kong

Not having taken a vacation in a couple of years, I decided to extend my trip both before and after Ham Fair. Cathay Pacific, a Hong Kong-based airline, offers an "All Asia Pass" each year that is valid for a few months during the year. My wife Carol, KB1GAT, and her daughter Christi accompanied me on the trip because it was such a great deal and neither had ever visited Asia. We spent three days in Hong Kong before the Ham Fair, five days in the Tokyo area, four days in Thailand, and then another three days in Hong Kong before returning to New York City on September 11 (we drove home from JFK Airport in the wee hours of September 11, thankfully).

The trip was a long and arduous one—New York City to Los Angeles and then on to Hong Kong. It took over 24 hours of traveling to reach the new Chek Lap Kok airport, and then another hour and a half to get to our hotel in Kowloon, but it was worth it. This was my fifth trip to Hong Kong and it is as vibrant and energetic as ever. The airport is amongst the best I have ever visited. After showering we all hopped aboard the buses, trains, and ferries of Hong Kong's wonderful public transportation system and visited Port Stanley on the south side of Hong Kong Island. We explored the famous Mt Victoria Peak later in the visit as well as the Temple Street night market and various restaurants. The amount of construction ongoing in Hong Kong continues to amaze me. There are dozens of new apartment buildings going up all over the territory to house the continually growing population in this, the world's most densely populated place.

I did not intend to operate Amateur Radio on this trip. I had previously made about 15,000 QSOs in the early and mid-90s as VR2/WX3N and AA9AK/VS6 and had operated several contests from the station of Steve, VS6WO (who is now back in Wisconsin as K9WO). My main focus was the Ham Fair, and I was very much looking forward to my work there

Doing the work at the opening ceremony and ribbon cutting were Mr C.K. Hyun, HL1AUG, President of KARL, Mr Wang Xinmin, BA1OK, Secretary of CRSA, Ms Kiyoko Ono, 7M3URU, Councilor of Japan's National Ministry of Health, Mr Shozo Hara, JA1AN, President of JARL, Mr David Wardlaw, VK3ADW, Vice President of IARU, Mr Fred Johnston, ZL2AMJ, Chairman of IARU Region 3, and Mr Hiroshi Nakano, President of Kenwood and JAIA.

The pileup at the DXCC desk begins!

In a quieter moment after the first day the Card Checking crew gathered for a picture. Seated (l-r) are Masa, JA1DM and Sachiyo. Standing (l-r) are Katsumi, JI1JMK; Yama, JA1SGU; Sam, JJ1SKG, and the author.

and to meeting all the ardent JA DXers and JARL colleagues. In all my travel in Asia I had spent very little time in Japan.

Japan and Ham Fair

On Thursday afternoon we arrived in Japan without a problem. Masa Ebisawa, JA1DM, a Senior Advisor of JARL and the number one DXer in Japan with 379 countries, met me at the hotel and guided me on a 15-minute walk to the Pacific Convention Center Yokohama, where the Ham Fair would be held. Just like at Dayton and Friedrichshafen, Germany, the other two of the world's biggest Amateur Radio gatherings, there was an abundance of activity as exhibitors and event managers busily prepared their stands and displays.

Friday morning arrived and Carol and Christi walked with me to the Fair in order to attend the opening ceremony and see the convention hall. The opening ceremony was a glamorous affair with Mr Shozo Hara, JA1AN, President of JARL presiding over the introductions of dignitaries. Mike Matsumoto, JA1AYC, provided translations and "Master of Ceremonies" functions. Some of the attending dignitaries represented IARU, including Vice President David Wardlaw, VK3ADW, while others represented national Amateur Radio Societies. There were also several prominent hams and non-hams including Martti Laine, OH2BH, and Mr Hiroshi Nakano, President of Kenwood and the Japan Amateur Radio Industry Association (JAIA). After introductions several of the dignitaries were invited up to the front where they joined Mr Hara in the ribbon cutting and official opening of the Ham Fair! A few minutes later the large audience of impatient visitors streamed through the entrance over the red carpet!

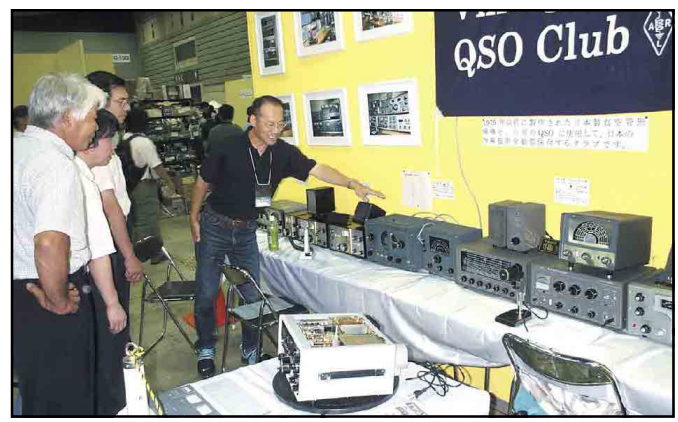
Shortly thereafter the queue at the JARL/DXCC booth had formed. Masa and his staff had prepared schedules for card checking and those slots quickly filled-up for the remainder of the day. There were usually four checkers available. It was an honor and a pleasure for me to meet many of the top DXers of Japan, many of whom were licensed long before I was born. Some of the highlights included verifying the 6 Meter DXCCs for JR2HCB and JE2TRG, and the 160 meter DXCC for JR1TNE.

An additional bonus for the Card Checkers was the presence of Martti Laine, OH2BH. Martti is one of the most famous contesters/DXers/DXpeditioners there is, and it was great fun to have him join us in the booth. He sat next to us in order to promote the World Radiosport Team Championship 2002 (which will be held in Finland next July—see **www.wrtc2002.org/index.htm**). As I checked the various QSL cards for an applicant I would usually find one or more from Martti's operations and I would hand the card over to Martti so he could autograph it personally for the DXer sitting in front of us! This was a great ice breaker for many of the newer DXers who seemed a bit shy around the famous Finn.

Highlights

A personal highlight for me was the chance to meet and chat with Tom Christian, VP6TC (ex-VR6TC), a direct descendant of the famous "HMS Bounty Mutineer" Fletcher Christian from Pitcairn Island. Tom was in Japan for the first time. He was a guest of another

The Japan Award Hunters Group pulled out the really big bottles of sake for me! Left to right are JH1STL, JG1IEB, JH7IEJ, 7K2XEA, JR1DOQ and JH1IED.



There was quite a nice collection at the Vintage Rig QSO Club!

I had the opportunity to meet the famous Tom Christian, VP6TC.

(Right) An energetic group of Chinese students gathered for a picture with me. Ham radio is rapidly gaining popularity in China.

famous DXer, Kan Mizoguchi, JA1BK. Tom is concerned with the loss of many of the young people from Pitcairn (including his daughters who are either attending school or working in other countries) and hopes to reverse this trend.

Every now and then I would find the opportunity to walk around the Ham Fair and gather in the atmosphere of Asia's biggest ham gathering. It is different from Dayton and Friedrichshafen (I attended both in 2001) in that there is a comparatively small flea market and the entire show is held in one very large space. I believe it is difficult to hold a flea market here similar to that in Dayton because it is so difficult to drive in and unload a bunch of stuff. And parking is not a cheap or easy exercise. But the sellers and exhibitors who were there did a brisk business. The stack of old Collins and Drake equipment had diminished markedly over the course of the show.

The biggest display belonged to a QSL card printing company that used a display of thousands of cards to advertise their wares. Another interesting display was that of a company that produced English language study materials. They were heavily staffed and stood smartly at attention waiting for the next customer to venture close enough to practice a bit of English. We also enjoyed a neat display of ham radio-related drawings created by elementary school students. My family and I noticed throughout our trip that many people would stop to chat briefly in order to use a little English or ask for help on how to describe something they were selling. Others helpfully volunteered with directions when they saw us with a map in hand.

In addition to seeing all the new equipment I had the privilege of meeting some of the folks working for and, in fact, owning these companies. Jun Hasegawa, President of Yaesu, is a very gracious and hardworking young man who has a cadre of hardworking staff that was well prepared for Ham Fair. Our booth was directly across from Yaesu's and it was a pleasure to watch their teamwork and group meetings at the beginning and ending of each day. Mr Hasegawa and Yaesu have been very generous in their support of DXpeditions and operating events such as WRTC. Icom also had a large display and I met many of its young group of employees, which included Executive Vice President Toshi Hosho, JN3NLX, and up-and-coming contester and Advertising Manager Hiro, JS3CTQ. Not only did Kenwood have a large display but they also had beautiful young ladies handing out brochures and posing with visitors for photographs. One of my other great experiences of this trip was meeting Hosokai, JA1JKG, who, as a longtime engineer with JRC, had been involved in the development of the JST-245, one of my favorite radios

On Sunday Mr Hara announced that the three-day attendance was about 35,000 people. Individuals must buy a ticket for each day, and those ticket sales are the basis for the total attendance figure. I was asked by several people to try to evaluate the differences between Dayton, Friedrichshafen and Ham Fair—and of course try to determine which is biggest. Clearly the Dayton Hamvention, at least in 2001, was the largest event of its kind. Friedrichshafen was also a larger show than Ham Fair. But each event has its own characteristics, advantages and disadvantages.

One of the things I really liked about Ham Fair was the JARL's 8J1HAM station. There was a large area in the exposition set up with individual stations for guests to operate. Each band was covered, 80 meters through at least 1296 MHz. Two crank-up towers loaded with antennas were set up outside the arena. And there was also a great homebrewing "booth" set up where people could try their hand at building, soldering, trouble-shooting, teaching—you name it. Both parts of Ham Fair are extremely

My hosts at HS0AC included (l-r) Winit, HS1CKC; Son, HS6NDK; John, HS1CHB; Ray, G3NOM; Champ, E21EIC, and Shirow, JF6DEA.

A ham and his son are really digging into building a kit at Ham Fair.

Ray, G3NOM, at the helm of HS0AC while running the SEANET on 20 meters.

popular. If you want to experience a great time in Amateur Radio, you should make plans to attend Ham Fair one year.

Thailand

Then it was on to Bangkok. I was officially on vacation for the rest of the trip, but we sure didn't get much sleep! I had never visited Thailand so I was looking forward to a new experience—and I wasn't disappointed. Ray, G3NOM, and his wife Lawan, E21UHL, and John, HS1CHB, met us at the airport, and thus began our first experiences with the legendary traffic of Bangkok!

Our friends told us that the traffic is much improved over past years, thanks to the addition of a nice tollway, but any other roads are quite busy! In fact, I have never seen traffic like this. Motorcycles have the best chance of getting through the chaos and do their best to wind their way in-between vehicles, up and on sidewalks, and eventually making it to the front of every intersection, where it seems like there couldn't possibly be enough room for dozens of bikes. John told me that if you have to make a meeting in Bangkok on time, you would be best off hiring one of the authorized motorcycle taxis and jumping on the seat behind the driver!

In addition to personal tours with John and Lawan, we enjoyed guided, professional tours of the main tourist areas around Bangkok so we could maximize our short time there and hopefully make it around the traffic. There are many thousands of amateur licensees in Thailand but the great majority of them can only operate on 2 meters. There is also a limit on tower and antenna height of 60 meters (about 200 feet) in Thailand. Even though I was aware of this before the trip, I was nonetheless amazed to see many such 200-foot towers, some on rooftops, most self supporting, with a large collinear array and a rotatable array of four vertically polarized 2 meter Yagis. Being a DXer in these stations means trying to work all the 74 provinces of Thailand on 2 meter FM, and Pranee, E21DKD, a YL op, appears to have done so.

The cultural show on our last night (l-r and around the table): the author; Mayuree, HS1YL, President of RAST; Carol, KB1GAT; Lawan, E21UHL; Kittipong, HS1ASN; Ray, G3NOM, and John, HS1CHB.

Of course another highlight of my trip was the chance to visit the Radio Amateur Society of Thailand's (RAST) club station, HS0AC, at the Asian Institute of Technology about a half hour north of Bangkok. I arrived in time to watch Ray, G3NOM, run the Southeast Asia Net on 20 meters, and of course was warmly greeted by several members of the club. After checking a couple of the guys' DXCC applications and before going out to dinner with the gang, I had enough time to make one QSO from HS0AC, and that was with Fred, K3ZO, who was booming in on 15 meters at 1400Z! The HS0AC station will be moving to a new location, which will continue to allow the crew great operating experiences. At present HS hams are allowed to use only the 2, 10, 15, 20 and 40 meter bands outside of contests, but the hope is for expanded privileges to be available in the next year or two.

The following evening my family and I were the guests of Mayuree Chotikul, HS1YL, the longtime President of RAST. Along with Ray, John and Lawan, and Kittypong, HS1ASN, we all had a great evening enjoying dinner and a cultural show highlighting traditional Thai dance and music. Mayuree has been instrumental in leading the growth of RAST and Thailand's amateur population. Mayuree's late husband, General Kamchai Chotikul, HS1WR, the previous President of RAST, was my first QSO with Thailand (when I was 14 years old). It was certainly my privilege to meet Mayuree and relate this QSO to her. She still maintains her husband's station as it was nearly 20 years ago.

The next morning we were up before dawn and back in Hong Kong in a few hours for the last leg of our trip. Needless to say, we had a great time and are looking forward to our next Asian trip in the near future! QST

By Al Klase, N3FRQ

The Age of the Autodyne

In the early days of Amateur Radio, the regenerative receiver was king of the world.

Most of us grew up equating short-wave communications receivers with the superheterodyne circuit. Yes, we knew there were regenerative receivers, but most of the ones we encountered were clearly toys, and were effective only on strong short-wave broadcast stations. However, an examination of history reveals that there was a 20-year period when the vast majority of short-wave receivers were regens. During this period, amateurs went from transmitting tens of miles to regularly contacting the far ends of the Earth, and they did it with radios that were the second cousin of the lowly Knight-Kit "Ocean Hopper."

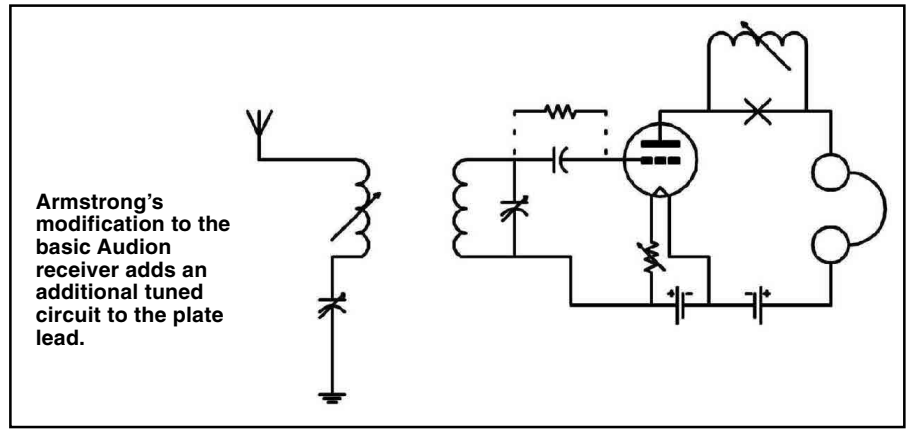
Edwin Howard Armstrong, an electrical engineering student at New York City's Columbia University and longtime radio experimenter, invented the regenerative circuit in 1912. The triode vacuum tube, in the form of the De Forest Audion, had been in use as a radio detector since 1906, but its operation was poorly understood. Its performance was better than that of crystal detectors, but its cost and unreliability kept it from displacing them from general use.

The original Audion circuit was what we would recognize today as a grid-leak detector. The grid-leak resistor was usually omitted, as the internal leakage of these primitive electron devices made it superfluous. Armstrong observed that adding a small bypass capacitor across the headset affected the output signal level. This led him to believe, contrary to Lee DeForest's assertions, that RF signals were present in the plate circuit. Being an experienced RF hand, he sought to peak these signals by adding a tuned circuit to the plate lead.

The effect was immediate and astounding. As Armstrong wrote, "Great amplification obtained at once!" By adding the tuned circuit to the plate, Armstrong had introduced positive feedback between the plate and grid circuits. At low levels, this feedback caused the signals to be amplified over and over achieving much greater gain that the original circuit. At higher levels of feedback, the circuit would break into oscillation and generate a radio-frequency signal of its own. This second mode of operation is important for two reasons: It marks the invention of the vacuum tube RF oscillator, the basis for a new generation of radio transmitters. Equally important, this oscillating grid-leak circuit is the autodyne detector that made continuous-wave (CW) telegraphy a practical reality. [1,2]

[1]Notes appear on page 45.

Prior to this time, "radio" almost universally meant spark-gap transmitters and receivers of limited sensitivity. Spark was inherently wasteful of spectrum space, emitting what was essentially broadband noise, and attaining sufficient transmitter power to overcome the shortcomings of the receivers was a considerable challenge. Experiments had already been conducted with CW transmitters using high-frequency alternators (rotating machinery) and arc (dc spark) transmitters, but the necessary heterodyne receivers



Armstrong's modification to the basic Audion receiver adds an additional tuned circuit to the plate lead.

needed a second alternator or arc to serve as a beat-frequency oscillator (BFO). In one fell swoop, Armstrong solved the basic problems at both ends of the transmission path.

Armstrong's regenerative circuit was protected by a patent, which constrained commercial applications and resulted in a long period of unpleasant litigation. However, this had no impact on the average amateur. All he had to do was add one more variable inductor, known as a variometer, to his Audion setup.

The Pace of Change Accelerates

Amateur Radio was banned in April 1917 for the duration of World War I. When operations resumed in September 1919, changes came rapidly. Much improved vacuum tubes for both transmitters and receivers were now available. Hams soon recognized that a few watts of CW "got out" better than a kilowatt of spark. Widespread CW operation uncovered serious weaknesses in the Armstrong-inspired receivers then in use. When one wanted to change frequency

A 1930s TRF-Autodyne Receiver

I purchased the homebrew radio shown in Figure A at an Antique Wireless Association auction some years ago. I was attracted by its excellent construction, and by the fact that it came with five sets of plug-in coils. The small size of the band-spread capacitor strongly suggested it was meant for ham use.

Not knowing exactly what it was, I took it to Gerry Mathis, W3GM, who was the local Grand Old Man of ham radio. Gerry lifted the lid and said two words, "rationalized autodyne." Beyond that, he didn't add much that I hadn't already figured out, but it was an important clue. Later, I discovered George Grammer's "Rationalizing the Autodyne" article in *QST*. In this landmark article, he summed up the current state of the art in regenerative receivers, and detailed the construction of a highly developed receiver that was widely built and elaborated upon by others.

My radio was constructed on a salvaged broadcast-receiver chassis (see Figure B), and was carefully mounted in a handsome mahogany case that formerly held an RCA Radiola 16. While the physical layout is somewhat different from the set in Grammer's article, the circuit is almost identical. Fit and finish are excellent for a home-brew rig.

The RF-amp and regenerative detector stages both utilize type 58 RF pentodes. Band selection is by way of plug-in coils. The coils for the 20 and 10-meter bands are wound on salvaged tube bases. Each tube, and its associated tuned circuit, is surrounded by a separate metal shield to prevent oscillation in the RF stage and to limit interaction between the controls. Audio-frequency amplification, sufficient to drive a headset, is provided by a type 56 triode. The tubes all have 2.5-V ac heaters.

Tuning is accomplished by the parallel capacitor method. The center tuning knob, below the lighted dial, is the "band-spread" control. It actuates two small capacitors that tune the RF amp and detector simultaneously. The knobs at the upper right and upper left are the "band-set" controls. The detector band-set is used to select the desired portion of a coil set's tuning range, and then the RF band set is tweaked for maximum signal. If you've logged band-set positions, this need be done just once when one changes coils.

The coils are designed so that a fair amount of band-set capacitance is always in the circuit when tuned to a ham band. This "high-C" arrangement greatly improves stability by making the unavoidable variations in tube capacitance, which occur as supply voltages and circuit settings change, small compared to the total circuit capacity.

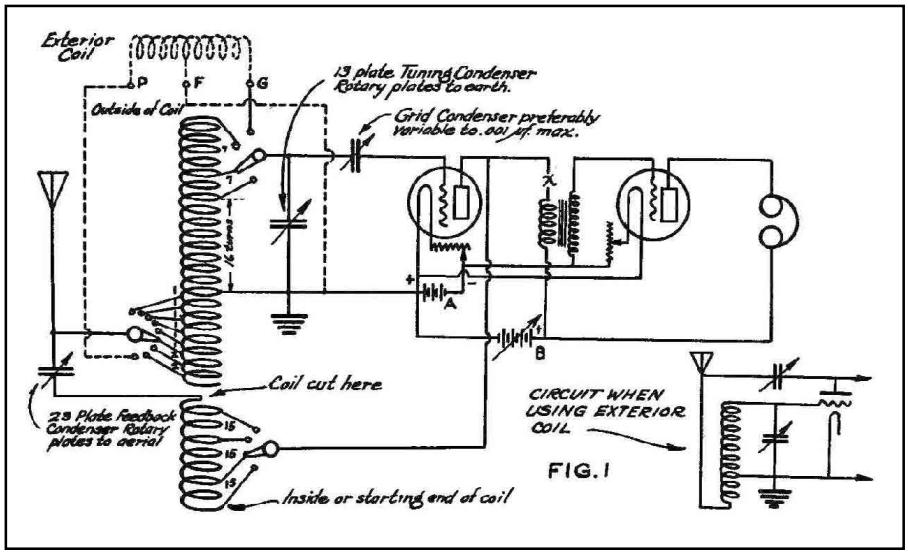
Grammer pointed out that many operators used battery power supplies to avoid problems of voltage variations on the ac line. However, this particular receiver, while it did not have a built-in power supply, was clearly intended for ac operation. It even has a switch brought out on the power connector to control the power transformer primary. The 1934 *Radio Amateur's Handbook* shows plans for a sophisticated voltage-regulated power supply for just such applications. I constructed one, using vintage parts, that I use with this radio.

On the air, the "rationalized autodyne" gives a good account of itself. Tuning is precise and repeatable. The detector slides smoothly in and out of oscillation making it easy to set the best operating points for both AM and CW/SSB. Selectivity, at least on 160 through 40 meters, is adequate for reasonable CW work. Sensitivity is very good, and the RF gain control keeps things nicely under control when the signals are strong. The set's stability is impressive, and interaction between the controls is minimal. It's easy to copy SSB on 20 meters.

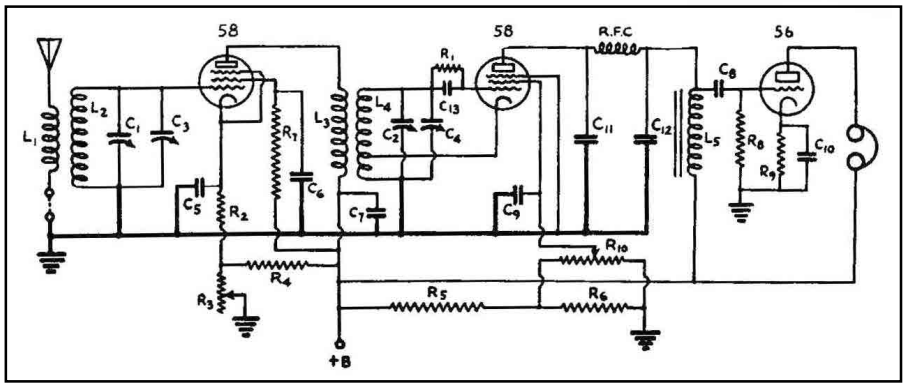
The overall performance of this radio, at least for CW use, is superior to most of the inexpensive non-crystal-filter superheterodynes of the era. After using one of these radios for a while, it's easy to understand how the simple home-brew TRF-autodynes held off the superhets for as long as they did.

Figure A—Rationalized Autodyne, power supply and spare coils.

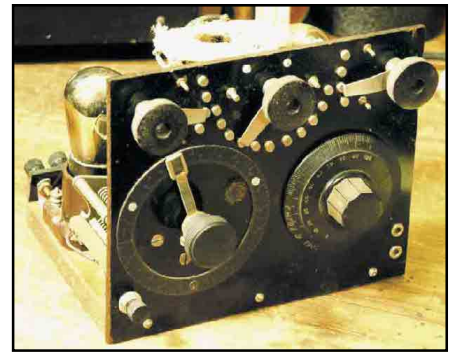
Figure B—Inside the Rationalized Autodyne.



"Improved Reinartz Tuner" from March 1922 *QST*.



"Rationalized Autodyne" schematic from January 1933 *QST*.



A vintage Reinartz receiver from the John Dilks, K2TQN, collection.

when operating in the autodyne mode, all the adjustments—primary tuning, secondary tuning, plate tuning and filament current—had to be readjusted to obtain peak performance.

In a series of *QST* articles in 1921 and 1922, John L. Reinartz, 1QP, introduced a simplified regenerative circuit that proved to be a much better solution for amateur operation. The Reinartz "tuner" uses a single parallel LC tank in the grid circuit. A tapped nonresonant tickler coil provides feedback from the plate circuit that is throttled by a variable capacitor. A third tapped winding allows variable antenna coupling. The three-winding coil was an easily reproducible "spider-web" affair. Hams around the world built thousands of these receivers, and, fortunately, a few have survived. [3,4]

Receiver development continued to advance as new and more effective vacuum tubes were introduced throughout the broadcast boom of the '20s and '30s. For instance, late 1927 saw the introduction of the "shield-grid" tube or tetrode. A second grid was added between the control grid and plate of the triode. This added element acts as a Faraday (electrostatic) shield between the grid and plate. This reduces unwanted feedback between the output and input of an amplifier, and allows significant RF gain to be achieved.

Shield-grid RF amps were quickly added in front of the traditional triode detector to improve performance on the emerging 20 and 10-meter bands where receiver sensitivity was at a premium. RF amps have some additional advantages. They provide isolation between the antenna and detector. This greatly reduces radiation from an oscillating detector, and prevents its frequency from being "pulled" by the antenna swaying in the wind. A tuned circuit on the grid of the RF amp can improve selectivity, but great care must be taken to prevent the tuned-RF stage from oscillating due to stray coupling between the input and output tuned circuits. An RF stage can also exacerbate detector overload on strong signals by providing too much gain.

Other vacuum-tube innovations included "heater" type amplifier tubes and high-voltage rectifier tubes to allow the radio to be powered from the ac line rather than batteries, low-filament-current types to allow portable operation from dry batteries, and the introduction of the "remote-cutoff" pentode to allow effective RF gain control.

The End of the Autodyne Era

In January 1933, *QST* assistant technical editor George Grammer published an article called "Rationalizing the Autodyne, A Three-Tube Regenerative Receiver of Unusual Performance" in which he enumerated the common problems in most amateur receivers, and detailed the construction of a highly effective radio, based on the latest tube types and circuit innovations, that carefully avoids these problems. [5]

The year 1932, however, had seen the introduction of the quartz-crystal IF filter. This circuit allowed superheterodyne receivers to deliver "single-signal" selectivity for CW signals. This development made superhets, another Edwin Armstrong invention dating back to 1918, sufficiently better than the autodynes to break into mainstream amateur usage. By the mid 1930s, many of the leading ham operators had abandoned their homemade TRF-Autodynes in favor of commercially made receivers from the likes of National, RME, Hammarlund, and, of course, Hallicrafters.

You can contact the author at 22 Cherryville Stanton Rd, Flemington, NJ 08822; **skywaves@bw.webex.net**.

Notes

[1]Edwin H. Armstrong, "Some Recent Developments in the Audion Receiver," *Proceedings of the IRE*, Vol 3, no. 3, September 1915, pp 215-248.

[2]Edwin H Armstrong, "The Regenerative Circuit," *The Electric Journal*, Vol. XVIII, no. 4, April 1921.

[3]"A Receiving Tuner for C.W.," *QST*, June 1921, pp 5-7.

[4]"The Improved Reinartz Tuner," *QST*, March 1922, pp 8-10, 26.

[5]George Grammer, "Rationalizing the Autodyne," *QST*, January 1933, pp 11-16, 23. QST

By Dan Henderson, N1ND

Birth of the Southern Appalachian Radio Museum

Old-time radio finds a home in Asheville, North Carolina.

In an age where the latest DSP, digital display and high-tech gizmo are featured in almost every shack, anything that highlights the historical roots of our hobby seems to be out of favor.

But don't tell that to Carl Smith, N4AA.

In the early 1990s Smith and his wife Miriam, KB4C (SK), were attending the Rock Hill (SC) hamfest and happened on an old general purpose receiver from the mid-1930s. Miriam insisted on having it. While she refinished the cabinet, Carl worked on getting the electronics working. When it was reassembled, it worked perfectly. And as the tubes started to glow, Carl started to dream about setting up a museum of antique gear.

What started as a dream a decade ago has become reality. Working with members of the Smoky Mountains Chapter of QCWA (#145) and officials at Asheville-Buncombe Technical Community College in Asheville, North Carolina, Smith has spearheaded the formation of the Southern Appalachian Radio Museum (SARM). The museum is open for visitors in the Elm Building on the campus of AB-Tech.

Incorporated with the state of North Carolina as a nonprofit organization, the SARM finalized an agreement for space on the AB-Tech campus and began setting up its displays in June. Since opening its doors, the SARM has received an influx of inquiries, and many offers of vintage equipment to be donated. "It has almost taken on a life of its own," says Smith.

While exhibits include both amateur and non-amateur gear, the focus remains on Amateur Radio. "Asheville is a great location for the museum," Smith adds. "Hammarlund had a major facility in the area at one time. We are also close to the Ten-Tec factory (in Sevierville, Tennessee). Radio has a strong heritage in western North Carolina, and we are planning on showcasing those ties as we develop exhibits."

The SARM has established a club station and is in the process of upgrading it with new gear and antennas for all bands, including satellite operation. Bill Hayes, W4AFM, had been a member of the QCWA chapter, but became a silent key during the spring of 2001. With the assistance and support of Hayes' son and to honor their longtime friend, the museum was able to secure the W4AFM call sign for their station. Contacts with the W4AFM club call were first made in August, the very first being with Hayes's son Bill, Jr, W4ABM.

A formal dedication of the museum was

SARM President Carl Smith, N4AA, makes the first contact from W4AFM. He worked Bill Hayes, Jr, W4ABM, son of the original licensee Bill Hayes, Sr (SK), who held the museum station call sign. Looking on during the first contact are Gaylen, Katherine and Dustin Ehrlichman, the granddaughter and great-grandchildren of Bill Hayes, Jr.

ARRL Roanoke Division Vice Director Les Shattuck, K4NK, and his wife Joyce, N2PTW, tour one of the first exhibit areas with SARM President Smith.

K4NK and QCWA National Treasurer Duke Kneif, W4DK, chat before the July 2001 dedication ceremony.

Smith listens as Frank Miceli, chairman of the electronics department at Asheville-Buncombe Technical Community College, greets those gathered at the dedication.

held July 27, 2001. Among the 60 attendees were invited guests ARRL Roanoke Division Vice Director Les Shattuck, K4NK; QCWA National Treasurer Duke Knief, W4DK; Frank Miceli, chairman of the electronics department at AB-Tech and the author (an Asheville native). In their comments, Vice Director Shattuck and SARM President Smith emphasized the desire of both the ARRL and SARM to work together to encourage sharing this valuable resource with the community.

From its modest roots, the SARM appears to have a great future. "As we grow, we envision having displays showing the evolution of the electronics industry—from early radio and television to today's latest technology," Smith said. "Hams have been behind so much of the development of electronic technology, and this is a great opportunity for us to be able to highlight our hobby's contributions to the electronics industry."

John Travis, W4QCF (SARM secretary/treasurer), has created a Web site and is constantly updating it to show the latest happenings in the museum. For more information on the Southern Appalachian Radio Museum, visit their Web site at **www.SARadiomuseum.org** or e-mail Smith at **N4AA@dxpub.com**.

Dan Henderson, N1ND, is Contest Branch Manager at ARRL Headquarters. You can reach him at **n1nd@arrl.org**.

NEW BOOKS

THE HANNIBAL FILES

By Bryan A. Bisley, VE7FH

Published by Innisfree Publishing, 281 James St, Parksville, BC V9P 2R9, Canada. First edition, 495 pages. ISBN 0-9688613-0-X. Available from ARRL, 225 Main St, Newington, CT 06111-1494, USA. ARRL Order No. 8635, $16.50 plus shipping/handling. Order toll-free 1-888-277-5289 or QUICK ORDER online at **www.arrl.org/shop/?item=8635**.

Reviewed by Steve Ford, WB8IMY
QST *Editor*

◊ The problem with reviewing a work of fiction is that I can't reveal too many elements of the plot, lest I spoil it for the reader. This is particularly true of *The Hannibal Files* by Bryan A. Bisley, VE7FH.

The Hannibal Files is a mystery, filled with various surprises, plot twists and intrigue. The story begins in India in March 1940 when the *Hannibal*, an Imperial Airways airliner, takes off on a long, multi-stop journey to England. Among the VIP passengers is a diplomatic courier carrying sensitive files.

The flight doesn't get very far before encountering an enormous cloud of locusts. Bisley does an outstanding job painting a horrific picture of the doomed aircraft as the crew realizes that what they thought was a thunderstorm is actually an unimaginably dense swarm of insects. Unable to climb above the living maelstrom, the *Hannibal* loses power and ultimately plunges to Earth. A search is undertaken in vain; the *Hannibal* seems lost forever.

Fast forward to 1960.

Another aircraft is down in the same area, this time an Indian DC-3. While recovering the DC-3, the rescuers discover the 20-year-old remains of the *Hannibal*. This ignites an investigation that quickly spins out of control, taking Alec Perkins, a radio officer, and his companions on a wild ride through a web of espionage that even includes the kidnapping of Alec himself. (He is pressed into service as a reluctant radio engineer for a band of Kurdish rebels.) Of course, radio in general (and Amateur Radio in particular) plays a prominent role as the plot unfolds.

Bisley brings considerable experience to *The Hannibal Files*. He served with British European Airways and several BOAC Associate Companies in the Persian Gulf area, Lebanon and Ireland during the 1950s and '60s. His Amateur Radio experience is equally extensive. Bisley taps both sources to add a credible, realistic tone to the book.

The writing is terse. So, despite the 495-page length of the novel, it carries you along rapidly. Be forewarned that *The Hannibal Files* is a novel for an adult audiences; it contains some mildly explicit sexual content. But if you're comfortable with adult material, you won't find anything offensive in *The Hannibal Files*. On the contrary, the book is compelling and the Amateur Radio dimension is a terrific bonus.

By Steve Ford, WB8IMY

The Drake TR-22: An FM Classic

An affectionate tribute to one of the first amateur FM transceivers.

It was 1972 and the amateur community had been overwhelmed by a serious case of FM fever. Repeaters were springing up across the landscape, even in my hometown of Dayton, Ohio. I was a high school senior and a freshly minted ham with only a year's worth of experience under my belt, but I desperately wanted to contract this disease as soon as possible.

In those ancient FM days there was cool, and there was *cool*. The *cool* FM operators had modified Motorola handheld transceivers, better known as *HTs*, dangling from their waists. You could spot them a mile away at the Marion's Pizza after-meeting club meeting. They didn't walk through the restaurant; they *strolled* with a haughty gait that put lesser mortals instantly in their places.

The non-italicized cool operators stuffed their automobiles with commercial FM rigs scavenged from 2-way mobile shops. These were hernia-inducing boxes with names like Motran and Progress. The guts of the transceiver remained in the trunk while the *control head*, a kind of semi-empty appendage attached to a cable as thick as your thumb, occupied the dashboard. These radios sucked down enormous amounts of current with every transmission, often dimming headlights dramatically. They were cool in their own way, but they weren't quite *cool*.

As for me, well, I owned a fire engine red Gonset Communicator 2 that could only transmit on 2-meter AM; I had to rely on careful *slope tuning* to listen to the FM action. That placed me somewhere in the FM outer darkness, but I had ambitions.

Bill Frost Recalls the TR-22

Bill Frost, WD8DFP, is well-known to hams as the veteran service manager of the Drake Company. In addition to his assistance in the creation of this article, Bill contributed these memories of the TR-22…

I remember going to the Findlay Hamfest in September of 1978. When we returned to Miamisburg (Ohio) that Sunday evening, we learned that a train had just derailed downtown. Jeem Newland, WB8RXI, of the Mound Amateur Radio Association quickly set the emergency plan into operation and we used TR-22s almost exclusively to assist the city officials during the emergency and cleanup that followed. The MARA club continued to use TR-22s for communication during band festivals, football games, the Miamisburg Turkey Trot, parades, city emergency drills and other public service events.

The Drake Company provided several TR-22s, modified for use on the business band, to emergency personnel in the aftermath of the Xenia tornado of 1974. Holding a TR-22 today or strapping one over your shoulder makes one realize how large and heavy they actually were, but compared to other FM rigs of that time, they were compact and versatile. A great little transceiver.

Enter the TR-22

After months of begging and repeated applications of pretzel logic on my part, my parents purchased a Drake TR-22 FM transceiver—primarily as a means to shut me up. I'll never forget the moment I gently lifted the TR-22 from its packaging. The perfume of fresh electronics filled the air. (To this day I relish that fragrance.) It was a black-and-chrome brick of a radio, all gleaming knobs and switches. The TR-22 ran on rechargeable batteries or an external dc source; no more buzzing vibrator power supplies and leaking car batteries in the basement. It was blessed with six crystal channels; no more digging in boxes and juggling hot crystal ovens when you wanted to change repeaters. The zipper pocket of the leather carrying case held a slender, lightweight microphone, not a fist-sized hunk of metal you could use to bludgeon someone senseless.

Perhaps best of all, the TR-22 was *new*. It was among the first 2-meter FM transceivers manufactured specifically for the amateur market. Finally, I could join the other deities on the summit of the local FM Olympus. The modified commercial HTs were still *cool* (ham HTs were still a few years away), but at least I could take my place among the semi-elite.

What's Under that Label?

I never intended to deface my TR-22, but I also never intended to shift my father's Oldsmobile into reverse at 40 MPH just weeks before. The result of my carelessness with the TR-22 wasn't

nearly as spectacular, but it was equally educational.

While deftly using a dental pick to scratch at the foil of a PC board, the implement slipped from my fingers and plunged toward my precious TR-22 like a stainless-steel javelin. It brushed the "Drake TR-22 FM" label on the front panel, neatly catching it at the edge and dislodging it with an audible *pop*. Imagine my surprise when I discovered that a little leaf-like symbol (it was actually a tree) and the word "Trio" lay beneath. What was the meaning of this? Was my TR-22 a Drake radio, or something else?

I would soon learn that the Drake TR-22 was actually an import from a Japanese company known as Trio-Kenwood. (They would later drop the "Trio" and become simply "Kenwood.") In Japan the Drake TR-22 was more familiar as the Trio TR-2200. The TR-22 was the first in a line of other Trio-Kenwood radios that Drake imported at that time, including the TR-22C and the TR-72.

The TR-22 may have been an import, but it wasn't cheap. The rig debuted in the American amateur market in March 1971 with a list price of $199.95. How much would that be today? Try $867! If you find this unbelievable, take a look at the inflation factor calculator on the Web at **www.cjr.org/resources/inflater.asp**.

Profile of the TR-22

The TR-22 was an FM transceiver with frequency coverage from 144-148 MHz. The large knob on the front panel selected six transmit/receive crystal pairs. Three channels were supplied with crystals for 146.34/.94 MHz, 146.16/.76 and 146.94 MHz simplex. (No, that last frequency isn't a typo. This was before 146.52 MHz became the "National 2-meter FM Simplex Calling Frequency.") Receive sensitivity was specified at 0.5 µV for 20 dB S+N/N—not super, but adequate. On the transmit side the TR-22 generated a solid 1-W output, pulling down about half an amp to do so. There was a 25-W companion amplifier, the AA-22, but it is as rare as proverbial hen's teeth today.

The rig weighed seven pounds with its 10 NiCd batteries. You could run it from an external 12-V dc source, as I've already mentioned, but you could also operate with the ac charger cord plugged in if you didn't mind the obnoxious hum on your audio. You could slip the TR-22 into a mobile bracket, or use the over-the-shoulder carrying case when you were operating on foot. The carrying case was a bit problematic for two reasons: (1) it fit as tight as skin and was difficult to remove, and (2) it lacked the macho look of an HT. When you're a self-conscious male adolescent you cringe at anything less than a "manly radio." I decided to awkwardly hold my TR-22 rather than wear it like a fashion accessory.

Thank goodness Drake/Trio-Kenwood added an SO-239 coax connector at the rear of the TR-22. The telescoping quarter-wavelength whip antenna was an accident waiting to happen. I snapped mine off within the first year. When I spoke with other TR-22 owners I learned that breaking the whip was almost a rite of passage. "Have you broken in your TR-22?" I'd ask. "Oh yeah, I broke the whip a few weeks ago." My solution was to adapt a rubber-duck antenna to a PL-259 connector that I could screw into

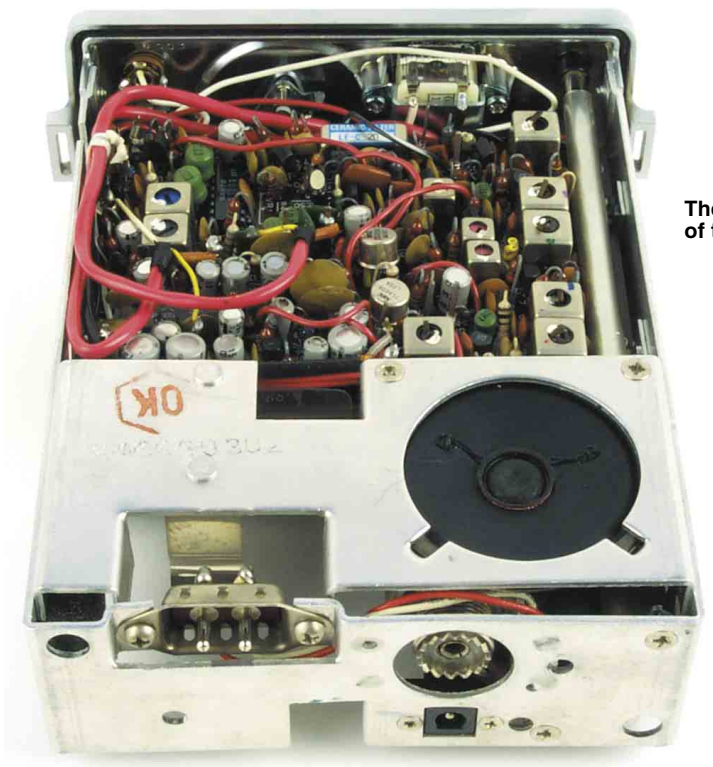
A TR-22 advertising flyer from 1971.

the SO-239 jack. Others went as far as removing the whip completely and installing front-panel jacks to accommodate more durable antennas.

Despite the fragile whip, the TR-22 was a rugged, dependable little radio. It proved its worth during my first public service event (a canoe race down the Great Miami River). It was my constant companion on the road. Even in my inner sanctum (every teenager's bedroom is an "inner sanctum") the TR-22 was my link to the outside world. My school buddies and I would meet almost nightly on simplex to debate critical questions of the day, such as who was the better guitarist—Jimmy Page or Robin Trower. The TR-22's single watt of power covered my area of town nicely.

When I fled to college at the University of Montana in 1973, my TR-22 came along for the ride. From my room in Duniway Hall I could cover most of the city of Missoula. Unfortunately, there weren't many people on the air; FM fever had yet to strike Montana in full force. I recall going to a local club meeting and encountering the curious stares of the Old Timers. I'm not sure if their curiosity was directed at my shoulder-length hair or the TR-22. Later, in the club newsletter, I was described as a "*repeaterist* from the Midwest." A repeaterist? It sounded like the sort of person you'd feel compelled to chase with a stick.

An interior view of the TR-22. You can clearly see the crystal bank, as well as the terminal clips for the NiCd batteries.



The top interior of the TR-22.

Lost and Found

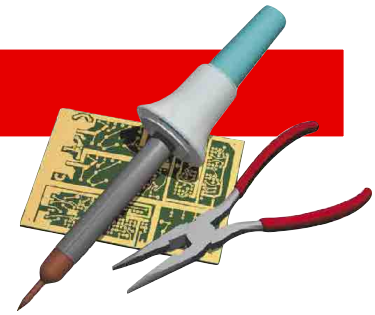
My TR-22 departed in 1976 at the hands of a thief. I had stupidly left my rusting deathtrap of a car unlocked one night and consequently incurred the penalty I so richly deserved. By that time amateur HTs and even frequency-synthesized transceivers were commonplace, so I quickly bought a replacement. Even so, I still held a soft place in my heart for the little TR-22.

Last summer, while browsing through the eBay auction site (**www.ebay.com**), the memory of my TR-22 suddenly returned. In the SEARCH window I typed "TR-22." To my astonishment I found a TR-22 at auction. It looked awfully good and awfully complete in the accompanying photo. Even the telescoping whip antenna was intact!

I spent the last 10 minutes of the auction perched on my keyboard, clicking the REFRESH button on my Web browser to see if anyone had attempted to top my bid of $35. In the last two minutes someone entered a bid of $38. "Oh, no you don't!" I muttered as I banged out a counter bid of $40. Apparently $40 was too rich for my adversary's blood and he decided not to retaliate. The TR-22 was mine.

A week later I gingerly lifted the TR-22 from a battered cardboard box. Brushing away the foam packing, I caught just a whiff of that old familiar fragrance. The radio was in mint condition. Memories flooded back as I opened the case, worked the knobs and extended the antenna. It was as though I was cradling a treasured piece of my past…and perhaps I was.

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



The Doctor is IN

Q Doug Rambo, KA3KHZ, of Dover, Delaware, writes: Have there been any articles that you know of that look at RF Safety and EME stations? I am working on building a 144 MHz EME station (4 Yagis) and I can't find any "clear" information regarding general steps to follow for EME... i.e., antenna height with respect to neighboring residences (1-2 story). Any references you might be able to supply would be helpful.

A The requirements for an EME station are really no different than for any other station. Any of the methods used, ie "worst-case" analysis, use of antenna pattern, antenna modeling or field-strength measurement, for examples, can be used.

The problem is that the "worst-case" analysis gives some pretty dismal results. If I use the "University of Texas" Webpage calculator (one of the links from the ARRL site at **www.arrl.org/rfsafety**) and assume 1500 W CW at a 50% on/off operating time, over a 30 minute time period, this results in 300 W of average power. If I assume 20 dBi antenna gain, about what one would get from a 4-Yagi array using 17-element Yagi antennas, this would require 181.4 feet of distance between your antenna and any human exposure in the direction the antenna is pointed. This may work for some EME stations, but others might find some difficulty if they are pointed at a neighbor's house. (The FCC does permit amateurs to control their station operation, however, so if a ham determines that his or her operation exceeds the limits in a neighbor's house, not pointing the antenna at a neighbor's house if the neighbor is home is a possible solution.)

Fortunately, the University of Texas site gives a true "worst-case" analysis that assumes one is in the main beam of the antenna. This does not apply to all EME stations, however, because the main beam of the antenna is not always pointed at the horizon—to the contrary, the antenna is pointed skyward more often than not.

The *EZNEC* (**www.eznec.com**) calculated free-space pattern of a 4×17-element Yagi array is shown in Figure 1 (also available on *ARRLWeb*, **www.arrl.org/tis/info/2m4x17.jpg**). This pattern can be used to estimate the amount of power actually radiated toward any given point.

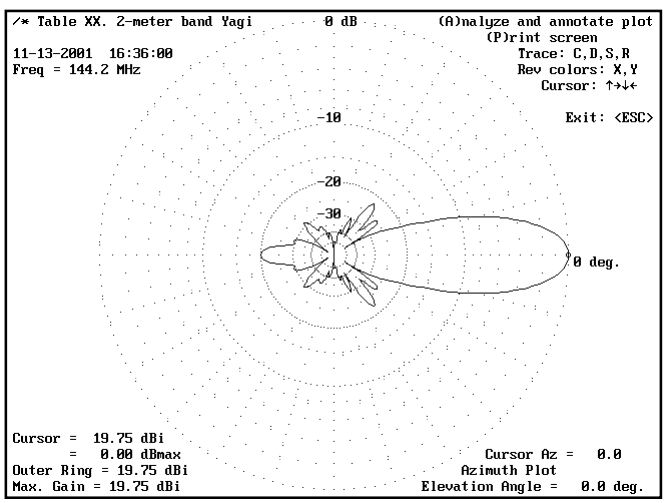


Figure 1—Free-space pattern of a 4×17-element Yagi array, as calculated by *EZNEC*.

There are two factors that you may be able to consider. First, if the antenna is located high in the air, the downward angle of the radiated energy toward a neighbor's house is not in the main beam of the antenna. You would have to use a little trigonometry to calculate the angle for any given height and distance, or draw it all out and use a protractor to measure the angle. As a real simple example, if the antenna is 70 feet in the air and it is 60 feet from a neighbor's one-story house with a first floor 10 feet above the ground, the angle downward is 45 degrees. If you look at the pattern, the pattern is way down at that angle, into the sidelobes. Because we are really in the near-field region, let's be conservative and assume that no sidelobe will be down more than 20 dB from the main beam of the antenna. In this case, if the antenna is pointed right at the horizon, right at your neighbor's house, the gain at the downward angle of 45 degrees is 0 dBi (or less). If we then run that through the RF calculator, the estimate is that the exposure needs to be 18.1 feet away from the antenna, diagonally. The antenna is 60 feet in the air, so the EME station evaluation for this hypothetical station is over.

Unfortunately, as the antenna is lower than 60 feet, the angle decreases, so the amount of energy directed downward goes up. The method still applies, but if the antenna is 25 feet in the air, 60 feet from a neighbor's one story house, the angle becomes –12.25 degrees, and the antenna gain at that angle is still a respectable 15 dBi. This requires a "worst-case" calculated diagonal distance to the antenna of 100 feet, not quite a "pass" if this hypothetical antenna is pointed at the horizon.

Even in that case, though, you can consider the amount of time that the antenna is actually pointed at the horizon. If you transmit for 15 minutes, then increase the elevation angle of this 35-foot high antenna to 10 degrees above the horizon to track the moon, the antenna gain for the next 15 minutes is back at 0 dBi (using the pattern and the protractor). The average power really is now just over 150 W (300 W average power, for 15 minutes, then about 30 W EIRP for the next 15 minutes). The required distance is now a diagonal distance of 72 feet—enough to "pass" for the antenna 25 feet in the air.

In the near-field of an antenna, the fields are almost always less than the far-field formula used to make the above calculation. You can take advantage of this by using the near-field analysis of *EZNEC*, if you model your antenna accurately. I used the model I put at **www.arrl.org/tis/info/2m4x17.zip** and used *EZNEC* to do a near-field calculation. *EZNEC* gives the good news—if the antenna is 35 feet in the air, pointed at the horizon, and a neighbor's house is 10 feet above the ground, the transmitter is 1500 W EME CW (300 W average power), in the direction the antenna is pointed, the electric and magnetic fields never exceed the permitted exposure levels at any point below the antenna, 10 feet or less above ground.

Now, there are a lot of variables here, and my sample cal-

culation is intended only as an example (although if it applies to your station, and you "pass," your evaluation is over.

As I have said in many of my talks about RF exposure, the present rules really are not a major burden for Amateur Radio. It took me about an hour to run through all of the various calculations for the two hypothetical EME stations I posed here, and even with 1500 W EME pointed right at a neighbor's house, the 35- and 60-foot high antenna/station combinations were below the required exposure limits. For most hams, the simple "worst-case" calculations suffice, but for the high-power, high-gain EME station, the more accurate *EZNEC* calculation is probably a better choice.

Q Duane, AA6EE, writes: Which of your antenna books would have info on Bazooka antennas?

A Chapter 9 of the 19th Edition of *The ARRL Antenna Book* gives a high-level review of the controversial Bazooka antenna. Here's a short history of the term "bazooka." Because it resembles the shoulder-held rocket launcher used by foot soldiers against tanks, the quarter-wave detuning sleeve shown in Figure 2A has been called a "bazooka balun." It is also known as a "sleeve balun."

The so-called "Double Bazooka" antenna was developed as a means to broadband the frequency response of a dipole. See Figure 2B. The need is to cover a wide amateur band, such as the 80-meter band from 3.5 to 4.0 MHz. This antenna is also known as a "coax dipole" and does achieve a moderate amount of broadbanding. As Frank Witt, AI1H, wrote in Chapter 9 of *The ARRL Antenna Book*: "The antenna offers a 2:1-SWR bandwidth frequency range that is only 1.14 times that of a simple dipole with the same feeder. And the bandwidth enhancement is partially due to the 'fat' antenna wires composed mostly of the coax shield. No improvement in antenna gain or pattern over a thin-wire dipole can be expected from this antenna."

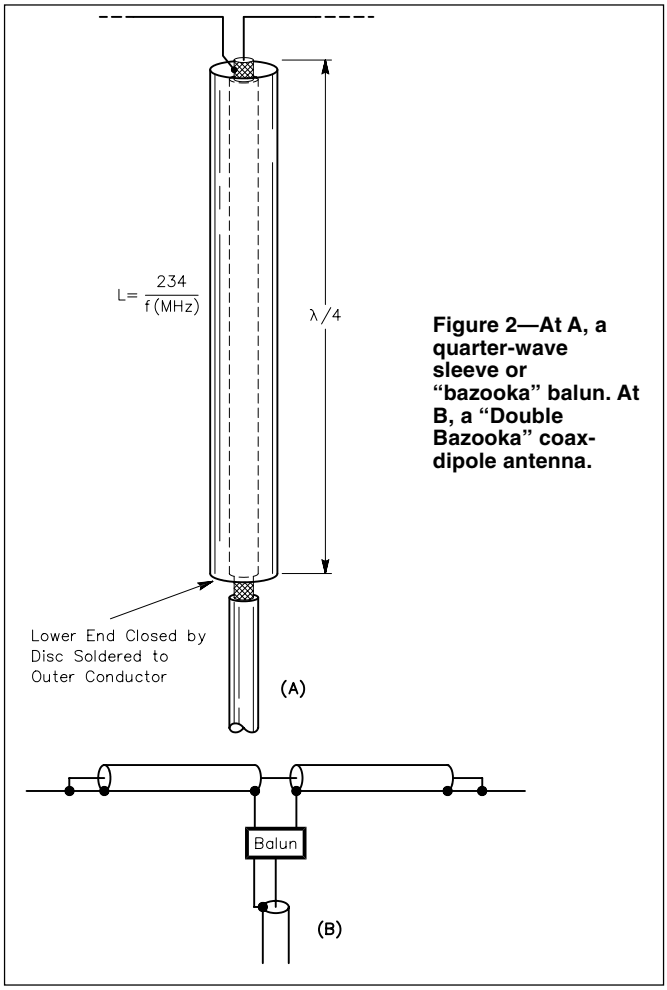


Figure 2—At A, a quarter-wave sleeve or "bazooka" balun. At B, a "Double Bazooka" coax-dipole antenna.

With the moderate amount of broadbanding comes disadvantages of cost and weight of the coax, not to mention the loss in the cable. Chapter 9 of *The ARRL Antenna Book* provides a number of other alternatives, including the TLR (transmission-line resonator), developed by AI1H.

Q Putra Djaja, JZ9DEX, of Jakarta, Indonesia, writes: What is, actually, double, triple or quadruple conversion superheterodyne receiver, and what are the differences among them?

A In a superheterodyne receiver, the radio frequency (RF) signal is converted to another frequency prior to demodulation. This is typically the frequency of a band-pass filter, which removes as many offending signals as possible before they can cause intermodulation distortion. This conversion takes place in the mixer stage of the receiver when the RF signal is mixed with another signal generated by the local oscillator (LO). This mixing process produces sum and difference signal frequencies. The difference frequency is amplified and becomes the intermediate frequency, or IF.

In a single-conversion superhet, there is only one IF. For example, let us say you have an IF of 4.9 MHz. So if you are listening to 40 meter CW on 7.040 MHz, this signal is mixed down to 4.9 MHz, where it is further amplified and filtered in IF stages of the receiver. After the IF, the signal goes to a detector stage, where it is turned into audio.

A dual-conversion superhet might use a first IF of 9 MHz and a second IF of 455 kHz. A triple conversion design would use three IFs, perhaps 60 MHz, 9 MHz and 455 kHz. A design in which the first IF is higher in frequency than any of the received frequencies is known as an "upconverting" type. Obviously, a quadruple conversion design involves 4 IF stages.

The advantage of more IF stages is that each one can provide less of the overall gain ("better gain distribution" is the term for it), and additional filtering. The disadvantage is that more noise can be introduced at each stage.

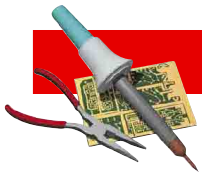
Traditional thinking says that more conversion stages are better, although this has been proven to be wrong in some instances. One of the best receivers of the tube era is said to be the Hammarlund HQ-180, a triple conversion design. However, one of the best receivers of recent years is the Elecraft K2, which is a single conversion design.

The most common configurations are double and triple conversion.

Q Forrest Wilson writes: Is there some kind of lockable power strip that could be used to "tamper proof" radio gear? Our club shack is in a classroom, and at times the students have access to it. If the power could be locked off, it would prevent tampering. We already lock up the microphones.

A The best thing to do is have the electrician install a separate circuit breaker box next to the station console. Use one that has a locking handle to open the cover. A combination or key lock can be use to disallow access to unauthorized personnel. When the station is in operation, this approach also makes a dandy safety "kill" switch.

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



By Kirk A. Kleinschmidt, NT0Z

Build Your Next Computer—A DIY Guide to Today's PC Technology

By using components that meet your *exact* requirements you'll wind up with the PC of your dreams, valuable new skills and a pride of ownership that only home-brewers can enjoy. Here's a look at the resources, information and parts you'll need to "do it yourself."

The last time I touched on this subject ("Supercomputers in Your Shack: Build, Don't Buy," Feb 1998 *QST*), 233-MHz Pentium processors were hot stuff, DOS was still mainstream and the Internet hadn't yet become indispensable—whew! In four short years, computer technology has made quantum leaps forward, prices have plummeted (again and again), and the World Wide Web grew from a ragtag collection of discrete tidbits to an encyclopedia of detailed information, e-commerce and opportunity. This technology explosion has benefited hams—traditional "early adopters"—and the larger community, of course. For PC home-brewers and computer enthusiasts, things have never been better! Performance is up, prices are down, and an entire industry stands ready to provide parts and expertise.

The last time around, more than a few stragglers had to be convinced that PCs would revolutionize the way we enjoy, operate and even learn about Amateur Radio. Today, that message has been received loud and clear. Hams have embraced personal computers and have made them integral to our hobby. For many, building, fixing and tweaking computers has all but replaced the tinkering we used to allocate exclusively to radio stuff.

Before you recoil in horror, look at the logic (pun intended) of experimenting with PCs. Although radio kits such as Elecraft's K2 transceiver can take you right to the top when it comes to technology and performance, and home-brewing useful radio gear is still in the mainstream, it's difficult for the typical ham to craft *state-of-the-art* radio gear.

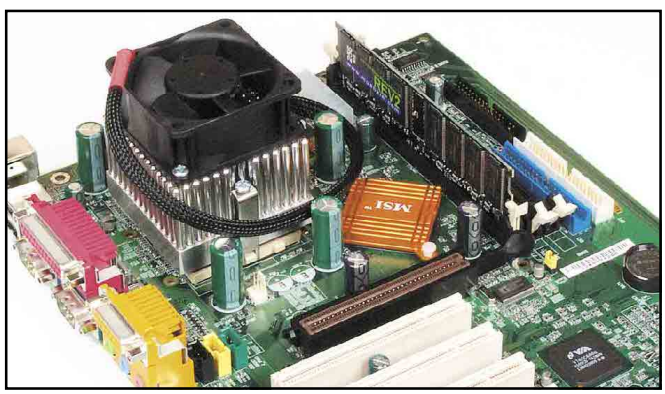
Duplicating a modern multi-band ham transceiver from inexpensive, commonly available parts is an impossible fantasy. In contrast, building a PC that rivals or exceeds the performance of the best store-bought machines is within almost every ham's reach. The ability to mix and match components adds a new twist.

How many times have you daydreamed about building your perfect rig—a fabulous hybrid with a Kenwood VFO, an ICOM LCD, Morse code keying and break-in from Ten-Tec, the brooding power of a Signal One final amplifier, a zippy antenna autocoupler from SGC, audio by Bob Heil, and so on? With ham gear that's only a dream. If you build your own PC, it's *reality*. Using the parts that serve you the best is perhaps the best part about home-brewing computers.

There's no doubt about it: For hams, building PCs is as much "real radio" as building ham gear.

With that blessing, then, the next step is determining where to find the best information, the best components and the best prices. That's what this article is all about. And if you'd rather buy than build—no shame in that!—keep reading. The information and sources highlighted here will help you save hundreds or perhaps thousands of dollars on your next PC, and help you to choose a retail model that's built around the technology and components you prefer—or one that's simply dirt cheap!

Although I built and photographed a PC as a part of this project, there's not enough space to include step-by-step assembly instructions (those can be found in the "Resources" sidebar). After all, my favorite PC parts may be off base for you. And because the computer technology curve is straight up and down, by the time this issue hits the newsstand, my project computer will be on its way to becoming yesterday's news—at least until it's time to u-p-g-r-a-d-e.



The innards of the Project PC. The motherboard is an MSI K7T Turbo (with a KT133A chipset). Note the ATX-style I/O connectors at the lower left. At the right is a 256-MB stick of Mushkin REV2 high-performance SDRAM and, nestled underneath the massive Swiftech MC-370 CPU cooler lurks a 1.3-GHz AMD Thunderbird processor. This has proven to be a nice combination. *(All photos in this article by the author.)*

First Things First

Before we get specific, let me say that, because of space restrictions and the vast number of potential topics, a lot of the information and recommendations here come from *my* specific experiences with building and fixing PCs over the past 15 years. This is the information I give to friends and customers. It's *highly condensed, somewhat biased* and *not exhaustive*. If you want to

Resources

Where to Search the Web for What You Need

Step-by-Step PC Assembly Instructions

www.pcmech.com/byopc
www.pcworld.com/features/article/0,aid,55674,00.asp
www.waterwheel.com/Build_A_PC/build_PC.htm

Device Drivers

www.windrivers.com—Comprehensive collection of computer device drivers.
www.driverguide.com—Ditto. The site requires a user name and password. User: "Drivers," PW: "All."

Good Deal Sites

www.slickdeals.net—Good deals!
www.dealnews.com—Ditto.

Price Engines

www.pricewatch.com—Find the lowest prices on *everything* PC related.
www.pricegrabber.com—Takes a back seat to Pricewatch, but sometimes lists items not found elsewhere.

Search Engines

www.google.com—The best search engine on the net.
www.deja.com—Now owned by Google, Deja is a huge searchable archive of USENET postings going back several years. Somewhere in there, someone else was looking for whatever you were looking for. A quick search often yields answers to the most esoteric PC questions.

PC Technology and Performance

www.anandtech.com—Shares the spotlight with Tom's Hardware Guide. The technology-specific forums in the "Community" section are worth their weight in gold.
www.tomshardware.com—Ditto.
www.hardocp.com—An excellent—if irreverent—site for hard-core PC tweakers.
www.arstechnica.com—A good hardware resource site.
www.coolcases.com—Learn how to keep *cool* (your PC, that is).

Where to Buy Stuff

www.compgeeks.com—The company name is Computer Geeks! Usually stocks complete 600-MHz+ systems for less than $200 (new, overstocks or factory refurbs), plus tons of parts.
www.mwave.com—Multiwave. Online vendor with good prices and good customer service.
www.newegg.com—Online vendor known for low prices and excellent deals.
www.axiontech.com—Axion Technologies. Online vendor with huge inventory.
www.plycon.com—High-performance PC parts. A speed-shop for PC builders.

Magazines

www.maximumpc.com—Whether in print or online, *Maximum PC* is refreshing, irreverent publication devoted to PC tinkerers and power users. Its slogan is, "Maximum PC, Minimum BS."

get esoteric or get down to the last nitty-gritty on any or all topics, the Web resources listed here will allow you to go right to the deep end of the pool. Otherwise, assume that I'm giving you my best advice, sifted and synthesized from multiple sources and experiences (my own and others'). Since there's no "one correct way" to approach PC construction, and I'm not a computer engineer, please hold back on the hate mail if we happen to disagree on a point or two.

As in my previous article, I'm assuming:

- That you're building a new PC or significantly upgrading an existing unit (new motherboard and CPU, for example).
- That you want a good balance between capabilities and cost.
- That, if you're a first-time builder, you'll arrange for help from a more experienced builder. Building PCs mostly involves the assembly of standardized "building block" parts, and once you've collaborated on a machine or two you can easily go solo.
- That you're building an AMD- or Intel-based IBM-compatible PC with high-quality parts. There are other CPU and hardware solutions available, and some of them are quite interesting, but the information here is slanted toward the type of computers used by most hams.

Industry Standard Architecture

Since early 1998, things have improved dramatically for PC tweakers. Component classes have more or less standardized, maverick manufacturers have fallen out of the marketplace, and compatibility—which once was subservient to brand recognition and propriety—is now the watchword. Veteran PC builders are sometimes surprised that today's manufacturers *want* their parts to work seamlessly with parts supplied by others. Standards for almost every part and subsystem are now the rule.

All of this standardization makes it easier for enthusiasts to build custom machines that work right out of the box (or boxes). With ATX motherboard standards, for example, building PCs is even easier, as there are no unruly serial and parallel port connectors to install backward or upside down…

Still, building PCs isn't as easy as cooking a TV dinner, it's just easier than it used to be. You round up the parts (case, power supply, motherboard, CPU, RAM, storage drives, and so on)—now more standardized than ever—put them together, format the drives, test the hardware, load an operating system (or two), tweak the hardware and software settings and you're ready to start using your creation.

That's greatly simplified, but essentially true. Unless you're experienced, however, choosing the right parts is where things can get tricky. Your choices will depend on your budget, how you'll use the computer, required operating systems, and so on. Let's get started sifting and sorting!

Cases and Power Supplies—Keep Your Cool!

Although they're still available in a variety of shapes and sizes, most PCs today are built in tower (vertical) cases ranging in size from micro to maxi. Micro towers house tiny space-saver models while full-size towers are used for large file servers or enthusiast machines. Desktop cases (horizontal), still somewhat popular in 1998, are only recommended for specialty installations.

Modern cases accommodate a variety of motherboard "form factors" (shape, size and position of mounting holes, etc). The most popular form factor for modern motherboards is ATX, which was just emerging in 1998. Most ATX cases also support older "AT" and "baby AT"-style boards by simply swapping out an interchangeable panel on the back of the case (required to accommodate old-style keyboard and port connectors that are now conveniently standardized on ATX-compliant hardware).

Although other considerations apply, basically, a PC case serves as a platform to mount your PC hardware—a place to keep your stuff! Make sure yours (1) has enough bays to accommodate the drives you'll be using (floppy, hard, CD, DVD, tape, CD-RW, etc), (2) has enough space to comfortably install your motherboard and accommodate additional cooling fans, if necessary, (3) is sturdy, yet easy to access, and (4) has a power supply that can handle your system's power draw with a sufficient safety margin.

A back-panel view of the Chenbro Genie case that contains the Project PC. The huge exhaust fans on the right seem to dwarf the standard-size power supply fan at the upper left. This big, beautiful case really moves some air, and because the oversize fans don't spin crazy-fast, you can hardly hear the computer when it's running.

A front-panel view of the Project PC. Note the seven extra hard drive activity LEDs (overkill?) and the custom drive bay cooler cut into the side panel (upper right). Called "blowholes" by PC tweakers, this extra fan actually pulls air into the case, cooling the drive bays. Again, the case mods were engineered by Jim Hanson at www.coolcases.com. Not visible are the wheels that allow this hulking PC to glide on the carpeted floor.

A close-up of the "blowhole." The rubber grommets greatly reduce noise and vibration.

For the project PC, a 1.3-GHz Athlon with plenty of extra hardware, I chose a large Chenbro case modified by Jim Hanson at www.coolcases.com. Jim builds custom cases for overclockers and PC enthusiasts, and his cases are lovingly tweaked to provide awesome cooling, power supply support and convenience. Check out his web site to see his hot-rod cases in action.

Power Supplies

Often previously ignored, power supplies play an important role in today's PCs, which tend to have power-guzzling CPUs, multiple drives, gobs of RAM and video cards that sometimes need *their own power supplies* to handle the load without crashing the rest of the computer!

The *quality* of the power supplied is also important, so make sure your case has a UL-listed supply that's approved by AMD (for Athlon CPUs) or Intel (for Pentium IV CPUs). Most vendors list these approvals in ads and sales literature.

Off-brand power supplies often have problems with ripple and regulation (under real load conditions), but units that have garnered an approval or two tend to provide smooth, stable power. Pentium IV users will need an ATX-compliant power supply that has the "extra connector" required by Pentium IV motherboards (AMD users can ignore the extra four-pin connector).

Considering the blazing speed of today's hardware, glitchy, fussy, wimpy power supplies should be avoided like the plague! In fact, many computer crashes and instabilities that are blamed on operating systems and other hardware are really power related.

In terms of power output, a 250-W supply should be considered the bare minimum. As long as you don't have a huge stack of drives or a monster video card, *and* your system is based on a Duron (750 MHz or less), Celeron or Pentium III CPU, you should be okay. If you're building speedy Athlon systems or *anything* with a Pentium IV under the hood, you'll need more power—at least 300 to 350 W (or more). You can skimp a bit on the case, if necessary, but don't hamstring your new machine by using a junky power supply: Look for the approval ratings from AMD or Intel.

Cooling

In the old days, case cooling was usually limited to the exhaust fan on the power supply. As power draws increase, however, the need for effective case cooling does, too. A GHz+ Athlon CPU might use 75 W of power (by itself!), and when you add a high-performance video card and a chunk of RAM, case cooling is critical. Better systems use additional front (intake) and rear (exhaust) fans to augment the fan(s) in an already beleaguered power supply fan. Resist the urge to install cheapie, $5 fans in these critical locations. Get and use high-quality ball bearing fans made by Panaflo (Panasonic), Sunon, Delta or YS Tech—the air flow boost is dramatic. A large selection of case fans and other performance PC parts can be found at www.plycon.com.

Good quality cases (most come with power supplies) start at about $60 and can run as high as $350.

Motherboards

The motherboard, sometimes called a main board or system board, is the heart of your PC, and choosing the right one is definitely confusing. There are hundreds of boards to choose from, made by dozens of manufacturers. Skimping here isn't a good idea. Unless you're experienced, stick with a name-brand ATX motherboard that can accommodate your chosen CPU and RAM—preferably one that's been favorably reviewed or recommended by a major hardware site such as Tom's Hardware Guide or Anandtech (www.tomshardware.com and www.anandtech.com, respectively). There are other useful hardware rating sites, but these two have consistent track records and are widely respected. They're both a treasure trove of expert information. With so many motherboard options it's difficult even for experienced builders to do enough homework to choose a winner every time. These sites (and others like them) do a *tremendous* amount of work on your behalf and articulate detailed considerations that would never fit in this article. Take advantage of them!

High-power PCs require beefy power supplies. This 450-W Enermax unit has thermostatically controlled fans and extra-long cables to accommodate large cases. Need more? Go with its 650-W big brother!

Beyond choosing a recommended system board from a name brand manufacturer, you need to make sure your motherboard (1) fits your case, (2) can accommodate your chosen CPU and RAM, (3) has the right chipset for the job (more on chipsets later), (4) offers the desired expansion slots and slot types for your existing and future plug-in cards, and (5) has the right I/O connections for your peripherals.

Let's look at some of these items individually.

CPUs and Sockets

AMD CPUs: AMD Athlon CPUs come in several flavors that cover a wide range of speed and power. Entry-level Athlons make up the Duron line of processors. They're virtually identical to their higher-end siblings, the Thunderbirds, except for a smaller built-in processor cache, a 100-MHz bus speed and a lower operating voltage. Duron CPUs are available from 600 MHz to 1 GHz and typically lag "same speed" Thunderbird models by 10% or less. Both series of AMD processors fit Socket A/Socket 462 motherboards and are fully interchangeable (as long as your motherboard is rated for the speed of each CPU). Build a Duron system and you can upgrade it to a Thunderbird CPU with no hassle whatsoever!

Duron CPUs are fast, amazingly inexpensive and make excellent low-cost systems. They also use a lot less power and require less cooling than Thunderbird CPUs. At press time, Duron CPUs range from $27 to $63, depending on speed.

For AMD systems that need more muscle, the Thunderbird line of CPUs picks up where the Durons leave off. Presently available from 900 MHz to 1.5 GHz (in 100- or 133-MHz bus speeds), Thunderbird CPUs offer blazing performance, faster bus speeds, low cost and wide availability. Drawbacks include heat, heat and heat! Although this issue will be addressed by future versions that will run at lower voltages and will be manufactured on smaller pieces of silicon, today's Thunderbirds running above 1 GHz need maximal cooling to prevent premature CPU death and system instability. (With press-time prices ranging from $49 to $115, you could afford to burn up a few CPUs without going broke, unlike the good old days when high-end CPUs could cost $300 to $600!)

Because the contact patch on AMD CPUs is quite small (the part that contacts the heat sink and transfers the heat), the clamping force required to secure and attach heat sinks/fans (abbreviated HSFs) is quite high. Be careful not to break the CPU socket or the CPU itself during HSF installation. If possible, install this hardware *before* you mount the motherboard in your case. At least be sure to attach the HSF *before* plugging in the power supply's ac cord! Without cooling, Athlon processors can die of heat stroke in as few as *two seconds*!

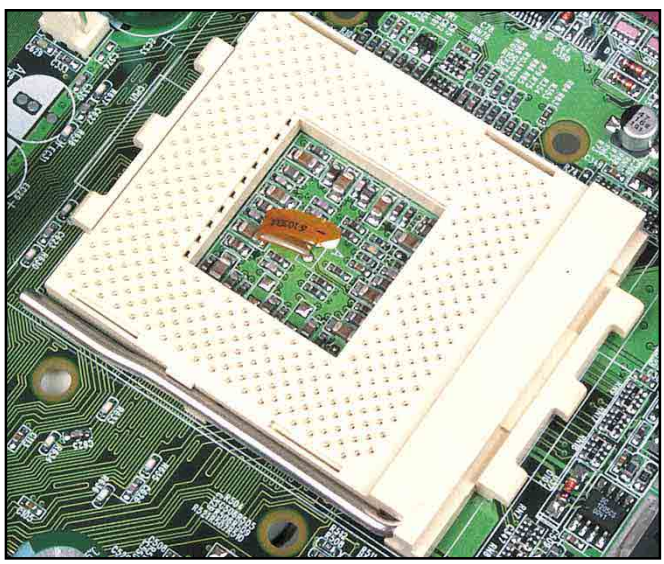
Intel CPUs: Like AMD, Intel offers a variety of CPUs tailored to every task and budget. The entry level chips comprise the Celeron II line, from about 600 MHz to 1 GHz. Essentially "Pentium III Juniors," present-day Celeron IIs run on 66- or 100-MHz busses and have half of the built-in processor cache when compared to Pentium III CPUs. Although they're serviceable and definitely affordable ($26 to $68 at press time), Celeron II CPUs take a back seat to Duron processors at similar price points. Unless you have a specific application, consider choosing a more robust CPU!

The Pentium III line, from 450 MHz to 1 GHz (or more), is getting a bit long in the tooth, but is still a proven workhorse. Now eclipsed by the Pentium IV, the P-III, which runs on 100- and 133-MHz busses, is being phased out (but is still available). The Pentium III makes a handy upgrade chip for Celeron II users, as both CPUs require Socket 370 motherboards. Celeron II and Pentium III CPUs are available in the FC/PGA package (dubbed "flip chips"), as opposed to older, much larger versions that require Slot 1 motherboards.

Celeron II/P-III users enjoy reasonable CPU cooling requirements and can get by with good-quality 250-W power supplies (unlike those who use power-hungry counterparts). Unfortunately, Pentium III chips are overly expensive when compared with faster devices from AMD and Intel itself. Prices range from $75 to $175 at press time.

The Pentium IV, Intel's new flagship processor, had a rocky introduction, but is gaining ground quickly now that Intel has slashed prices, improved chipsets are available and motherboard manufacturers have had extra time to produce more stable products.

Available from 1.3 to 2.0 GHz, you might think that P-IV



Tucked into the center of the K7T Turbo's CPU socket is a "spring-loaded" thermal sensor that helps the BIOS monitor CPU temperature. If it gets too hot the system can shut itself down to prevent CPU failure. The present generation of motherboard-mounted thermal sensors aren't terribly accurate, but they're a step in the right direction.

The business end of a 1.3-GHz AMD CPU. The four rubber pads prevent the heat sink from tipping to one side or another, which would compromise the heat transfer from the already small contact patch (center).

systems would have a decided edge over the competition. For a variety of reasons, that's not the case. Clock speed alone doesn't necessarily translate into specific performance, especially across processor lines and families. For example, a 1.4-GHz AMD Thunderbird system is roughly equivalent to a system powered by a 1.8-GHz Pentium IV. The race is neck and neck, with each platform excelling in certain areas.

The ace in the hole with the Pentium IV line is that it's expected to top out at nearly 3 GHz and, because of a new internal architecture and a breezy 400-MHz bus, when the software we use on a daily basis is optimized for the Pentium IV, it should really perk up.

Now that the specialized RAM required by many P-IV systems has become affordable and the chips themselves have been discounted, the Pentium IV is certainly viable, if a bit pricey. I'm still leery of the P-IV, however. These systems are much less mature than their counterparts, and parts changes could be (and have already been) costly. For example, the first P-IVs (now being phased out) required a Socket 423 motherboard, while later (and present) versions work with the newer Socket 478 boards. Conservative builders should be cautious, and should thoroughly research Pentium IV issues, chipsets and hardware at Tom's or Anandtech before making a move.

P-IV power consumption is high, and systems require robust power supplies and beefy CPU coolers. At press time, chip prices range from $103 to $515.

CPU Coolers

Some older, slower CPUs don't even need cooling fans—just heat sinks. But those days are long gone! Today's chips run hot, especially Athlons and Pentium IVs. Keeping them cool has become an esoteric art. Instead of yesterday's generic, no-name HSFs, modern CPU coolers come in all shapes and sizes, with one, two and even three cooling fans. And that's just the mainstream stuff. Experimenters have perfected liquid cooling and even cryogenic cooling! Silicon ICs perform best in cool climates—not toasty temperatures that can be found inside a closed PC case.

Top-tier cooling units are available from Swiftech, GlobalWin, Alpha and others. PC performance Web sites love to host cooler "shootouts" to see which models work the best. You can find extensive resources at Tom's Hardware Guide, or follow the links at **www.hardocp.com**.

Chipsets

"Chipsets," found on each and every motherboard, are the specialized integrated circuits that work with the CPU to control and enable all motherboard functions (running the memory, controlling the system and expansion busses, I/O ports, etc, and sometimes even built-in sound, graphics, modems and network interfaces. A *critical* technology, the chipset used by a particular board will literally determine its fate—how well it functions, what RAM it can use and how long it remains competitive.

Previously, high-performance chipsets focused on the basics, while those aimed at the low-end market usually included built-in sound, graphics, modems and even network ports. These "all in one" system boards served *only* the low-end market, leaving performance users to build machines that required plug-in video cards, sound cards, modems, etc. But that, too, is now changing. Newer chipsets from Intel, SIS, VIA and nVidia are closing the gap, and some newer "all in one" boards perform superbly and are quite cost effective.

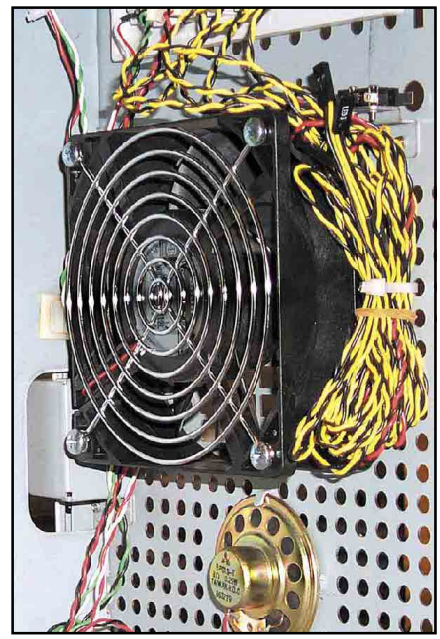
As an example, the new—and inexpensive—735 chipset from SIS (the Taiwanese equivalent of Intel) has played to excellent reviews at Tom's, Anandtech and elsewhere, making it a strong platform for high-performance PCs using Duron and Thunderbird CPUs. And two new chipsets from video giant nVidia promise built-in graphics that rival those from conventional plug-in video cards (which cost extra).

As with CPUs, you should do *plenty of homework* on the web *before* making a final chipset choice. Chipset choices are a free for all, but I'll toss out a few recommendations knowing full well that computer nerds everywhere are passionate to the death about this subject. Hold the hate mail please!

For AMD Durons and Thunderbirds, consider motherboards that use the VIA KT-133A, VIA KT-266A or the SIS 735 chipsets. AMD makes its own chipsets, but the home-brewing community and the cash-conscious seem to favor those mentioned above.

For Celeron II and Pentium III flip-chip systems, consider boards that use Intel 440BX (an aging but solid choice for systems that run on 100-MHz busses), 815 or 815e chipsets. Avoid the Intel 820 and 810-series chipsets (the 820 is an early P-IV board that is pretty much a dead-end experiment in expensive, esoteric RAM; the 810-series is slow and has upgrade-limiting operating system incompatibilities). Non-Intel Celeron II/P-III chipsets tend to offer poorer performance and sometimes have compatibility issues.

When it comes to the Pentium IV, the plot thickens! Early boards were flaky and expensive. Present-day boards have yet to shake out, and some are still quite expensive. And yet, even in this arena, another chipset from SIS is stealing headlines—the SIS 645. Other users rely on the Intel 850 chipset and are



When compared to the standard-size PC speaker (bottom center) you can see that this isn't an ordinary case-mounted cooling fan (intake)! This gigantic Panaflo fan pulls air into the Project PC's case and is part of the mod package engineered by Jim Hanson at www.coolcases.com.

eagerly awaiting new P-IV chipsets from Intel and VIA. *Do your homework*, folks, because Pentium IV hardware hasn't settled into a groove.

CPU wars are more visible to the average user, but the battle among the various chipsets and chipset makers often overshadows CPU choices when it comes to overall importance. In this era of fast systems, I'd still choose a PC with a stable chipset and a slower CPU over a machine with a racy processor backed by a twitchy, glitchy chipset—and you should, too!

Memory (RAM)

Formerly expensive and sometimes balky, RAM is now a certified bargain that's pretty well behaved. Costing as much as $50 per megabyte in the '80s (and still rather expensive in 1998), good-quality RAM sticks sell for about 20 cents a megabyte today (a bit more for exotic types, but still a real bargain).

Beyond obtaining the correct RAM for your system, it's important to buy high-quality RAM while avoiding the junky stuff. You can do this by buying memory from known, top-tier vendors such as Mushkin, Corsair, Micron and a few others.

Modern RAM technology is still an alphabet soup. SDRAM has been around for a few years now and comes in 66, 100, 133 and 150-MHz varieties (referred to as PC66, PC100, PC133 and PC150 RAM). Newer systems use faster RAM; older systems slower. Most SDRAM is backward compatible, meaning that a 133-MHz module will *usually* work in older systems that specify 66- or 100-MHz RAM.

A more recent SDRAM variant is DDR SDRAM. The DDR stands for "double data rate"—meaning that DDR SDRAM can offer twice the memory bandwidth of conventional SDRAM. That is, a unit of DDR SDRAM operating at 133 MHz actually performs as though it were running at 266 MHz. First appearing in high-performance video cards, DDR SDRAM is used in many new Athlon and Pentium III motherboards (those that use the so called "DDR chipsets").

Because of other system considerations, DDR SDRAM offers only a 3 to 15% "real world" speed boost in most PCs. That's still a bargain, however, as DDR RAM is priced similarly to conventional SDRAM.

DDR SDRAM is usually identified as PC1600 or PC2100 (double-rate 100- and 133-MHz RAM, respectively), although a few companies sell PC2400 RAM, which is really hopped up 150-MHz DDR RAM. (Why manufacturers don't call it PC133-DDR, for example, is a marketing issue.)

RAMBUS RAM, known as RIMM or RDRAM, is ultra-high-bandwidth memory designed for many Pentium IV systems (some new P-IV boards *are* coming out with support for DDR SDRAM modules). The RAMBUS design is responsible for the amazing memory performance of Pentium IV systems. That specific performance isn't critical right now (as other components limit the benefit of searingly-fast RAM), but it may be in the near future.

RDRAM and RIMM modules aren't always user friendly. They can be tricky to set up, may need to be installed in matched pairs, may require "dummy" or "continuity" modules if memory slots on the motherboard would otherwise remain empty, and are more expensive than DDR SDRAM. Although priced at 50 to 60 cents a megabyte at press time, RAMBUS modules sold for as much as $10 a megabyte only a year or so ago!

Another somewhat complicated RAM issue involves latency. In short, the fastest RAM (among all speed and RAM technologies) is classified as CAS2, while standard RAM usually falls into the CAS3 category. Boards that can run their RAM at CAS2 tend to offer zippier performance than those that are stuck at CAS3 (although CAS3 operation tends to offer greater stability). If your motherboard supports it, you can find these "RAM timing" settings in your BIOS setup screen. You can learn more about these (and similar considerations) at Tom's or Anandtech.

To generalize, when it comes to RAM, the more the merrier and the faster the better. Modern operating systems such as *Windows* 2000 and *Windows* XP *love* gobs of RAM. Because it's now so affordable, consider 128 MB a bare minimum (more than enough for *Windows* 95 and 98). For *Windows* 2000 or XP, install 256 MB or more. For an excellent mini-education on modern computer RAM, point your browser to **www.mushkin.com**.

Expansion Slots

Expansion slots enable you to add devices such as video cards, sounds cards, LAN cards, and so on, to your base PC. Modern PCs include several slot varieties, dubbed AGP, PCI, ISA, AMR and CNR.

AGP (advanced graphics port) slots host video cards. Although AGP specifications have been tweaked over the past few years, the important point about AGP slots is whether your system board has one! If it does, you'll be able to add upgraded video cards as performance increases and prices drop. Without an AGP slot, you're limited to the system's built-in video (usually slower and potentially less compatible) or forced to upgrade with video cards that fit the older, slower PCI bus. Fast PCI video cards (a bit of an oxymoron) will soon be a thing of the past, so choose carefully if upgradeability or video performance is important to you. Some systems with built-in video also have AGP slots—which is very desirable.

PCI (peripheral component interface) slots handle most expansion duties nowadays, and you'll find five or six PCI slots on most motherboards. Smaller system boards, such as those built to the micro-ATX standard, may have only two or three PCI slots, which limits expandability.

ISA (industry standard architecture) slots are yesterday's news and will soon disappear entirely. Older systems still have them, and ISA plug-in cards are still available, but not for too much longer. ISA slots are important only if you have an older ISA card that you need to use in your new machine.

AMR (audio modem riser) and CNR (communications network riser) slots accept tiny, inexpensive modem and network plug-in modules. These aren't widely supported, but manufacturers seem to include them for the sake of OEM buyers.

I/O Connectors

PCs once had a menagerie of semi-proprietary connectors for serial, parallel, keyboard and mouse devices, but thanks to the ATX standard, these connections, and those for USB, joystick and sound (perhaps others) have been built onto the motherboard and protrude out the back of the case in a set arrangement—bliss! No muss, no fuss. I'd never go back!

Most modern PCs still have two 9-pin serial connectors that are useful for hooking up external modems and connecting handheld devices such as Palm Pilots, but many users simply disable these ports in the motherboard's BIOS to conserve precious system resources. The 25-pin parallel (printer) port is still there, too, but as with serial ports, many I/O chores are now being handled by USB and Firewire ports, which support multiple devices and daisy chaining. Hams, of course, often use serial and parallel ports for keyers, loggers, rig and rotator controllers, etc, so if you need these legacy ports make sure your system still has them—some don't!

USB—the universal serial bus—now in its second iteration (USB2), can theoretically support a gaggle of devices on the same port, all sending and receiving data along a single, fast serial channel. In practice, however, USB has been a mixed bag because of chipset compatibility issues and standards problems. USB2 is threatening to solve those issues, but at press time, Firewire, a USB-like high-speed serial technology, offers the performance and reliability originally promised by USB. With a

400-Mbit/s maximum data rate, Firewire can support external hard drives and CD recorders with ease.

Drives

New and definitely improved, every drive in a modern PC is better than the drive that came before it, except for the now-lowly 1.44-MB floppy drive, which is disposable and on its way to becoming extinct.

Hard Drives

Much like RAM, hard drives used to be slow, small (capacity) and expensive. Today they're huge (capacity), affordable and faster than ever. Unless you're building a file server, forget expensive and complicated SCSI drives (and their controllers) and stick with IDE models (which are now just as fast in typical applications). Models that range from 20 to 100 Gbytes (not a typo) sell for $80 to $225. At press time the sweet spot is a 40-Gbyte drive for less than $100.

The IDE interface now supports UDMA 66 and UDMA 100 modes (representing 66- and 100-Mbyte/s maximum *internal* data rates, respectively) and the drives spin at 5400 and 7200 RPM (faster rotation, faster access).

Don't worry too much about hard drives—you can hardly go wrong. Today, the various makes and models are similar in performance and durability. Buy drives made by Seagate, Western Digital, IBM, Maxtor or Quantum. Try to avoid units manufactured by Samsung (good RAM, nice monitors) and Jaton, which have much higher failure rates than those made by the "big five." Fujitsu drives seem to be somewhere in-between.

And remember, unlike older UDMA 33 drives, newer, faster drives require 80-wire cables for maximum performance. If you use a conventional 40-wire cable the drives default to UDMA 33 speeds, which is good for backward compatibility but bad for maximum performance.

CD Drives and Recorders

CD drives, especially units that can also record, have overtaken floppy drives for almost every portable storage task. Today's readers, which are largely commodity items, read data at up to 75X (75 times faster than the first CD-ROM drives), but anything that's 32X or faster seems to offer similar performance.

Choose name-brand units with IDE interfaces. SCSI models are expensive, complicated and no longer necessary to make "coaster-free" CD copies and recordings. Decent CD-ROM drives cost about $30.

CD recorders (all models work with recordable and rewriteable discs) now support recording speeds of up to 24X—an astronomical improvement over previous 2X and 4X models. At press time the sweet spot is at 16X, and a typical "16X10X40" CD recorder (which can record write-once discs at 16X, erasable discs at 10X and can read discs at 40X) can be had for less than $100. At these speeds, a full CD takes about three to eight minutes to record, compared to 20 to 40 minutes only a year or two ago. Again, stick to IDE models and forget about SCSI "burners."

In addition to raw speed, modern CD recorders often use a variety of technologies to prevent buffer under-runs (and their associated coasters, or ruined discs). The most recognizable is called Burn-Proof, which pauses the laser during a recording session if the computer can't provide data fast enough for full-speed burning. With Burn-Proof and its cousins, CD recording has become a no-brainer. I'd suggest a 16X unit made by Yamaha, Sony, HP, TDK or Mitsumi.

DVD Drives and Recorders

Think of today's DVD drives as CD-ROM drives that can also play movies! They're backward compatible with most CD discs and can read CDs at speeds of 24X to 48X. In the early days, playback speeds and name brands were more important, but today, DVD players are significantly similar. Some are a bit faster than others (which doesn't affect movie playback, just software installation and data transfer), and some offer new features here and there, but that's about it. Stick with name brands such as Pioneer and Toshiba and you'll do fine. Name-brand DVD drives cost about $60.

DVD recorders, unlike DVD readers, are a real mess of conflicting standards, hardware and capabilities. And they're expensive, weighing in at several hundred dollars each. My advice is to avoid them unless you have special needs. And make sure you do your homework before you buy. Next year your expensive DVD recorder will likely be obsolete, replaced by models that conform to the newest "standard."

Video Cards

Once filled with dozens of rivals and competing products, the PC video card marketplace has narrowed to only a few key players. More than ever, today's video cards are fast, functional and affordable. Cards with 2D *and* 3D engines are the norm, and now that RAM, too, is fast and inexpensive, video cards are dripping with the stuff.

High-performance cards have 64 MB of DDR SDRAM, and it's difficult to even find a card that has less than 8 MB. That means that even entry-level video cards—or the graphics subsystems built into many motherboards—can drive big monitors at high color depths, and should work well for word processing, internet surfing and almost all general-purpose computing, including ham applications.

If you require fast 3D graphics—for computer gaming, animation or rendering—you'll need a more powerful video card. Most popular models made by a variety of manufacturers are

What to do with pesky IDE cables? The new high-performance cables designed for UDMA 66 and UDMA 100 drives fold up rather nicely. The compact cables provide for a tidy layout and less-restricted air flow.

based on one of two prominent video chipsets (there's that word again!)—nVidia's *Geforce* series and ATI's *Radeon* series. Both offer excellent 2D and 3D performance and a variety of extras such as TV out, video out, video in (ATI), built-in TV tuners (ATI) and DVD playback. As a rule, Geforce-based cards are designed exclusively for 3D gaming performance, while Radeon-based cards have richer, better-looking 3D graphics and tend to be better in all-around performance.

Now that most video hardware performs pretty well, driver support is a key issue. Software "drivers" are the low-level programs that allow the video card's hardware to interact with the hardware on the motherboard (and vice-versa). Better drivers produce better performance *and* reduce operating system crashes, strange behavior, etc. Using the latest and greatest video drivers isn't important for most non-3D applications (as long as the video card works with whatever operating system you're using), but for gaming, rendering, video editing and the like, frequently updated drivers can be critical. Without a doubt, nVidia is the runaway leader when it comes to driver support, while ATI is improving but still playing catchup.

If you need more video oomph, consider cards based on nVidia's Geforce 2 MX ($50), Geforce 2 GTS ($100), Geforce 2 Ultra ($200) or Geforce 3 ($300) chipsets. ATI's Radeon series is available in 32 and 64-MB models, many of which have built-in TV tuners, video-capture subsystems and multi-monitor support. Radeon 7200, 7500 and the blazingly fast 8500 models range in price from $80-200. The Project PC sports a Radeon 8500—which itself has more computing power than some PCs.

Tom's Hardware and Anandtech feature weekly updates on video cards and video technology. If you want to be up to date, start there.

Flat Panel Support

Flat panel monitors, once found only in movies about Wall Street, are now affordable (although they're not necessarily cost effective when compared to conventional CRT units). Some panels have analog inputs and can be driven by standard video cards, while others have digital inputs and must be driven by video cards that have outputs compatible with digital flat panels. Make sure your video card has the right outputs if you're thinking about a flat panel monitor.

Monitors

Last time around, monitors were still a bit tricky, and it was possible to buy some really poor units. That's largely a thing of the past, as monitors are pretty much commodity items now. Models from dozens of manufacturers perform well, making it difficult (but not impossible) to come up with a lemon.

Small 14- and 15-inch monitors have given way to 17- and 19-inch models, which offer a lot of extra screen real estate and greatly improved performance. CRTs have become flatter, or perfectly flat, and refresh rates, once marginal, are now generally high enough (at higher resolutions) to eliminate annoying and fatiguing screen flicker. High-quality models have tight dot pitches and plenty of on-screen geometry controls to help ensure undistorted screen images.

As always, resist the temptation to buy cheapie monitors and try to get some kind of extended warranty when you buy. Fixing monitors is almost impossible, even for resourceful hams. Although you can casually buy parts through the mail, try to evaluate monitors in person. If a monitor looks great in the store, chances are it will look great in your shack. So the next time you're in town, check out the monitors at your local Best Buy (or equivalent), and when you've found one that looks good, check out the online reviews to confirm your decision.

Unless space restrictions are a concern, buy the largest good-quality monitor you can afford. Your computing experience will be better and your system will be more versatile. Decent 17-inch monitors can cost as little as $175, while comparable 19-inchers will set you back another $100 or so. Professional-grade monitors are a bit more expensive, but are recommended if you need to use your computer for extended periods.

Flat Panels

The big news in monitors is affordable flat panels. Formerly reserved for laptop PCs, these thin, lightweight, power-friendly units are now available in quantity as desktop monitors. Flat panels are perfectly square and offer similarly perfect screen geometry. New models are bright and contrasty.

But before you rush out and buy one, consider the downsides. Flat panels usually only work well at one screen resolution, may require special video cards, are fragile, hard to clean, expensive to fix, use expensive backlights (built-in), can be difficult or impossible to focus (analog input models) and have the same *annoying* brightness gradients that plague laptop users—bright at the top of the screen and dim at the bottom (or is it the other way around?). I don't know about you, but I reserve flat panel monitors for situations that have specific space or power restrictions. Until newer technologies overcome these limitations, flat panel usefulness is still somewhat limited.

Fifteen-inch flat panel monitors can be purchased for as little as $300, which is almost a thousand dollars less than their introductory price. Seventeen-inchers, once thousands of dollars, can be purchased for as little as $700.

Sound Cards and Speakers

For years hams have depended on Sound Blaster-compatible audio systems to provide DSP platforms for operating digital modes, audio signal processing and more. The good news is, Sound Blaster compatibility is built into *virtually every* audio chipset, including those that are built into system boards. On the whole your sound card-based ham software should work just fine. Should your system be the rare exception, inexpensive add-in sound cards are available in ISA and PCI versions that can cost as little as $7—a far cry from flaky $150 sound cards a decade ago!

Although it hasn't made the evening news, PC sound hardware, including speaker systems, has really come into its own with the advent of inexpensive PC DVD players and inexpensive, DSP-based five- and six-channel sound cards. I'm devoting an extra bit of space here because the improvements in PC audio can really impact and improve your PC experience.

Today's premium sound cards are based on powerful DSP engines and offer CD-quality, multi-channel playback and record, a full spread of digital and analog inputs and outputs and choice of 2, 4, 5 and 6-channel outputs, including Dolby surround-sound. Popular models include the Philips Acoustic Edge, Creative Labs' Sound Blaster Live! and the Hercules' Game Theater XP (which has a nifty breakout box that's experimenter friendly). Prices for these very capable cards range from $50 to $120.

Of course, playing all of this fabulous sound through a pair of teeny desktop speakers doesn't provide the full experience. Thankfully, speaker systems have evolved to match. In the course of writing this article and reviewing PC hardware for other publications, I've had a *lot of fun* playing with two top speaker systems: the Klipsch ProMedia 4.1s and the MidiLand S4 7100s.

With 400 W of total power and a 150-W subwoofer, the Klipsch speakers (front and rear speakers plus a subwoofer) can make the sound system in your local movie theater sound like a tabletop AM radio. This top-rated system is actually THX certified, which explains why it can bow the walls without sounding distorted. With a convenient control layout, an auxiliary line input and amazing power and clarity, the Klipsch speakers excel

at immersive, "feel it in your body" gaming sound and do quite well with DVD movie playback, despite the fact that the system is not 5.1-channel Dolby capable.

The MidiLand 7100s can't produce the rock concert sound levels of the Klipsch speakers, but they have an extra center-channel speaker and a Dolby decoder for true surround sound (front and rear speakers, a center-channel "dialog" speaker plus a subwoofer). The system also has an external control box/decoder with plenty of inputs and outputs, which is handy. Although more restrained (and less expensive), the MidiLand system sounds great with any audio source, it games well and adds true surround sound to your PC. Either system will bring your computer audio into the 21st century. These systems sell for $175 to $250.

Operating Systems

Although most of us now run some version of *Windows*, hams are among a shrinking population of computer users who can actually use DOS (or even CPM) in productive, useful ways! That said, not many folks are going to build new, powerful machines *dedicated* to DOS. And although the newest versions of *Red Hat Linux* and *Mandrake Linux* can give *Windows* a run for its money, the prevalent Microsoft OS has the market share (and most of the mindshare). Power users often install several operating systems on their favorite PCs, so you really can have the best of both (all) worlds.

Windows—it's everywhere, and we have a real love/hate relationship with it! It's powerful, yet oh so buggy. It's fabulous, yet frustrating.

Windows 95, although not a good choice for new machines, is perfect for older desktop and laptop systems and runs well with only 8 to 16 MB of RAM.

Windows 98/*Windows* 98se is faster than its predecessor and more stable, but likes more RAM, at least 64 MB. It's a decent all-around choice for a multi-purpose machine and offers maximum device compatibility. The really annoying thing about 95/98 is that they significantly degrade over time, become unusable at some point and require frequent reinstallation and fixing—which is frustrating and time consuming!

Windows ME is a dead-end OS that should be avoided, if possible. On most systems it's buggy and crash prone, and other *Windows* OSs clearly outperform it.

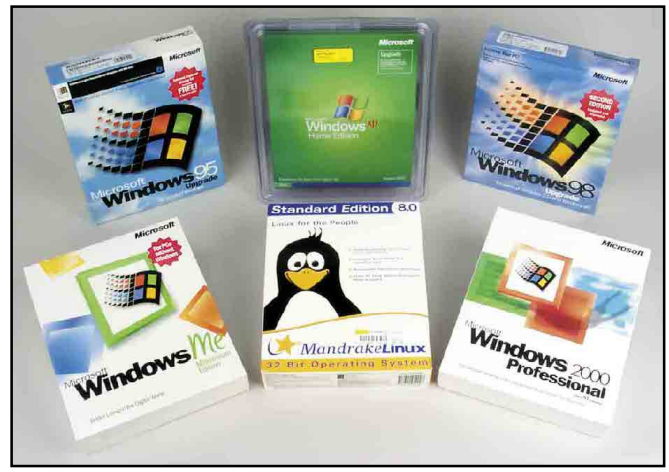
Windows NT, with all of its flavors and bug fixes, is a specialist OS and has been supplanted by *Windows* 2000 and XP. Unless you're a masochist or have a specific need, avoid *Windows* NT!

Windows 2000 is what *Windows* NT always wanted to be. It's matured nicely, is quite stable, has excellent security features and now supports more and more devices. Because it's designed for corporate environments, however, '2000's major drawback is its complexity and frustration factor. It's sometimes tedious to use and administer for non-nerds and has a steep learning curve. *Windows* 2000 likes fast systems with plenty of RAM. On my P-III 450 machine with 256 MB of RAM, *Windows* 2000 is solid, but still sluggish.

Folk wisdom clearly cautions against installing new Microsoft OSs until one or two "service releases" (bug fixes) have come and gone, but *Windows* XP *seems* to be the lone exception. XP "upgrades" existing *Windows* machines nicely, it's amazingly stable, has many new and nifty features, and seems extra zippy. At press time, XP lacks support for a fair bit of hardware, including motherboards, peripherals and the like. But if your system supports it—600 MHz+ with 256 MB of RAM and a large, fast hard drive—XP is worth considering.

Final Thoughts

I know there's a lot more to cover here, but there's simply no space. I hope I've answered a few of your questions and sparked



A sampling of the wide variety of operating systems available to today's computer-savvy ham. Can't decide? If your hard drive is large enough, you can install two or three!

you to get going on your own DIY PC. And if I've raised more questions in the process, at least I've provided the resources to answer them, which was a major aim.

Computer technology is better, faster, more capable and much less expensive than it was in 1998, but it's the web-based information sources and our tremendous access to every tidbit, price and opinion that benefit us the most. Somewhere, somewhen, somebody is asking (or has asked) virtually every computer question you're likely to pose, and if you know where to look and how to ask, you can access expert advice and opinions 24 hours a day. You can also go on a virtual shopping spree, saving hundreds of dollars and browsing inventories from coast to coast.

For PC home-brewers, today's environment is a cornucopia of opportunity. It could hardly be better, save for next year, and the next year, etc! So, arm yourself with expert knowledge, round up a pile of your favorite parts and get busy and have fun!

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NEW PRODUCTS

MIDLAND'S F-12 FRS MINI HAND-HELD

◊ Midland's new F-12 FRS hand-held features the usual 14 channels and 38 interference-reducing sub-codes, but does so in a tiny, virtually miniature package. The little Family Radio Service transceiver has a range of up to two miles and features innovative VOX-based T/R switching. You simply talk into the radio and it transmits—without requiring the use of a headset.

Other features include a water-resistant enclosure, a paging function, channel scan, low battery indicator, a bright daylight-visible LCD, squelch and an accessory speaker/mike jack. The radio operates on three AAA batteries.

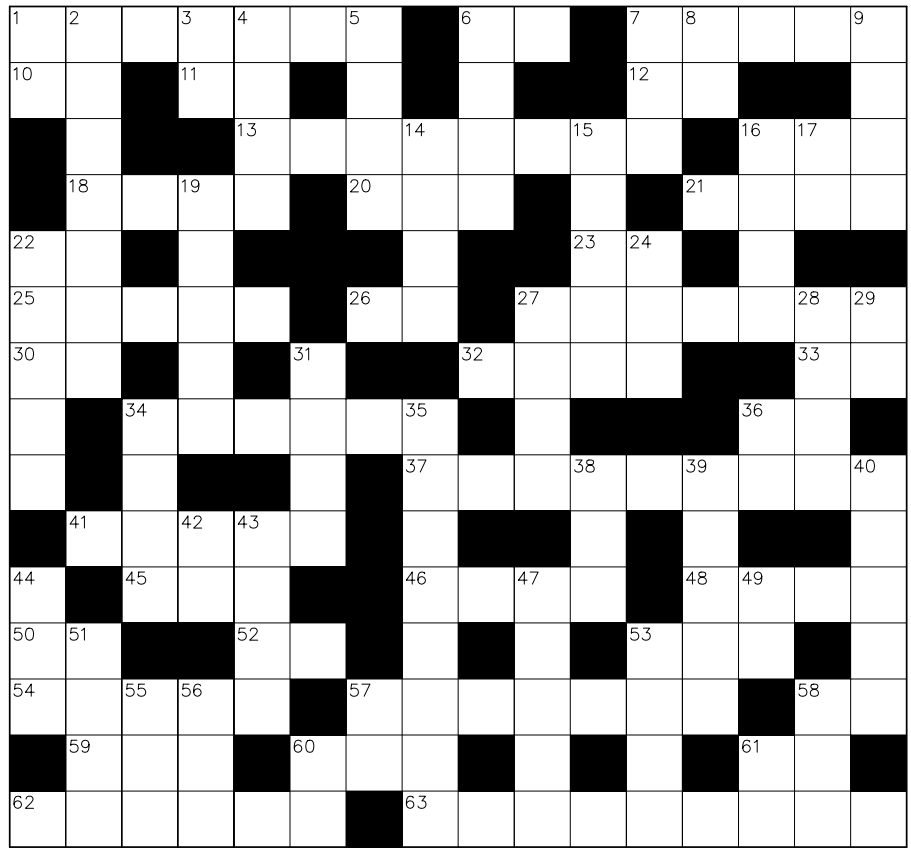
Price: $29.95 each, or $59.95 per pair. For more information, contact Midland at 1670 N Topping Ave, Kansas City, MO 64120, or point your Web browser to **www.midlandradio.com/**.

Next New Products

By H. Ward Silver, N0AX

Test Your Knowledge!

A Vintage Crossword

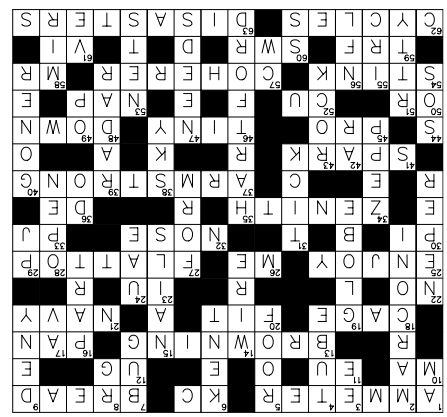


Across

1. Showed transmitter current output
6. Frequency unit (abbr)
7. Type of board used for construction
10. Unit of current (abbr)
11. One of the continents (abbr)
12. Military prefix for RF connectors
13. DXpeditioner who liked Coke
16. Move an ATV camera across a scene
18. Multiple-wire antenna
20. Throw a _____
21. Branch of armed forces that controlled radio after WW I
22. Unconnected switch position
23. International Units (abbr)
25. We _____ ham radio
26. Not you
27. Antenna in the shape of a T
30. Circumference over diameter
32. KH6 DXer Katashi
33. Dutch Caribbean prefix
34. Manufactured Trans-Oceanics
36. From (CW abbr)
37. Inventor of the superhet
41. First amateur emission
45. Super-_____ receiver
46. In the early days, rigs were anything but _____
48. QSY_____ 5
50. Gate
52. Bye-bye (CW abbr)
53. Midday snooze
54. A burning transformer makes this
57. First type of RF detector
58. Mister (abbr)
59. First type of rcvr with RF selectivity
60. Matching impedances minimizes this
61. Roman numeral for 6
62. Old name for Hz, _____ per second
63. Hams rise to the fore during these

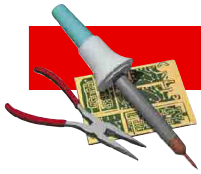
Down

1. First amateur voice emission
2. First to span the Atlantic
3. Type of engineer (abbr)
4. Elements in a vacuum
5. Antennas on the house often mount here
6. Atwater-_____
7. Early type of automatic mechanical keyer
8. Military prefix for coax
9. Prevent from having
14. Open-_____ line
15. Coils were wound on these in a board
16. Builder's lament: "I'm missing one _____!"
17. Audio-visual (abbr)
19. Made Scout and King transmitters
22. Transmission line loss units
24. Prefix is A6
27. What a plug-in coil is wound on
28. Normally _____ switch
29. Nighttime clothing
31. WWV pulse
34. Half-wave, end-fed antenna
35. Original ARRL station QTH
36. Take action
38. Buddy and Ranger receivers
39. First radio ranging system
40. Touch that high voltage and you'll be one of these
42. End of msg
43. Crystal (slang)
44. What the *Titanic* sent
47. Know the difference between these and your wants
49. Second ___
51. First character-based digital mode
53. First chat rooms
55. Exchange for DX postage (abbr)
56. ARRL FL section



57. First digital mode
58. Russian predecessor to the ISS
60. Contest that features a Clean Sweep
61. Northerly prefix

22916 107th Ave SW
Vashon, WA 98070



By Gil McElroy, VE3PKD

Never Test a Transistor with an Ohmmeter

A Short History of the Transistor in Amateur Radio.

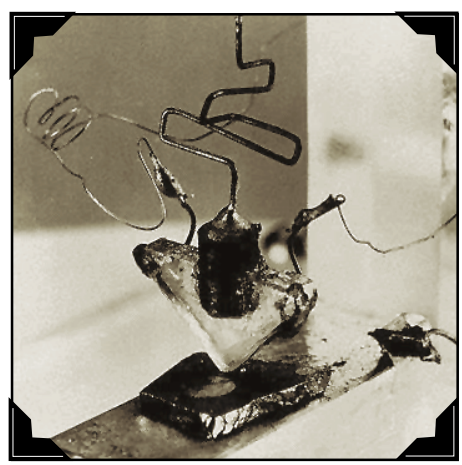
The Intel Corporation recently announced the development of a new silicon transistor for use in future Pentium computer chips. A single transistor in computers manufactured in 2007 will be 1000 times faster than today's, and with a microscopic size measured in mere atoms.

The world has come a long way since December 16, 1947 when John Bardeen and Walter Brattain, working with William Shockley at Bell Telephone Laboratories in Murray Hill, New Jersey, constructed a makeshift solid-state device actually capable of amplifying a signal applied to it out of a piece of germanium, some gold foil, copper wires and a hunk of plastic. The first manufactured transistors that followed were small, temperamental things that didn't work, more often than not. Today, they are infinitesimally minute devices—some experimental ones are a mere 50 nanometers, or 50 billionths of a meter, in size—that are the backbone of electronic devices ranging from computers to cellphones to smart refrigerators. New generation devices include plastic transistors printed by ink-jet, molecule-size transistors made of carbon-60 (or "buckeyballs"), and even living bio-transistors made of bacteria.

They all, however, trace back to Brattain and Bardeen's discovery, announced to the world by Bell Labs in a press conference on June 30, 1948. Of course, it wouldn't be long before hams took note of this new piece of technology. The October 1948 issue of *QST* made first mention of the transistor, noting that "it doesn't appear that there will be much use made of Transistors in amateur work…the noise figure is said to be poor comparable to that obtained with vacuum tubes," but also acknowledging that "these clever little devices are well worth keeping an eye on."

QST had it right on both counts. There wasn't much of a place for transistors in amateur work, nor would there be for some time. But they were, indeed, worth keeping an eye on. The version of the transistor announced in the summer of 1948 was the point-contact transistor, in which two fine wires (like the "cats whiskers" of crystal detectors already so familiar to hams), called the emitter and collector, were in mechanical and electrical contact with a tiny block of germanium. It was a device so temperamental that some versions produced by Western Electric and General Electric had holes drilled into the sides of the casings to allow for optimum adjustment of the point contacts during the manufacturing process.

Just like early vacuum tubes (not to mention computers in the early 1980s), early transistors were pricey little things, a consequence of the newness and difficulty of the manufacturing technology, as well as the fact that branches of the US military (for whom money was no object at the height of the Cold War) were the primary customers. Vacuum tubes, by comparison, were considerably cheaper, not to mention a lot easier to come by. It would be quite some time before they would be succeeded by affordable solid-state technology.



One of the first transistors, circa 1948.

Within a few years, the original point-contact transistor was superseded by the more sophisticated junction transistor, the invention of William Shockley, which entirely dispensed with the unreliable mechanical connections of its predecessor, instead using "junctions" between dissimilar sections of semiconductor material to channel current flow. According to Michael Riordan and Lillian Hoddeson in their history of the transistor, *Crystal Fire*…"they were hundreds, and eventually thousands, of times quieter than their noisy siblings. This meant that they could easily manipulate far weaker signals, which were imperceptible to point-contact transistors—like trying to find a tiny ripple on a storm tossed sea."[1]

Hams were good at finding those "tiny ripples," and with the introduction of the junction transistor, solid-state technology would at last find its rightful place within the hobby. It would all begin in 1953.

Transistors for Hams

"NOW YOU CAN TRY TRANSISTORS" was the heading for a half-page Raytheon advertisement in the January 1953 issue of *QST*, the first in which ads for transistors intended for amateur use appeared. No price was listed for the two junction transistors Raytheon was selling, but two months later in the March issue, a full-page ad from Radio Shack offered Raytheon CK721 junction transistors at a whopping $12.50 apiece—about $83 in 2001 dollars!

But January 1953 would also mark a technological milestone in Amateur Radio, when Ed Tilton, W1HDQ, reported the first amateur transmission using a transistorized transmitter—all of 25 miles— in his *QST* column, "The World Above 50 Mc." The transmitter itself made the cover of the February issue of *QST*, and in March, the rig's owner and builder, George M. Rose, K2AH, contributed an article describing his 2-meter rig that used a single point-contact transistor and pumped out a mighty 50 microwatts. At the time, it was the lowest-powered rig ever used in an amateur QSO.[2]

The first two-way all-transistor contact occurred in February, a half-mile contact on 40 meters, and in May Ed Tilton reported the first 50 MHz two-way contact. The ball was rolling! The June issue of *QST* reported the first known all-transistor amateur station, and a full-page Raytheon advertisement for a "Transistor Application Contest" offered $10,000 in prizes for the best designs using their new

[1]Notes appear on page 64.

Who Really Invented the Transistor?

On December 10, 1956 in Stockholm, Sweden, John Bardeen, Walter Brattain and William Shockley (none of whom, unfortunately, were hams, though both Bardeen and Shockley had experimented with crystal radio as boys) were awarded the Nobel Prize in physics for their invention of the transistor. There is no question about the validity of their achievement, but as with virtually every other technological achievement, the history of the invention of the transistor is a story of close calls and near misses by others.

Though Bardeen and Brattain are credited with the invention of the point-contact transistor in 1947, as far back as 1938, German physicist Robert Pohl working at Gottingen University constructed a solid-state amplifier in which salt was used as the semiconductor. John Woodyard, a scientist working at the University of California at Berkeley in the early 1940s, is also thought to have independently invented the device in late 1941 or early 1942. Apparently, university lawyers were uninterested in patenting it as it had nothing to do with the cyclotron, an early particle-beam accelerator, which was the university's main focus of research at that time.

Perhaps the scene of most dispute has to do with the invention of the field effect transistor. William Shockley, a theoretical physicist, had begun seriously investigating the "field effect" in semiconductors, in which a current is modulated by an external electrical field, in 1945, and attempted to patent it in 1948. Trouble was, there were already several existing claims to the invention. In 1935, a British patent had been issued to physicist Oskar Heil for what would later be called a field-effect transistor. And earlier, in 1930, Julius E. Lilienfeld was issued a US patent for "a method of and apparatus for controlling the flow of an electric current between two terminals of an electrically conducting solid by establishing a third potential between said terminals." Lilienfeld's patent went on to claim that his invention was "particularly adaptable to the amplification of oscillating currents such as prevail, for example, in radio communication."

Both Heil and Lilienfeld were unable to construct functioning devices based on their patents. In fact, the lack of a strong theoretical basis behind both patents later led the IEEE to establish a policy on publishing theoretical papers in their Transactions. As for Shockley, he went on to invent the junction transistor, the device that quickly superseded the quirky point-contact device of Bardeen and Brattain, and later to establish the first semiconductor company in California in the area that has come to be called "Silicon Valley."

Heil is better known today for his groundbreaking work in loudspeaker design, and Julius Lilienfeld for his role in developing X-ray technology that established it as an important tool in medicine. The American Physical Society established the Julius Edgar Lilienfeld Prize in 1988 under a bequest of the scientist's widow. Awarded yearly, it recognizes outstanding contributions in physics, and winners have included the likes of British physicist and author of *A Brief History of Time*, Stephen Hawking. Interestingly, Lilienfeld was the number one write-in choice in 1999 of readers of the magazine *PC World New Zealand* as their "Man of the Millennium" for his invention of the transistor.—*Gil McElroy, VE3PKD*

junction transistors. Not surprisingly, two of the top four prizes were won by hams (and *QST* authors to boot). At the end of the year, the first *QST* article introducing hams to transistor circuitry appeared, noting that "if you've been thinking of experimenting with transistors this article will help you get off on the right track."[3]

By the spring of 1954, transistor prices had dropped significantly. New generation Raytheon junction transistors could be had at $3.50 each, down considerably from their price a year earlier. The technology of mass production was improving. Now, there was no excuse for ham experimentation with solid-state devices. In November, a *QST* "Stray" reported one adventurous ham who built his own point-contact transistors using broken diodes, bronze wire, and instructions from a British radio magazine!

By early 1955, one company in *QST* was advertising transistors ostensibly designed specifically for hams, and the "Strays" column increasingly carried reports of DX contacts using transistorized transmitters. Circuit designs employing transistors were popping up on a regular basis.

Hallicrafters advertised the first commercial amateur solid-state rig in the August 1957 issue of *QST*.

In May of 1956, the first design for a transistorized receiver appeared in the pages (and the rig itself on the cover) of *QST*, a multi-band superhet using 7 transistors,[4] and in July the first two-way 6 meter QSO occurred using entirely transistorized equipment. A milestone was achieved at the end of the year when the first transatlantic contact using transistor equipment was made on 40 meters.

Solid State Commercial Gear

Where hams went, the manufacturers were sure to follow. Ads for transistor kits like code practice oscillators, band converters, and even general coverage receivers had been appearing in the pages of *QST* regularly. But in August of 1957, a breakthrough in commercial gear occurred when Hallicrafters advertised the "First transistorized all band, single sideband fixed-portable-mobile transmitter-receiver!"

Hallicrafters offered a glimpse of the future of ham radio. The ad was literally a promise of things to come, for the company hadn't yet actually produced the rig. But hams weren't content to sit back and wait for the future to be delivered to them. They continued their experiments with increasingly affordable transistors, pushing the technology ever forward. While it happened, E. G. Von Wald, W4YOT, had some good advice for hams beginning to work with transistors for the very first time that he passed along in the September 1958 issue of *QST*: "Never test a transistor with an ohmmeter."

Solid state was here to stay.

Notes

[1]Michael Riordan and Lillian Hoddeson, *Crystal Fire: The Birth of the Information Age* (New York: W.W. Norton & Company, 1997), p 189.

[2]The March 1953 issue of *QST* was notable for reporting another major amateur achievement: the first amateur signals successfully reflected off the moon by Ross Bateman, W4AO, and Bill Smith, W3GKP. It was quite an issue!

[3]Richard Clay, W9JRO/4, "Transistor Circuitry," *QST*, December 1953, pp 35-38.

[4]Carl J. Heinen, W0MCN, "An Experimental All-Transistor Communications Receiver," *QST*, May 1956, pp 11-16.

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gmcelroy@eagle.ca

Two from IZ8BLY: *Stream* and *Vox Recorder*

Stream

Have you been hearing musical signals around 14.080 MHz? If so, you've probably been listening to MFSK16, one of the latest in a series of sound-card-based HF digital modes. Like RTTY and PSK31, MFSK16 is a keyboard-to-keyboard "conversational" mode. MFSK16 does not guarantee 100% error-free copy, but it offers remarkable performance under difficult conditions.

I won't go into the technical details of MFSK16 itself (Murray Greenman, ZL1BPU, covered that ground in his January 2001 *QST* article, "MFSK for the New Millennium"), except to point out that this is a robust, multi-tone digital system that occupies only 350 Hz of spectrum. The multi-tone nature of MFSK16 creates signals that sound like carnival music; they're easy to spot on the bands.

Nino Porcino, IZ8BLY, created the software that brought MSFK16 to the amateur community. His *Stream* freeware package for *Windows* runs on just about any sound-card-equipped Pentium PC, 100 MHz or faster. Transmit/receive switching is handled via the computer's COM port using either a homebrew interface, or one of the RIGblaster, Tigertronics or MFJ commercial interfaces. Audio is routed to and from the sound card directly, or through the interface.

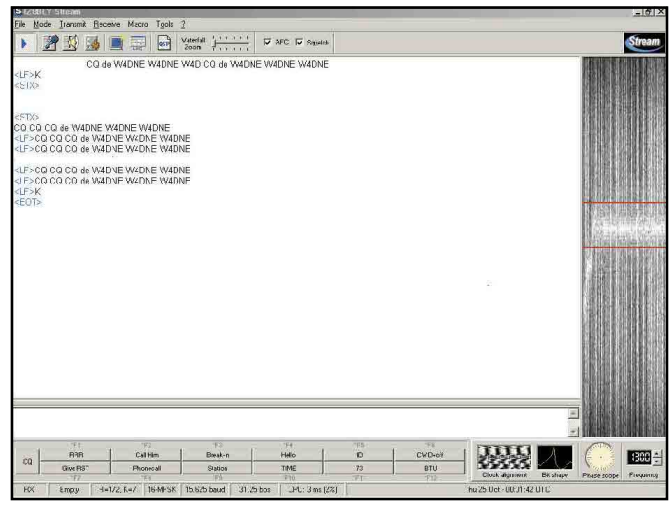
Stream provides macro buttons for all sorts of "canned" messages—CQ, BTU, sign off and so on. Between the buttons and the various status indicators, the *Stream* window may seem quite "busy." Don't let this intimidate you—using *Stream* is much easier than it looks. The display that needs your attention is the horizontally scrolling waterfall along the right-hand side of the window.

You simply tune your SSB transceiver until the jagged lines of an MFSK signal appear somewhere in the waterfall, preferably near the middle. Then, you place your mouse cursor in the waterfall and drag the two horizontal tuning lines up or down until they bracket the signal along the top and bottom. Left click the mouse once and *Stream* will attempt to lock in and begin decoding.

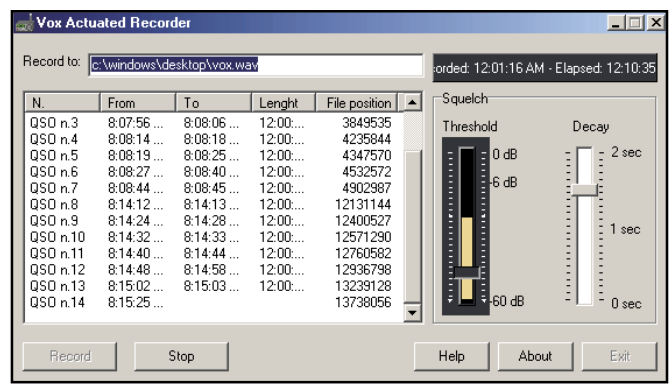
You'll need some patience at this point. Coherent text won't appear in the *Stream* receive window for about 4 seconds. If you still see nothing (or gibberish) after 4 seconds, you need to reposition the tuning lines and try again. I found that with some practice I was able to properly tune MFSK16 signals on the first or second attempts.

Stream has a built-in AFC that will compensate for drift up to about 7 Hz, but you still need to use reasonably stable radios. I've used *Stream* with several late-model rigs without difficulty.

MFSK16 activity is sparse compared to PSK31, but on the weekends I can usually find someone to chat with around 14.080 MHz. It's fascinating to listen as the signals fade almost to silence, only to find that you are still copying readable text!



***Stream* MFSK16 software for *Windows* by IZ8BLY.**



***Vox Recorder* logs activity on 6-meter FM.**

Vox Recorder

Vox Recorder is a neat little *Windows* application from IZ8BLY that allows you to record activity when you are away from the radio. As the name implies, this is sound-activated recording.

All you need to do is feed the audio from your radio to the line or microphone input of your PC sound card. Fire up *Vox Recorder* and set the *threshold*—the audio level that triggers *Vox Recorder* to begin creating files. You can also set the *decay*—the amount of time *Vox Recorder* waits before closing the current file (up to 2 seconds). Simply click on the RECORD button and *Vox Recorder* swings into action.

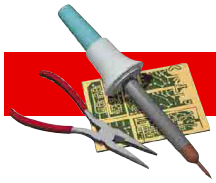
Each time a signal breaks the threshold, *Vox Recorder* will begin writing an audio WAV file to the designated directory on your hard drive. Additional recordings are appended to the same file. In *Vox Recorder's* status window you'll see a log (including date and time) of each recording.

You can do interesting things with *Vox Recorder*. I set it up to monitor activity on 6-meter FM at 52.525 MHz and 10-meter FM simplex at 29.600 MHz. You'd be amazed at what goes on when you're not at your station!

Download 'Em Today

Both *Stream* and *Vox Recorder* are completely free for downloading from Nino's Web site at **iz8bly.sysonline.it/index.htm/**. If you're looking for a new mode and a useful monitoring tool, both of these applications are worth your attention. QST

Steve Ford, WB8IMY ♦ *QST* Editor



THE HELP DESK

The Considerate Operator's Frequency Guide

The following frequencies are generally recognized for certain modes or activities (all frequencies are in MHz).

Nothing in the rules recognizes a net's, group's or any individual's special privilege to any specific frequency. Section 97.101(b) of the Rules states that "Each station licensee and each control operator must cooperate in selecting transmitting channels and in making the most effective use of the amateur service frequencies. No frequency will be assigned for the exclusive use of any station." No one "owns" a frequency.

It's good practice—and plain old common sense—for any operator, regardless of mode, to check to see if the frequency is in use prior to engaging operation. If you are there first, other operators should make an effort to protect you from interference to the extent possible, given that 100% interference-free operation is an unrealistic expectation in today's congested bands.

1.800-1.810	Digital
1.810	QRP CW calling frequency
1.800-2.000	CW
1.843-2.000	SSB, SSTV and other wideband modes
1.850-2.000	CW
1.910	SSB QRP
1.995-2.000	Experimental
1.999-2.000	Beacons
3.500-3.510	CW DX
3.560	QRP
3.590	RTTY DX
3.580-3.620	Data
3.620-3.635	Automatically controlled data stations
3.710	QRP Novice/Technician CW calling frequency
3.790-3.800	DX window
3.845	SSTV
3.885	AM calling frequency
3.985	QRP SSB calling frequency
7.040	RTTY DX
	QRP CW calling frequency
7.075-7.100	Phone in KH/KL/KP *only*
7.080-7.100	Data
7.100-7.105	Automatically controlled data stations
7.171	SSTV
7.285	QRP SSB calling frequency
7.290	AM calling frequency
10.106	QRP CW calling frequency
10.130-10.140	Data
10.140-10.150	Automatically controlled data stations
14.060	QRP CW calling frequency
14.070-14.095	Data
14.095-14.0995	Automatically controlled data stations
14.100	IBP/NCDXF beacons
14.1005-14.112	Automatically controlled data stations
14.230	SSTV
14.285	QRP SSB calling frequency
14.286	AM calling frequency
18.100-18.105	Data
18.105-18.110	Automatically controlled data stations
21.060	QRP CW calling frequency
21.070-21.100	Data
21.090-21.100	Automatically controlled data stations
21.340	SSTV
21.385	QRP SSB calling frequency
24.920-24.925	Data
24.925-24.930	Automatically controlled data stations
28.060	QRP CW calling frequency
28.070-28.120	Data
28.120-28.189	Automatically controlled data stations
28.190-28.225	Beacons
28.385	QRP SSB calling frequency
28.680	SSTV
29.000-29.200	AM
29.300-29.510	Satellite downlinks
29.520-29.580	Repeater inputs
29.600	FM simplex
29.620-29.680	Repeater outputs

Note

ARRL band plans for frequencies above 28.300 MHz are shown in *The ARRL Repeater Directory* and *The FCC Rule Book*.

IBP/NCDXF beacons operate on 14.100, 18.110, 21.150, 24.930 and 28.200 MHz.

VHF/UHF/EHF Calling Frequencies

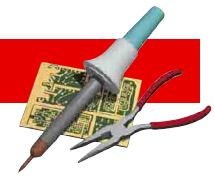
Band (MHz)	*Calling Frequency*	
50	50.125	SSB
	50.620	Digital (packet)
	52.525	National FM simplex frequency
144	144.010	EME
	144.100	CW
	144.200	SSB
	146.520	National FM simplex frequency
222	222.100	CW/SSB
	223.500	National FM simplex frequency
432	432.010	EME
	432.100	CW/SSB
	446.000	National FM simplex frequency
902	902.100	CW/SSB
	903.100	Alternate CW/SSB
1296	1294.500	National FM simplex frequency
	1296.100	CW/SSB
2304	2304.1	CW/SSB
3456	3456.1	CW/SSB
5760	5760.1	CW/SSB
10000	10368.1	CW/SSB

VHF/UHF Activity Nights

Some areas do not have enough VHF/UHF activity to support contacts at all times. This schedule is intended to help VHF/UHF operators make contact. This is only a starting point; check with others in your area to see if local hams have a different schedule.

Band (MHz)	*Day*	*Local Time*
50	Sunday	6 PM
144	Monday	7 PM
222	Tuesday	8 PM
432	Wednesday	9 PM
902	Friday	9 PM
1296	Thursday	10 PM

HINTS & KINKS



WINTER ANTENNA HINT

◊ I find that outdoor soldering of wire antennas in the winter is much easier inside a cardboard box. Winter winds in Ohio make repairs very difficult, even with a high-powered iron. I take a box big enough to work in and cut slots down two opposite sides. Secure the wire ends together and slip the antenna into the box, centering the splice in middle. Now, solder away. The box keeps out the wind, rain and ice and protects your work. *—Jeff Rahmel, KA8ZAW, 923 W Washington St, Napoleon, OH 43545;* **rahmel@henry-net.com**

RAISE YOUR PUSH-UP MAST SAFELY

◊ We hams tend to use the TV push-up masts for various antenna supports. I use a 40-foot TV push-up mast for part of my 160-meter vertical. The most dangerous part of the installation is erecting or lowering the mast. Because the sections of the mast telescope into each other, locking pliers are generally used to secure each mast section until the proper cotter pin or bolt is inserted to hold the section in place. Have you ever had the pliers suddenly lose their grip and let the mast section come down? I have, and this can be a very dangerous situation.

To alleviate this recurring problem, I laid out the mast on the ground and extended it as it would be in the vertical position. I left a one-foot overlap at each joint. Generally, the manufacturer drills a hole one foot below from the top of each mast section so a cotter pin can be inserted to hold the telescoping mast section in place. If a hole is not present, drill one. I drilled my holes large enough for a $^1/_4$-inch bolt. I then drilled a hole of the same size into the mast that is telescoped in the larger section. This hole is drilled just above the top of the larger section. While raising the antenna, place a Phillips screwdriver through the hole to temporarily prevent the mast from falling if the pliers suddenly lose their grip. You can then safely install the bolt and nut to secure this section of the mast.

For greater safety, I painted a red stripe around the hole drilled in the smaller mast. One foot above it, I painted a blue stripe around the mast. When the blue stripe appears, I know I have one more foot to raise the mast before the hole appears. I also use the two holes for a bonding strap at the junction (see Figure 1). After securing the bonding strip, I raise the mast to the next section, and so on until the erection process is completed.*—John J. Roessler, K6BX, 392 N Westwind Dr, El Cajon, CA 92020;* **k6bx@arrl.net**

LONG LIFE FOR PERMANENT PUSH-UP MASTS

◊ If you use a push-up mast on a permanent basis, add a cap to the top and use silicone caulk to seal each joint against the weather (see Figure 2). This keeps the rain out and prevents internal rust. Without sealing, water inside the mast could freeze in winter and split the mast tubing. If there is any chance of internal water—no seal remains perfect forever—drill a couple of small "weep" holes at the bottom of the mast.*—Richard Mollentine, WA0KKC, 7139 Hardy St, Overland, KS 66704-1710*

AN ANTENNA THRUST BACKUP

◊ If the bolt in a bolt-secured thrust bearing becomes loose, the mast can drop, placing its full weight on the rotator. As a safety backup, install a heavy washer just above the thrust bearing with a heavy shear pin or bolt above the washer as shown in Figure 3. If the thrust bearing fails, the mast is still supported by the washer and pin.*—Richard Mollentine, WA0KKC, 7139 Hardy St, Overland, KS 66704-1710*

ADD SAFETY AND COMFORT FOR TOWER CLIMBING

◊ Unless you have a platform, working on a tower for any length of time is hard on your feet. A simple modification can pro-

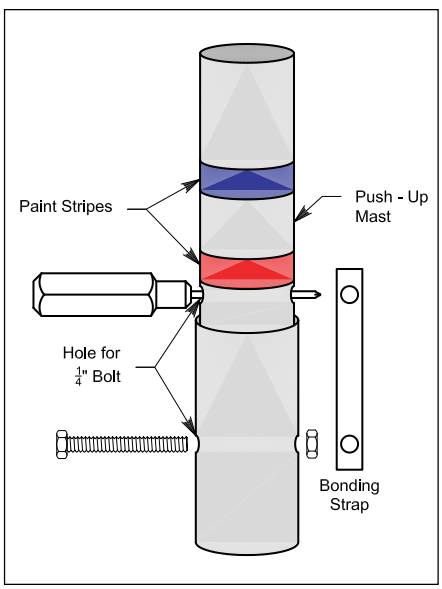


Figure 1—K6BX's scheme to ease erection of push-up masts. Two painted stripes signal when the joint fastening is near. The new hole in the inner section accepts a screwdriver shaft to prevent accidental slippage while installing the main fastener. Bolts through both holes hold a jumper strap that provides electrical continuity across the joint.

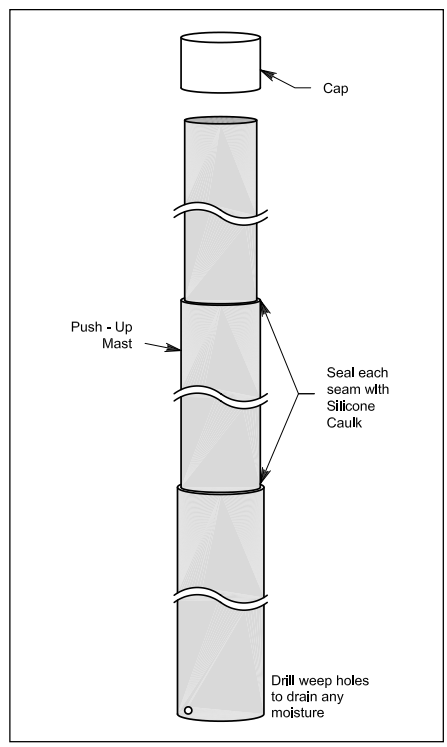


Figure 2—WA0KKC recommends sealing push-up masts against the weather.

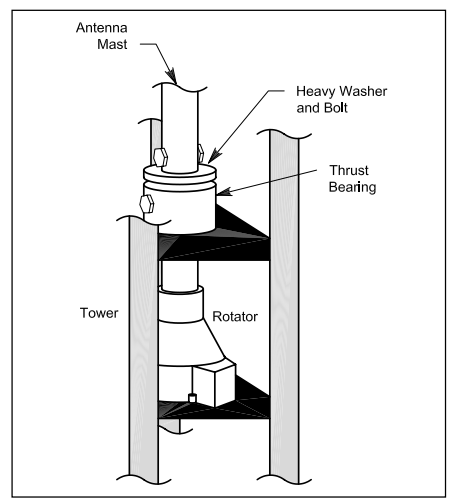


Figure 3—WA0KKC adds a washer and pin to insure against thrust bearing failure.

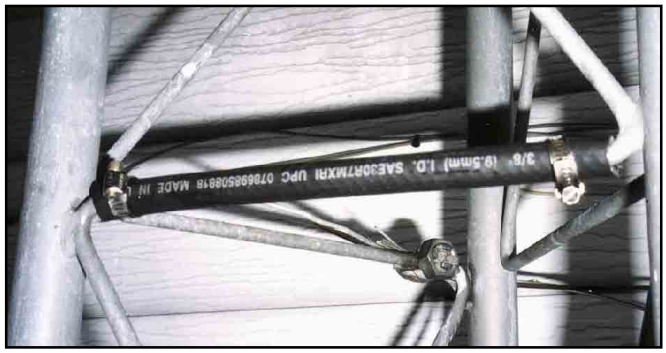


Figure 4—WA0KKC adds sections of rubber hose over horizontal tower rungs to protect his feet and prevent slipping. See text for installation details.

tect your feet against those narrow rungs and make them less slippery as well. Cover the horizontal tower bars with sections of automotive hose. To install the hose, cut it to length, slit along its length, fill it with silicone caulk and snap it onto the rung. Orient the hose so that the slit opens downward and secure it in place with a hose clamp at each end (see Figure 4).

Rohn 25 towers have $^{5}/_{16}$-inch-OD rungs, so cover them with $^{3}/_{8}$-inch-ID rubber hose. Rohn 45 and 55 towers use $^{7}/_{16}$-inch-OD rungs, use $^{1}/_{2}$-inch-ID hose.—*Richard Mollentine, WA0KKC, 7139 Hardy St, Overland, KS 66704-1710*

ROTATOR GEAR PROTECTION

◊ Every time your rotator starts or stops, a shock is imparted to the gear train. Figure 5 shows a mechanical assembly that absorbs some of the shock and protects the rotator. To make the assembly, use new parts from an automotive shock absorber and longer bolts as required by the parts you use.—*Richard Mollentine, WA0KKC, 7139 Hardy St, Overland, KS 66704-1710*

[Other suitable parts sources include polymer cushions from bicycle shock absorbers and rebuild kits for automotive anti-roll bars.—*Ed.*]

STEALTHY ANTENNA WIRE

◊ Premier Fence Systems[1] sells "GreenCote HT Smooth Wire," stock #301210 at $34 for a 2100-ft roll. This is #12 AWG electric fence wire, and it may have some use for stealth antennas. I got the Premier catalog after attending the Maryland Sheep and Wool Festival.—*Bill Riley, N3SNU, 12215 Malta Ln, Bowie, MD 20715-1811;v* **n3snu@arrl.net**

[From Premier's Web site, this appears to be high strength galvanized steel wire that has been painted green. It is meant to resist rust, and the greenish color may make the wire less visible than are many other conductors in outdoor settings. Remember that it is steel wire and has relatively high resistance compared to copper.—*KU7G*]

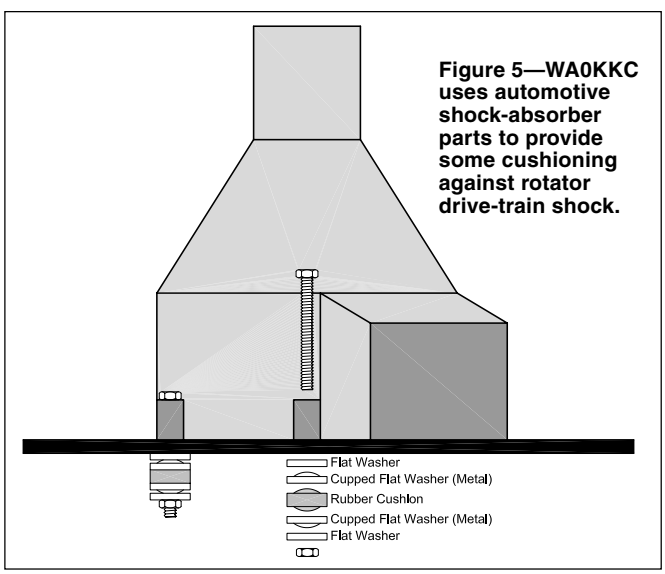


Figure 5—WA0KKC uses automotive shock-absorber parts to provide some cushioning against rotator drive-train shock.

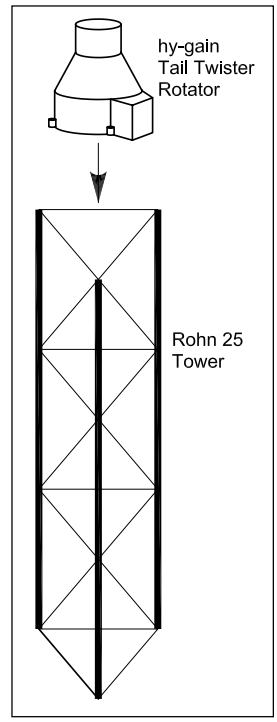


Figure 6—WA0KKC points out that TailTwister rotators can be used in Rohn 25 towers. Simply remember to insert the rotator from the end of a tower section.

INSTALLING A HY-GAIN TAILTWISTER ROTATOR IN ROHN 25

◊ A hy-gain TX[2] rotator *will* fit inside Rohn 25 tower sections, but it *cannot* be installed from the side. (The crossbars are too close for it to pass through them.) The rotator can be inserted from the ends of each tower section, as shown in Figure 6.—*Richard Mollentine, WA0KKC, 7139 Hardy St, Overland, KS 66704-1710*

STEALTHY LADDERLINE

◊ Like many hams, I discovered the advantages of using open-wire line, "window line" as some variants are called. While I was totally pleased with its performance, my XYL was less than amused by its appearance.

When working with camouflage, one of the goals is to mimic nature rather than man-made objects. I followed some camouflage principles and devised a way to significantly reduce the visual signature of window line, particularly when it has a background of trees, as in my installation.

My first step was to buy a pair of "nail-slot-hole pliers" as sold in hardware stores and elsewhere for punching oblong holes in aluminum and vinyl siding. With these pliers, you can remove extra material from the rectangles of solid plastic in the window line (see Figure 7). Neatness and uniformity are discouraged because the result then looks "man-made." A line with some rough edges actually looks more natural.

Second, I used some spray paint to break up the uniform color of the plastic insulation. Even without the paint, however, the reduction in visual signature is dramatic. If you elect to use spray paint, try to pick colors that resemble foliage in your area for the longest season, or the sunniest season, as appropriate. Avoid certain paints, however. For example, some "ultra flat black" paints use carbon black for pigmentation. While not a perfect conductor, carbon black can result in losses and disrupt the impedance, depending on the amount used.

While the modified window line can still be seen from the house, it is far less noticeable. From the street, it's easy to miss unless you are looking for it.—*Evan Rolek, K9SQG, 1295 Oakleaf Dr, Beavercreek, OH 45434-8002;* **k9sqg@aol.com**

Figure 7—Pieces of window line before and after K9SQG modified the "windows" to maximize the camouflage ability of the line.

[1]Premier1Supplies, 2031 300th St, Washington, IA 52353; tel 800-282-6631, fax 800-346-7992; **info@premier1supplies.com**; **www.premier1supplies.com**.

MEASURING AN UNKNOWN AF IMPEDANCE—THINK AGAIN!

[In the November 2001 column, I proposed a standard bridge circuit as an alternative to AA4FB's multiple-measurement technique. I was mistaken; the bridge only nulls if both the resistance and reactance of the known and unknown are equal. Since I showed only a resistance in the known branch, the bridge nulls only if the unknown is purely resistive. AA4FB's technique, however, is unaffected by phase relationships and works just as presented. Several readers have caught my error and responded with useful alternatives that are presented below.—*73, Bob, KU7G*]

◊ I'm sorry to say I believe that you were having a "brain crash" when you wrote the note on page 62 of November 2001 Hints and Kinks.

As shown by the attached *Electronic Workbench* simulation in Figure 8, if the unknown impedance is reactive (I used a worst case), the voltages across the unknown and the pot may be equal, but not equal to the voltage on the resistive dividers.

That is, although all four impedances are 1000 Ω at 1 kHz, there *is* a voltage between points A and B, not a null.

Therefore, the original idea works, but not the bridge proposed by KU7G. I suggest that the original method could be reasonably easy to do if one makes the two measurements simultaneously:

- Use two voltmeters
- Use two scope probes connected to a dual-channel scope, (making the common point the ground)

By the way, Hints and Kinks is about the first thing I read in every new issue, and I find it full of quite a bit of useful stuff. Keep up the good work!—*John Stanley, K4ERO, ARRL Technical Advisor, 8495 Hwy 157, Rising Fawn, GA 30738;* **JNRStanley@aol.com**

◊ I was just reading November's Hints and Kinks and came across a suggestion you made that I do not think is altogether correct. You were responding to a method for measuring impedances at audio frequencies made by Bert Kelley, AA4FB. Bert placed the unknown impedance in series with a potentiometer, R1, and the signal source, and suggested that one adjust R1 until the voltage across it equals the voltage across the unknown, in which case the magnitude of the impedance would be equal to R1.

You suggested an alternative, namely making a four-leg bridge with three resistors and the unknown impedance (that is a Wheatstone bridge). However, I think your suggestion only works if the unknown impedance is resistive. If, instead, the unknown has a significant reactive component, it will no longer be possible to adjust R1 to achieve a null.

I actually think AA4FB's original circuit is useful. I would, however, modify his method slightly. Using a high-impedance voltmeter, I would measure the voltage, *V1*, across R1 and the voltage V_x across the unknown impedance, Z_x. By dividing *V1* by R1, we obtain the current, *I*, in the circuit. Since this current also flows through Z_x, its magnitude is simply $Z_x = V_x/I = R1(V_x/V1)$. Thus, it is not necessary to adjust R1 to achieve equality of V_x and *V1*.

Even better, if a dual-channel oscilloscope is available and the audio source has a floating output (that is, neither side grounded), you can determine the phase of the impedance by examining the two voltages *V1* and V_x simultaneously on the scope. To do this, the ground sides of both channel inputs to the scope would be connected to the junction of R1 and Z_x. Thanks for your interesting column.—*Bill Kaune,* W7IEQ, *111 Piper Ct, Richland, WA 99352;* **w7ieq@arrl.net**

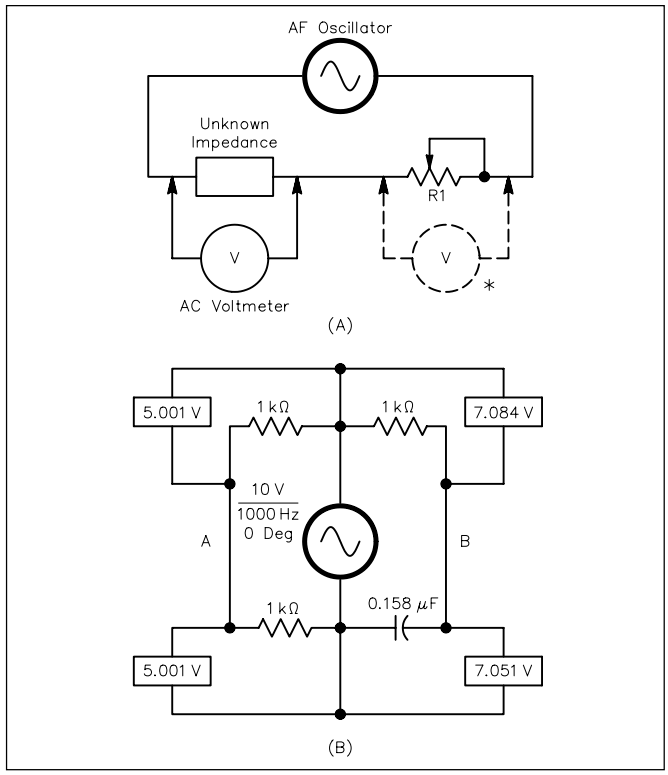


Figure 8—At A is the original and correct circuit as presented in the November 2001 column. At B, K4ERO's analysis shows that the bridge alternative proposed by KU7G will not register a null when the known and unknown impedances have equal magnitudes but their phases differ.

GUY WIRE SAFETY

◊ Plain guy wires are slender and dull in color. This makes them difficult to see, and an unseen guy wire can be hazardous. We can protect others and ourselves by making guy wires more visible. One way to do so is to place a brightly colored sheath on the wire. We can make inexpensive sheaths from $^3/_4$-inch PVC pipe and color them with brightly colored spray paint. On new tower installations, we can simply slip the pipes over the guy wires as they are secured to their anchors. For existing towers, we can slit the pipes, lengthwise, on a table saw and slip them over the guy wires. I cut the pipes into segments and space them on the guy wires with cable clamps as shown in Figure 9.—*David Malara, Jr, KB2UBO, 5827 Bartlett Rd, Rome, NY 13440;* **mustang5@borg.com**

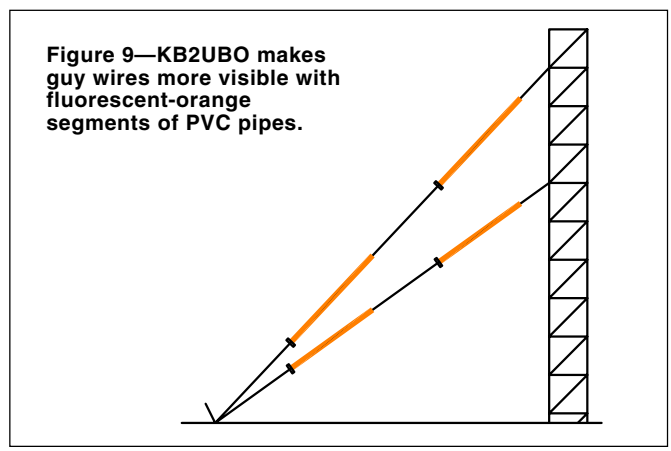


Figure 9—KB2UBO makes guy wires more visible with fluorescent-orange segments of PVC pipes.

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

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

WiNRADiO WR-1550i Computer-Based Communications Receiver

Reviewed by Rich Arland, K7SZ
QST *Contributing Columnist*

Shortwave radio has been part of my life since I was 9 years old. Dad's old Arvin console radio put the world at my fingertips. The excitement of hearing history in the making by listening to shortwave broadcasts was—and still is—quite a thrill.

Shortwave receivers have evolved tremendously since 1955. Vacuum tubes were replaced with transistors, which, in turn, gave way to integrated circuits and surface mount technology. The size of the receivers has shrunk dramatically. These days, you can tune in the world with tiny portable radios that are less than twice the size of a pack of playing cards!

Enter the WiNRADiO model WR-1550i. Just plug it into an empty ISA expansion slot on your computer's motherboard and hook up an antenna, and the WiNRADiO will transform your PC into a wide-range communications receiver. You'll have instant access to frequencies from 150 kHz to 1.5 GHz in the AM, narrow and wideband FM, CW and SSB modes—all at the click of a mouse. (WiNRADiO offers a wide variety of both internal "card" and external "black box" PC-based receivers. Visit **www.winradio.com** for details.)

With a WiNRADiO-equipped computer, you can catch up on news of local and world events delivered through the AM, FM and shortwave broadcast outlets; eavesdrop on military/civilian HF flight-following traffic and long-haul maritime ship-to-shore transmissions; monitor tactical FM frequencies used by fire, police, EMS and the US government; tune through most of the ham bands—and lots more. If a radio signal exists somewhere between 150 kHz and 1500 MHz, chances are you can receive it using the WiNRADiO system. The cellular telephone frequencies are blocked, of course. (We certainly wouldn't want to violate the Electronic Communications Privacy Act of 1986, would we?)

Installation and Set Up

The WR-1550i package includes a circuit card (the actual receiver unit), a 3.5-inch floppy installation disk, an indoor "test" antenna, a *User's Guide* and warranty information. The installation instructions are very concise and made the job of getting this radio up and running the proverbial "walk in the park."

Installation of the card was totally uneventful. The hardest part was getting the darned cover off the computer cabinet! I had two unused ISA expansion slots, so I put the card into the bottom-most slot. The factory default jumper setting for the I/O address (180) worked fine. I chose not to jumper the audio output of the radio card into the line input of my soundcard. Instead, I just plugged my computer speaker system directly into the single $^1/_8$-inch phono jack on the back of the board.

Just a few minutes after I had the computer case buttoned back up, I had the indoor test antenna connected to its BNC terminal, the speakers plugged in and the software loaded. I ran the indoor antenna over to my shack window and connected the end to a long-wire antenna I have up outside. A second or two after I double-clicked on the new WiNRADiO icon on my computer screen the speakers came alive with signals! There was some slight interference generated by my computer (as might be expected with this temporary indoor/outdoor antenna lashup) but it was not objectionable.

Bottom Line

Slip a WiNRADiO WR-1550i into an expansion slot in your PC and you'll instantly transform it into a sophisticated wide-range communications receiver.

I have a confession to make. I'm yet another one of those guys who don't like to spend a whole lot of time wading through the detailed operating instructions found in most manuals. I save that exercise for those times when I *really* can't figure out how a feature works. I've discovered that a little hands-on experience can substitute for page upon page of text.

The WiNRADiO receiver presented few challenges. It took me about 15 minutes of mousing around on the virtual front panel to master nearly all of the nuances of this receiver. To say that the layout of the controls and the organization of the drop-down menus make operating this rig easy would be an understatement. If you've got a little common sense, a bit of computer savvy and some basic radio operating knowledge—you'll quickly master this rig.

The *User's Guide* outlines all of the various control operations in excruciating detail, but a quick glance at the uncluttered front panel that appears on the monitor screen will immediately convey

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1
WiNRADiO WR-1550i, serial number 107620

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: 0.15-1500 MHz (cell blocked).	0.15-1600 MHz, cell blocked.[1]
Modes of operation: FM, WFM, AM, USB, LSB, CW.	As specified.
Size (HWD): 4.5×0.7×11.4 inches; weight, 20.2 oz.	
CW/SSB sensitivity (10 dB S/N): 0.5-1.8 MHz, 2.0 μV; 1.8-30 MHz, 0.3 μV; 30-1000 MHz, 0.3 μV; 1000-1500 MHz, 0.4 μV.	Noise floor (MDS): 1.0 MHz, –101 dBm; 3.5 MHz, –132 dBm; 14 MHz, –128 dBm; 50 MHz, –118 dBm; 144 MHz, –113 dBm; 222 MHz, –124 dBm; 432 MHz, –120 dBm; 902 MHz, –120 dBm; 1240 MHz, –114 dBm.
AM sensitivity (10 dB S/N): 0.5-1.8 MHz, 10.0 μV; 1.8-30 MHz, 1.0 μV; 30-1000 MHz, 1.5 μV; 1000-1500 MHz, 1.9 μV.	AM narrow, test signal modulated 30% with a 1-kHz tone, 10 dB (S+N)/N: 1.0 MHz, 20 μV; 3.8 MHz, 0.6 μV; 53 MHz, 2.6 μV; 120 MHz, 2.3 μV; 146 MHz, 2.5 μV; 440 MHz, 1.8 μV.
FM narrow sensitivity (12 dB SINAD): 0.5-1.8 MHz, 2.5 μV; 1.8-30 MHz, 0.4 μV; 30-1000 MHz, 0.4 μV; 1000-1500 MHz, 0.6 μV.	FM narrow, 12 dB SINAD: 29 MHz, 0.75 μV; 52 MHz, 1.1 μV; 146 MHz, 0.83 μV; 222 MHz, 0.44 μV; 440 MHz, 0.69 μV; 906 MHz, 0.84 μV; 1296 MHz, 1.7 μV.
FM wide sensitivity (12 dB SINAD): 30-1000 MHz, 1.5 μV; 1000-1500 MHz, 2.5 μV.	100 MHz, 6.1 μV.
Blocking dynamic range: Not specified.	CW mode: 3.8 MHz, 49 dB; 14 MHz, 45 dB; 50 MHz, 35 dB; 144 MHz, 34 dB; 222 MHz, 52 dB; 432 MHz, 26 dB; 902 MHz, 26 dB; 1240 MHz, 39 dB.
Two-tone, third-order IMD dynamic range: Not specified.	CW mode dynamic range and third-order intercept point *Frequency (MHz)* / *Dynamic Range (dB)* / *Intercept Point[2] (dBm)* 3.8 / 53 / –53 14 / 50 / –53 50 / 50 / –43 144 / 51* / –36 432 / 51 / –43 902 / n/a[3] / n/a[3] 1240 / 49 / –40
Second-order intercept point: Not specified.	–14 dBm.
FM adjacent channel rejection: Not specified.	20 kHz channel spacing: 29 MHz, 45 dB; 52 MHz, 46 dB; 146 MHz, 33 dB; 440 MHz, 37 dB; 906 MHz, 53 dB; 1296 MHz, 41 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing: 29 MHz, 45 dB*; 52 MHz, 46 dB*; 146 MHz, 33 dB*; 440 MHz, 37 dB*; 906 MHz, 48 dB; 1296 MHz, 41 dB*; 10 MHz channel spacing: 52 MHz, 59 dB; 146 MHz, 67 dB; 440 MHz, 55 dB.
Squelch sensitivity (threshold): Not specified.	At threshold: SSB, 14 MHz, 25 μV; FM, 29 MHz, 1.1 μV; 52 MHz, 0.62 μV; 146 MHz, 1.3 μV; 440 MHz, 0.43 μV; 906 MHz, 0.42 μV; 1296 MHz, 1.4 μV.
S-meter sensitivity: Not specified.	"45" indication[4]: 14 MHz, 23 μV; 50 MHz, 97 μV; 144 MHz, 266 μV; 430 MHz, 85 μV; 902 MHz, 14 μV; 1240 MHz, 26 μV.
Audio output: 0.2 W into 8 Ω (THD not specified).	0.21 W into 8 Ω at 12% THD.[5]
IF/audio response: Not specified.	Range at –6 dB points (bandwidth): CW: 102-2127 Hz (2025 Hz); USB: 385-2294 Hz (1909 Hz); LSB: 119-2234 Hz (2115 Hz); AM: 96-1249 Hz (1153 Hz).
Spurious and image rejection: Not specified.	IF rejection: 14 MHz, 96 dB; 144 MHz, 58 dB; 430 MHz, 44 dB; 902 MHz, 35 dB; 1240 MHz, 14 dB; image rejection: 14 MHz, 75 dB; 144 MHz, 87 dB; 430 MHz, 4 dB; 902 MHz, 0 dB; 1240 MHz, 18 dB.

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 shown.
[1]Sensitivity degrades below 0.5 MHz. Cell blocked 869-895 MHz.
[2]Intercept points were determined by noise floor reference.
[3]Could not be measured due to blocking response.
[4]Meter reads in "dB above the noise floor" according to manufacturer. Using the quasi-standard of 6 dB per S-unit, S9 equals 45 dB. The meter can be calibrated through software (see text).
[5]Output at 10% THD was 20 mW.

Figure 1—The virtual front panel of the WiNRADiO WR-1500i communications receiver. Don't let its simple appearance fool you—this receiver is packed with sophisticated capabilities.

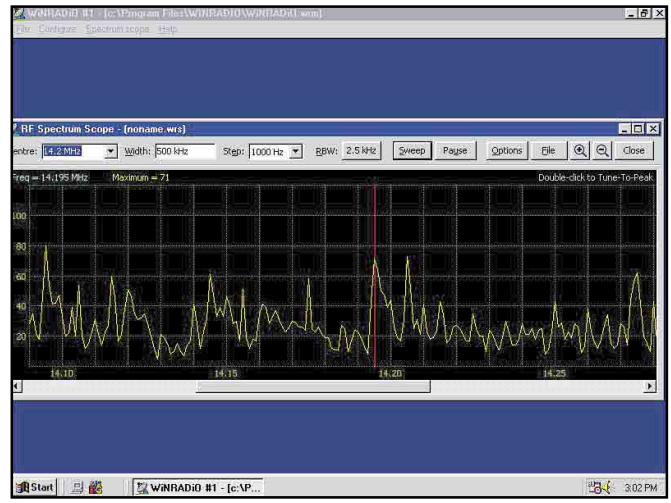


Figure 2—The '1550i's RF Spectrum Scope can sweep through a range of frequencies and generate a graph of relative signal strength. The mouse cursor can be used to instantly tune the receiver to interesting "peaks."

a good sense of its simplicity (see Figure 1).

A Tour of the Controls

The main tuning "knob" is located directly below the digital frequency display—the most prominent feature on the virtual front panel. Placing the cursor on top of the tuning knob and holding down the left mouse button varies the frequency either up or down, depending upon the position of the cursor on the knob. You can also punch in frequencies directly with the number keys on your computer keyboard. (Nearly all of the radio's controls can be alternatively operated using keyboard commands.)

There are four tuning step configurations available: fixed, auto, memory and duplex. "Fixed Stepping" is useful when tuning AM/FM broadcast stations and other "channelized" radio services. "Auto Stepping" is an enhanced form of fixed stepping where the step size and receive mode is directly dependent upon the specific frequency range you're tuning. (You set this up by typing information into a table in a submenu. It's a very simple operation.) "Memory Stepping " is used to move through the stored memory frequencies. "Duplex Stepping" makes the task of jumping between the two sides of a duplex communication a snap.

The receive mode is selected by clicking on one of six buttons located in a group to the left of the main tuning knob. Volume and squelch are controlled by two sets of up/down arrow buttons on the far right side of the front panel. Their relative levels are shown numerically, and there's even a handy MUTE button that can instantly silence the receiver.

Sensitivity is controlled by a pair of buttons located immediately to the left of the digital frequency display. The "DX" setting provides maximum sensitivity; the "local" setting activates an 18-dB attenuator that's helpful in cases of interference, intermod or overload.

Directly under the digital frequency readout is an alphanumeric comment field that displays text that relates to the tuned frequency. When the radio is in the VFO mode, for example, tuning the receiver anywhere between 14 and 14.35 MHz will bring up the message "Amateur Band (20-metre)." Programmed memories are capable of displaying any desired text—up to 34 characters in length—in this same field.

Sampling the Spectrum

The first time you power it on, the WiNRADiO receiver comes up on 10 MHz. The memories are empty and the tuning step rate is 5 kHz. WWV on 10 MHz can occasionally be a bit difficult to hear in my neck of the woods. I moved up to 15 and then 20 MHz by changing the step size from 5 kHz to 1 MHz and clicking the mouse on the up/down arrow buttons to the right of the frequency display. Hey! This is really simple.

All of the IF filters in the radio are preset for their respective modes. These are fixed—the user cannot vary the bandwidth—and this can lead to some frustration when you're trying to separate signals on a crowded band. IF/BFO shift is available in the SSB/CW modes. Some form of external active audio filtering, with notch, would be a great enhancement.

In the SSB/CW modes the BFO can be adjusted in 5-Hz steps up to 3000 Hz above or below the displayed frequency. As with most of the functions on this virtual receiver, the shift value is controlled by using up/down arrow buttons. A RESET button immediately returns the offset to the default value.

It was time for a visit to the HF shortwave broadcast portion of the spectrum—the frequencies around 5.9, 7.2 and 9.5 MHz are known to be popular shortwave watering holes. Grab the mouse—click, click, click—and there it is—BBC World Service on 5.975 MHz. WOW! This is neat! A few more clicks of the mouse and I'm listening to Deutsche Welle—The Voice of Germany—on 9.515 MHz. Oh, I'm beginning to fall for this little rig!

I tried an old shortwave listener's trick. I switched the receiver into the SSB mode and tuned in an AM shortwave broadcaster. This interference-fighting technique is commonly known as ECSS (for *Exalted Carrier Selectable Sideband*). The idea is to isolate either the upper or lower sideband portion of the AM signal within the narrower filter used in the SSB modes. This can reduce interference from nearby stations. I found this effective in several instances.

Our local police department communicates on 154.485 MHz, so I moved from

the HF to the VHF portion of the radio spectrum to give that a listen. Setting the squelch is as simple as clicking on the pair of arrow buttons that increase and decrease the squelch sensitivity. A bar graph relative signal strength meter—calibrated in dB—on the lower right hand portion of the front panel is a welcome tuning aid. By watching the peak signal, it's easy to adjust the squelch threshold to a level where it will mute the receiver and still maintain good sensitivity. This meter functions in all modes. Calibration software—*Calibration Editor*—is available for download free from the WiNRADiO Web site. This will allow you to recalibrate the meter indication independently for each mode.

Since I don't keep my handheld scanner in the shack, I decided to load up a few of the local VHF/UHF "action band" frequencies into the memories. A click of the S (store) button in the MEMORY control group brings up a submenu titled: "Store Frequency Into Memory." It's a simple matter to write the currently selected VFO frequency, mode and squelch settings into one of the WiNRADiO's memory positions, and you can assign the memory to one of 16 memory groups. A memory channel lockout feature, for locking a specific memory out of a memory scan, is available.

Serious scanner listeners will be delighted to hear that optional software is available that will allow this receiver to follow trunked communications. Information on the WiNRADiO Web page indicates that the radio can track Motorola SmartNet and MPT1327 systems.

You can store up to 1000 frequencies in each memory file, and the number of memory files that you can retain is only limited by the available space on your computer's hard drive. You access memories by clicking on the R (recall) button. This evokes the "Recall a Frequency from Memory" submenu. Highlight the desired memory in the list, click the mouse on it and the radio instantly tunes to that frequency. Another optional software package—*Database Manager*—expands the station information retained in the memory files, allows you to sort through the memory data, and lets you import frequency lists from other sources.

You can scan through the memories or a specific range of frequencies by using the buttons in the SCANNER button group. You can even set up frequencies or ranges of frequencies to exclude from a VFO scan.

"Immediate Scanning" is quick and simple. Just select the step size and then click on the left/right arrow buttons in this group and the receiver tuning will take off in whichever direction you selected, stopping on active channels.

"Frequency Range Scanning" is accomplished by using the scanning options menu and entering the start/stop frequencies, the step size, the mode and the squelch settings into a table. You can even select an "AutoStore" mode that will automatically write active frequencies directly into memories.

"Memory Scan" scans the frequencies that are programmed into the memories. The "Scanner Options" dialog box allows you to select a variety of scanning settings including the scan rate, pause/stop on active frequencies, the delay time, etc. All in all, the WiNRADiO's scanning abilities are very impressive.

Another neat feature is the RF Spectrum Scope (see Figure 2). Activate this feature and the receiver will sweep a selected frequency range and generate a graph of signal strength versus frequency. Once you've captured a trace, you hold down the mouse button and drag the cursor up and down the trace to tune around, or double click on a portion of the trace to tune to the closest signal peak. This is very handy when you're searching for interesting signals.

Digital mode fanatics may want to investigate the optional *Digital Mode Suite* package. This software product provides WEFAX, HF Fax, Packet and ACARS decode capabilities. Additional features include CTCSS squelch, DTMF decode, a "Signal Classifier" function (that can identify signals as noise, data or carrier for improved scanning), an audio oscilloscope, a spectrum analyzer and a squelch-controlled audio record and playback system.

I can't over-stress the fact that this rig is really simple to operate, which is a definite advantage. The longer it takes to become familiar with the operational characteristics of a receiver, the less time you'll spend having fun doing what you bought the radio to do—listening around the bands. The WiNRADiO folks did their homework on this one. The user interface software that they crafted for this computer-controlled radio makes it extremely user friendly.

Performance Particulars

I've always been leery of "dc-to-daylight" receivers. Trying to cover this much radio real estate in a single receiver often leads to compromises in overall performance. As the accompanying ARRL Lab test results reveal, the WiNRADiO WR-1550i receiver exhibits some less-than-spectacular performance characteristics (see Table 1). There are rather mediocre blocking dynamic range measurements. Sensitivity also suffers in some instances (notice that the AM and FM sensitivity specs are not met on several ham bands). Basically this means that the ability of the WiNRADiO to hear very weak signals, particularly in the presence of strong close-in signals, is sometimes impeded.

Does all this mean that the WiNRADiO is not a "good" receiver? Not at all. On-air usage of the WiNRADiO was, even to my seasoned tastes, quite enjoyable. I found having almost instant access to such a huge hunk of RF spectrum quite intoxicating. Add to this the absolutely fantastic computer/radio interface and this rig can deliver a tremendous amount of listening enjoyment. In fact, I was simultaneously listening to BBC World Service on 12.035 MHz reporting on the first US military strikes against the Taliban in Afghanistan while I was working on this review!

There are a couple of things that I would change on the WiNRADiO. First would be the addition of some sort of AF filtering with a tunable notch filter. Active audio filters are ultra simple to design and much less expensive than IF crystal filters. Since the audio output of this receiver can be jumpered back into your soundcard, you could make use of one of the soundcard-based audio filter programs that are currently available.

Another feature I would like to see incorporated is AGC control. There are times when it can be advantageous to turn off the AGC, especially when there are strong nearby signals that make the AGC "pump."

Would I go out and buy a WiNRADiO? If I wanted to add receive capabilities to the computer in my home office or if I was looking for a wideband HF/VHF/UHF/microwave receiver that wouldn't take up operating desk space in my shack, I would definitely consider a WiNRADiO. Although the overall performance may not be stellar, this is a very user-friendly receiver that delivered a great deal of listening enjoyment.

Manufacturer: WiNRADiO Communications, PO Box 6118, St Kilda Rd, Melbourne 3004, Australia; **www.winradio.com**. Price, WiNRADiO WR-1550i: $549.95. Optional accessories: WR-TO Trunking Option, $99.95; WR-DS Digital Suite, $99.95; WR-DM Database Manager, $49.95. See WiNRADiO's Web site or contact *QST* advertising for US dealers.

Yaesu VL-1000 Quadra Linear Amplifier

Reviewed by Mark Wilson, K1RO,
QST *Publisher*

Convenience is something that many people look for—and seem increasingly willing to pay for—in life. No time to cook dinner after work? That's no problem—there's plenty of takeout available, or your local supermarket has the widest variety of frozen dinners imaginable. Can't wait around the house for that phone call? No problem, grab your cell phone and go.

Over the years our ham stations have gotten more convenient, with solid-state transceivers, automatic antenna tuners, multiband antennas, computer control and the like. Despite the changes in station technology, many of the power amplifiers in use today require the operator to change bands manually. That's not difficult, usually involving turning the band switch and adjusting the tune and load capacitors, but it just seems like a hassle when everything else in your station happens automatically.

The VL-1000 Quadra is Yaesu's latest entry in the amplifier market, and it is designed to add a lot of convenience to your station. The Quadra 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. The amplifier sells for about $4000 and competes with high-power auto-tune tube amplifiers from Alpha-Power[1] and ACOM,[2] and with the solid-state ICOM IC-PW1.[3]

Features

The Quadra is actually two pieces—the 46-pound VL-1000 RF deck and the 32-pound VP-1000 switching power supply. The power supply can sit on the floor or some other convenient spot, connected to the RF deck with two 6-foot cables (one carries 48 V dc from the power supply; the other carries control signals). For full power you need a 200-240 V ac supply (14 A max), but you can use it with a 120-V supply in the low power mode (500 W out). Yaesu ships US-model Quadras without an ac power connector because of the wide variety of possible configurations. A local home center had the needed plug for the 240-V ac line in my station. The Quadra detects the line voltage and adjusts itself accordingly—no jumpers or switches. I didn't try the amplifier at 120 V.

The RF deck houses the power amplifier circuitry, heat sinks, cooling fans, antenna tuner, control circuitry, and switching for up to four antennas and two transceivers. The Quadra includes extensive protection circuitry. The amplifier will take itself offline and display error messages if the temperature, SWR, drive power, drain voltage or drain current exceed the limits. It will also warn if there is an imbalance among the four power amplifier sections, if the connection between the power supply and RF deck fails, or if your transceiver is set to a different band than the amplifier. An interesting feature exercises the relays periodically when the amplifier is not in use to keep the contacts clean.

You communicate with the Quadra via an LCD panel 8 inches wide by 2 inches high, and a row of pushbuttons under the display. Most of the display is devoted to metering functions, and you switch among them using the DISPLAY SELECT switch. You can store and recall any two options as DISPLAY 1 and DISPLAY 2. Display options include various combinations of peak and average power, SWR, drain current and voltage, and frequency. The graphical SWR meter option shows a graph of SWR with the tuner in and out across the selected band. During antenna tuner adjustment, the display changes to show an SWR bar graph in the center and a graphic representation of two variable capacitors in motion. You can dim the display and adjust its contrast.

The bottom of the display shows the status of the various switches. OPERATE allows you to bypass the amplifier for barefoot operation. LOW switches the amplifier to low power (500 W). INPUT selects between two transceivers that can be connected to the rear panel. ATT switches in a 3-dB attenuator for use with transceivers that exceed 100 W. ANT switches among the four antenna jacks. TUNER switches the antenna tuner in and out, while TUNE starts the automatic antenna tuning process. F SET is used to select the band when the Quadra is not connected to a compatible Yaesu transceiver.

Connections

You can connect two transceivers to the Quadra and choose between them with the front-panel INPUT switch. If you're using a recent Yaesu transceiver (FT-920, FT-1000, FT-1000MP) with the Quadra, an 8-pin "Band Data" cable provides control signals from the radio to automatically switch the Quadra to the appropriate band, handle TR switching, and turn the Quadra's power on and off when the transceiver is switched on and off. There's a supplied ALC cable (phono plugs) to connect to the transceiver's ALC jack to prevent overdriving the Quadra. Transceiver antenna connections are handled by SO-239 jacks labeled INPUT 1 and INPUT 2. BAND-DATA 2 has the same band information as BAND-DATA 1, plus additional pins to close the transceiver's

Bottom Line

The Yaesu VL-1000 Quadra 1 kW amplifier is a great way to boost your signal on all bands from 160 to 6 meters. Although it's designed to work smoothly with Yaesu transceivers, you can use it in any station.

[1]Notes appear on page 76.

Table 2
Yaesu VL-1000, serial number 0K220026

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.
Drive power required: 50-80 W.	Typically 40 W (band dependent).
Input SWR: 1.5:1 or better.	Typically 1.0:1.
Output matching: 16-100 Ω on 160 meters, 16-150 Ω on 80-10 meters and 25-100 Ω on 6 meters.	As specified.
Spurious signal and harmonic suppression: 50 dB for HF, 60 dB for 6 meters.	60 dB on HF and 6 meters.
Intermodulation distortion (IMD): better than –30 dB typical.	See Figure 3.
Primary power requirements: 100-234 V ac (VP-1000 power supply).	
Size (HWD): VL-1000 RF deck, 5.9 × 16.3 × 17.8 inches; weight, 46 lb. VP-1000 power supply, 5.9 × 16.3 × 15 inches; weight, 32 lb.	

[1]See text.
[2]On 200-240 V ac; de-rated to 500 W on 100-120 V ac.

PTT input line when the Quadra's F-SET button is pushed. If you're not using a Yaesu transceiver, you would use a phono cable for TR switching (PTT 1 or PTT 2) and not use the BAND DATA jacks. You also have to use the Quadra's front-panel switch to turn the power on and off.

The Quadra includes connections and switching for up to four antennas, and the 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. When the amplifier is off, antenna "1" is connected to your transceiver.

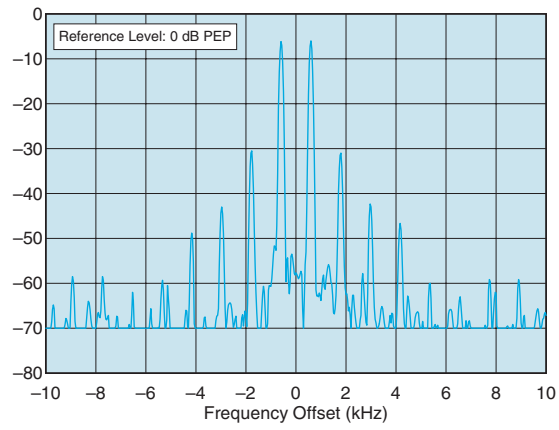


Figure 3—Worst-case spectral display of the Yaesu VL-1000 Quadra amplifier during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 32 dB below PEP output, and the worst-case fifth-order product is approximately 44 dB down. The amplifier was being 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.

Using the Quadra

The US version of the Quadra is shipped without 10- and 12-meter operation enabled because of FCC regulations. To enable 10- and 12-meter operation, you need to contact Yaesu's service department and provide verification of your amateur license, and they will send details. The operation is not difficult and involves internal jumpers and some programming via the front panel.

I used the Quadra with a Yaesu FT-1000D and an ICOM IC-746. The interconnections were straightforward—INPUT 1, ALC 1, PTT 1, BAND-DATA 1 for the FT-1000, and INPUT 2, ALC 2 and PTT 2 for the IC-746.

Once everything is hooked up, the manual advises you to check the drive power. The Quadra wants to see 50-80 watts for normal operation. If your transceiver is capable of more than 100 W output (like my FT-1000D), use the front-panel ATT control to enable the input power attenuator. Although the ALC level is set to work with Yaesu transceivers, I needed to adjust it slightly to get full 1000 W output with my FT-1000D. That involves entering the "ALC alignment mode" and watching the front-panel display while using the DISPLAY 1 and DISPLAY 2 buttons to increase or decrease the ALC voltage. ALC adjustments for the two inputs are independent of each other. The ALC range is 0 to –10 V dc, which is also compatible with my IC-746 and most other modern transceivers.

The next step is to go through each band, select the appropriate antenna, and adjust the antenna tuner if necessary. The Quadra remembers which antenna you last selected for each band, whether or not the antenna tuner was used, and the last tuner setting that was programmed.

The Quadra will put out full power into an SWR of up to 2:1, so you don't need to use the tuner in many situations. A nice feature is that if the antenna SWR reaches 2:1 and you're not using the tuner, the Quadra folds back into the low-power mode but still puts out 500 W. When the SWR goes below 2:1, the amplifier goes back to high power. The Quadra continues to work in the low power mode until the SWR reaches 3:1; at that point it takes itself offline and issues a high SWR warning via the front panel display.

The built-in antenna tuner can match 16 to 100 Ω on 160 meters, 16 to 150 Ω on HF and 25 to 100 Ω on 6 meters. The tuner came in handy for phone operation with my 40-meter dipole, which is cut for the CW end of the band. I also needed it for some segments of 15 and 20 on my Cushcraft X7 multiband beam. The X7 works on 12 and 17 meters but has an SWR near 3:1 on those bands. The Quadra's tuner had no problem coming up with a good match. The tuner can be used when the amplifier is in standby.

During the course of our evaluation

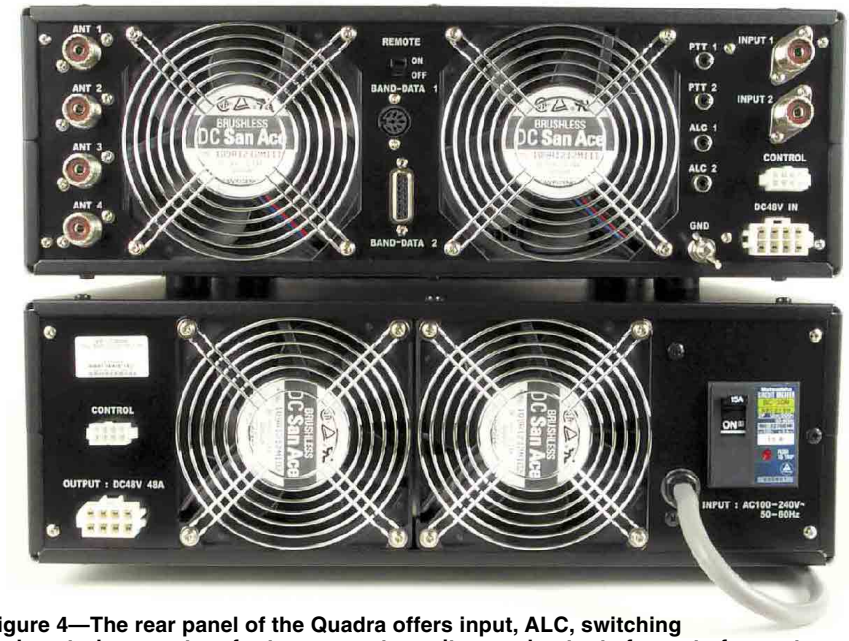


Figure 4—The rear panel of the Quadra offers input, ALC, switching and control connectors for two separate exciters and outputs for up to four antennas.

period, the ARRL Lab received correspondence from a member who reported experiencing some unusual behavior from his VL-1000 when transmitting on 80 or 160 meters. The Quadra includes several cooling fans, and apparently when the amplifier is operated at full output on those bands, stray RF inside the amplifier enclosure causes a noticeable decrease in the motor speed of the fan that cools the antenna tuner subassembly. The member—in the finest of ham tradition—had fashioned an RF shield for the fan motor that eliminated the problem.

Our lab tested two different Quadras (with the amplifiers connected to antennas and to dummy loads) and observed similar fan motor behavior. Yaesu is investigating the problem, but states that during typical transceive operation the short-term decreases in cooling air flow are unlikely to result in failures.

The one aspect of operation where the Quadra could be more convenient is band changes. Although the Quadra tracks the band selections from my FT-1000D, it doesn't track frequency changes within the band. For example, if I am on 14.025 and switch to 14.250, the frequency display on the Quadra doesn't change and the tuner settings don't change to the right ones for phone.

To change frequency, you set your transceiver to RTTY or another carrier mode and press the F-SET switch. If you have the BAND DATA 2 cable hooked up as shown in the manual, the Quadra keys the PTT on your transceiver. If not, you need to press the F-SET switch and then put your transceiver into transmit. The amplifier samples the incoming RF and makes the adjustment. This is also the procedure to change bands if you are using a non-Yaesu transceiver. There are no front-panel band-selection controls.

If you need to use the tuner, press the TUNE switch (again with the transceiver in RTTY or another carrier mode) and the amplifier will tune itself up in a few seconds. The amplifier remembers the last tuner setting that you used for a band. For example, if you have the tuner set for 40-meter SSB, move to 15 meters and then back to 40 SSB, the Quadra remembers the 40 SSB settings. But if you move to the CW end of 40, you have to use the F-SET or TUNE switch to retune. On bands where my antenna is broad enough to do without the tuner, or on the narrow 17- and 12-meter bands where one setting works across the band, this isn't an issue.

The other high-power autotune amplifiers on the market are a little more "automatic." The ACOM and Alpha 87A products sense the drive frequency and preset the tuning/loading capacitors really quickly (sending a dit on CW or speaking a syllable on phone will usually do it). The ICOM IC-PW1 tracks operating frequency via the CI-V system and updates the tuner settings to saved values. It would be great if the Quadra used its internal frequency counter to automatically track frequency changes, or if there was a more direct way to change bands from the front panel other than the F-SET or TUNE procedure.

During the review period, I gave the Quadra a workout on all bands, including a serious effort in the ARRL RTTY Roundup and time in several other CW and phone contests. The manual seems to recommend the low power mode for RTTY "to prevent overheating during continuous operation for several hours." The specifications say the amplifier can transmit continuously for 1 hour at 500 W. RTTY contesting isn't nearly that demanding—more like 5-10 second transmissions with listening periods in between. I ended up using the Quadra at full power for RTTY contests and saw no evidence of overheating. (Had it overheated, one of the error messages would have indicated the need to reduce power or shorten transmissions.) The Quadra's fans are quiet, even when they kick into high gear after you've been transmitting for a while.

The Quadra proved its versatility late in October and November of 2001 when 6 meters opened again. My setup—the IC-746 and a 5-element M^2 Yagi at 45 feet, not on a hill—is not real competitive, but it gets me on the band. Pileups have been frustrating, and it's often difficult to get through when conditions are marginal. After a particularly difficult time getting through the pileup to D44TD, I hooked up the Quadra for 6-meter operation and had a kW out right away. After that it was a lot easier to work through pileups when conditions weren't great, and to get responses to CQs. Now I just need to hear better.

I liked the Quadra a lot. Most of the time it was a convenient extension to my Yaesu transceiver. Although it doesn't run the full legal limit, it's within 1.5 dB. For my interests, the 6-meter capability is worth a lot, as is the internal antenna tuner to deal with my multiband antennas (especially on 12 and 17 meters) and the antenna switching. It would be nice if it was less awkward to changing bands with non-Yaesu radios, and if the amplifier and tuner settings tracked operation within a band.

Manufacturer: Yaesu USA, 17210 Edwards Rd, Cerritos, CA 90703; tel 562-404-2700; fax 562-404-4828; **www.yaesu.com**. Manufacturer's suggested retail price: $5990. Typical current street price, $4000.

Notes

[1]"Product Review: AlphaMax and Alpha-Remote for the Alpha 87A," *QST*, Aug 2000, pp 73-74; "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.

[3]"Product Review: ICOM PW1 Linear Amplifier," *QST*, Feb 2001, pp 85-87.

SOLICITATION FOR PRODUCT REVIEW EQUIPMENT BIDS

[In order to present the most objective reviews, ARRL purchases equipment off the shelf from dealers. ARRL receives no remuneration from anyone involved with the sale or manufacture of items presented in the Product Review, Short Takes or New Products columns.—*Ed.*]

The ARRL-purchased Product Review equipment listed below is for sale to the highest bidder. Prices quoted are minimum acceptable bids, and are discounted from the purchase prices. All equipment is sold without warranty.

Ameritron ALS-600 solid state HF amplifier, serial number 12727 (see "Product Review," Aug 2001 *QST*). Minimum bid: $750.

AOR TDF-370 DSP multi-media terminal, serial number 01-00060 (see "Product Review," Sep 2001 *QST*). Minimum bid: $215.

ICOM IC-V8 2-meter FM handheld transceiver, serial number 01702 (see "Product Review," Nov 2001 *QST*). Minimum bid: $110.

Ranger Communications RCI-2970DX 10/12-meter transceiver, serial number T1M00426 (see "Product Review," Oct 2001 *QST*). Minimum bid: $285.

Ten-Tec Model 416 Titan II HF amplifier, serial number 02C10070 (see "Product Review," Sep 2001 *QST*). Minimum bid: $1975.

Ten-Tec Model 526 6N2 multimode VHF transceiver, serial number 04C10421 (see "Product Review," Oct 2001 *QST*). Minimum bid: $470.

W2IHY Technologies 8-band audio equalizer and noise gate (see "Short Takes," Dec 2000 *QST*). Minimum bid: $165.

Yaesu FT-7100M dual-band FM mobile transceiver, serial number 1D040208 (see "Product Review," Aug 2001 *QST*). Minimum bid: $295.

Sealed bids must be submitted by mail and must be postmarked on or before Mar 1, 2002. Bids postmarked after the closing date will not be considered. Bids will be opened seven days after the closing postmark date. In the case of equal high bids, the high bid bearing the earliest postmark will be declared the successful bidder.

In your bid, clearly identify the item you are bidding on, using the manufacturer's name and model number, or other identification number, if specified. Each item requires a separate bid and envelope. Shipping charges will be paid by ARRL. Please include a daytime telephone number. The successful bidder will be advised by telephone or by mail. Once notified, confirmation from the successful bidder of intent to purchase the item must be made within two weeks. No response within this period will be interpreted as an indication of the winning bidder's refusal to complete the transaction. The next highest bidder will then have the option of purchasing the item. No other notifications will be made, and no information will be given to anyone other than successful bidders regarding the final price or the identity of the successful bidder. If you include a self-addressed, stamped postcard with your bid and you are not the high bidder on that item, we will return the postcard to you when the unit has been shipped to the successful bidder.

Please send bids to Bob Boucher, Product Review Bids, ARRL, 225 Main St, Newington, CT 06111-1494. QST

NEW PRODUCTS

THE DJ-X3 HAND-HELD SCANNING RECEIVER FROM ALINCO

◊ Alinco's new DJ-X3 wideband portable receiver covers 100 kHz to 1.3 GHz in AM, FM-wide and FM-narrow modes and has a distinctive design that places the speaker behind the display. Audio is heard from ports on either side of the display window.

The compact radio, which easily fits in a shirt or jacket pocket, features 700 memory channels, a rechargeable Ni-MH battery, a dry cell battery pack (three AA) and an advanced triple-conversion design. Other features include stereo FM reception (with headphones), a choice of four antennas, computer control (software is free and downloadable), a built-in attenuator, 12 selectable tuning rates, a large, illuminated display, and more. A charger, belt clip and strap are also included.

Price: $302.95 (MSRP). For more information, see your favorite Amateur Radio products dealer or point your Web browser to **www.alinco.com/usa/**.

FOUR-BAND MODULE FOR THE ELECRAFT K1 TRANSCEIVER

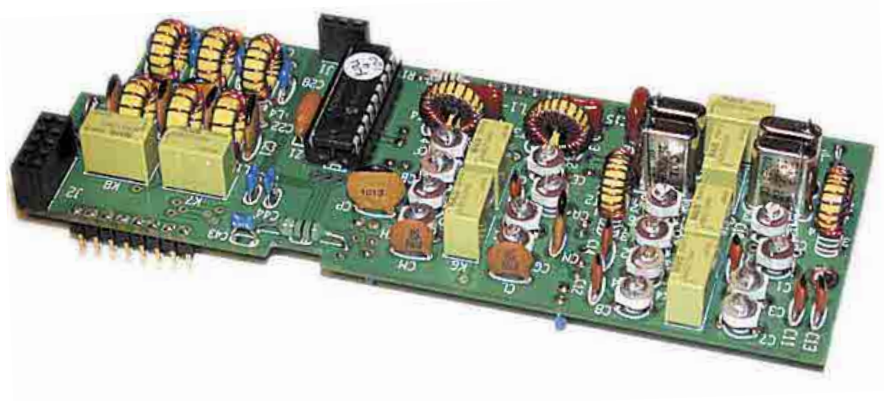
◊ Thanks to the KFL1-4 expansion module, your Elecraft K1 transceiver can become a quad-bander! The new band-switch module covers 40, 30, 20 and either 17 or 15 meters, and existing K1s are easily upgradeable.

No hardware or firmware changes are necessary to use the four-band module. The K1's low current drain (about 55 mA on receive) is unchanged thanks to the use of latching relays for all band-switching functions.

The four-band module works with all K1 options, and with the internal ATU and battery installed, the quad-band K1 offers a useful combination of features for field operation, in a package measuring only about 2 × 5 × 6 inches (HWD).

Prices: $349 (four-band K1, model K1-4) and $129 (four-band option module for existing K1s, model KFL1-4). For more information, point your Web browser to **www.elecraft.com/**. QST

Previous • Next New Products



"The Big Project" Seeks Additional Pilot Schools

"The Big Project" is seeking additional pilot schools. Known formally as The ARRL Amateur Radio Education Project, the educational initiative of ARRL President Jim Haynie, W5JBP, is aimed at providing a turnkey Amateur Radio curriculum, equipment and resources to schools. It already has pilot schools in Texas and Georgia.

Big Project Coordinator Jerry Hill, KH6HU, says additional pilot schools are needed to help in developing the curriculum and setting up the program on a national scale. "These can be schools that already are using Amateur Radio in their curricula," said Hill, who came aboard in September as Project Coordinator.

Schools selected to participate will help to shape the ultimate project design, which will include classroom materials and resources as well as Amateur Radio equipment to establish a school station. In addition, teachers currently using Amateur Radio in their classrooms are eligible to apply for progress grants to help them continue their efforts.

Hill said he's hoping to recruit several schools that offer a good demographical and geographical representation of US schools. DeGolyer Elementary School in Dallas, Texas, and Richards Middle School in Lawrenceville, Georgia, already have been designated as pilot schools. The ARRL Education Project already has supplied DeGolyer with a HF/VHF/UHF transceiver plus antennas and accessories for its K5DES club station. Richards Middle School is working closely with the Gwinnett Amateur Radio Society.

Hill concedes the program's success depends both on funding and the participation of a sufficient number of schools. Last year, the project received donations of stock from anonymous benefactors. In addition, the ARRL Foundation donated $50,000 in start-up funds for the project. Since the ARRL is a 501(c)(3) organization, donations are tax deductible—at the appreciated value in the case of securities. But Hill's primary focus right now is on the educational aspects.

"The goal of the Amateur Radio Education Project is to improve the quality of education by providing an educationally sound curriculum focused on wireless communications," Hill said. "The project emphasizes integration of technology, math, science, geography, writing, speaking and social responsibility within a global society."

DAVE CONDON, KI7YP

Sixth grader Katie LaFramboise, KD7NPN, attends Franklin Elementary School in Kirkland, Washington. She got her Technician ticket in June.

ARRL

"Big Project" Coordinator Jerry Hill, KH6HU.

Hill said the program will be as much hands-on as possible. Teachers will be able to use the ARRL Amateur Radio Education Project as a complete classroom curriculum, as an enrichment program or as a before or after-school activity.

In addition to gleaning practical knowledge from the pilot schools, Hill's own "big project" in the months ahead will be to develop the actual curriculum. He'll be working with a core of at least six teachers—all of whom have been using Amateur Radio in their classrooms for a long time—to develop the materials students will use. He's also invited the assistance of educational professionals on the college and university level.

Schools interested in incorporating Amateur Radio into their curricula or using it as an enrichment program or as a club activity are invited to apply to become pilot schools. To apply, visit the ARRL Amateur Radio Education Project Pilot School Application page, **www.arrl.org/FandES/tbp/pilot-school-ap.html**.

Teachers now using Amateur Radio in the classroom are welcome to apply for a Progress Grant to assist them in maintaining their stations or enhancing their programs. The ARRL Amateur Radio Education Project Progress Grant Application page is **www.arrl.org/FandES/tbp/progress-grant.html**.

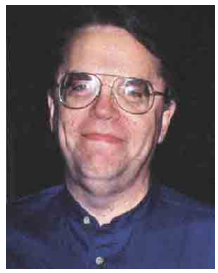
Donations are invited to the ARRL Amateur Radio Education Project, c/o ARRL Development Officer Mary Hobart, 225 Main St, Newington, CT 06111. For more information, contact Hobart, **mhobart@arrl.org**; 860-594-0397.

Rick Lindquist, N1RL ♦ Senior News Editor

New Southeastern, Southwestern Division Vice Directors Elected

Two new faces will grace the back bench at the January 2002 meeting of the ARRL Board of Directors in Dallas. They are Nelson E. "Sandy" Donahue, W4RU, in the Southeastern Division and Tuck Miller, NZ6T, in the Southwestern Division. Both come from the ranks of ARRL section managers.

Ballots were counted November 16, 2001, at ARRL Headquarters in contested races for vice director in three ARRL divisions for the 2002-2005 term.



Southeastern Division Vice Director-elect Sandy Donahue, W4RU.

In the Southeastern Division, Donahue, a retired TV traffic coordinator from Atlanta, Georgia, outpolled West Central Florida Assistant Section Manager and computer programmer-analyst Paul J. Toth, NA4AR, of Seminole, Florida, 2783 to 2305. They were contending for the seat being vacated by Vice Director Evelyn Gauzens, W4WYR, who decided not to seek a new term after 22 years of service.

A ham for more than 40 years, Donahue, 56, is in his third term as Georgia Section Manager and has been an Assistant Director since the mid-1980s.

In the Southwestern Division, San Diego Section Manager and train operator Tuck Miller, NZ6T, of National City, California, defeated electrical engineer Edward J. "Ned" Stearns, AA7A, of Scottsdale, Arizona. The vote was 2485 to 2208. Miller thus gains the vice director's position being vacated by Art Goddard, W6XD. Goddard, 59, ran unopposed for director upon the retirement of Fried Heyn, WA6WZO, who has served as director since 1984. Goddard is a retired project manager. He's served as Vice Director since 1993.

Southwestern Division Vice Director-elect Tuck Miller, NZ6T.

A ham since 1991, Miller, 48, has served as San Diego SM since 1998 and is active in the Amateur Radio Emergency Service.

In the only other contested race, Pacific Division incumbent Vice Director Bob Vallio, W6RGG, of Castro Valley, California, beat back a challenge from physician Gerald D. Griffin, K6MD, of Pacific Grove, California, 1924 to 1225. A ham since 1952 and previous East Bay SM and SCM, Vallio, 65, is completing his second year as Pacific Division Vice Director.

Donahue, Miller and Vallio all are ARRL life members.

In addition to Goddard, those unopposed for directors' seats in this election cycle were incumbents Jim Maxwell, W6CF, in the Pacific Division; Walt Stinson, W0CP, in the Rocky Mountain Division; Frank Butler, W4RH, in the Southeastern Division, and Coy Day, N5OK, in the West Gulf Division.

Vice directors who went unchallenged were incumbents Warren G. "Rev" Morton, WS7W, in the Rocky Mountain Division; and David Woolweaver, K5RAV, in the West Gulf Division.

All unopposed candidates were declared elected. New terms for all successful candidates begin at noon January 1, 2002, and run for three years.

ARRL

ARRL Headquarters staffers Lisa Kustosik, KA1UFZ (left) and Jennifer Hagy, N1TDY, were among those assisting in the ballot-counting process at ARRL Headquarters November 16.

VICE DIRECTOR GAUZENS RECEIVES PRESTIGIOUS AWARD

Outgoing ARRL Southeastern Division Vice Director Evelyn Gauzens, W4WYR, who stepped down this month after 22 years of service to the League, was presented with the CHAMP Award October 5 by Sam Harte, KQ4MR. CHAMP—Citizens' Ham Mobile-Marine Patrol—was founded in 1994 by the South Florida FM Association, Citizens' Crime Watch, and the Miami-Dade Police Department. The CHAMP mission is for hams, in the ordinary course of their activities, to assist the police in the Miami-Dade County area in the prevention and reduction of crime by reporting sightings of emergency and/or criminal activities. National television coverage of CHAMP during its early years provided a model for similar programs now in place across the US.

Evelyn Gauzens, W4WYR, and Sam Harte, KQ4MR.

The annual CHAMP Award is presented to an Amateur Radio operator for an exemplary act of service to the community during the preceding year, or to an amateur who has demonstrated years of distinguished service to Amateur Radio and the community. Gauzens, whom Harte called "the South's most distinguished lady Amateur Radio operator"—was recognized for her half-century of service to the community and Amateur Radio. A cofounder of the Tropical Hamboree, Gauzens continues to chair the Miami event. She also helped author Dade County's initial Amateur Radio antenna ordinances.

In October, the ARRL Executive Committee endorsed Gauzens' nomination for the office of Honorary Vice President and forwarded it to the Board of Directors for consideration at the 2002 annual meeting this month in Dallas.

COPPS SAYS FCC HAS "A LARGER JOB TO DO"

FCC Commissioner Michael Copps said October 15 in a speech before the Federal Communications Bar Association that he believes the FCC has "a larger job to do in the months and years ahead" than was thought five weeks earlier. "If September 11 was about anything other than evil, it was about communications," Copps said. "Communications from hijacked airliners and doomed buildings to loved ones on the ground; communications between emergency care, law enforcement providers and public safety workers; communications between the leaders of our federal, state and local governments; communications among our military forces around the world; communications by the media to viewers around the globe; and desperate outreach from each of us as citizens to find out what was going on, where our loved ones were, what other threats were coming our way."

While not mentioning—or possibly overlooking—the role of Amateur Radio in the subsequent relief and recovery efforts, Copps said that in the wake of the terrorist attacks, "our telecommunications and media industries performed well and even nobly." Copps went on to say that the FCC does not merely have the directive to consider the public interest in its decisions—it has the statutory obligation to take only actions that are in the public interest. "The events of the last month demonstrate very dramatically that concepts like the safety of the people and the public interest are not mere abstracts, not just theories to endlessly debate," he said.

KENWOOD "SKY COMMAND" PETITION PUT ON PUBLIC NOTICE

The FCC in October put on public notice a rulemaking petition from Kenwood Communications Corporation requesting that the FCC relax restrictions on Amateur Radio auxiliary station operation. The FCC assigned the rulemaking number RM-10313 to the petition and invited public comment. The petition marked Kenwood's latest attempt to legalize its "Sky Command" remote station control system.

Kenwood seeks a change in Part 97 rules that would expand permission to operate an auxiliary station on all 2-meter frequencies above 144.5 MHz, except on 145.8 to 146.0 MHz. While not mentioning Sky Command by name, Kenwood said the proposed rule change "would allow the development and use by amateurs of new technology devices and increase the utility of the limited amateur allocations." Current FCC rules limit auxiliary operation to certain frequencies above 222.15 MHz.

In July 2000, the FCC declared that use of the Sky Command did not comply with Amateur Service rules—specifically §97.201(b)—and declined to grant a waiver to make it legal. The ARRL commented in opposition to Kenwood's earlier efforts to have the system declared to be in compliance, and it refused to permit Sky Command advertisements in *QST*.

Sky Command lets a user control a fixed HF station via a pair of dual-band transceivers. It operates in full duplex, using frequencies on 70 cm and 2 meters.

In a *Petition for Rule Making* filed May 1, Kenwood asserted that auxiliary operation is "poorly defined" in the FCC rules and "significantly overregulated." Kenwood argued that present limitations on auxiliary operation no longer are appropriate in today's amateur environment and should be withdrawn.

FCC NAMES HOMELAND SECURITY PANEL

The FCC in November announced the creation of a Homeland Security Policy Council. The council's stated missions are to assist the FCC in evaluating and strengthening measures for protecting US communications services; to assist the FCC in ensuring rapid restoration of communications services and facilities that have been disrupted as the result of threats to, or actions against, US security; and to ensure that public safety, health and other emergency and defense personnel have effective communications available to them to assist the public as needed.

The Homeland Security Policy Council will be comprised of senior staff from each of the Commission's bureaus and will be directed by FCC Chief of Staff Marsha MacBride. Deputy directors will be Linda Blair and Brad Berry, both deputy chiefs

ARRL ADVISES FCC TO JUST SAY "NO" TO COMMERCIAL USERS AT 2390-2400 MHZ

The ARRL has urged the FCC "in the strongest possible terms" to make no commercial allocations in the Amateur Service 2390 to 2400 MHz primary allocation. The League tentatively suggested, however, that hams might be willing to share the band with compatible government services that are displaced to make room for advanced wireless systems.

The ARRL told the FCC in October that advanced wireless services "are fundamentally incompatible with continued amateur access to the band." The federal government, on the other hand, "has historically been a compatible sharing partner," the League said, adding that government uses would offer "the least disruptive opportunities for sharing" in the band. The ARRL made clear that such sharing should happen only "if it is absolutely necessary to reaccommodate some displaced users" and would be "subject to compatibility studies."

The ARRL commented in four separate proceedings dealing with allocations for advanced and third-generation wireless systems, the mobile satellite service and the Unlicensed Personal Communications Service (U-PCS). The ARRL focused its remarks on ET Docket 00-258, which included 2390-2400 MHz as a candidate band for advanced wireless services.

Commenting on the WINForum *Petition for Rule Making* (RM-9498) that seeks to modify technical rules for Part 15 U-PCS operation at 2390 to 2400 MHz, the ARRL reiterated its position of two years ago. The ARRL said it still opposed a power increase for asynchronous U-PCS devices in the band and said there can be no change in maximum power spectral density. The ARRL called those two provisions "critical to the compatible sharing plan that resulted in ARRL support of the U-PCS authorization" in the band.

The ARRL also asked the FCC to retain the non-government primary Amateur Service allocation at 2390-2400 MHz. The ARRL also noted that amateur

in the Enforcement Bureau. Peter Tenhula, Senior Legal Advisor to Chairman Powell, will serve as Special Counsel.

Amateur Enforcement

♦ **FCC says band plans do matter:** The FCC in mid-September asked three amateurs to respond to complaints alleging that they deliberately transmitted SSB on top of CW stations operating in the vicinity of 1820 to 1825 kHz. The FCC has never designated mode-specific subbands in the 160-meter amateur band. Instead, operators are asked to voluntarily adhere to the ARRL band plan, revised this past summer, which recommends a lower limit of 1843 kHz for SSB operation. In the wake of the complaints, FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth wrote George Wehrung, W5TZ, and Dennis Clauder, KT5S—both of Texas—and Derrick Vogt, WA4TWM, of Kansas. Hollingsworth asked each to respond to allegations from several other operators that their SSB transmissions deliberately interfered with attempts by others to operate on CW between 1820 and 1830 kHz. Copies of the complaints were sent to all three operators, who were asked to reply within 20 days.

"Band plans are voluntary in nature," Hollingsworth acknowledged in each of the similarly worded letters. He said the FCC depends upon voluntary compliance because it minimizes the necessity for the Commission to be called in to resolve amateur problems. "Where interference results from band plans not being followed," Hollingsworth continued, "the Commission expects substantial justification to be shown by the operators ignoring the band plans."

♦ **Amplifiers case highlights certification rules:** The FCC's Riley Hollingsworth used the occasion of a recent *Warning Notice* to hammer home the FCC's position on the sale of RF amplifiers that have not received FCC certification—formerly called "type acceptance." In a September 19 letter to Extra class licensee Sidney Lee Martin, KD4YBC, Hollingsworth reiterated an earlier FCC warning to Martin that he cease commercial marketing of non-certificated external RF amplifiers and amplifier kits capable of operating below 144 MHz. The case arose from a February 11, 2000, warning to Martin from the FCC's Detroit office as a result of a classified ad for external Amateur Radio RF amplifier kits for HF and 6 meters that Martin had run in *QST*. The FCC letter admonished Martin that selling or offering such units for sale violated §2.815 of the FCC's rules.

In 1978, the FCC banned the manufacture and sale of any external RF amplifier or amplifier kit capable of operating below 144 MHz without a grant of certification. The rules specifically prohibit manufacture and sale of amps that operate between 24 and 35 MHz as a means to stem the flow of illegal Citizens Band amplifiers.

Martin—who operated a one-man business called RF Electronics in South Carolina—countered with his interpretation that he was allowed, under FCC Part 97 Amateur Service rules, to sell such kits as one amateur to another, one per calendar year, under an exception to the certification rules. The FCC rejected his interpretation, however, noting that Martin was mass marketing his kits. The rules do not provide for mass marketing or manufacturing and marketing kits or assembled amplifiers as part of a business, Hollingsworth said.

Hollingsworth emphasized that FCC's rules require all external RF power amplifier kits that can operate below 144 MHz after assembly be FCC-certificated before they can be made, sold, leased, marketed, imported, shipped or distributed. Other provisions of those rules, Hollingsworth pointed out, apply only to certain already-fabricated amplifiers and do not exempt amplifier kits, particularly if they work between 24 and 35 MHz after assembly.

Hollingsworth said amateur rules specifically prohibit "the use in the Amateur Service of an amplifier that the operator had constructed from a non-certified kit." He also noted that, in addition to kits, Martin's RF Electronics Web site had been selling non-certificated, assembled RF power amplifiers for use below 144 MHz. Hollingsworth said at least three of the assembled models were advertised as operational between 24 and 35 MHz.

Martin's Web site no longer offers any RF amplifiers for sale.

allocations in the vicinity of 2 GHz "have been steadily eroded" through encroachment by other services. "Of the original 150 MHz [once available to amateurs], the only primary amateur allocation that is actually available for a variety of amateur uses is the 10 MHz at 2390-2400 MHz," the ARRL said.

SECTION MANAGER ELECTION RESULTS

It was a tight race, but Tennessee's new section manager will be Terry Cox, KB4KA, who eked out a victory over David Bower, K4PZT, 540 to 538. Cox and Bower were vying for the honor of succeeding O.D. Keaton, WA4GLS, who decided not to run for another term. Cox, an Extra class licensee who lives in Collierville, has been a ham for 24 years and is an ARRL DXCC field checker.

Keaton had served two stints as SM in the Volunteer State—from 1971 until 1979 and from 1992 until the present.

In Alaska, incumbent SM L. Kent Petty, KL5T, beat back a challenge from David W. Stevens, KL7EB. The final vote was 154 to 104. But despite his victory, Petty—who has been Alaska's SM since January 2000—has decided that he no longer wants the position. He informed ARRL Field and Educational Services Manager Rosalie White, K1STO, that he'll be stepping down as of this month, leaving White to appoint a successor.

In Alabama, incumbent SM Bill Cleveland, KR4TZ, defeated Chris Sells, AC4CS, 391 to 153. Cleveland has served as Alabama SM since March 1999. He's also served as an Assistant Section Manager, District Emergency Coordinator and Public Information Officer.

Ballots were counted in the Tennessee, Alaska and Alabama races on November 20 at ARRL Headquarters. Due to the closeness of the Tennessee race, counters reviewed the ballots four times. Two-year terms for successful candidates begin January 1.

In related news, White has appointed John J. Cline, K7BDS, to succeed

Michael Elliott, K7BOI, as Idaho SM, effective January 1. Elliott resigned because of increased career responsibilities that he felt would prevent him from doing a satisfactory job as SM.

Cline, an Advanced class licensee who lives in Boise and a former San Diego SM, is the top administrator for Idaho's Bureau of Disaster Services (hence his call sign). Cline was involved with the successful effort to get an Amateur Radio antenna bill passed in Idaho. He's also served as a Public Information Officer, Assistant Section Manager and Net Manager and currently holds an Official Emergency Station appointment.

AMSAT-NA SYMPOSIUM DRAWS A CROWD

Amateur Radio satellite enthusiasts from around the US—and a few from abroad—converged in Atlanta October 5-8, 2001, for the 19th AMSAT-NA Symposium and Annual Meeting. The event attracted approximately 150 amateurs, who heard presentations on a wide range of amateur satellite-related topics.

The problem of interference from non-amateur intruders on VHF and UHF satellite bands was a topic raised in more than one forum during the weekend. The majority of the interference—particularly on 2 meters—has been blamed on taxicab operations in Mexico. "This particular source is Mexico," said Ray Soifer, W2RS. "It's been pretty well documented." Some conference participants said individuals using amateur gear as a personal communication service also are to blame.

At the AMSAT-NA Board meeting, AMSAT-NA President Robin Haighton, VE3FRH, was re-elected without opposition to another term. Haighton says AMSAT-NA now has more than 5000 members "and continues to grow."

Soifer, who chaired a VHF-UHF committee during the International Amateur Radio Union Region 2 Conference in Guatemala last fall, said the issue got "quite a bit of attention" during conference. He advised a "use it or lose it" approach to combating interference. All agreed that reporting any intruders promptly to the IARU Monitoring System would be beneficial. (The ARRL Monitoring System Coordinator is Brennan Price, N4QX, **bprice@arrl.org**.)

During the Symposium's IARU forum, Soifer reported that Region 2 IARU member-societies were urged to report such interference to their national administrations. In Mexico, complaints already have been registered with COFETEL—the Mexican Federal Telecommunications Commission—and AMSAT has been prompting the amateur community to report such interference when they monitor it. "The idea is to keep the pressure up on Mexico," Soifer said.

AMSAT Treasurer Art Feller, W4ART, agreed. "The more noise that gets made… the more likely it is to get attention," he said. "So, report, report, report!"

IARU Satellite Adviser Hans van de Groenendaal, ZS6AKV, said keeping the bands active and reporting and documenting intruders help to keep interference away and lessen demands on amateur spectrum. "It adds to the ammunition that the IARU can use at the various conferences," he said.

Symposium attendees also packed presentations on the progress of the AO-40 satellite, the planned AMSAT-NA "Project JJ" satellite, Amateur Radio on the International Space Station, and various technical topics relating to amateur satellite work. Steve Diggs, W4EPI, chaired the conference.

Proceedings of the AMSAT-NA 19th

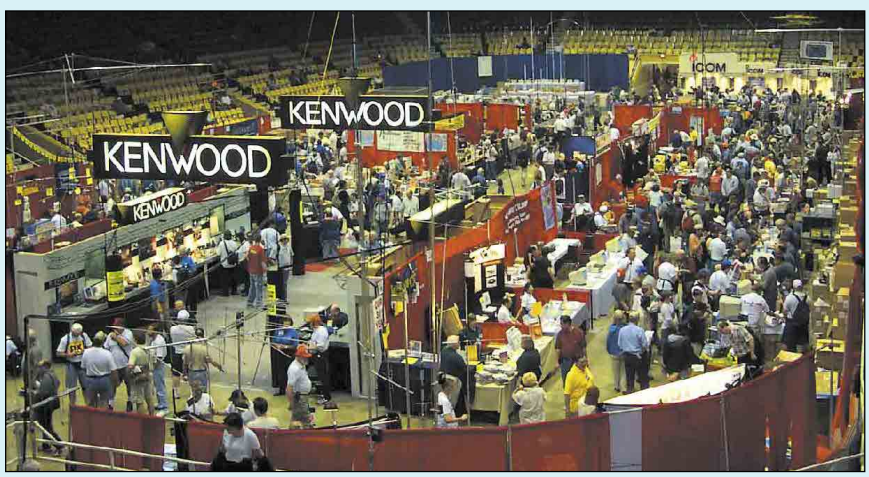
Dayton Hamvention Picks Emergency Communications Theme

The theme of the 2002 Dayton Hamvention will be emergency communications and preparedness, the Hamvention Committee announced in October in a letter to vendors and exhibitors. Hamvention said it's expecting "record attendance" at its 51st show, May 17-19, 2002. The annual event draws upwards of 30,000. "Hamvention expresses deep concern for the tragic events that occurred September 11, 2001, and the world events since," the letter said. "In order to show our support for Amateur Radio, we are going to emphasize emergency communications and preparedness as our theme for Hamvention 2002." The committee said it anticipates new Amateur Radio-related exhibitors as a result and would "limit the number of computer exhibitors at the show to only those who are related to Amateur Radio."

Hamvention is accepting nominations for its Amateur of the Year, Special Achievement and Technical Excellence awards until January 31. All amateurs are eligible. The Amateur of the Year Award goes to an individual who has made a long-term, outstanding commitment to the advancement of Amateur Radio. The Technical Excellence Award is for the person who has made an outstanding technical advancement in the field of Amateur Radio. The Special Achievement Award honors someone who has made an outstanding contribution to the advancement of Amateur Radio, usually someone who has spearheaded a significant project.

The Hamvention Awards Committee makes the decision on all awards based in part upon the information it receives—and not on the number of nominations submitted. Documentation that informs the Awards Committee of a candidate's accomplishments may include magazine articles, newsletters, newspaper clippings, and even videos (these materials become the property of Hamvention and will not be returned).

Nominations may be submitted by mail to Hamvention Awards, PO Box 964, Dayton, OH 45401-0964, or by completing the e-form on the Dayton Hamvention Web site, **www.hamvention.org**. Click on the "Award Nominations" link.



NAM LEE, HL1DK

A portable AO-40-capable station was set up for a while in the parking lot outside the Symposium. (L-R) are Phil Caldwell, N2ARB; Antonio Fernandez, KC2HAX, Pieter Ibelings, N4IP; Howard Long, G6LVB, and Bill Sinbine, N4XEO.

This participant from Mongolia was among those getting their bearings during the 10th Amateur Radio Direction Finding Championships in Nanying, China in 2000.

Space Symposium and AMSAT-NA Annual Meeting are available from ARRL for $20; order item No. 8535. Visit the ARRL Products Catalog, **www.arrl.org/catalog/**. The 2002 AMSAT Symposium and Annual Meeting will take place November 8-11 in Fort Worth, Texas.

GEORGIA TO HOST 2002 USA ARDF/RADIO-ORIENTEERING CHAMPIONSHIPS

ARRL Amateur Radio Direction Finding (ARDF) Coordinator Joe Moell, K0OV, has announced that the Georgia Orienteering Club will host the second USA ARDF/Radio-Orienteering Championships. The event will take place April 19-21, 2002, at F.D. Roosevelt State Park near Pine Mountain, about 90 minutes southwest of Atlanta. GAOC's Laurie Searle, KG4FDM, will serve as the meet director.

The USA ARDF/Radio-Orienteering Championships are open to all, from beginners to experts from the US and elsewhere. No Amateur Radio license is needed to compete. The 2002 competition will feature a practice session on Friday, followed by the 2-meter ARDF event on Saturday and the 80-meter hunt and an awards ceremony on Sunday.

The registration fee includes all events and activities during the weekend. Participants will compete in age/gender categories with awards given for first, sec-

In Brief

• **FAR announces 2002 scholarships:** The Foundation for Amateur Radio, a non-profit organization headquartered in Washington, DC, plans to administer 62 scholarships for the 2002-2003 academic year. FAR—composed of more than 75 local area Amateur Radio Clubs—fully funds seven of these scholarships using the income from grants and its annual hamfest. The remaining 55 are administered by FAR without cost to the donors. Amateur Radio licensees 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. Preference in some cases goes to residents of certain geographical areas or to those pursuing certain academic programs. FAR encouraged clubs—especially those in Delaware, Florida, Maryland, Ohio, Pennsylvania, Texas, Virginia and Wisconsin—to announce and promote these scholarship opportunities. More information and an application may be requested by letter or QSL card, postmarked prior to April 30, 2002, to FAR Scholarships, PO Box 831, Riverdale, MD 20783. The Foundation for Amateur Radio 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.

• **Vote on *QST* Cover Plaque Award:** The winner of the *QST* Cover Plaque Award for October was Nick Powell, NH6ON, for his article "A Ham's South Pole Adventure." Congratulations, Nick! The winner of the *QST* Cover Plaque award—given to the author of the best article in each issue—is determined by a vote of ARRL members. Voting takes place each month on the Cover Plaque Poll Web page, **www.arrl.org/members-only/qstvote.html**. As soon as your copy arrives, cast a ballot for your favorite article!

Nominations sought for ARRL instructor, recruiter, educator awards: Nominations close January 31 for ARRL awards that recognize excellence in teaching Amateur Radio classes, using Amateur Radio in the classroom, and recruiting others to Amateur Radio. The ARRL Herb S. Brier Instructor of the Year Award goes each year to a volunteer Amateur Radio instructor. The ARRL Professional Educator of the Year award goes to a professional teacher who has incorporated Amateur Radio into his or her class curriculum. The ARRL Professional Instructor of the Year award is presented to a paid, non-state certified ham radio instructor, such as those teaching classes offered through adult education programs. The ARRL Excellence in Recruiting Award goes to a ham who exemplifies outstanding recruiting enthusiasm and technique and has gone the extra mile to introduce others to Amateur Radio. All winners receive beautifully engraved plaques, which may be sponsored by clubs. Complete information and nomination forms are available on *ARRLWeb,* **www.arrl.org/ead/award/**. Completed forms go to section managers before January 31. For more information, contact Jean Wolfgang, WB3IOS, **jwolfgang@arrl.org**.

ond and third-place finishes in each. Awards will be presented in two divisions, Overall and USA-Only.

Registration is now open. Details, including rules and registration forms, are on the Georgia Orienteering Web site, **www.mindspring.com/~sam.smith/gaoc**. Click on the "Radio-O Champs" link (under Special Events). The GAOC site includes information on local accommodations.

The next ARDF World Championships in fall 2002 will be held in Slovakia, and positions on Team USA for that event will be determined by individual performances at Pine Mountain and at the USA Championships in Albuquerque that were held last August.

For additional information on Amateur Radio direction finding, visit Joe Moell's Homing In Web site, **www.homingin.com/**.—*Joe Moell, K0OV*

ISS Crew Chief Adds Some Spice to JOTA

Although he's been licensed a relatively short time, International Space Station crew commander Frank Culbertson, KD5OPQ, sounded like a contesting pro the weekend of October 20-21 during Scouting's Jamboree On The Air. A former Boy Scout himself, Culbertson—operating NA1SS—worked a string of JOTA participants in the US and abroad during the event., all while wearing his Scout T-shirt.

Among the happy customers was Al Lark, KD4SFF ("Scouting for Fun"), who reports that at least three Scouts spoke with NA1SS from Lark's N4ISS backyard JOTA setup in Greenville, South Carolina, Culbertson's home state. Lark said the Scouts now are very interested in obtaining their ham tickets.

On a Sunday pass over the US, Culbertson also logged contacts with K2BSA—the official Boy Scouts of America station, as well as with other stations in the Southwest, Midwest and Northeast.

In Louisiana, Cedric Walker, K5CFW, said he had 16 boys from Troop 48 in New Orleans on hand to participate in JOTA. Walker said the QSO with Culbertson was crystal clear and was "an unforgettable thrill for every one of them."

In Oklahoma, Boy Scouts from Troop 850 in Guthrie and Troop 116 in Oklahoma City managed a quick contact with Culbertson on a Saturday pass. "At 17,000 miles per hour, he didn't have much time to chat," explained Assistant Scoutmaster John Dronberger, N5YZA.

From Australia, Tony Hutchison, VK5ZAI, said a young woman in his Scouting group of about 60 also snagged a contact with Culbertson. While over Europe, Culbertson whipped through a series of contacts—some with JOTA operations and others with non-participating stations.

During his four-month stay aboard the ISS, Culbertson also enjoyed a string of successful contacts with schools, arranged by the Amateur Radio on the International Space Station (ARISS) program. He and his Expedition 3 crew were scheduled to return to Earth in early December.

SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Illinois, Indiana, Maine, Northern Florida, Oregon, Santa Clara Valley, Vermont and Wisconsin 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 8, 2002. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before April 1, 2002, to full members of record as of March 8, 2002 which is the closing date for nominations. Returns will be counted May 21, 2002. Section Managers elected as a result of the above procedure will take office July 1, 2002.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning July 1, 2002. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the July 2002 *QST*. A Section Manager elected through the resolicitation will serve a term of 18 months. Vacancies in any Section Manager's office between elections are filled by the Field & Educational Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Rosalie White, K1STO, Field & Educational Services Manager* QST

CARMEN

By John McHugh, KU4GY
Amateur Radio Coordinator,
National Hurricane Center

What does the acronym CARMEN stand for?

It stands for **C**aribbean **A**mateur **R**adio **M**eteorological **E**mergency **N**etwork. It's the name of a joint project between the Amateur Radio community and NOAA.

What is its purpose?

CARMEN is dedicated to providing selected Amateur Radio operators in the Caribbean with meteorological instruments, and making it possible for them to send critical weather data to W4EHW, the Amateur Radio station at the US National Weather Service (NWS) Tropical Prediction Center/National Hurricane Center (TPC/NHC) in Miami, Florida.

Supplemental surface reports gathered from these stations will give the forecasters an extended view of weather conditions and improve information on which tropical weather predictions are made by forecast offices in the United States and the Caribbean region. Observations of wind direction/speed, barometric pressure, and precipitation amount will be routinely reported before, during, and after a hurricane. This information is vital in implementing storm preparedness and response activities. CARMEN is modeled on the similar and successful "storm spotter" networks established along the coasts of the US to assist the NWS.

How did it start?

The CARMEN Project developed from the need to have timely, supplementary weather observations from sites in the Caribbean region before, during, and after tropical storms. Volunteer Amateur Radio operators have maintained a radio station W4EHW (Watching 4 Early Hurricane Warnings) at the National Hurricane Center (NHC) in Miami since 1980.

Each year during hurricane season, whenever a hurricane is approaching landfall, they have collected hundreds of supplemental surface weather reports from hams in and around the Caribbean. These reports from hams, who possess a home weather station, have helped the hurricane forecasters refine and improve the forecasts that they produce. NHC also receive weather data from "official" sites in the area such as local airports. However, when a storm is approaching many of these facilities close down, personnel go home and important weather data is not available. The forecasters at NHC have constantly requested more reporting locations so a method to increase the number and accuracy of surface reports from the affected area was needed, and CARMEN was created. W4EHW, working in cooperation with

John McHugh, KU4GY (left) and William Young, Jr, display a solar-powered automated weather station.

Don McGehee, PJ6DM, uses this equipment on Saba to record and send tropical weather-related data.

United States Third-Party Traffic Agreements

Countries with which the United States shares third-party traffic agreements:

V2	Antigua and Barbuda
LU	Argentina
VK	Australia
V3	Belize
CP	Bolivia
T9	Bosnia-Herzegovina
PY	Brazil
VE	Canada
CE	Chile
HK	Colombia
D6	Comoros (Federal Islamic Republic of)
TI	Costa Rica
CO	Cuba
HI	Dominican Republic
J7	Dominica
HC	Ecuador
YS	El Salvador
C5	Gambia
9G	Ghana
J3	Grenada
TG	Guatemala
8R	Guyana
HH	Haiti
HR	Honduras
4X	Israel
6Y	Jamaica
JY	Jordan
EL	Liberia
V7	Marshall Islands
XE	Mexico
V6	Micronesia, Federated States of
YN	Nicaragua
HP	Panama
ZP	Paraguay
OA	Peru
DU	Philippines
VP6	Pitcairn Island*
V4	St. Christopher and Nevis
J6	St. Lucia
J8	St. Vincent
9L	Sierra Leone
ZS	South Africa
3DA	Swaziland
9Y	Trinidad & Tobago
TA	Turkey
GB	United Kingdom**
CX	Uruguay
YV	Venezuela
4U1ITU	ITU, Geneva
4U1VIC	VIC, Vienna

*Since 1970, there has been an informal agreement between the United Kingdom and the US, permitting Pitcairn and US amateurs to exchange messages concerning medical emergencies, urgent need for equipment or supplies, and private or personal matters of island residents.

**Limited to special-event stations with call sign prefix GB (GB3 excluded).

the International Activities office of NOAA, developed the plan.

How will it work?

Weather stations will be provided and installed at the QTH of selected hams on strategic islands in the Caribbean area. The size as well as the geography of each island will determine the number of units and their location. Each ham station has to have 20-meter SSB capability together with suitable standby power. As a hurricane approaches an area the hams will activate their stations and, whenever possible, will regularly read the weather station and transmit the data to W4EHW either via radio, e-mail or fax. They will continue to send reports until after the storm has left the area.

The National Hurricane Center, on the campus of Florida International University, in Miami. W4EHW operates from here.

Is CARMEN operational?

To cover the whole of the Caribbean Islands is a big project and is impossible to do all at once. CARMEN is being implemented in phases. A pilot project, Phase 1, was implemented in late1999 and focused on the northern Lesser Antilles. Twenty weather systems were installed on the Netherlands Antilles (6) (Islands of St Maarten, Saba, and St Eustatius), Antigua/Barbuda (5), Anguilla (4) and St Kitts and Nevis (5). During the hurricane season of 2000 some of these stations were put to the test and provided valuable data to the forecasters. Phase 2, this year, expanded the network to four additional countries with 35 weather stations. Installation and checkout of the equipment for the Bahamas (15), Dominican Republic (5), Belize (5) and Guatemala (10) has started and some were completed for the 2001 hurricane season.

What's in CARMEN's future?

All of these reporting stations are currently manual, in that the operator takes a reading and then sends it to NHC either by radio, e-mail or fax. Many times, when a storm is pending, the operators are understandably very busy making preparations to protect their family and home and don't have the time to send in weather reports. The Amateur Radio Coordinator at NHC has been working with NOAA with the idea of making the reporting stations automatic using the APRS system. The weather data from several locations on and around a larger island will be sent on a 2-m VHF link to a collection point and then when a storm is imminent the data would be "gatewayed" onto HF for transmission to NHC in Miami. This has recently been demonstrated by tests conducted by John McHugh, KU4GY, and Don McGehee, PJ6DM, on the island of Saba (20 miles southwest of St Maarten).

We have also been working with the Florida Solar Energy Center and have developed and tested two prototype stand alone weather stations that use APRS. This approach will allow the operators more time to secure their homes and family and it will also allow units to be placed in critical locations that are usually evacuated when a storm is approaching. The ultimate goal is to install a large number of weather stations dispersed across the region, all connected via APRS and automatically sending important weather data to W4EHW at NHC.

How is this project funded?

CARMEN is funded through NOAA by a grant from the Shell Marine Habitat Program, a special program of the National Fish and Wildlife Foundation created in partnership with the Shell Oil Company Foundation.

What other interesting projects is the W4EHW group working on?

We have our ongoing Weather Volunteers Observers Network "ON-NHC" program that has over 200 members registered. Some of these are hams and a large number are people that have home weather stations and are

interested in providing W4EHW with reports via email or fax whenever a hurricane is approaching their area. Naturally, most of these stations are along the coastal areas of the US.

For those with weather stations that are inland and our ON-NHC members who wish to help with weather forecasts, we have our new program called CWOP, the Citizen Weather Observer Program. Joe Schmidt, W4NKJ, who is our Internet Coordinator, has developed this. It provides free software that allows a home weather station to automatically connect to the Internet, download their current weather conditions and then disconnect. This data is gathered and then displayed on the net so all can see. The NOAA forecasters will use this data to supplement other data in preparing forecasts. The free software for the CWOP is available at our Web site.

I encourage anyone interested in our operation and/or setting up a weather station to visit our Web site at **www.fiu.edu/orgs/w4ehw** to learn more about the subject and our history.

Amateur Radio Operations during Hurricane Michelle

By Julio Ripoll, WD4JR, Assistant Amateur Radio Coordinator, National Hurricane Center

From Saturday, November 3, to Monday, November 5, 2001, W4EHW, the Amateur Radio station at the National Hurricane Center (NHC) in Miami, Florida, received many reports from Amateur Radio operators in Jamaica, the Cayman Islands, Cuba, the Bahamas and Bermuda during Hurricane Michelle's track through the Caribbean Sea and Atlantic.

For almost a week, Tropical Depression #15 dropped torrential rains in Nicaragua and Honduras causing flooding and mud slides as it moved very slowly into the Caribbean Sea. TD-15 would eventually grow into a powerful Category 4 hurricane, named "Michelle," with winds of 135 miles per hour.

As Michelle started her track northward toward Cuba and began intensifying, W4EHW activated early Saturday morning and started coordination with the Hurricane Watch Net on 14.325 MHz and the Cuban Emergency Net on 40 meters.

In anticipation of possible interruptions in normal communications between Havana and NHC, Max Mayfield, Director of the National Hurricane Center in Miami, requested W4EHW to establish a backup Amateur Radio link with Havana in order to maintain the flow of Hurricane information and warnings.

One of the most important communications from the Bahamas came from Wayne Wilkinson, KC4CYK/C6A, on his 42-foot sailboat docked at tiny Highbourn Cay, located between New Providence and Eleuthera islands. As Michelle started to lose its classic form and the eye became difficult to see, the hurricane forecasters were considering lowering the warnings. Wayne reported winds of 87 knots (100 mph) with gusts of 100 knots (115 mph). This report caught Mayfield's attention, and, ultimately, the warnings were not lowered.

Field Organization Reports

Public Service Honor Roll
October 2001

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers). Please note the maximum points for each category:
1) Checking into a public service net, using any mode, 1 point each; maximum 60.
2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24.
3) Performing assigned liaison between public service nets, 3 points each; maximum 24.
4) Delivering a formal message to a third party, 1 point each; no limit.
5) Originating a formal message from a third party, 1 point each; no limit.
6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30.
7) Participating in a communications network for a public service event, 10 points each event; no limit.
8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points. Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ on written notification of qualifying months to the Public Service Branch at HQ.

862 NM1K
434 K9JPS
339 N9VE
269 W7TVA
261 N8IO
251 W7GHT
240 N2LTC
234 K8GA
228 AC5XK
226 W9RCW
218 KA2ZNZ
213 KB2VRO
212 WA5OUV
210 KK5GY
203 WA9VND
202 N2CCN
199 W6DOB
198 N5IKN
196 KB1DSB
192 N1SN
191 KK3F
186 W4ZJY NN7H
185 N9KNJ
183 KB8ZYY K5NHJ KA4FZI
182 W5ZX W6IVV
181 W5RDM
180 WN0Y
176 WB5NKC
174 WA2MWT
173 KC2DAA KB2RTZ
171 N2JBA KA5KLU
170 AC4CS
169 K9FHI
168 K6YR N2YJZ W4EAT KA2GJV K4RBR
166 W0WWR AG4DL
165 K2UL
162 NR2F
161 K8PJ N2RPI N2OPJ
160 WB4GM WX8Y
159 K5UPN
158 W3YVQ N9BDL W8YS
157 N7CEU
156 K0IBS W2AKT
155 N7YSS
154 W1PEX N5NAV KC5OZT WB2UVB
153 N3ZKP W6QZ
152 KD4GR
150 WA2YBM KB5WY WA5I
149 KC2HUV
148 N2GJ
147 N2AKZ
146 AA3SB KC4ZHF
145 WA4DOX W0OYH
144 KE4JHJ
143 KB2KLH N2WDS
142 WA2ZCM K4IWW N5OUJ K4SCL
141 N8BV WB2GTG KC2EOT
140 W0LAW
139 AF4NS WA4QXT W7ZIW
138 K3JL KM5YL N0SU W5GKH KG4EZQ WX4H
137 N8OD W3BBQ NN2H
136 K4YVX
135 KG4FXG
134 K5IQZ KA1GWE KG4CHW
133 W9YCV
132 K4RLD KG2D
131 KK1A AA8SN
130 KC7ZZB WB4BHH WB2QIX N5SIG W3IPX W7GB
129 KC7SRL NB4K K4FQU
128 KA4UIV WA0TFC KB5TCH WD8DHC N3YSI
127 KC8KYP KV4AN AF4QZ W4DGH N3WKE
NC4ML AD4XV
126 W1ALE K9LGU
125 N2KRP
124 N4TAB W2JG
123 KC4VNO WB5NKD
122 K4BEH WI2G W3HK
121 WA2YL W7QM K7GXZ
120 KF6OIF WD4JJ K0PIZ N9TVT AA2SV
119 N8DD W4WXA KC3Y KI4YV WD9HII KA2DBD KF4KSN KF5A
118 K4MTX W4CKS K5DPG K4WKT K9GBR N9MN KT4TD WD9F
117 W1QU
116 KB0RUU W3CB N2JRS
115 AC7DD K1FP N2BVM
114 WA8DHB KB0DTI KA2BCE WA1JVV K2PB WD4GDB
113 KC8CON K1JPG
112 N4VVX K5MC K8VFZ KE3FL KB2ETO WD0GUF AG9G WB2LEZ W7LG
111 W2LC KF4WIJ
110 KA4LRM N3WK KO4OL W2MTO K2DBK W4AUN K2BCL
109 KC6NBI K2YS WB4BIK WA2GUP KM5VA
108 AF2K KB2KOJ W9CBE KA2CQX K7MQF
107 W3UAQ
106 W1JX K2DN WA4EIC
105 WA8SSI W4CC
104 AA3GV KF4NJP W5AYX
103 AC5Z AB4XK
102 WB4UHC K4BG
101 W1JTH K8ZJU
100 WA9JWL AD6HR
99 KA0DBK N2RTF AF4PX WA7UVX KC2ANN N3RB AE4MR W3NNL KJ7SI
98 KC8HTP
97 KE4GYR WA4GLS KE2SX W6JPH KF4OPT
96 KE4WBI
95 KE4PAP W4VLL KA4HHE WA2YOW WB2IJH KD4HGU
94 K2SLY WB4PAM
93 WB4ZNB WA2CUW WW8D
92 KC6SKK
91 KB2YUR
90 AA4YW N8NMA N3SW
88 K8AE W2GUT
87 KU6Z WA1QAA W2CC KA7TTY
86 KG9B WB9GIU W7DPW
85 WB9OFG W2PII W9RSX
84 W0FCL N1ZYD
83 KG4FQG KA2ZKM AA4BN
82 K3CSX N2AVY
81 AB2IZ
79 KA2IWK
78 N4FNT K6IUI
77 W4QAT W5PY
76 KC4PZA N1JBD KE4JFS
75 W7VSE
74 K1TSV
73 WJ2F W8IM
71 W4CAC W7EP KJ2N
70 WA4EYU KE4DNO K3TX

The following stations qualified for PSHR during the months indicated, but were not previously recognized in this column: (Aug 2001) AA3GV 91. (Sept 2001) N7YSS 155, KK1A 134, N7DRP 118, KC7ZZB 114, AC7DD 111, KC7SRL 104, W7VSE 101, W5AYX 93, KC7SGM 88. (Feb 2001) K4BG 102. (Jan 2001) K4BG 99.

Section Traffic Manager Reports
October 2001

The following ARRL Section Traffic Managers reported: AK, AL, AR, CO, CT, DE, EB, ENY, EPA, EWA, GA, IA, ID, KS, LA, LAX, MDC, ME, MI, MN, MO, MS, MT, NC, NFL, NH, NLI, NNJ, NNY, NTX, OK, ORG, SBAR, SC, SD, SDG, SFL, SNJ, STX, TN, NV, OH, VA, VT, WCF, WI, WNY, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports
October 2001

The following ARRL Section Emergency Coordinators reported:
CT, ENY, EWA, IN, KS, KY, LA, MDC, NLI, NNJ, NTX, OH, SD, SFL, STX, SV (North), TN, NY, WCF, WMA, WPA, WV.

Brass Pounders League
October 2001

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	*Orig*	*Rcvd*	*Sent*	*Dlvd*	*Total*
KK3F	29	1438	1390	48	2905
NM1K	777	287	893	3	1956
N2LTC	1	696	729	21	1447
W1PEX	0	136	1078		1254
WX4H	0	438	458	0	996
KF5A	1	415	432	0	848
K9JPS	0	360	31	354	745
WB5ZED	32	366	299	16	713
W0WWR	1	116	545	7	669
K9GU	0	290	27	291	608
W9IHW	0	199	208	179	586
WB2GTG	17	229	314	6	566
W6DOB	17	179	333	24	553
N8IO	92	235	190	21	538
KA2ZNZ	19	255	199	61	534
N9VE	0	238	34	242	514
K5UPN	19	287	204	2	512

BPL for 100 or more originations plus deliveries: W9RCW 165, W7TVA 141, N5IKN 135, KK5GY 114, WA5OUV 108, K8GA 106, K5KXL 106.

Some Thoughts from the Other Side of the Pile-Up

By Ed Sawyer, K8EP

I scheduled a business trip to Hong Kong for the annual Electronics Asia show back in August. Like everyone else, after September 11 I questioned whether I should still go ahead with the plans, which had me flying in October. I always enjoy that show and was planning on adding some DXing to the agenda so I would be doubly disappointed if I cancelled. I write this as the plane is descending into Minneapolis on the way home and I can honestly say that I am glad I decided to continue with my plans. Certainly a review of the stability of the region being visited was in order, but I felt confident that Hong Kong (and Macau, my DX destination) would not be especially volatile. In fact, I felt safer there during October than I did listening to the stories filtering back about the US from CNN.

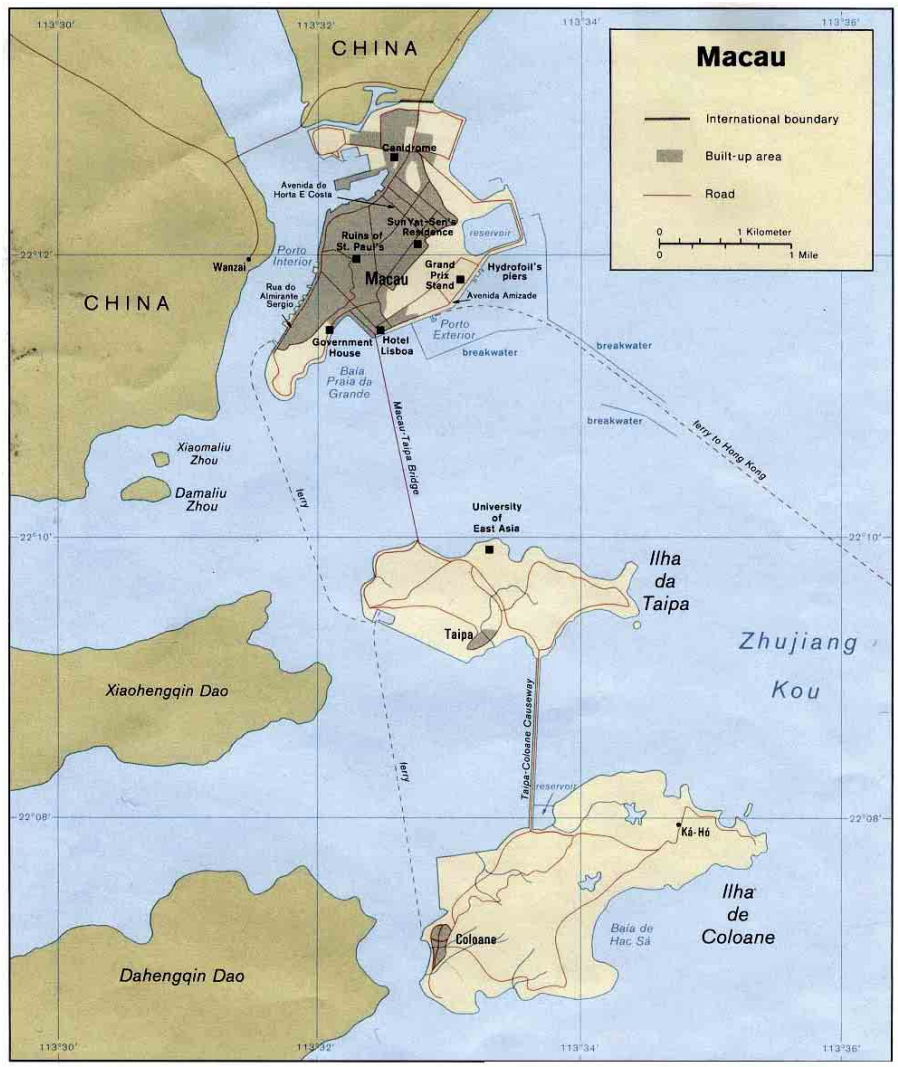
Often, when I go to Hong Kong on business, I try to include a side trip over the weekend to Macau. Macau isn't on the top 100 list but the pile-ups generated from there are quite large, especially on CW. There are no resident hams in Macau who operate CW on a regular basis. As a CW fan, this makes Macau especially appealing for a DXer like myself.

I operate at a station in the Hotel Royal on Mainland Macau. The station consists of a C3 Yagi on a 25-foot tower on top of this 17-floor hotel. There are also inverted Vs on 30-160. For this trip, I concentrated on 10-30 due to the excellent propagation predictions. Pertti Simovaara, OH2PM, and Martti Laine, OH2BH, established the station a number of years ago. There used to be an FT-1000MP transceiver on site as well, but now you need to bring your own radio. Through a gracious invitation from Pertti a few years ago, I was offered the chance to operate from the station and have been back numerous times since.

You get to Macau, typically, by taking a high-speed jetfoil ferry over from Hong Kong. These ferries run continuously and are very reliable and safe. I personally can vouch for them as I was on the last ferry before a typhoon hit in 2000 and felt very safe. The approach to Macau harbor is quite impressive. If you know where to look, you can see the tribander on top of the hotel from the harbor. The hotel sits on top of a hill next to Macau's famous lighthouse on the hill and is one of the higher points in the area. It is located on the mainland so it is not an IOTA location. Customs and immigration are low hassle in both Hong Kong and Macau so within minutes you are in your taxi for a 5-minute ride to the hotel.

The hotel is first rate and the staff is very accommodating. They know all about ham radio and are quite used to seeing wires strung on the roof and delivering room service to "strange people screaming into headsets." After checking in, it's up to the roof to drop feed lines to the top floor hotel room, raise the inverted Vs, and untie the ropes securing the C3 into a fixed position. Next it's off to obtain a license. This is done at the GDTT. It used to be in the post office but is now around the corner in a nice modern office. You need pictures, a copy of your passport/license, information on your radio (including serial number) and roughly $90 US for the license, good for up to 90 days. Each time I come, even though my license is expired, the nice people at the GDTT give me my same call sign, XX9TEP.

The operator license and call sign can be obtained on the spot. However, Macau has a station license requirement. This requires an inspection of the equipment. This can take anywhere from 1-3 days to schedule. Your best bet is to phone ahead and try to set up an advanced schedule booking. It's not a guarantee (nothing ever is) but it can improve the turnaround time. In the end, you are at the mercy of



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the scheduler, however. Ah, the perils of DXing….

After all that is taken care of, it's time to get on the air! It usually only takes a CQ or two to get things going almost 24 hours a day in Macau. I arrived on a Friday and took care of licensing. Some work needed to be done on the antennas and I was beat from just arriving from the US. For that reason, I did not start operating until Saturday mid-morning local (Friday night in the US). It was immediately apparent that predictions were right and the bands were hopping. I had missed the morning US openings, which usually close down by 0300-0400Z, so initial CQs on 10 meters produced an immediate JA pileup followed shortly after by Europeans as the sun was coming up across Europe. I operated 50/50 CW and SSB and found the pile-ups to be large on both modes. During strong openings to EU and the US, I was listening up 5-10 with wall-to-wall signals on SSB and up 2-4 on CW with the same volume. Europe was open on 10 m/12 m from 0500Z-1000Z 15 m from 0600-1000Z and 1200Z-1500Z, 20 m more often than not (mid-day and wee hours of the morning being the dead times).

Thirty meters produced excellent openings from 1600Z-2300Z. The pile-ups on 30 m were intense, giving many of the Deserving a new one on that band. Signal levels were lower given the inverted V and band, but steady 120-150/hour rates were still very achievable. To the US, the windows are smaller: 10/12 m 2200-0200Z, 15 m 1200-1600Z and 0100-0300Z, 20 m 1200-1400Z, 30 m 1000-1200Z. Signal levels were often just as strong as EU when open.

A note to US hams trying to work in Asia: If the long path is open, it is the best shot. Signal levels can be extremely high when the path is there. Look for it in the mornings US time on 10-20 m. Possible in the late afternoons as well but most likely in the morning.

I purposely skipped stating opening times on 17 m because it didn't stay predictable. I had a great opening into EU from 1400-1800Z on 10/14 but other times it was dead, or it seemed to be. Maybe no one was listening but it was open. It's hard to tell.

I operated all day Saturday and Sunday and then was able to work Monday/Tuesday mornings and Monday night around my business schedule in Hong Kong. All in all about 50 hours operating time and 3800 QSOs evenly split between CW and SSB.

I think a few thoughts are worth sharing on what I observed from out there on the other end of the pile-up. For one thing, I observed extremely professional operating behavior from all corners of the globe. In one intense European SSB pile-up on 15 m at 1300Z, a stateside station broke through on long path (reference note above). I immediately asked the European crowd to QRX to see if any other North America stations were coming through. There were well over a hundred EU operators calling me at that instant spread out over 5 kHz. You could have heard a pin drop from the silence of that crowd while I worked maybe six stations (W/VE) and then a roar when I went back to EU. I was extremely impressed and said so numerous times to the next few stations I worked. The JAs have always shown that same courtesy to EU and North America stations and I commend them as well. I usually stop every 30-40 QSOs if I am holding them at bay and work 5, thanking them for their patience. It is an excellent balance of courtesy and fairness in my opinion. Most of the time, I just let propagation decide who is going to get worked and keep the rate going at a good clip.

In the pile-ups, if you are not a strong signal, your best strategy on SSB is to work the edges of the split and away from the pack. I would suggest listening to the 5 kHz spread, finding a hole, and calling numerous times (breaking when you hear the DX station return, obviously). Keep looking for the hole each time, as it will move around as the DX moves around where he is listening. You would be surprised how many lower strength stations were worked who were on a good, clear frequency, as opposed to louder stations. Those louder stations either called on the frequency of the last station, a good strategy only if you are plenty loud or propagation is outstanding into your location at that time, or just broadcasting away without listening to the pile-up side of the split.

On CW, I think a different strategy works better. Follow the listening location but keep a shift of your beat tone by + or – 500 Hz so that the tone is distinctly different than the large group that will zero beat the last station. Think about it. Ten loud stations all zero beat is uncopiable while one softer station down 500 Hz is Q5 to my ear. Try these techniques and see if it improves your QSO percentage.

It is amazing how quiet everyone gets when you are giving out your QSL information, but it doesn't get that quiet when you come back to a station. You will be worked faster if you wait for the station called to be worked before you call again. Once I lock onto a call sign, it is the only one I am going to work. Most DX stations seem to work the same way.

October 2001 had the best propagation worldwide I have witnessed on 10/12 m in the four years (seven trips) I have been DXing from Asia. You know it won't last forever, but it sure is wonderful while it does. There's always plenty of operators who need 80-160 m during the lower phase of the cycle, so you may as well work what's open while it is on the high bands.

I would like to thank all the courteous operators I worked out there as well as the fine staff at the Hotel Royal and Pertti, OH2PM, for his continuous support and friendship.

QSL XX9TEP via direct or the bureau to K8EP. All cards are answered.

New DXCC Entity — Ducie Island

The IARU has announced the addition of its latest member-society, The Pitcairn Amateur Radio Association (PIARA). In March 2001, the PIARA filed an application with IARU Region 3 asking for membership in the IARU. This matter went to a vote of the IARU member-societies worldwide in June, and the result of the vote was announced November 17.

As a result of the addition of PIARA as an IARU member-society, a new DXCC entity has been created. Under DXCC rules, an entity that is represented by an IARU society gains the status of "Political Entity." In changing from a geographic separation to a political DXCC entity, certain distance requirements for additional separations change. As a result, Ducie Island, a part of the Pitcairn Islands, becomes a new DXCC entity. Effective 0000Z, November 16, 2001, Ducie Island is added to the DXCC Entity List.

Only QSOs dated November 16, 2001 and later will count for this entity. QSL cards for DXCC credit will be accepted beginning June 1, 2002. The addition of Ducie Island to the DXCC list will not affect the March 2002 Honor Roll. —*ARRL DXCC Desk*

DX NEWS FROM AROUND THE GLOBE

3X—GUINEA

Francois Normant, VE2XO, will be back in Guinea at the end of December or beginning of January and will be operating from Conakry as 3XY6A. On this trip he expects to operate from Rooma Island (AF-051) with a special call-sign to be announced later.

WRAP UP

Well that is all for this month's column. Special thanks this month to K8EP. Keep sending your pictures, newsletters, stories and DX news. Until next month, see you in the pileups!—*Bernie, W3UR* QST

Cycle 23 Resurges

When it became apparent that Cycle 23 had peaked sometime in mid-2000, prospects for another season of worldwide 6-meter propagation during fall and winter 2001-02 seemed doubtful. Last year at this time, NASA was still projecting a steep decline in the cycle through 2001, although some scientists suggested that solar activity might revive, producing a second peak. The latter forecast now seems to have been closer to the mark. See the previous summaries of the progress of Cycle 23 in this column for October 1999, April 2000 and May 2001.

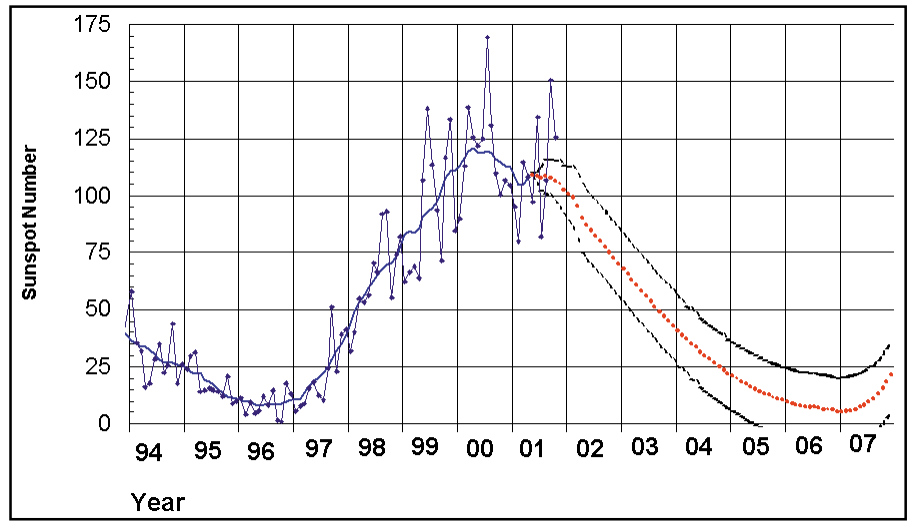

Figure 1—The resurgence of solar activity during 2001 suggests that Cycle 23 will have a double peak. The solid line is the estimated 13-month smoothed monthly average as of November 2001. Average monthly values are shown with small dots connected by a thinner line. The large dotted line forecasts the 13-month smoothed monthly average, with upper and lower predicted limits shown with smaller chain dots. Based on the November 1 graphic at www.sec.noaa.gov/SolarCycle/.

Double Peak

Average monthly solar activity did continue to drop during January and February 2001, but thereafter, solar activity began a surprisingly steady reversal, as shown in Figure 1. The monthly average Sunspot Number continued to rise at least through September 2001, which now appears will be the second highest month of the entire cycle. By November 2001, it was evident that indeed Cycle 23 would indeed have a second peak.

Plots of 13-month smoothed average solar activity (whether measured as the strength of 2800-MHz solar emissions or calculated based on sunspot size, number and grouping) rarely produce a single smooth curve. Cycle 22 had a clear double peak, Cycle 20 remained flat-topped for two years and Cycle 18 also had two distinct peaks. Only Cycle 19 of the most recent series produced a single distinct peak, so the double peak of Cycle 23 is not very rare.

Worldwide 6-Meter Activity

In any case, the welcome resurgence of Cycle 23 became evident on 50 MHz as early as August and September, when operators in some parts of the world were already making some surprisingly long intercontinental contacts. Six-meter activity during October was even more widespread, producing the best worldwide conditions so far for Cycle 23. Experienced 6-meter operators have remarked that it was probably the most exciting October of any previous cycle.

The solar flux broke through 200 on October 16 and remained above 200 through the end of the month. As if on cue, US and Canadian stations also began making contacts to Europe, Africa, the Middle East, the Pacific and Japan by the middle of the month. This is unusually early in the fall-winter season, even during the best cycles. East Coast stations worked Europeans nearly every day from October 23 into November, and West Coast operators found the band crowded with Japanese on at least half a dozen afternoons.

This level of 6-meter activity would have been unusual at any time, but it was quite astonishing for October of an average solar cycle. If the daily solar flux remains in the 200 region (equivalent to a Sunspot Number of about 158) through the end of the year, the 2001-02 fall-winter season may turn out to be the most spectacular of any cycle. Whether that conjecture turned out to be true or not should be evident by the time you read this.

ON THE BANDS

Worldwide 6-meter DX dominated the activities for October, as Cycle 23 resurged. Several aurora resulted from increased solar activity as well. Sporadic E is rare in October, but 6-meter DXers alert to any signals found E-skip for brief periods on October 21, 23 and 28. Jeff Dover, KU4WW (EM54) in northern Alabama, reported some late-season tropospheric enhancement on the 21st, when he worked W5III (DM91) in western Texas on 144 MHz over an 1150-km path and others in northern Texas. Many thanks to all who sent in reports—there were too many to acknowledge individually this month. Dates and times are all UTC.

This Month

Jan 3	Quadrantids meteor shower peaks
Jan 19-21	ARRL VHF Sweepstakes

Six-Meter DX

October 2001 may have been the best month for 6-meter DX ever reported. Ionospheric conditions were excellent, although there may have been times during previous cycles when propagation was even better. What made this October so spectacular was the number of DXCC entities on the air. Nearly every country in the world now allows amateurs access to 50 MHz, and operators were quite keen to make the most of the band.

Stations from Greenland in the north to the Falkland Islands in the south and virtually everywhere in between were able to make worldwide contacts on many consecutive days, especially over the second half of the month. The duration of openings in many parts of the world were just incredible. These necessarily abbreviated summaries can provide only a glimpse of the 6-meter excitement.

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US and Canada to Asia

West Coast stations from British Columbia to southern California, often including stations as far east as Montana, Colorado and New Mexico, began working across the Pacific and into Australia and Japan as early as October 2. Their afternoon openings were practically daily affairs. Among the prized catches were 3D2CY (Conway), 3D2SM (Fiji), T32EQ (Tuvalu), ZK1NCP (a Japanese expedition on North Cook), ZK1AKX (VE7XF operating from both North and South Cook Islands) and VK9KND (Norfolk). Some of the longest contacts included 3D2AG to AC4TO (EM70) on October 2 and ZK1AKX to N0LL (EM09) on the 30th.

Stations along the west coasts of Mexico, the US, and Canada worked Japan via the direct path on half a dozen afternoons during the second half of the month, although K6QXY caught JA1RJU on a skewed scatter path as early as October 2. The October 26-27 opening extended eastward to Illinois through Texas, allowing KA9CFD (IL) and N0LL (KS) to make a few fleeting contacts.

Other Asian contacts were more difficult to come by. W7EW worked DS3EXX (Korea) on October 26, and DU1EV logged several Hawaiians. HL1LTC may have made it into a few California logs in October as well. KH6SX found BG7IAG on October 9, but apparently, none of the Chinese stations has yet worked the North American mainland.

Early morning long-path contacts also provided US stations with opportunities to work Japan on October 17, 18 and perhaps other days. KC8LGL (OH) and K4SN (FL) found Japanese stations on the band on the 17th around 1400. The next morning about the same time, N0JK (KS), N0KQY (KS), K0SQ (MN), and N0VSB (CO) each worked a handful of JAs the long way around—simply incredible! Signals are generally quite weak and fluttery along this path.

Transcontinental DX

The first transcontinental contacts may have been made on the afternoon of October 23, when N7DB (OR) logged several Florida stations. Stations in the Canadian Maritimes and Maine reported signals from the West Coast on the 26th. Other transcontinental openings may have gone unreported. Alaskans worked into the lower 48 states on October 26 and 27, as WL7M, KL7FZ and others logged scores of eager takers eastward to Michigan and Maryland, and south to Mississippi.

US and Canada to Europe and Africa

East Coast operators found themselves busy working European and African stations on the mornings of October 11, 21, 23-27 and 29-31. Most contacts were made on CW, as signal strengths were usually modest, but several openings were strong enough to allow many stations to make it across the Atlantic on SSB. As is typical of these opening, those in the Northeast, including the VO1, VY2, VE1, VE9 and W1 call areas generally garnered the lion's share of contacts with western Europeans, but not always. Florida stations also did exceptionally well on several days, and stations as far westward as Texas, Oklahoma and Colorado were able to squeeze out a few contacts.

Favored stations in the Northeast made it as far eastward as Croatia (9A), Yugoslavia (YU) and Bulgaria (LZ) on October 21, while E30NA (Eritrea) came booming in on SSB for the first time. K4QI (NC) worked EH and IS0 while AC4TO (FL) nabbed CT, EH and E3. On the 23rd, W1s had a lackluster opening to EH and CT, while several W8 stations, including K8TVD (OH) and KC8LGL (OH), worked EH9IB and CN8LI. K8KFJ (WV) also logged CN8LI.

Activity picked up on the morning of October 24. Stations in the Northeast, plus the W2 and W3 call areas, made it as far eastward as OH, SV and ZC4 (UK Sovereign Base on Cyprus). VE1YX added YL2JN (Latvia) to the array of countries. K8TVD logged I, 9H and SV. W4TJ (VA) worked SV1EN and SV1AHZ. Several W4s in Florida reported SV as well as 5B, ZC4, and 4X. The 25th yielded stations eastward to SM and 9A from the Northeast, but this was not a spectacular day.

Conditions generally improved toward the end of the month. On the 26th, East Coast stations made it as far as OH and DL, but those elsewhere in the US did nearly as well. K4QI (VA) logged SM and GW; Ohio stations, including K8TVD and K8MFO, reported GW, EH9, F and ON. KA9CFD (IL) picked out ON4ANT, and WB5YWI (OK), K5CM (OK) and W0ETT (CO) worked GW4VEQ. ON4ANT worked widely throughout the W1-5, 8 and 9 call areas. W6JKV/5 (TX) logged S5, DL, 9A, and OH for some of the most impressive contacts of the opening.

US stations made some unusually long contacts into Europe on the 27th. In addition to the usual western Europeans, N1RZ (NH) worked ES2QH (Estonia) and LY2BAW, the first time any US station has worked Lithuania. W4WM (NC) chatted with UT5JCW (Ukraine) on SSB. October 28 was generally quiet, save for the appearance of 9G5AN (Ghana) on the East Coast.

Conditions favored more southerly paths on the 29th, as D44TC (Cape Verde), 9G5AN, E30NA, FR5DN (Reunion) and FR1GZ came booming into the Northeast. These along with a host of Europeans as far east as LZ and SV and South Americans, including P4, 9Y, YV, PY and HK. K4MQG (FL) worked more than a dozen European countries, including 9A, YU, YO, LZ and UR.

The opening of October 30 was "phenomenal" (according to WB2QLP/4), "amazing" (wrote GW7SMV), and "the best day for 6-meter DX in Cycle 23 so far" (commented GW4VEQ). East Coast stations from Nova Scotia to Florida were swamped with Europeans, especially I, 9A, YU and LZ. WB2QLP (FL) worked a dozen countries, including the Ukraine (UR) with just 100 W. W4SO (FL) logged ER1OO (Moldova) for another US first. Some other noteworthy contacts included W1JJM (RI) to T77GO, YO7VS; K4QI (VA) to UT5JCW; AA4H (TN) to D44TD, YO7VS, LZ2CC; NN4X (FL) to 9A1CCY, YT1VV, LZ1RB, SV1DH, UX0FF, UU3JJ, UT5JCW; K5SW (OK) to D44TD, 9G5AN (for #100) and N5HYV (LA) to EI, I, 9H.

The European opening on the last day of the month brought some additionally impressive activity. Stations in the Northeast had especially good conditions to 9A, S5 and YU. For a 15-minute period around 1500, a few of the East Coast gang made it to Asian countries Cyprus (both 5B and ZC4), Lebanon (OD) and Israel (4X). They included ZC4FL to W3EP (CT), W1JJM (RI), K1DAM (RI), W3BTX (FL); OD5/OK1MU to W3EP, W1JJM, W3BTX and 4X1RF to W1JJM.

Stations scattered throughout most of the US also worked into more than two dozen

Jurgen Glind, PE1LWT, and Chris Ploeger, PA2CHR, chief operators of the J45M EME expedition to the island of Rhodes this past spring. Their 2-meter EME array is in the background.

Microwave Standings

Published Microwave Standings include call area leaders as of November 1. For a complete listing of all stations, check the VHF/UHF/Microwave Standings Boxes at **www.arrl.org/qst/worldabove/standings.html**. To ensure that the Standings Boxes reflect recent activity, submit reports at least every two years by e-mail to: **standings@arrl.org**. Printed reporting forms are available by sending a request with SASE to: Standings, ARRL, 225 Main St, Newington, CT 06111.

33 cm (902-928 MHz)

Minimum Terrestrial DX = 500 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
AF1T*	NH	17	1	24	849
K1TEO	CT	16	2	44	970
K1UHF	CT	13	1	30	858
WA1ECF	MA	9	1	19	843
W1GHZ	MA	8	1	13	558
W2FCA	NY	7	1	7	638
WA2FGK	PA	14	2	27	940
W4DEX	NC	8	1	10	1214
K4RF	GA	2	1	10	1045
W5LUA*	TX	20	2	60	1725
AA5C	TX	12	1	38	1528
W5ZN	AR	12	1	32	1050
W5RCI	MS	10	1	17	1200
N5QGH	TX	5	1	20	1062
N6CA	CA	4	3	19	3978
K2YAZ/8	MI	11	1	38	960
N8KOL	OH	6	1	14	527
K3SIW/9	IL	17	2	57	1200
WB9SNR	IL	10	1	28	614
W0UC	WI	8	1	29	783
W0GHZ	MN	10	2	27	1353
N0UK	MN	4	1	10	571

23 cm (1240-1300 MHz)

Minimum Terrestrial DX = 800 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	17	2	45	1010
K1UHF	CT	14	1	35	911
WA1ECF	MA	11	1	19	988
KU2A	NH	7	2	9	814
W1GHZ	MA	7	1	10	976
WA2FGK	PA	15	1	36	940
K4QIF*	VA	27	18	—	1271
W4TJ*	VA	22	23	64	—
K4RF	GA	17	1	32	1067
W4DEX	NC	14	1	23	1078
W4WTA	GA	9	1	16	1023
KD9KP	TN	9	1	11	1165
W5LUA*	TX	41	39	251	2060
W5RCI	MS	17	1	66	1200
AA5C	TX	17	1	59	1721
W5ZN	AR	15	1	41	1050
N5QGH*	TX	14	7	45	1545
W5UWB	TX	6	1	14	1664
N6CA*	CA	8	11	44	3978
K6QXY	CA	4	2	18	3794
K2YAZ/8	MI	18	2	58	1300
K3SIW/9	IL	22	2	75	1207
WB9SNR	IL	16	2	52	1250
W0UC	WI	11	1	46	1180
W0OHU	MN	13	2	38	1228
W0GHZ	MN	12	2	46	960

13 cm (2300-2310 2390-2450 MHz)

Minimum Terrestrial DX = 800 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	15	1	26	860
WA1ECF	MA	9	1	13	843
W4DEX	NC	7	1	9	1030
W5LUA*	TX	21	21	98	1533
W5RCI	MS	10	1	18	920
AA5C	TX	8	1	23	1439
W5ZN	AR	8	1	21	1050
N5QGH	TX	5	1	14	1013
N6CA	CA	3	3	20	3978
K2YAZ/8	MI	7	1	26	924
K3SIW/9	IL	13	1	51	1041
WB9SNR	IL	6	1	15	812
W0GHZ	MN	9	2	25	1353

9 cm (3300-3500 MHz)

Minimum Terrestrial DX = 300 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	11	1	16	590
AF1T	NH	4	1	5	374
W4DEX	NC	5	1	6	714
W5LUA*	TX	9	5	33	1353
AA5C	TX	5	1	15	1048
N5QGH	TX	4	1	13	294
W5ZN	AR	3	1	9	1050
N6CA	CA	3	3	20	3978
K2YAZ/8	MI	3	1	4	412
K3SIW/9	IL	9	1	39	880
WB9SNR	IL	5	1	14	518
W0GHZ	MN	5	1	17	1353

5 cm (5650-5925 MHz)

Minimum Terrestrial DX = 300 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W1GHZ	MA	6	1	8	367
W5ZN*	AR	8	3	10	1050
W5LUA*	TX	7	14	43	1187
N5QGH	TX	4	1	14	256
AA5C	TX	5	1	18	1134
N6CA	CA	3	3	20	3978
K2YAZ/8	MI	5	1	11	924
K3SIW/9	IL	8	1	33	800
WB9SNR	IL	5	1	12	614
W0GHZ	MN	5	2	7	655

3 cm (10-10.5GHz)

Minimum Terrestrial DX = 400 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	13	1	16	634
WA1ECF	MA	10	1	18	843
AF1T/1	MA	10	1	13	772
AF1T	NH	9	1	14	443
W1VT	CT	9	1	13	651
K1UHF	CT	9	1	12	897
W1GHZ/1	NH	8	2	14	549
W1GHZ/1	VT	8	1	14	501
K1AE	NH	7	1	10	486
N1SAI	NH	6	2	13	486
W4DEX	NC	10	1	12	1030
W5LUA*	TX	10	16	58	617
W5ZN	AR	4	1	10	1050
N5QGH	TX	3	1	13	382
N6CA	CA	2	2	18	986
W6ASL/6	CA	1	1	15	770
K2YAZ	MI	3	1	7	412
K3SIW/9	IL	7	1	20	464
WB9SNR	IL	5	1	14	742

12mm (24-24.25 GHz)

Minimum Terrestrial DX = 50 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W3IY	VA	1	1	3	81
W4SW	VA	1	1	1	100
W5LUA*	TX	2	2	6	160
WW2R/5	OK	2	1	3	162
K5RHR	NM	1	1	5	118
W5ZN	AR	1	1	4	80
N5QGH	TX	1	1	2	23
N6CA	CA	1	1	5	171
WB9SNR	IL	2	1	2	179
K3SIW/9	IL	1	1	4	113

6 mm (47-47.2 GHz)

Minimum Terrestrial DX = 10 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W4SW	VA	1	1	2	81
WW2R/4	KY	1	1	2	51
W3IY	VA	1	1	1	81
WW2R/5	TX	1	1	1	55
W5LUA	TX	1	1	1	1
N5QGH	TX	1	1	1	1
W0EOM	CA	1	1	3	153

4 mm (75.5-81-GHz)

Minimum Terrestrial DX = 10 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
WW2R/4	KY	1	1	2	51
WW2R/5	TX	1	1	1	55
W0EOM	CA	1	1	2	145

2.5 mm (119.98-120 GHz)

Minimum Terrestrial DX = 10 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W0EOM	CA	1	1	1	11.6

2 mm (142-149 GHz)

Minimum Terrestrial DX = 1 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W0EOM	CA	1	1	1	11.6

1 mm (300 GHz and Higher)

Minimum Terrestrial DX = 1 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
KB0QXR	NJ	1	1	1	—
N2LPN	NJ	1	1	1	—

†Terrestrial
—Information not supplied
*Some stations worked via EME

Central and South American DXCC entities. Among the less common calls widely reported were 9Y4AT, 9Z4BM, FG5FR, FY5KE, HC2FG, HK3AVR, OA/N6XQ, PZ5RA, P43JB, PJ2MI, V44KAI, YN9HAU, YS1RR and ZP6CW,

Europe

Europeans also made some spectacular contacts into Central and South America, including KP4, HP, TI, TG, YN, YS, YV, HK and others about the same times that they worked into the US. LY2BAW found YS1RR on October 27, for example. On the 29th, UT5JCW worked KP4, PY, HK and YV. YV4DDK logged YO, LZ and UR for new countries, along with CT, EH, F, and 9H. ZF1DC had tremendous runs of Europeans from GW to YO and 5B on October 29 and 30.

Europeans also worked widely throughout Asia on more than a dozen days, beginning October 4. Such paths have been quite rare in the past. Hatsuo Yoshida, JA1VOK, believes that all of the Europe-Japan openings prior to October 24 took place via the long path across the Americas. After October 25, the direct path predominated. Europeans logged many JA and several VR (Hong Kong) calls, along with BG7OH (China), XW0X (Laos), DU1EV and DU/GM4COK in the Philippines, 9M2TO and other Malaysians and YB5QZ with others in Indonesia. They also worked UK9AA (Uzbekistan), UN6P (Kazakhstan) and VU2ZAP (India) a bit closer to home. Fantastic!

Middle East, Asia and the Pacific

VU2ZAP probably had his best day on October 30, when he ran Europeans all the way to EI, GI and GM and crossed the Atlantic to work TI for a new country and his first North American. Raj and VU2MKP had previously worked HC2FG on October 14 around 1630. BG7OH had several spectacular days into Europe, including October 25, when he provided a new country for many DL, ES, OH and others in northern Europe. Middle Eastern stations A45XR, HZ1MD, 7Z1SJ and A61AO worked JA, VR and V73AT (Marshall Islands) among others to the east. Japanese operators also logged XW0X, XV3AA (Kampuchea), UN7QX, UN4P, KH0/AA1NY and KH2/KH0V.

Finally, Hawaiian stations also made some spectacular contacts. KH6s worked into the western US, as far eastward as Illinois and Missouri on October 21, 27 and 30, at least. In addition to more mundane contacts, Jim Kennedy, K6MIO/KH6, reported a quite bizarre event on October 18. "We had a really nice long-path opening right over the South Pole from KH6 to Mediterranean Europe and Africa. I had a total of 39 QSOs between about 0825 and 1005, including 5B4AGM, 9A8A, 9H1AZ, I0WTD, LZ1JH, OD5/OK1MU, SV1DH and YO7LGI." KL7IKV reported hearing an LZ station about this same time while beamed south from Alaska.

In a subsequent e-mail exchange, Jim explained that he thought the radio path was not actually over the South Pole, although he was beamed due south, but rather the signals were skewed as they entered and left the unusual ionospheric regions adjacent to the geomagnetic equator. These same regions give rise to transequatorial field-aligned irregularities.

Expeditions

Several expeditions considerably enlivened 6-meter activity around the world. An international group sponsored by the Bavarian Contest Club operated E30NA (Eritrea) from October 21 to 30 and made 550 QSOs in nearly all parts of the world, including 100 contacts with North America. G3WOS set up on the Falkland Islands as VP8DBL October 21 to November 6 and caught several open-

Two members of the 9G5AN expedition relax with Ghanan radio amateurs at a restaurant in Elmina. From left to right are Philip Brock (9G1PB), Arliss Thompson (W7XU), Dick Hanson (K5AND), an unidentified short-wave listener and Ralph Quist (9G1RQ).

ings to both Europe and the US. The Greenland contest station XP1AB worked into Europe as far eastward as Greece, but did not record any North American contacts in October.

W7XU, K5AND and W0SD put 9G5AN (Ghana) on 6 meters for eight days beginning October 26 from the coastal town of Elmina. They attribute their phenomenal success to a compact 800 W amplifier and a seven-element Yagi. They tallied over 3000 6-meter contacts in 84 countries, including 200 in North America. Highlights included working JA, VR and V7 by both long and short paths.

Aurora

Tim Havens, N1RZ (FN44) in New Hampshire, is ideally located to catch the first signs of aurora. He found weak aurora on October 1, 3 and 4. Of course, he also participated in the more widespread events of October 10, 21-22 and 28. Stations as far south as Tennessee and southern Illinois made aurora contacts on October 10, but this session seemed to attract little attention.

The aurora over October 21-22 extended as far south as Alabama and Georgia in the East and supported some unusually long contacts on 144 MHz. W4MW (EM96) ran off more than 30 QSOs on 144 MHz from western North Carolina. KU4WW (EM54) in Alabama worked K2AXX (FN12) in western New York, and KM0A (EN13) in western Iowa connected with W3EP (FN31) in Connecticut over a 1950-km path. N7CZ (DN47) in Montana made some unusual 432-MHz auroral contacts with W7MEM (DN17) in Idaho, W1IPL/7 (DN62) in Wyoming and K0GU (DN70) in Colorado about 900-km distant.

The aurora of October 28 was widely anticipated, but it appeared suddenly after midnight local time, when most operators had given up on catching it. Visual observers as far south as Texas and Florida reported an impressive red aurora after 0500. Contacts were widespread over the US on 50 and 144 MHz, but activity was low. New England and Canadian Maritime stations made a few transcontinental contacts via auroral-E. Aurora was still reported in the western states as late as 1200.

More 24-GHz EME Tests

After completing the first ever 24-GHz EME contact in August, VE4MA and W5LUA conducted further tests during October. G3WDG, RW3BP and VE7CLD heard both stations, according to reports published in the *432 and Above EME News* and the RSGB *Microwave Newsletter*, but none was yet ready to transmit. The team at G3WDG used a 10-foot Andrew dish with a DB6NT designed preamp and transverter. RW3BP installed a somewhat smaller dish with an offset feed on the roof of his apartment building and used a DB6NT preamp with a converter built by RA3ACE. All three reported weak but consistent signals.

NOTES FROM ALL OVER

New Beacons

Norman Fitch, G3FPK, reports in his November *RadCom* VHF/UHF column that the Poldhu ARC is all set to operate a 2-meter transatlantic beacon from the English coast. GB3SSS will transmit on 144.407 MHz, initially with 25 W and two eight-element Yagis, presumably aimed toward North America. GB3SSS joins F5XAR (144.405 MHz), which has been transmitting for some years with 400 W and a nine-element Yagi pointed toward the Americas.

Greg Stahlman, KJ6KO, has recently put three new beacons on the air from the Sacramento area (CM88). They operate on 144.2825, 432.350 and 1296.350 MHz and send the same identification in CW and PSK31. The beacons run 10 to 40 W to Yagis pointed southeast. For more detailed information, check the beacon link at **www.innercite.com/~kj6ko**. Send signal reports to **kj6ko@innercite.com**.

Grid Chase on the Web

VHF-UHF Century Club leaders by band are now published on the World Above 50 MHz Web pages, thanks to the work of Bill Moore (NC1L) and Jon Bloom (KE3Z) at ARRL Headquarters. Check out **www.arrl.org/qst/worldabove/grid-chase.html**. More than a dozen operators have tallied more than 700 confirmed grids on 6 meters, for example, while more than half a dozen 2-meter leaders have at least 400 grids to their credit. Other World Above 50 MHz Web features include complete Standings Boxes, North American Distance Records and US 6-Meter Firsts.

VHF/UHF/MICROWAVE NEWS

New Microwave Column

"Microwavelengths," a new bimonthly column written by Tom Williams (WA1MBA), debuts in this issue of *QST*. Microwavelengths will focus on technology, equipment and building techniques for the bands above 902 MHz, while this column will continue to report on all aspects of on-the-air microwave activities, including propagation issues. Beginners and experienced microwave experimenters should find a wealth of useful and practical information in Tom's pages. If you are not yet on the bands above 902 MHz, let Tom be your guide.

Winter Contest

The Six Club is sponsoring a 6-meter only contest over the second weekend of February. It will run from 2300 on the 8th to 0300 on the 11th. Each QSO made within the participant's own DXCC entity counts as one point and contacts made with another DXCC entity count two points each. The final score is the product of QSO points times total number of grids worked. For details, check the club Web page at **6mt.com/contest.htm**. QST

From January 1965 *QST*

MICROWAVELENGTHS

QST is proud to present the debut of a new bimonthly column: "Microwavelengths." The column editor is Tom Williams, WA1MBA. He has a graduate degree in Computer Science, and directs the development of imaging, software and millimeter-wave technologies as a consultant. Tom's radio amateur interests are primarily VHF, UHF and microwaves, and he is active on all bands from 144 MHz to 10 GHz from his home. He has done some pioneering work in the EHF bands of 120 and 145 GHz.—*Steve Ford, WB8IMY,* QST *Editor*

Welcome to the first "Microwavelengths" column.

Twenty years ago the number of amateurs operating above 1296 MHz may have been dozens, but now there are hundreds, perhaps even thousands. Hilltops are swarming with dish antennas during contest weekends, there are microwave topics at every major VHF conference, and there are kits available to get us on all bands up to 10 GHz. Hams are constantly experimenting with equipment, techniques and propagation. They are setting DX records on all bands. Recently, the 24 GHz band was added to the list of successful EME contacts.[1] Although contesting and DX records are great operating fun, most microwavers will tell you that the reason they come to and stay involved in these bands is the technical challenge and the rewards of successfully building and operating their own equipment.[2]

The ARRL has recognized this growing interest by providing multipliers in the VHF contests, creating a contest focused on 10 GHz and above, and by publishing DX records. *QEX*, the publication for ham experimenters, has always given significant space to microwave topics. The time has come to bring microwave techniques and information into the mainstream, and so this column is born.

"Microwavelengths" promises to be a technical forum, presented at a level that most amateurs will be able to understand. Hopefully, it will both stimulate and help our readers to move into this part of the spectrum. Each column will focus on one aspect of microwave techniques, and will answer some common questions about the topic. If you have a question, send it to ARRL, Microwavelengths, 225 Main St, Newington, CT 06111, or e-mail me at **wa1mba@arrl.org**. "The World Above 50 MHz" column will continue to deliver timely operating news and propagation reports for all the upper bands. Please send your operational reports and other news to Emil Pocock, W3EP. Although "Microwavelengths" explores the equipment and technology that make the microwave bands special, it will not describe details or news about operating or propagation.

I probably will not be able to answer every question, but will try to be informative and useful. Because no one person is an expert on all aspects of this field, I am getting help from well-respected amateurs as we cover each topic. In this issue, the topic is the general area of Amateur Radio microwaves, so I feel expert enough to continue on alone.

Q: What are microwaves?

A: How about a small motion of the hand. Or maybe that box in your kitchen that quickly heats up food? No, here we are discussing a range of wavelengths, and consequently, a range of frequencies. Unfortunately, the term "microwaves" is not well defined. During the Second World War, experimenters noticed the ease with which short wavelengths could be focused and the ability to get detailed range information by receiving echoes from transmitted pulses. This radar application was one of the reasons that engineers and others needed a word to distinguish this range of the spectrum as being different from the portion normally used for communication at the time. For our purposes, we will treat all frequencies about 1 GHz and higher (wavelengths about 30 cm and shorter) as "microwaves." See Table 1 for some better-defined terms for frequencies in this range.

Often, people will use the term "Millimeter Waves" to distinguish the EHF band from the others because of their wavelength and the especially difficult technical problems associated with their use.

Q: Is the 902 to 915 MHz band a microwave band?

A: Some would say yes; others no. For this column, we will include all bands, 902 MHz and above, recognizing that bands that most microwavers feel are "especially microwave" are 2.3 GHz and above. In this column the invented term "microwavers" is used to mean any amateur who is active on the microwave bands.

Q: How are microwaves useful to society?

A: There are many uses for microwave energy. The common ones are heating, radar and communications. Microwaves are particularly useful in a way distinct from lower frequencies because of beam-width and bandwidth. With such a small wavelength, it is possible to construct an antenna of convenient size that has quite narrow *beamwidth*. This allows for high gain and therefore less RF power than would otherwise be needed for communications. It also permits more communication activities on the same frequency in one geographic area because interference can be controlled with very directive antennas. And also, communications tend to be more secure on microwaves because of tighter beamwidths.

The added *bandwidth* available at these frequencies permits more information to be carried on one signal. Telephone companies have used this characteristic to carry hundreds of voice signals or dozens of video signals on one carrier. Advanced digital techniques can use microwaves to put many megabytes per second on one carrier. Other uses of microwaves include material heating, such as a microwave oven or industrial microwave heater, and radar which uses the narrow beamwidth to interrogate a narrow beam of the sky and the wide bandwidth to measure distance accurately.

[1]Notes appear on page 95.

Table 1
Frequencies and Wavelengths Associated with Microwaves

Abbreviation	*Designation*	*Frequency Range (GHz)*	*Approximate Wavelength Range*
UHF	Ultra High Frequency	0.300 to 3	1 meter to 10 centimeters
SHF	Super High Frequency	3 to 30	10 centimeters to 1 centimeter
EHF	Extremely High Frequency	30 to 300	1 centimeter to 1 millimeter

Tom Williams, WA1MBA ♦ wa1mba@arrl.org

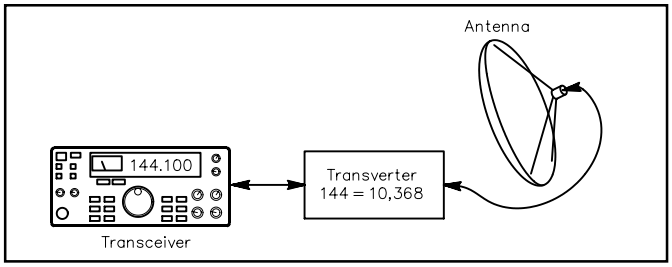


Figure 1—A typical microwave station consists of a transceiver with a transverter and antenna.

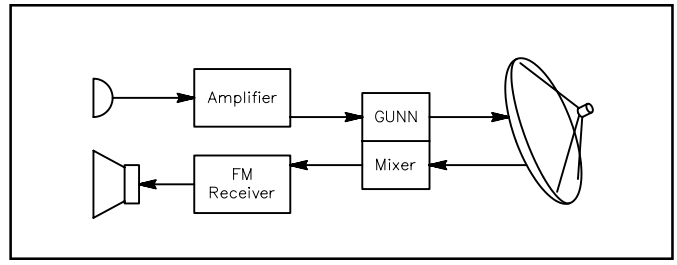


Figure 2—A Gunnplexer station setup. An FM receiver tuned to 30 MHz acts as the receiver.

Q: How do amateurs get on a microwave band?

A: This will be the primary interest of this column in general. Each issue will deal with a specific topic about techniques and equipment to get on the air. One common microwave radio consists of a transverter and a conventional transceiver (often running on 28 MHz or 144 MHz). The antenna is usually a Yagi or "looper," a dish with feed, or a horn. The transverter converts the conventional transceiver transmit signal up to the microwave band, and on receive converts the incoming microwave energy down to the transceiver frequency. By simply using the transceiver (and knowing the transverting frequency) one operates on the microwave band. In the example in Figure 1, 144.100 on the transceiver means 10,368.100 MHz on the air, which is the North America calling frequency for CW and SSB on 10 GHz.

It is necessary to interconnect the transceiver and the transverter so that proper transmit/receive switching is accomplished, and so that transmit and receive signal levels are appropriate and not damaging. Because most transmission lines are very lossy at microwave frequencies, the connection between the transverter and antenna must be kept short, or further amplification needs to be mounted close to the antenna feed.

Q: What is a "Gunnplexer"?

A: A Gunnplexer is a type of microwave radio that is much simpler than the transceiver and transverter type. The Gunnplexer consists of a microwave oscillator called a GUNN diode that can be frequency modulated by direct connection of an audio source. For reception, a simple diode type mixer is added. It creates an intermediate frequency equal to the difference of frequency between the two stations' transmitters, such as 30 MHz. As shown in Figure 2, an FM receiver tuned to 30 MHz will then act as the receiver.

This type of microwave radio has been most popular on 10 GHz, and to a lesser extent, on 24 GHz for a few decades. Although the system power and sensitivity are limited by modern standards, its sheer simplicity has brought many amateurs to the microwave bands. This mode is still used by many amateurs for successful and fun contacts. Because the modulation occupies a relatively wide bandwidth this mode is often referred to as WBFM or simply "wide band" to distinguish it from the narrow bandwidth modulation of SSB and CW used in higher performance systems. Wide-band FM can also be used for TV and data modulation.

Q: What modes of modulation are used?

A: As you may have guessed, all modes are used. Narrow and wide-band FM, SSB, CW, TV (AM and FM), spread spectrum, various data modes and even pulse are used. The greatest DX is provided by CW, and is probably used the most often during contests and attempts at DX records. The greatest information is communicated using TV, spread-spectrum and data modes. In all communication there is a tradeoff between bandwidth and noise, and therefore effectively between bandwidth and distance for a given pair of stations. This effect will be described more in future issues when we work out system performance details.

Q: Does everyone have to build his or her microwave rig?

A: There are ready-made transverters, preamplifiers, power amplifiers as well as kits. Some hams enjoy designing and building from scratch, others enjoy building kits, and others purchase ready-made systems. There are many publications that relate design and construction experiences, and those will be referenced in this column. About 15 years ago, there were not so many choices. Most hams had to build most of their equipment from components or surplus modules. Over the last decade there has been quite a bit of surplus showing up at flea markets and hamfests, and also there has been a significant increase in the availability of kits and pre-built systems from a few notable suppliers.[3] Most of the designs have come from a few of the leading amateur microwave circuit designers from around the world.

Q: Is microwave activity limited to line-of-sight communications?

A: No, there are over-the-horizon contacts being made every day. This is because there are several atmospheric phenomena that will scatter the transmitted energy and permit contacts around obstacles and across significant distances, much like with VHF and UHF signals. Certainly it is not every day that contacts of 1000 km are made on 2304 MHz, or 500 km on 10 GHz, but they happen frequently enough to have a lot of fun getting on and trying. Being on a high spot with a clear horizon does help, but setting up on a small hill overlooking a body of water, or even pointing at a nearby mountain can yield surprising results. There are many less-than-spectacular home station sites that operate successfully. Whether hilltopping, contesting, or operating from home, amateurs are getting on the microwave bands and having fun while learning to communicate beyond line-of-sight.

Next installment (March *QST*) we will look into the workings of the Gunnplexer and the transverter to get a good grounding on how these two most popular means of getting on the microwave bands function.

Notes

[1]"The World Above 50 MHz," *QST*, Nov 2001.

[2]Microwave Update, 2000, "A Survey of Microwave Radio Amateurs," ARRL.

[3]There are several suppliers of various useful microwave components and systems. The ones that cater to the needs of radio amateurs that the author knows of are:

(US)

Down East Microwave, 954 Rte 519, Frenchtown, NJ 08825; tel 908-996-3584; **www.downeastmicrowave.com/**.

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

DL2AM amplifiers are available from Tom Haddon, K5VH, 1005 Hidden Hills Dr, Dripping Springs, TX 78620; tel 512-894-4374; **k5vh@texas.net**.

Advanced Receiver Research, Box 1242, Burlington, CT 06013; tel 860-485-0310; **www.advancedreceiver.com/**.

SHF Microwave Parts Company, 7102 W 500 S, La Porte, IN 46350; **www.shfmicro.com/**.

(Overseas)

Kuhne Electronic, Birkenweg 15, D-95119 NAILA/Hoelle, Germany; tel +49-9288-8232; **www.db6nt.com/**.

Eisch-Kavka Electronic GmbH, Abt Ulrich Str 16, Ulm, Germany; tel +49-07305/23208; **www.eisch-electronic.com/**.

A 1927 TGTP Transmitter

A popular transmitter circuit from the late 1920s was called the Tuned Grid-Tuned Plate, or TGTP. March 1927 *QST* had a very complete article on this popular circuit, called "A Flexible Transmitter." It was described "as one of the best circuits for short-wave transmission because of its inherent steadiness, efficiency, and ease of adjustment. It can be entirely controlled by two variable condensers, one in the grid and the other in the plate circuit, and is nearly fool-proof."

Another reason for its popularity was its "small size and pleasing appearance," the writer said. "It can be placed in the corner of a small room without undue crowding." He was comparing it to the older, noisier and much larger spark transmitter of the past.

F. J. Marco of the Aero Products Company, manufacturer of coils and other radio parts wrote the article, and of course Aero was selling a kit version of this transmitter. He described it in great detail. In fact it is so well written, that anyone today contemplating building or operating one of these vintage transmitters should read it, study it, and understand it completely before attempting to put one on the air.

I have admired this radio in the past, reading about it and seeing the ads in many magazines, but have never seen one in person. Gross Transmitter Kits also sold the same circuit, with their own version of coils. Aeros were made on plug-in forms and wound with enameled number 12 wire. Gross used 1/4 inch copper tubing in theirs. Copper tubing coils were also popular with hams who built their own transmitters. It was fairly easy to obtain, wind and mount.

When I first saw my transmitter advertised in California, I thought it was an Aero because of the shape. Then I thought it was a Gross because of the coils. Finally I realized it was a homebrew with the best of both designs. I bought it as quickly as I could.

It is a classic ham radio from the past. Many collectors have similar TGTP transmitters in their collections and use them on the air from time to time. Many hams are still building this circuit, using the original number 10-type tube, or substituting other available, compatible tubes. Often they are powered by more modern power supply designs.

The TGTP CW transmitter from 1927. See the close-up on the cover of this month's issue.

This particular transmitter would be easy and fun to replicate, due to the few number of parts needed. The hardest part to find is the original Aero coils. They turn up fairly often at hamfests and vintage radio meets. You have to be careful, though, because Aero also made receiver versions with smaller wire. Make sure you get the heavier transmitter version.

Or you can make the version like mine with the copper tubing coils. This might be the easiest to build, as copper tubing is available in almost every home plumbing supply store. If you want to get started, here is the information for constructing the wooden frame.

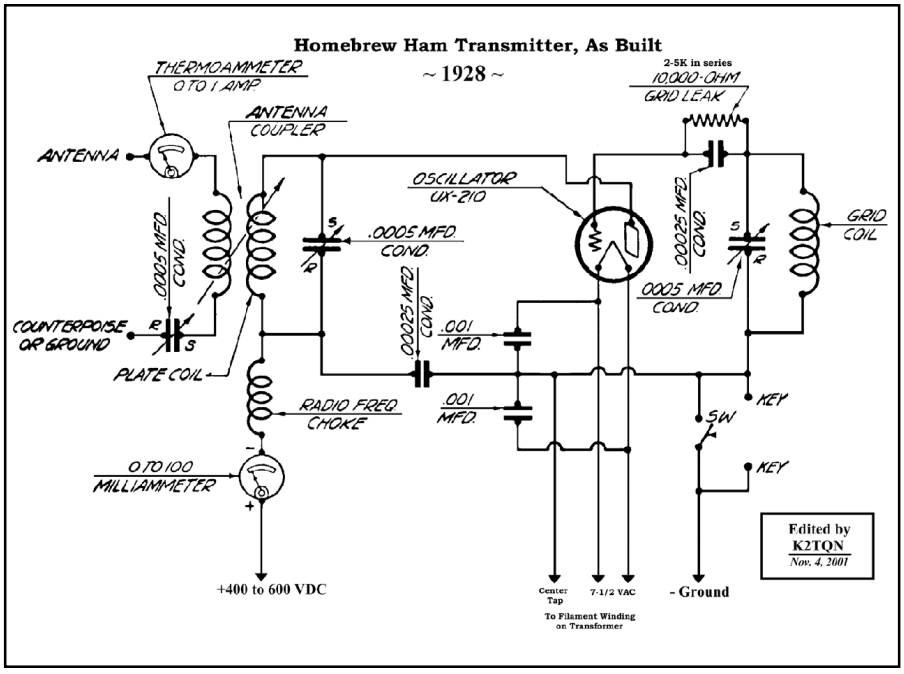
Building the Frame

The transmitter is a double-decker, with the heavy power supply going on the bottom level and the transmitter on the upper. I'll provide the dimensions from mine, which match the Aero exactly. The wood is hard pine, knot free and stained dark with a lacquer finish.

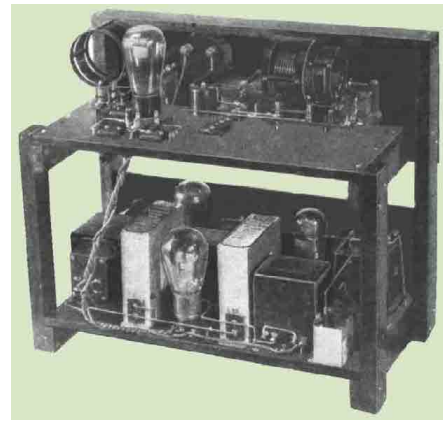
It is built much like a chair. The height overall is 16 inches. It is 18 inches wide, and 10 inches deep, not counting the front panel. The top transmitter board is 6.5 by 16.4 inches. The bottom power supply board is 10 by 16.4 inches.

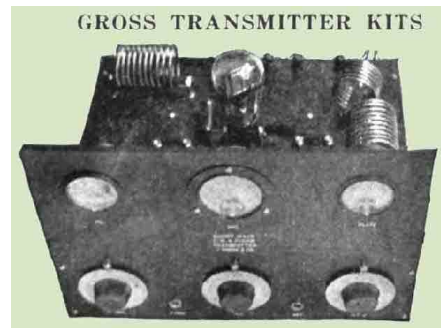
The four legs are made from 1.5 by .75 wood. You need two each, 12 inches and 15.5 inches. Four shelf brackets are made from 1.5 by .5 wood 10 inches long. The top piece is also from 1.5 by .5 wood, 18 inches long.

John Dilks, K2TQN ♦ 125 Warf Road, Egg Harbor Township, NJ 08234-8501 ♦ k2tqn@arrl.org



The schematic, from the original *QST* article.





Three photographs of the commercial version of my homebrew transmitter.

The rear of the transmitter shows its array of fascinating components.

Everything is fastened by brass slotted wood screws of the proper lengths, and is pre-drilled to keep the pine from cracking.

After you have everything fitted and together, remove the two wood boards so you can build the power supply and transmitter on your workbench. Again, pre-drill all holes for the screws to prevent cracking.

The front panels on mine each had an earlier life. The top panel at one time was a three-dial receiver. You might be able to find a junker-radio and use that panel and the three condensers and knobs that should come with it. An alternative would be to use a thin wood board or black Plexiglas. (Do not paint the panels with conductive paint!) A clear finish on wood would look just great and be better electrically. Both panels should be about 18 inches wide and each about 7.5 inches high. You're trying to cover 15 inches vertical, leaving one inch open at the bottom.

I should add here that my radio is CW only, which is fine with me. The Aero circuit had an early version of plate modulation. I would suggest you build the CW version first. Later if you want to try Phone modulation on an oscillator, it might be easier to build one separately and add it into the high voltage lines.

On my web site I will have the parts lists and both schematics, for the 1927 Aero and my old homebrew as built 75 years ago. I will also have a link to a four-page 1928 magazine article on building the Aero version, complete with layout drawings for all the parts. See it at **www.eht.com/oldradio/arrl/index.html**.

Putting it on the Air

The original filter capacitors in mine are defective. I don't want to tear them apart and rebuild them with new parts, so I've decided to substitute new capacitors in a small module hidden behind the front panel. I'll disconnect the old ones, leaving them sit in place, and connect the new ones into the circuit. This way I can return it to original if I want to enter an old equipment contest. I am going to have to resolder some of the connections, though; many of them are broken or coming apart.

By the time you read this, I hope to have had mine on the air in the Bruce Kelley Memorial 1929 QSO Party in December. I will also try to have it on the air in the Linc Cundall Memorial Old-Time CW Contest January 23, 24 and 26, 27. For information on these contests contact John Rollings, W1FPZ, HC 33 Box 150, Arrowsic, ME 04530. Please include an SASE for his reply.

This column is starting its third year. I have received many hundreds of e-mails and letters from you since the beginning. Your comments and suggestions are always appreciated. I am hoping to include more photos of your radios and your collector profiles this year, so keep sending them to me. QST

Prepared. *A state of readiness.*

Lately, there's a lot of talk about being prepared. While it's impossible to be totally prepared for every conceivable event, here at "Radios To Go" we can be a bit more focused. Although we should hope and pray the atrocities of September 11 are never repeated (calling it a tragedy is terribly insufficient), we know disasters can happen anytime, anywhere. We owe it to ourselves and others to be ready, willing and able to do what we do best: *Communicate*.

It might seem that the ubiquitous cell phone has usurped our role as communicators, but history has proved that when a disaster occurs, cell phone and landline phone services often become overloaded and unusable. That's when hams really come to center stage. Part 97 of the FCC Rules identifies Amateur Radio as a "voluntary non-commercial communications service, particularly with respect to providing emergency communications." Let's have a look at what the typical mobile or portable operator can do to fulfill that calling.

Mobile Radios and More

Because 2 meters provides the backbone for tactical communications during most emergencies, a mobile radio for that band is essential. Keep in mind that if repeaters in the affected area are knocked off the air, you'll be relying on simplex operation. Having only your HT and rubber duck antenna will limit you to short-range contacts. With so many neat multiband, multi-mode mobile rigs available, why restrict yourself to just the VHF/UHF bands? Not only can you QSY to another band to minimize congestion, the HF bands give you access to wide-area traffic nets and long-range propagation.

By utilizing a continuously-tunable antenna, you can switch bands and frequencies on the run. Some hams don't like the appearance of an HF antenna on their cars. No problem. Install and test the system, leave the mount but remove the antenna and stow it away in the trunk until it's needed. Whether your mobile installation consists of one rig or a dozen, make sure it's safe and reliable with solid electrical and mechanical connections that are checked frequently.

Besides radio gear, it's a good idea to keep your vehicle equipped with a blanket, non-perishable food, first aid kit, bottled water, flashlight and batteries, notepad and pencils, area maps, rain coat and overshoes. Because of security concerns, always carry a couple of photo IDs and a copy of your amateur license. By the way, if you tend to tempt fate by always running with the fuel gauge near empty, you may want to change your ways—or forget about being available for emergency deployment. Even if stations are open, you can lose lots of valuable time waiting in line.

Resources

www.ares.org/: Web site that explains the Amateur Radio Emergency Service (ARES)

www.arrl.org/cce/: Learn about the ARRL Amateur Radio Emergency Communications Course

www.pelican.com/product/cases/index.htm: Pelican manufactures a variety of watertight containers in an assortment of sizes and styles

Portable Stations

A mobile station is the most practical means to provide tactical communication from an affected area. But, there are times when operation from a vehicle just isn't possible. Those situations demand a station that can be transported, set up and operated on location, often independent of a commercial power source. Ideally, such a station will consist of dedicated equipment. Since that could be financially prohibitive to the individual ham, it's best approached as a club project. *Don't overlook local government agencies as potential benefactors. Our County Fiscal Court has been very generous to our club's equipment needs.*

Your choice of equipment will be governed by numerous factors, but shoot for a minimum of one HF and one dual-band rig along with two power supplies—each capable of powering both radios simultaneously. Fit all rigs and power supplies with a common type power connector and you'll eliminate incompatibility and wrong-polarity mishaps. In addition to spare rechargeable batteries for your handheld, it's a good idea to have at least one battery case for alkaline cells. You can swap in fresh batteries when there's no convenient way to recharge a depleted NiCd. Transportation and protection of electronic gear will be easier if you store it in shockproof transit cases. These often show up at hamfests as new surplus, usually at greatly discounted prices.

Radio First Aid

In March 2000, I suggested that hams who travel should consider putting together a "Traveling Ham's Survival Kit." An assortment of connectors, adapters, basic tools and other items can be a real asset to keeping you QRV. If you are providing emergency communications, you don't want to be without your own "Survival Kit."

Personal Preparation

Perhaps you've viewed the video of the storeowner who emptied his handgun at an armed robber and missed with every shot. That's a graphic illustration of how perfectly functional equipment in the hands of the untrained can be ineffective during an emergency. Even seasoned Amateur Radio operators can become confused and frustrated when the stress of rapid-fire traffic handling becomes overwhelming. Practice and training are essential to ensure your ability to "deliver the goods" when it counts.

An excellent place to start is by joining your local Amateur Radio Emergency Service. Operating under the auspices of the ARRL Field Organization, the ARES functions on a local level to prepare and provide Amateur Operators for emergency communications service. Your area Emergency Coordinator can provide details.

If you decide to become involved in ARES, you'll want to sign up for the ARRL Amateur Radio Emergency Communications Course. This comprehensive study is offered in three levels, with the introductory and intermediate levels available online. Once you've completed the courses and received certification, you'll be much better equipped to effectively provide emergency communications service.

QRZ

Perhaps you have a ready-to-go setup of your own design, or maybe this column has inspired you to construct one. Either way, drop me an e-mail message with some details and photos. QST

Roger Burch, WF4N ♦ Box 100, Island, KY 42350 ♦ wf4n@arrl.org

Put a Repeater Controller in Your Computer

My first column for *QST* was called FM/RPT and its subject was the Amateur Radio FM and repeater modes. Back when I started that column in 1979, commercial repeater controllers for Amateur Radio were relatively new and definitely expensive. Typically, the only repeaters that had these commercial controllers were clubs with large treasuries or repeater benefactors with large bankrolls. The rest of us used homebrew and surplus equipment to perform the basic legally required controller chores.

Times have changed! Today, you can have a repeater controller running on a *Windows* computer and the software that does all the work only costs $19.95. *EchoStation* is the name of that software and it is the creation of Jonathan Taylor, K1RFD (**K1RFD@synergenics.com**). All the features you would expect to find in a stand-alone hardware repeater controller are supported by *EchoStation*. This includes duplex and simplex repeater operation, carrier-operated relay (COR), CW and voice identification, hang timer, timeout timer, courtesy tone and autopatch (reverse and forward).

The software uses the computer's modem to provide the autopatch function. Other requirements are a Pentium-class computer with a 133 MHz or higher processor running Microsoft *Windows 95* or later (the software will run on a 486 CPU-based computer if the processor speed is high enough). The software also requires that the computer have a *Windows*-compatible sound card (or built-in sound hardware) and a minimum of one COM port.

After installing the software, you simply connect a transmitter and receiver to the computer's sound card. The transmitter supports VOX control and may be connected to the computer's COM port (rather than the sound card) using a third-party interface.

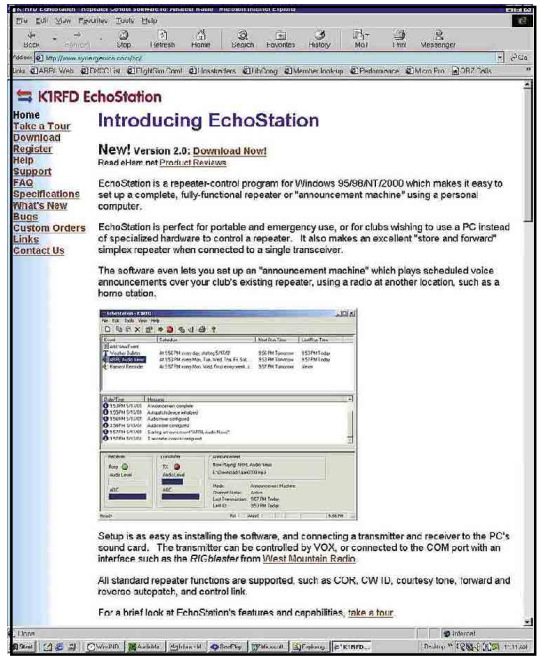
Beyond the full-feature repeater-controller functions, *EchoStation* may also be configured as an "announcement machine" to play scheduled voice announcements over another repeater. In this configuration, *EchoStation* can transmit Amateur Radio club announcements, news bulletins (like the ARRL Audio News), and emergency information (ARES, SKYWARN, etc).

A very nice feature that goes beyond basic repeater-controller operation is *EchoStation* audio-control facility. It gives you complete control over the computer's sound card. You can precisely mix the sound level of every source or use an AGC function to select the optimal audio automatically.

You can download, register, and find out more about *EchoStation* at **www.synergenics.com/sc/**. You can also join the *EchoStation* mailing list at this Web site and keep up to date with what is going on in the computerized repeater controller world.

Why I Like the Internet (Part 1)

My surname is not a common one. Like a lot of other hams, I used one of the Internet call-sign servers to look up my surname to see how many other folks with my surname are licensed Amateur Radio operators. When I first tried this a number of years ago when the call-sign servers were relatively new, I found one other licensed Horzepa in all the United States: a fellow down in New Jersey.



***EchoStation* puts another Amateur Radio application inside your computer: a repeater controller and announcement machine.**

I looked him up on one of the on-line telephone directory white-pages servers, found his mailing address and sent him a note. We exchanged snail mails and that was the last I heard of him. I don't know if he became a silent key or dropped out of Amateur Radio or what, because now when I search the call-sign servers for Horzepas, they only find little old me.

A few months ago, I received an e-mail out of the blue from an Amateur Radio operator in Poland, SP7MJL. There was a problem in that the e-mail was written in Polish. Although my first generation Polish-American parents raised me speaking Polish, Howdy Doody, Winky Dink and the Ricardos wiped most of the Polish language out of my consciousness long ago.

I tried to translate the e-mail using a Polish-English dictionary, but got nowhere fast. So, I e-mailed a copy of SP7MJL's e-mail to my Aunt Stephanie, who was an old hand at translating missives from our motherland. A few days later, my aunt e-mailed the message back to me translated into English, and what a surprise I had in that e-mail.

SP7MJL e-mailed me because he came across my name on the Internet in something I had written about ham radio. But he was not writing to me to tell me what a great or lousy article I had written. Instead, he was writing to me because when he read the article he noticed that I had the same name as he has!

SP7MJL is Stanislaw Chorzepa. Stanislaw is the Polish equivalent of Stanley and Chorzepa is Horzepa before US Immigration on Ellis Island got a hold of my grandfather's name. Stanislaw and I exchanged e-mails, snail mails, QSL cards, family photos, etc, and we will probably exchange greeting cards during the holidays… all thanks to the Internet.

And with that, I hope you too will exchange holiday greetings on the air, on the Internet, or even via snail mail with your Amateur Radio brethren around the world, as I will now: Season's Greetings from the WA1LOU household including XYL Laurie, our YL Hayley, Stan (the OM), and the dog, three cats, two fish and one bird! QST

Stan Horzepa, WA1LOU ♦ One Glen Ave, Wolcott, CT 06716-1442 ♦ wa1lou@arrl.net, www.tapr.org/~wa1lou

The Elecraft K1 Transceiver Kit

Kicking off our third year of "QRP Power" (*man,* Where has the time gone?) we are going to profile the Elecraft K1 QRP transceiver kit. With the introduction of the K1, Elecraft has captured a large chunk of the QRP equipment market. Wayne Burdick, N6KR, and Eric Swartz, WA6HHQ, wanted to provide a high quality, featured-filled kit for the QRPer that would be at home in the bush as well as the home station. The result: the K1, a compact, dual-band CW transceiver featuring some of the bells and whistles found on its big brother, the K2.

This kit is *not* a simple project. Due to the extremely well written instructions and accompanying documentation, however, it can be undertaken by anyone with some kit building experience.

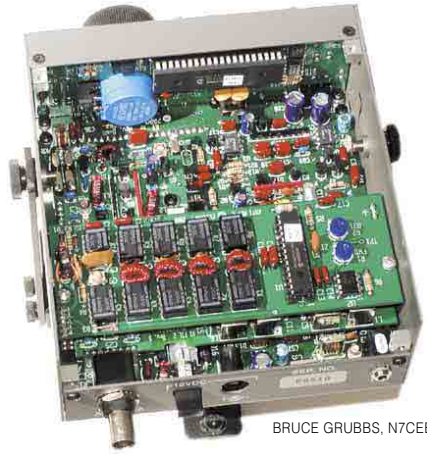
The K1 uses a dual band module. When you order a K1 you must specify your choice of two bands, in any combination, from 80 through 10 meters. These dual-band modules can be swapped in the field to provide four, six or eight band coverage. Depending on whether the rig has the internal battery option installed, changing a band module takes between one and two minutes.

My K1 kit (s/n 017) arrived in the familiar white Elecraft box. The parts were fully prepackaged, and inventory was a snap (you *do* perform the inventory, don't you?). The detailed manual guides the builder through every step of assembly and checkout. All you have to do is be able to read and follow the instructions to assemble a kit that works the first time power is applied. If you do get stumped, help is just a few keystrokes away at **www.elecraft.com**. Construction and alignment took me 14 hours.

The beauty of the K1 transceiver is its ruggedness and extreme portability coupled with multi-band operation in a very compact package (2.2×5.2×5.6″ HWD). Power output can be adjusted from 100 mW to 5 W, and higher. Power consumption is around 60 mA on receive and 800-900 mA on transmit, at the 5 W level. By throttling back the RF output you can reduce the transmit current to conserve battery consumption when operating in the bush.

The K1 incorporates microprocessor circuitry to control the various functions of the radio. The many features are accessed through the "tap-and-hold" front panel buttons. This system of assigning multiple control functions to each button not only saves panel space but dramatically increases the flexibility of the radio. The multi-functional LCD readout displays the frequency, S-meter readings, power output, keyer speed and dc supply voltage level along with menu options. The receiver features a single conversion superhet design (using NE-602, Gilbert Cell mixers) with three software-selectable/variable IF crystal filters. The transmitter is straightforward with a 2SC216 driving a 2SC1969 PA. Keying is clean and fast, resulting in almost full break-in (QSK). The internal memory keyer provides two programmable messages and will handle speeds up to 50 WPM.

The tuning range is selected during construction. Elecraft furnishes two capacitors that will yield a tuning range of approximately 80 or 120 kHz, depending upon which cap is installed in the VFO. The larger tuning range was a little too fast for me so I settled on the 80 kHz.



BRUCE GRUBBS, N7CEE

Interior shot of the K1.

BRUCE GRUBBS, N7CEE

K1 mounted on the optional stand with the "long arms." Another optional stand features "short arms."

There are two outstanding reviews of the Elecraft K1 transceiver. First, read the March 2001 issue of *QST*. The HQ Lab figures are enlightening. The other is on the Adventure Radio Society Web site: **www.natworld.com/ars** (December issue of the *ARS Sojourner*, in the archive section of the Web site) which ranks the K1 against other rigs currently on the market. This is especially informative, since it gives the prospective buyer a look at how the K1 performs against such radios as the Yaesu FT-1000D, the Elecraft K2, the Wilderness Radio SST, the NorCal-20 and others.

I loved my K1. It accompanied me on several trips to Florida and, until it was stolen in July, was my rig of choice when operating QRP mobile. The receiver is quite sensitive and the selectivity is above average, allowing the operator to pick out weaker stations on a crowded band. RIT and XIT give the K1 some frequency agility. Currently there is no way to split the transmit and receive frequencies more than a couple of kilohertz to allow for wide split frequency operation favored by DXpeditions. The ability to accurately control the RF output down to 100 mW allows exploration of the challenging world of milliwatt ham radio which, if you haven't given it a try, is a real *GAS!*

Optional accessories include an automatic antenna tuner that fits inside the rig's case. This is a scaled down version of the K2 auto-tuner. Elecraft sells an optional internal noise blanker to defeat impulse noise and there is a stand available that allows the K1 to be positioned in various ways while operating, then folds flat for storage and transport. Elecraft offers an internal battery option for the K1, which further reduces the "things" you have to carry when operating from the bush. Add an antenna and a paddle set and you are ready to go.

For those times when you need a small, highly portable rig to take backpacking, on business/camping trips or to augment your shack, check out the Elecraft K1 at **www.elecraft.com** or mail them at PO Box 69, Aptos, CA 95001-0069, tel 831-662-8345. QST

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ k7sz@arrl.org

QPC Releases Revised Amateur Extra Class Question Pool; FCC Again Collects Dates of Birth and Begins FRN Collection

Effective July 1, 2002, a revised Extra class question pool will take effect for all Element 4 Extra class license written exams. The new question pool, released this past December by the Question Pool Committee (QPC) of the National Conference of Volunteer Examiners, contains a number of updates to rules and technical content areas. Subject matter has been added where appropriate, while content that may have become less relevant over time or technically inaccurate due to changes in technology or practices has been deleted.

Technician Pool Next Up for Review; Public Input Invited and Requested

The next pool up for review is our Element 2 Technician question pool. This is our question pool for the newcomer/beginner. A review of the Technician question pool syllabus is the first step in the process. That review is currently underway.

The amateur community is welcome to review the existing Technician question pool syllabus and then recommend any changes to the QPC. By early spring, the QPC will have revised as necessary the Technician syllabus and will release it to the public. At that time we ask that all interested parties review the existing Technician question pool along with the recently updated syllabus and then submit to the QPC any recommended changes to pool questions.

Please include with your syllabus submission the subelement reference that you are supplying input on; or for question updates please reference the current subelement and/or question number and the text of the existing question, answer or distracters that you would like to see replaced. For new questions, please supply as much of the full question, answer and three distracters as possible. Full questions can be worked through the committee far easier than partial ones.

Send your question pool input to QPC Chairman Scotty Neustadter, W4WW, with copies to QPC Members W5YI, W3BE and myself, W9JJ, as follows:

QPC Chairman Scotty Neustadter, W4WW, 9710 Dortmund Dr SE, Huntsville AL 35803; e-mail **w4ww@arrl.net**.

QPC Member Fred Maia, W5YI, POB 565101, Dallas TX 75356-5101; e-mail **w5yi@w5yi.org**.

QPC Member John B. Johnston, W3BE, 17701 Bowie Mill Rd, Derwood, MD 20855; e-mail **Johnston.john1@worldnet.att.net**.

QPC Member Bart Jahnke, W9JJ, ARRL VEC Manager, 225 Main St, Newington CT 06111; e-mail **w9jj@arrl.org**.

Current Question Pools

Our three current question pools (and any exam designs based on these question pools) are valid as follows:

Current Extra class Element 4—valid through midnight June 30, 2002

New Extra class Element 4—valid from July 1, 2002 through June 30, 2005

Technician class Element 2—valid through June 30, 2003

General class Element 3—valid through June 30, 2004

[This three-year cycle is expected to repeat accordingly.]

The Technician and then General class pool revisions will follow the Extra class pool revision by one year and two years, respectively. This revision cycle will be our opportunity for a complete and comprehensive review of each of your question pools.

These pools can be viewed on *ARRLWeb* at **www.arrl.org/arrlvec/pools.html**.

NCVEC Form 605 Revised to Include Collection of Date of Birth and FRN

Beginning December 3, 2001, FCC is once again collecting applicant date of birth (DOB) on Form 605. The FCC has actually been collecting DOBs on their FCC Form 605 since March 2001.

This time around FCC will *not* be sharing DOB information in their public data files—this should set some amateurs' minds at ease as compared with when FCC made DOBs public during the previous collection process that ended a few years ago.

Beginning December 3, 2001, anyone seeking services from the FCC must begin supplying their date of birth on NCVEC Form 605 (in the small box to the right of the street address) and in item 11a on FCC Form 605. FCC is allowing only a short few-month implementation on DOBs, so be sure this item is completed when you submit Form 605 to a VE team or to the FCC.

The newest NCVEC Form 605 can be found on *ARRLWeb* at **www.arrl.org/fcc/forms.html**. For VE teams with plenty of earlier obtained NCVEC 605s, and until updated forms can be distributed during regular update circulation (there's no need to toss the old forms), please place the date of birth in the upper right corner of NCVEC Form 605 in mm/dd/yyyy format.

Also on December 3, 2001, FCC began to accept CORES FCC Registration Numbers (FRNs) on documents being filed through a VEC. FCC says that to meet the Taxpayer ID Number requirement for applications filed with FCC they will accept a FRN in the Taxpayer ID/SSN box (if you don't know your FRN, you can still write your Social Security Number in its place). Foreigners or others without an SSN can go to the FCC CORES Registration Web site (**svartifoss2.fcc.gov/cores/CoresHome. html**) and register using the "Foreign" option to get their FRN; or file FCC Form 160 to register by mail (FCC Form 160 can be found at **www.fcc.gov/Forms/Form160/**); or direct any questions to the CORES Help Desk toll-free in the US at 877-480-3201 (e-mail **CORES@fcc.gov**).

FCC advises that all Amateur Service applications beginning in March 2002 that do not include a Date of Birth or Taxpayer ID Number/FRN will not be processed.

ARRL VEC Test Fee Remains at $10 for 2002

Starting January 1, 2002, ARRL VEC VE teams will charge $10 for exams conducted during 2002 (the same fee charged during 2001).

2002 ARRL-Sponsored National Exam Day Weekends

Spring National Exam Day Weekend—April 27-28, 2002

Fall National Exam Day Weekend—September 28-29, 2002

Bart Jahnke, W9JJ ♦ ARRL VEC Manager

Junior High School Success Story for Hermann Bearcat ARC

By Richard Lionberger, KB0WCY, Trustee

On August 9, 2001, I represented KC0JYV, The Hermann (Missouri) Bearcat ARC of Hermann Junior High School, Gasconade County R1 School District to present a $1000 Victor C. Clark Youth Incentive Program Grant to school sponsor and teacher Dianne Pankau, KC0KSJ, and School Board Director Muriel Brison.

Present were supporters Duane (Bud) Moellenger, KC0HGP, of Moellenger Electronics of Hermann, Keith Wilson, K0ZH, Vice President of The ZeroBeaters ARC of Washington, a Franklin County RACES Officer Manager from St Clair, and Boy Scout and high school student John Steiner III, a former Hermann Middle School student who had dreams of a school station when he was a student.

Progress was made on our donated 64-ft tower and HF antenna located on the school grounds. The base and first section were set into place and leveled. Concrete was donated by the local Hermann Lumber Company. A trencher was rented to trench the school yard. Bud, KC0HGP, John Steiner III, Jason Moellenger, KC0HOD, and I covered, seeded and strawed approximately 348 feet of trench that housed one coax and rotator wire fed through 1¼ inch conduit. A HyGain triband HF antenna was donated by Mark Choate, AA0YY, and was refurbished by cleaning, replacing caps and covers, and adding all new nuts, bolts and screws. The tower base was made at the Hermann High School VoAg Shop. We used my portable winch to raise the tower and utility trucks for final section placement. Contacts were then made into New Jersey and the northeastern tip of Maine to test and confirm the signal reports.

Within the school year, we hope to encourage new students' interest in ham radio and help them obtain their licenses. A program for new hams is now in place and we're making announcements, providing literature, and giving hands-on activities. We hope we will be able to hold a Club Special Event Station soon to help educate teachers, students, parents and Scouts. We have made progress with the American Red Cross and SKYWARN for programs that might interest our students. We'd like to bring together our school, Hermann Elementary School, the Hermann Senior High School, and the St George schools for future radio projects.

We wish to thank the ARRL Foundation for the Victor C. Clark Grant and its help with this project. We can say we have pulled together and have pulled ahead. This has been a lot of work but we have had fun doing it. It shows that, with the help and determination of others, we can succeed!

HAMMING THE BLUES AWAY

Worried by "what ifs"? Fretful about the future? Sure, the evening news has been serious and unremitting in warning us of hazards we have never before considered. Still, you might find a real boost tonight in talking to another ham who, like you, has tuned the band looking for a friendly chat. So, turn off the tube, take out the HT or sit down at the station rig. Try a new band…or slow down to help that 10 wpm newcomer. You'll remember all over again why you love the hobby so much!

You can also make a tangible difference in preserving Amateur Radio by supporting any fund of The ARRL Foundation. Send your check today to: The ARRL Foundation, Inc, 225 Main St, Newington, CT 06111. The Foundation is a 501(c)(3), tax-exempt entity and contributions to it are tax-deductible to the extent of IRS rules.

Contributor's Corner

We wish to thank the following for their generous contributions to:

The WRTC – USA Youth Fund
Mike Zeug, W7OT
Lisa Riegel, K7UQT

The Norman Strohmeier, W2VRS, Memorial Scholarship Fund (pending)
Ella Strohmeier, KA2SLX, in loving memory of Norman Strohmeier, W2VRS

The PHD-ARA Scholarship Fund
Mary C. Miller, in loving memory of Lyndell "Chuck" Miller, WA0KUH
Homer and Judy Wilcox*
John Strenge, N0IEA, and Valoris Strenge*
Lew and Terry Gordon, K4VX and NS0Z*
Phillip Young, WD0CFJ, and Mary Young, in fond memory of Chuck Miller, WA0KUH

The Tom and Judith Comstock Scholarship Fund
John L. Blake, in fond memory of Robert A. Wood, W5AJ

The Edmond A. Metzger Scholarship Fund
Richard D. Cox, K9PGN

The Chicago FM Club Scholarship Fund
Chicago FM Club (Illinois)

The General Fund
Watertown ARC (Wisconsin), in fond memory of Terry R. Ludwig, N9JUU
Kathleen and Delbert S. Gregory, KC6WOB and KC6WNW, in fond memory of Orrie Thompson, W0DFC
Wolverine Single Sideband Net (Michigan), in fond memory of Theodore Sloch, W8FOM
Massachusetts Army MARS, in fond memory of George Forant, W1FON
Jack Dow, KE7ZQ
Chaparral ARC (Texas), in fond memory of Hugh Gene Glasson, WR5X

As received and acknowledged during the months of **September and October**.

RICHARD LIONBERGER, KB0WCY

Proudly displaying their Victor C. Clark Youth Incentive Grant check (original and enlargement) are Muriel Brison, School Board Director; Dianne Pankau, KC0KSJ; student John Steiner III; and Trustee Richard Lionberger, KB0WCY.

All great tower installations feature a trench, and Hermann Bearcat ARC members took shovels and trenching machine in hand for this schoolyard effort. QST

Mary E. Lau, N1VH ♦ Secretary, ARRL Foundation Inc.

SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

W1BSO, Maynard C. Cheney, Titusville, FL
N1GMU, Emil Bitterlich, Milton, VT
WJ1G, Carl D. Nelson, Weymouth, MA
N1ISB, Donald L. Horton, Adams, MA
K1KQW, Harry Sussman, Waterford, CT
W1KSD, Robert C. Dunn, Daytona Beach, FL
K1SRN, Roger O. Snowman, North Weymouth, MA
W1TAT, Thomas L. Nutting, West Springfield, MA
N1TC, Anthony P. Capelle, Deerfield, NH
W2DKC, Dominick J. Yenoli, New Hyde Park, NY
WA2FJJ, LeRoy Batty, Horseheads, NY
W2FR, Earl H. Mann, Liverpool, NY
WB2GMZ, Clarence J. Reinisch, Miller Place, NY
*K2JM, John N. Michel, Columbus, NJ
NI2P, Leon N. Kanopka, Massapequa, NY
N2UYG, Eric W. Pratt, Lewiston, NY
N2WD, Wade Derreberry, Charleston, WV
W2YIF, Wyckoff A. Sherwood, Addison, NY
W3ADS, Vertner Mandelstamm, Silver Spring, MD
ex-WB3ESO, James V. Blake, Erie, PA
W3FEM, Fred E. Marmarosh, Silver Spring, MD
W3GRB, Paul E. Mace, Taylors Island, MD
W3GUB, Willard M. Broome, Lafayette Hill, PA
KA3IFF, Harry L. Francis, Baltimore, MD
N3MXO, Raymond L. Miller, Orangeville, PA
*K3ONU, Robert L. Roberts, Easton, MD
K4AHS, John E. Nagley, Falls Church, VA
W4BR, George O. Verven, College Grove, TN
K4CBA, William G. Walsh, Arlington, VA
KF4DJ, Chester T. Yunt, Frankfort, KY
WB4EIY, Dean May, Huntington, WV
W4ETK, James A. Sigmon, Maiden, NC
KB4GA, William M. Estes, Mobile, AL
W4GBP, Robert R. Knight, Anniston, AL
KE4IMR, Estil R. Starnes, Big Sandy, TN
AC4KK, Lester H. Andrews, Columbus, GA
ex-W4MPP, Robert G. Schmitz, Memphis, TN
WB4NFI, Harry H. Kroll, Knoxville, TN
WB4NNC, Albert C. Allen, Franklin, NC
KC4OAA, Wavie L. Samsel, Bean Station, TN
W4OWR, William H. Shields, Spartanburg, SC
W4PWA, Bill Peterson, Greensboro, NC
K4QMY, J. D. Hammett, Greenwood, SC
K4TEW, Terry E. Wiand, Raleigh, NC
*W4UJ, Joshua H. Felton, Lake Worth, FL
K4UKI, William J. Templeton, Lexington, KY
WB4VGG, H. Edward Boggess, Mobile, AL
KN4VUE, Lloyd R. Cornwell, Columbus, GA
N4WWD, Albert R. Kendall, Franklin, KY
AC4XM, Robert G. Landreth, West Columbia, SC
WA4YQC, Cecil R. Pryor, Gallatin, TN
W5BWV, Glenn W. Howard, Artesia, NM
KE5FL, Archie Barron, Mobile, AL
AE5H, Steve S. Rumfelt, Stafford, VA
W5JC, James B. Rives, Orange, TX
KC5NCL, Victor Swann, N Little Rock, AR
KA5ODD, Peter C. Verhaagen, Burleson, TX
KF5PM, Wilbur A. Schlegel, Alamogordo, NM
WB5PNH, Anthony J. Holzman, Choctaw, OK
N5PVS, Kirk G. Farm, Albuquerque, NM
W5SEP, Robert L. Harmon, Winslow, AR
W5TDC, Charles M. Pearson, Morgantown, MS
K5WK, Louis P. Goetz, Roswell, NM
W5WQ, Joseph W. Turner, McComb, MS
*WA6CCM, Harold J. Franklin, Oakland, CA
W6EMK, Henry W. Tanner, Sacramento, CA
W6HZY, L. D. Phillips, Chula Vista, CA
W6JY, Aram Pashgian, Santa Barbara, CA
N6KCG, Timothy E. Perkins, Mojave, CA
WH6N, Elbert Cripps, Lake Forest, CA
WB6ODX, John L. Butler, Fresno, CA
W6OMR, Irving Astmann, Mount Shasta, CA
W6RDJ, John B. Harmon, South Whitley, IN
K6VJU, George W. Pipkin, Mission Hills, CA
**K6YB, John R. Abbott, Newhall, CA
N7AIK, Leslie C. Belyea, Belgrade, MT
K7AJT, Richard J. Foster, Aberdeen, WA
KK7BV, Edward V. Lamanno, Las Vegas, NV
WA7CCK, Amos Ulberg, Nordland, WA
N7CI, Leo J. Paquette, Tempe, AZ
*W7INP, Robert L. Carter, Mesa, AZ
W7JWT, James Fankhauser, Mesa, AZ
KC7MBZ, Phillip Cook, Dinuba, CA
WB7RLO, Robert D. Harris, Phoenix, AZ
N7UTW, Oscar W. Westman, Yuma, AZ
W7VIF, Vance N. Shearer, Saint Helens, OR
KB7WDB, Louis W. Simmons, Graham, WA
N7XXU, James R. Koehler, Phoenix, AZ
K8DFS, Joe F. Holstein, Saint Albans, WV
W8FG, Lyle B. Gaston, Pratt, WV
W8GRG, Richmond B. Shreve, Bridgewater, NJ
WA8HRT, Eugene Sayre, Charleston, WV
W8KEJ, Edward O. Proske, Cincinnati, OH
W8LGV, Donald V. Urbytes, Tucson, AZ
WB8WZS, John R. Furry, Dayton, OH
N8YY, Cecil F. Lloyd, West Union, WV
N8ZN, Ted C. Schultz, Rogersville, TN
K9DGW, John L. Hartzler, Elkhart, IN
WA9DYL, Harry L. Herres, Fond Du Lac, WI
WD9EOI, James F. Allman, Marion, IN
K9HTJ, Clarence L. Eley, Auburn, IN
WB9JXV, Edward Wilcox, Loveland, CO
KB9OM, John W. Fiscus, Hartford, WI
N9PE, Paul Hammond, Bloomington, IL
W9PEL, Charles L. Hilderbrand, Avon, IN
K9SUB, Edward J. Joy, Jonesboro, IN
W9YFW, Gordon J. Fedder, Shawano, WI
K0HLH, Teddy S. Godfrey, Knoxville, IA
K0HYG, Evan R. Applegate, Linn Valley, KS
W0KQO, Arnold L. Smith, Brookings, SD
KD0ML, Herman E. Keith, Rocky Mount, MO
*W0NT, David B. Roberts, Littleton, CO
K0OAL, Vitale A. Cashon, Chadron, NE
WA0RJL, Harry M. Warth, Sylvan Grove, KS
W0RJZ, John H. Robinson, Creston, IA
N0SYU, Jerry L. Summers, Kansas City, MO
K0TTY, Harold L. Jones, Salina, KS
K0ZIK, Lon Wadman, Bemidji, MN
G3TYH, Michael J. Cooney, London, Great Britain
DL8PC, Horst Lemp, Florstadt, Germany

*Life Member, ARRL

**Charter Life Member, ARRL

‡Call sign has been re-issued through the vanity call sign program.

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

Kathy Capodicasa, N1GZO ♦ Silent Key Administrator

STRAYS

NEW DIGITAL WAS

◊ The Worked All States award is given for submitting confirmations from all 50 states. A new version of the WAS award is available for making QSOs using the various digital modes. It is marked Digital and will indicate the particular mode used. The award will be dated, but not numbered. Aside from the basic certificate for any combination of bands/modes, specialty certificates are issued for a variety of different bands and modes such as Satellite, 160-meters, SSTV, Digital and each VHF band. Available endorsements include SSB, CW, Novice, QRP, Packet, EME and any single band except 30 meters. WAS cards are checked by volunteer ARRL HF Awards Managers that are affiliated with ARRL Special Service Clubs (although QSL cards can be checked at HQ, absent an awards manager). To encourage increased activity and station improvement throughout the bands, the 5-band WAS certificate (and plaque) is available for working all states on five amateur bands (except 10/18/24 MHz). Cards for 5BWAS can be checked by your local HF Awards Manager or at ARRL HQ. More information about ARRL awards can be found at **www.arrl.org/awards/**.

QST Congratulates...

◊ Mike Hudgens, W6YQ, whose book, *Donald Barthelme: Postmodernist American Writer*, has been published recently. Mike teaches philosophy at the South Dakota School of Mines & Technology in Rapid City.

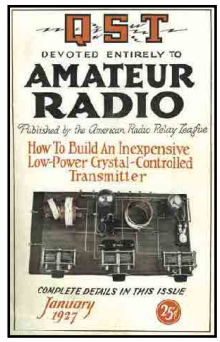
◊ Bernie (Bud) Michaels, KB1OO, who recently completed the script for a documentary film produced by the New England Air Museum in Windsor Locks, Connecticut. The film's subject is the Sikorsky VS-44A Flying Boat, which is on display at the museum. Victor Politi, W1NU, of Fairfield, Connecticut, was one of the 130 volunteers who restored the aircraft, built in the early 1940s. Politi was responsible for rebuilding the radio operator's station aboard the plane.

◊ Glen Westbroek, KD7LLE, a science teacher at Orem (Utah) Junior High School, a 2001 winner of the prestigious Milken Award, awarded to outstanding educators by the Milken Family Foundation. In addition to the $25,000 award, Westbroek also won an all-expense-paid trip for two to Los Angeles, where he will be recognized during a banquet held in honor of all the winners.—*David Seaver, KD7KGR*

Previous • Next Strays

75, 50 AND 25 YEARS AGO

January 1927

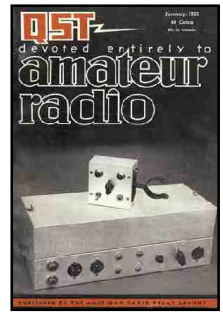


◊ The cover photo shows a simple little rig, with the caption, "How to Build an Inexpensive Low-Power Crystal-Controller Transmitter." There's big news in the editorial: "In the *I.A.R.U. News* in this issue will be found an announcement of international intermediates … to go into effect at 0000 G.M.T. on February first next." Now that Amateur Radio was spanning international distances with ease, the service needs an international system of letters before the call sign's numeral that indicates the station's country.

The art of radio receiver design continues to improve, with David Grimes presenting "Developments in Tuned Inverse Duplex." The cover story about "Low Power Crystal-Controlled Transmitters" is written by *QST* Assistant Technical Editor John Clayton. Technical Editor Bob Kruse tells about "A Radio Factory," noting that the demand for radio receivers has caused manufacturers to improve their techniques of mass production. In another article, Bob explains "How Our Tube Circuits Work," with this second article of the series describing the Armstrong and Meissner circuits. H. A. Stowe tells about "Standard Frequency Transmission in Australia" from Australian 2WI. Bob Kruse describes "5-Meter Receivers," and Edwin Dallin tells about "A Short-Wave Super-Regenerative Receiver."

I.A.R.U. News lists nine more DX countries, giving their assigned wavelengths, the best DX band for US hams to use, and the best times (GMT) for a QSO. "Practically all countries in the world will have been covered with this list in print." The column also lists the new intermediaries for the various countries of the world, with European countries having two letters, the first of which is E; Asian countries, similarly, beginning with A; North America, N; South America, S; and Africa, F.

January 1952



◊ The cover photo shows Vern Chambers, W1JEQ's, latest mobile rig for 10 meters. The editorial looks at "Old Man 1951" and the progress in Amateur Radio during that year: new Novice and Technician licenses were introduced, civil defense frequency planning for hams was finalized, a new Charter for the ARRL was issued, a great National Convention was held in Seattle, there were two court victories by the League in assuring the right of hams to install towers on their property, etc.

George Grammer, W1DF, describes "Practical Applications of Pi-Network Tank Circuits for TVI Reduction." Vern Chambers, W1JEQ, tells about getting "Three Channels on Ten" in the cover article about his new mobile transmitter. The announcement for "The Novice Round-up" tells about this new ARRL operating activity. FCC Engineer George Turner describes "FCC's Plan for Handling TVI," an approach using interference committees made up of hams, and the requirement for TV manufacturers to install filters in their TV receivers.

Don Mix, W1TS, continues to help the new Novices, "Adding an Amplifier to the Novice One-Tuber," with about 60 W input to the single 807. Ed Tilton, W1HDQ, discusses "R.F. Amplifiers for 420 Mc" to improve U.H.F. reception. *Whoa!* E.C.S. Leavenworth, W6ZV, tells us about "75-Meter Mobile, California Style"—running a kilowatt to a *pair* of big antennas on the rear of his convertible!

January 1977

◊ The cover photo announces Part 1 of "Understanding Linear ICs," appearing in this issue. The editorial announces that "The Tide Has Turned," with Amateur Radio breaking out of a decade of no growth, showing the effects of the League's efforts to attract new amateur candidates.

Doug DeMaw, W1FB, presents Part 1 of "Understanding Linear ICs." Frans Bruin describes "A Dual-Gate MOSFET Dip Meter." Robert Shriner, WA0UZO, tells how "The DVM/Frequency Counter Becomes a Clock." Ted Hartson, WA8ULG, describes "A Gated Noise Source" to use in receiver alignment. "The Microprocessor and Repeater Control," by Carl Robbins, W8JDH, discusses how to easily change repeater operation without having to do tedious rewiring.

Henry Frankel, WB2DQP, discusses "A New-Look Noise Blanker That Works." Sgt Ralph Volpe, WB8VCS, tells how to build "A Hybrid 20-Meter Quad" with a loop driven element and a linear reflector. Part 1 of "Getting to Know OSCAR—from the Ground Up," by HQ staffers Joel Kleinman, WA1ZUY, and Charles Harris, WB2CHO, explains amateur satellite communication. League Assistant General Manager David Sumner, K1ZND, introduces *QST*'s new monthly propagation charts, in "Chart Your Way to Better DX." QST

Al Brogdon, W1AB ♦ Contributing Editor

W1AW Schedule

PACIFIC	MTN	CENT	EAST	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	VISITING OPERATOR TIME (12 PM - 1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	TELEPRINTER BULLETIN				
4 PM	5 PM	6 PM	7 PM	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	TELEPRINTER BULLETIN				
6^{45} PM	7^{45} PM	8^{45} PM	9^{45} PM	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

♦ **Morse code transmissions:**

Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 1992 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by K6YR. See "Contest Corral" in this issue. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Send a 9×12-inch SASE for a certificate, or a business-size SASE for an endorsement.

♦ **Teleprinter transmissions:**

Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

♦ **Voice transmissions:**

Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

♦ **Miscellanea:**

On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day. QST

COMING CONVENTIONS

NEW YORK CITY/LONG ISLAND SECTION CONVENTION

January 20, North Babylon

The New York City/Long Island Section Convention, sponsored by the Great South Bay ARC, will be held at the Babylon Town Hall Annex, Phelps Ln; Southern State Parkway E to Exit 37 S (Belmont Ave), continue straight across Belmont Ave onto Sylvan Rd, turn right on Miller, turn left at stop sign into Town Hall Annex parking lot. Doors are open 9 AM to 4 PM. Features include "Ham Radio University 2002" (a day of education about Amateur Radio), technical education with 20 forums about different aspects of Amateur Radio, demonstrations, information tables, Special Event Station W2V set up and operational on HF, VE sessions, refreshments. Talk-in on 146.685 (118.8 Hz). Admission is $2. Contact Phil Lewis, N2MUN, 22 Belle Terre Rd W, Lindenhurst, NY 11757; 631-226-0698; **n2mun@arrl.net**; **www.hudson.arrl.org/nli/**.

MISSISSIPPI STATE CONVENTION

February 1-2, Jackson

The Mississippi State Convention (Capital City Hamfest 2002), sponsored by the Jackson ARC, will be held at the Mississippi State Fairgrounds Trade Mart Building, NE of the Coliseum; exit I-55 at High St (Exit 96B), go W to second traffic light, turn left into main entrance of Fairgrounds, Trade Mart is first building on left. Doors are open for dealer setup Friday at 1 PM, non-dealer setup at 3 PM, Saturday 7 AM; public Friday 5-8 PM, Saturday 8 AM to 4 PM. Features include flea market, dealers, forums (MARS, Baptist Ham Fellowship, APRS, ARES, QRP, DX, ARRL, satellite, traffic nets), test bench, "Introduction to Ham Radio" (Friday, 6 PM), VE sessions (Sunday, Feb 3, 1:30 PM, Red Cross Building, 875 Riverside Dr, Jackson; all classes), RV camper space available on fairgrounds (hook-ups $10). Talk-in on 146.76. Admission is $5, under 13 free. Tables are $15 (non-dealer flea market), $20 (dealers). Contact Ron Brown, AB5WF, Box 55643, Jackson, MS 39296-5643; 601-956-1448; fax 601-982-3385; **ab5wf@arrl.net**; **www.jxnarc.org**.

SOUTHEASTERN DIVISION CONVENTION

February 2-3, Miami, FL

The Southeastern Division Convention (42nd Annual "Tropical Hamboree"), sponsored by the Dade Radio Club of Miami, will be held at the Dade County Fair and Exposition Center, 10901 SW 24th St (Coral Way). Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 4 PM. Features include swap and shop, major manufacturers, commercial booths, dealers, vendors, craft and hobby exhibit area with continuous "how to" demonstrations, presentations and forums (satellite communications, APRS, antennas, propagation, DXing, ARRL, International Amateur Radio, Sectrum Spats, CC&R Challenges, and more), VE sessions (Sunday, 9 AM; no advance registration required), on-site campground with full hookups ($25 per night). Talk-in on 147.0, 442.35 (94.8 Hz), 147.315 (94.8 Hz), information loop 147.555. Admission is $6 in advance (thru Feb 1), $8 at the door. Contact Evelyn Gauzens, W4WYR, 2780 NW 3rd St, Miami, FL 33125; 305-642-4139; fax 305-642-1648; **w4wyr@arrl.net**; or John Hall, WD4SFG, **wd4sfg@bellsouth.net**; **www.hamboree.org**.

February 23
Vermont State, Milton

March 8-10
Louisiana State, Rayne

NORTHERN FLORIDA SECTION CONVENTION

February 8-10, Orlando

The Northern Florida Section Convention (55th Orlando Hamcation Show), sponsored by the Orlando ARC, will be held at the Central Florida Fairgrounds, 4603 W Colonial Dr (Rte 50), 3 miles W of I-4. Doors are open Friday noon to 9 PM, Saturday 9 AM to 5 PM, Sunday 9 AM to 3 PM. Features include 400 swap tables, 150 commercial booths, largest tailgate in the SE, "Bring and Buy" area, RV camping with electricity and water ($16 per night in advance, $20 per night at the door; Bob Cumming, W2BZY, 407-333-0690), VE sessions (Gil Lineberry, N4VOX, 407-843-4122), forums. Talk-in on 146.76. Admission is $7 in advance, $9 at the door; under 12 free with paid adult. Tables are $35 in advance, $45 at the door (407-847-0650). Contact Hal Prosser, KK1B, 1017 Gammage Pt, Oviedo, FL 32765; 321-235-7513 (days) or 407-365-2444 (eves); **hal@mpinet.net**; **www.oarc.org/hamcat.html**.

TENNESSEE STATE CONVENTION

February 9-10, Memphis

The Tennessee State Convention (DIXIEFEST 2002), sponsored by the DixieFest Committee, will be held at the Shelby County Building, Mid-South Fairgrounds, Early Maxwell Blvd. Doors are open for setup Friday night and Saturday morning; public Saturday 9 AM to 5 PM, Sunday 9 AM to 2 PM. Features include flea market, dealers, special forum conducted by Riley Hollingsworth (FCC Special Counsel for Amateur Radio Enforcement), many other forums (ARES/RACES, ARPS, ARRL, Contesting, DX, Tri-Service MARS, PSK31/digital, Skywarn, Volnet, RF Exposure), auction (both days; items will be accepted for registration at 10 AM with auction beginning at noon), DXCC QSL card checking, VE sessions (both days, 10 AM; on the campus of Christian Brothers University, just N of hamfest site; Buckman Hall, Room 104), camping ($15 per hookup per night), refreshments. Talk-in on 146.82, 146.88. Admission is $5, under 12 free. Tables are $20 (non-commercial flea market, power $10 per table extra), $40 (dealers, includes power) up to 2 weeks before the event, $45 last 2 weeks, $50 Feb 8-10. Contact Melinda Thompson, KE4DXN, 4178 Vann Ave, Memphis, TN 38111; 901-743-1949 or 901-744-1737; **melindat@mem.net**; **www.dixiefest.org**; or Ben Troughton, KU4AW, 901-372-8031.

VIRGINIA STATE CONVENTION

February 10, Richmond

The Virginia State Convention (Richmond Frostfest), sponsored by the Richmond Amateur Telecommunications Society (RATS), will be held at The Showplace, 3000 Mechanicsville Tpke; I-95, Exit 75 to I-64 E, then Exit 192 (Rte 360), go 1/2 mile on left. Doors are open 8:30 AM to 3:30 PM. Features include Amateur Radio and Computer Show, electronics, indoor national and local vendors, major manufacturers, demonstrations on new products, flea market, forums, handicapped accessible, refreshments. Talk-in on 146.88. Admission is $6 (online tickets: **tickets.frostfest.com**); special VIP tickets before Jan 21 for early admission and special entrance—reservations 804-330-3165. Tables are $15 (before Jan 15), $20 (after Jan 15); commercial booth space $35 (before Jan 15), $40 (after Jan 15). Contact Pat Wilson, W4PW, 4416 New Kent Hwy, Quinton, VA 23141; 804-932-9424 or Frostfest Info Hotline 804-790-0077 (option 4); **w4pw@arrl.net**; **www.frostfest.com**.

Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262. **Note**: Sponsors of large gatherings should check with ARRL HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. QST

Gail Iannone ♦ Convention Program Manager

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 **January 1** to be listed in the **March** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

Alabama (Troy)—Jan 26. Jerry McCullough, KE4ERO, 334-382-7644.

†Florida (Arcadia)—Jan 26, 8 AM to 2 PM. *Spr:* DeSoto ARC. DeSoto County Fairgrounds, Heard St; take Hwy 17, S of Arcadia, turn E onto Heard St. Tailgating (free with paid admission), VE sessions, refreshments. *TI:* 147.075. *Adm:* $4. Tables: $10 (8-ft, with electricity). Doug Christ, KN4YT,

†ARRL Hamfest

Gail Iannone ♦ Convention Program Manager

Box 1352, Nocatee, FL 34268; 863-494-5070; **kn4yt@arrl.net**.

†Florida (Ft Myers)—Jan 11-12. *Spr:* Fort Myers ARC. Shady Oaks Community Center, 3280 Marion St; Exit I-75 at No 25, W 3 miles on Rte 80, left on Palmetto Ave, right on Marion St, center on left. Hamfest/Computer Show. *TI:* 146.88. *Adm:* advance $4, door $5. Tables: $15 (8-ft, electricity $5). Earl Spencer, K4FQU, 1735 Hanson St, Ft Myers, FL 33901; 941-332-1503; **k4fqu@juno.com**.

Florida (Miami)—Feb 2-3, Southeastern Division Convention. See "Coming Conventions."

Florida (Orlando)—Feb 8-10, Northern Florida Section Convention. See "Coming Conventions."

†Florida (Sarasota)—Jan 19-20; Saturday 9 AM to 5 PM, Sunday 9 AM to 3 PM. *Spr:* Sarasota ARA. Sarasota County Fairgrounds, Potter Building, 3900 Fruitville Rd; from I-75 take Exit 39 (Fruitville Rd), go approximately 5 miles W. Hamfest/Computer Show, vendors, tailgating ($5 per vehicle, plus admission), forums, VE sessions (Saturday, 9-11 AM; all classes; Jerry Bloch, KG4CBJ, 941-358-6483; **g.bloch@worldnet.att.net**), RV facilities, free parking, refreshments. *TI:* 146.91, 444.925. *Adm:* $7. Tables: $25 (5 or more, $20 each; includes a vendor pass and electricity). Eddie Martin, KI4ZJ, 7334 Deer Crossing Ct, Sarasota, FL 34240; 941-917-1491 (days) or 941-378-8371 (eves); **Eddie-ki4zj@worldnet.att.net**; **saraclub.org**.

†Illinois (Chicago/Stickney)—Jan 27, 8 AM to 1 PM. *Spr:* Wheaton Community Radio Amateurs. Hawthorne Race Track, 3501 S Laramie; located between Laramie and Cicero Aves, at 35th St. Ham Radio/Computer/Electronics flea market, commercial booths, VE sessions, free parking, handicapped accessible. *TI:* 145.39. *Adm:* advance $6, door $8. Make check payable to WCRA and send with business size SASE by Jan 1 to WCRA, Box QSL, Wheaton, IL 60189. Pat Byrne, K9JAU, 630-545-9950; **info@wheatonhamfest.org**; **www.wheatonhamfest.org**.

†Indiana (South Bend)—Jan 13, 8 AM to 2 PM. *Spr:* Michiana Valley Hamfest Assn. Century Center Community Building, Elkhart County Fairgrounds; US 33 S in Goshen. *TI:* 145.29. *Adm:* advance $4, door $5. Bob Denniston, KA9WNR, 21970 Kern Rd, South Bend, IN 46614; 219-291-0252 (7-11 PM EST).

†Kansas (LaCygne)—Feb 2, 9 AM to 1 PM. *Spr:* Mine Creek ARC. LaCygne Community Building on Broadway in downtown LaCygne; take US 69 to K152, go W 5 miles to town; or take K7 Hwy to K152, go E 8 miles to town, turn N on Broadway; 45 miles S of Kansas City. *TI:* 147.285. *Adm:* Free. Tables: $10 (first-come, first-served basis). Ron Cowan, KB0DTI, Box 36, LaCygne, KS 66040; 913-757-4455; **kb0dti@arrl.net**.

†Louisiana (Hammond)—Jan 19, 8 AM to 3 PM. *Spr:* South East Louisiana ARC. University Center, W University Ave; I-55 N to Exit 32, go E 1 1/4 miles, University Center is on N side of road. Swap tables, dealer displays, forums, VE sessions, free parking. *TI:* 147.0. *Adm:* Free. Tables: swap $10; dealers $20 (first table; $10 each additional table). Bill Borstel, KB5SKW, Box 1324, Hammond, LA 70404; 225-695-6414; **wborstel@hotmail.com**; **www.selarc.org**.

†Maine (Chelsea)—Feb 9; set up 7 AM; public 8 AM. *Spr:* Augusta ARA. Crystal Falls, Rte 17, 5 miles E of Augusta and 2 miles E of the Togus main gate. Hamfest/Computer Fair, flea market, vendors. *TI:* 146.7 (100 Hz), 145.39 (100 Hz). *Adm:* $5. Tables: Free. Tom Clay, KD1KE, 138 Oak Ln, Freedom, ME 04941; 207-382-6000; **kd1ke@uninets.net**.

†Maryland (Odenton)—Jan 27, 8 AM to 1 PM. *Spr:* Maryland Mobileers ARC. Odenton Volunteer Fire Department Hall, 1425 Annapolis Rd (Rte 175); 9 miles E of I-95/MD 175 interchange, midway between Baltimore and Washington DC. *TI:* 146.805. *Adm:* $4. Tables: $10. Gary Johney, N3BYN, 1885 Poplar Ridge Rd, Pasadena, MD 21122; 410-437-4285; **n3byn@arrl.net**; **www.qth.com/mobileers/**.

Michigan (Flushing)—Jan 19. Clay Hewitt, KF8UI, 810-233-7889.

†Michigan (Hazel Park)—Jan 20; set up 6 AM; public 8 AM to 2 PM. *Spr:* Hazel Park ARC. Hazel Park High School, 23400 Hughes St; I-696 to first exit E of I-75 (Couzens Dr), S on Couzens Dr, 1/2 mile to Woodward Hts, left on Woodward Hts, go 2 blocks and take right onto Hughes St. Swap and Shop, free parking. *TI:* 146.64 (100 Hz). *Adm:* $5. Tables: $14. Jeff Albrecht, N8WR, c/o HPARC, Box 368, Hazel Park, MI 48030; 248-642-3608; **n8wr@arrl.net**; **www.qsl.net/w8hp**.

†Michigan (Negaunee)—Feb 2, 10 AM to 3 PM. *Spr:* Hiawatha ARA. Negaunee Township Hall, 42, M-35; 8 miles W of Marquette on US-41 to M-35, S on M-35, 1 mile to Township Hall. Swap and Shop, refreshments. *TI:* 147.27. *Adm:* $2. Tables: $6. John Veiht, N8RSE, 906-228-9417; **n8rse@chartermi.net**; or Bob Serfas, N8PKN, 906-226-9782; **n8pkn@aol.com**; **www.qsl.net/k8lod/**.

†Minnesota (St Cloud)—Feb 9, 9 AM to 2 PM. *Spr:* St Cloud ARC. Holy Spirit School, 1615 11th Ave S; from I-94 go N on County Rd 75, right at 33rd St S onto Clearwater Rd, follow Clearwater Rd to 16th St S, turn left, go 2 blocks. VE sessions. *TI:* 147.015. *Adm:* $5. Tables: $10. L. Scott Hall, KA0DAQ, 3001 8th St N, St Cloud, MN 56303; 320-252-4498; **lscotth@aol.com**; **www.w0sv.org**.

Mississippi (Jackson)—Feb 1-2, Mississippi State Convention. See "Coming Conventions."

†Missouri (Springfield)—Jan 12, 8 AM to 2 PM. *Spr:* 145.49 Repeater Group. Teamsters Union Hall, 1850 E Division St; I-44 to US 65 S, W on Division St. Amateur Electronics and Computer Show, vendors, VE sessions. *TI:* 145.49 (136.5 Hz). *Adm:* $3. Tables: $12 (first table; $7 each for two or more). Michael Blake, N0NQW, Box 246, Willard, MO 65781; 417-742-3955; **n0nqw@arrl.net**; **www.qsl.net/49ers**.

†Missouri (St Joseph)—Jan 19, 8 AM to 3 PM. *Sprs:* Missouri Valley and Ray-Clay ARCs. Ramada Inn, 4016 Frederick Blvd; Exit 47 off I-29, just 47 miles N of Kansas City. VE sessions, free parking. *TI:* 146.85, 444.925. *Adm:* advance $2 each or 3 for $5; door $3 each or 2 for $5. Tables: $10 each (first 2 tables), $20 each (3 tables and up). Carlene Makawski, KA0IKS, 3704 Meadow Oak Ln, St Joseph, MO 64503; 816-279-3406; **nem3238@ultra.ccp.com**.

†New York (Lockport)—Jan 26; set up 7 AM; public 8 AM to 4 PM. *Spr:* Lockport ARA. Eagles Hall, 6614 Lincoln Ave, corner of Davison Rd. Vendors, auction (noon), refreshments. *TI:* 146.82 (107.2 Hz). *Adm:* $5. Tables: 8-ft $5. Duane Robinson, W2DLR, Box 142, Ransomville, NY 14131; 716-791-4096; **w2dlrham@aol.com**; **lara.hamgate.net**.

†New York (Marathon)—Jan 12, 7 AM to noon. *Spr:* Skyline ARC. Marathon Civic Center, Marathon Village; I-81, Exit 9, follow signs. Indoor heated flea market, VE sessions. *TI:* 147.18. *Adm:* $2. Tables: $5. Patrick Dunn, KC2BQZ, 419 Center St, Syracuse, NY 13209; 315-488-3499; **patdunn@dreamscape.com**; **www.dreamscape.com/sarc**.

New York (North Babylon)—Jan 20, New York City/Long Island Section Convention. See "Coming Conventions."

†Ohio (Dover)—Jan 27; set up 6 AM; public 8 AM to 1 PM. *Spr:* Tusco ARC. Ohio National Guard Armory, 2800 N Wooster Ave; exit I-77 at Exit 87 (Strasburg), turn right at exit stop sign, head S on County Rd 74 to first traffic light, continue through traffic light intersection, Armory is on right. Dealers, VE sessions (by appointment), refreshments. *TI:* 146.73. *Adm:* $3. Tables: $10 (reserve and pay in advance by Jan 20; bring your own extension cords). Gary Green, KB8WFN, 32210 Norris Rd, Tippecanoe, OH 44699; 740-922-4454; **kb8wfn@tusco.net**.

Ohio (Lorain)—Feb 3. John Schaaf, K8JWS, 216-696-5709.

†Ohio (Mansfield)—Feb 10. *Sprs:* InterCity ARC and MASER. Fairgrounds Buildings, 750 North Home Rd; from I-71 N or S, take Exit 176 (US Rte 30), turn W onto Rte 30, go 7.4 miles to Trimble Rd/Fairgrounds Exit, turn N onto Trimble Rd, turn left (W) onto Longview Ave, go to end of road, turn right (N) onto Home Rd, Fairgrounds entrance on right. New and used amateur radio equipment and parts, computers, VE sessions. *TI:* 146.94 (71.9 Hz). *Adm:* advance $5, door $6. Tables: 8-ft $10. Scott Yonally, N8SY, 179 Malone Rd, Mansfield, OH 44907; 419-522-9893; **n8sy@arrl.net**; **www.maser.org**.

†Ohio (Middletown)—Jan 12, 9 AM to 4 PM. *Spr:* DIAL RC. Miami University, Thesken Hall, Middletown Campus; from I-75 exit at SR 122 (Exit 32), go W toward Middletown; continue to Breiel Blvd, turn right (N), continue on Breiel to 6th traffic light; this is entrance to University, second building is Thesken Hall. 16th Annual SW Ohio Digital Symposium (there will be no flea market—this is a technical society conference/seminar only). *TI:* 146.61, 224.96, 444.825. *Adm:* Free. Hank Greeb, N8XX, 6580 Dry Ridge Rd, Cincinnati, OH 45252-1750; 513-385-8363; **n8xx@arrl.net**; **www.swohdigi.org/**.

†Ohio (Nelsonville)—Jan 20; set up 6 AM; public 8 AM to 1 PM. *Sprs:* Sunday Creek AR Federation and Hocking College Computer Club. Tri County Joint Vocational School, on State Rte 691; take Rte 33 E to Nelsonville, go through town to 5th light, turn right onto Rte 691, go about 1/8 mile just past the Ramada Inn to Vocational School. Hamfest/Computer Show, flea market, VE sessions (noon, walk-ins accepted). *TI:* 147.15, 147.225. *Adm:* $5. Tables: $3 (first-come, first-served). Russ Ellis, N8MWK, 8051 Oregon Ridge, Glouster, OH 45732; 740-767-2226; **n8mwk@arrl.net** or **n8mwk@frognet.net**; **www.hfradio.org/kc8aav/**.

Pennsylvania (Philadelphia)—Jan 9. Richard Moll, W3RM, 215-448-1139. (Auction-Fest)

†South Carolina (North Charleston)—Feb 2, 8:30 AM to 4 PM. *Spr:* Charleston ARS. R. B. Stall High School, 7749 Pinehurst St; located near I-26 and Ashley Phosphate Rd. Hamfest/Computer Show, forums (ARRL, weather, APRS), VE sessions. *TI:* 146.79, 145.25, 147.045. *Adm:* $5, under 12 free. Tables: advance $8, door $10. Jenny Myers, WA4NGV, 2630 Dellwood Ave, N Charleston, SC 29405-6814; 843-747-2324; **brycemyers@aol.com**; **www.qsl.net/wa4usn/index.html**.

Tennessee (Gallatin)—Jan 19. John Hermon, WB5OOL, 615-451-0213.

Tennessee (Memphis)—Feb 9-10, Tennessee State Convention. See "Coming Conventions."

Tennessee (Morristown)—Jan 5. Dennis "Rocky" Beckner, K8DRB, 423-587-4584.

Virginia (Richmond)—Feb 10, Virginia State Convention. See "Coming Conventions."

CONTEST CORRAL

Feedback

In the **2001 ARRL International DX CW Contest** the call sign of **HL5UOG** was reported as HL1UOG. The call sign of **VE2OWL** was reported as VE2OWK. A log file problem led to the omission of **W0ETT** who was Single Op High Power from the Colorado section. He posted a score of 996,240 on 1186 QSOs and 280 Mults.

In the **2001 ARRL International DX Phone Contest**, a log file problem with the **K8FK** Single Band 10 meter entry from the WCF section led to it being omitted from the results. After correcting the file, his score is 59,409 with 287 QSOs and 69 multipliers. **N3AIU** was improperly coded as Single Op QRP instead of Low Power. This moves **W7YAQ** into the Top Ten in W/VE in the SO QRP category. The call sign of **KO8S** was reported as NO8S in the Michigan Section. The World 28 MHz Single Band plaque winner was **HC8Z (HC1OT, op).** The log of **KM5YL** showed she operated from the CT section, but she was in fact in the LA section.

W1AW Qualifying Runs are 10 PM EST Thursday, January 3 and 9 AM EST Wednesday, January 23. The K6YR West Coast Qualifying Run will be at 9 PM PST Wednesday, January 9 (10-40 WPM). Check the W1AW Schedule for details.

Abbreviations
Cont—Continent
SO—Single-Op
M2—Multiop—2 Transmitters
MO—Multi-Op
MS—Multi-Op, Single Transmitter
MM—Multi-Op, Multiple Transmitters
AB—All Band
SB—Single Band
SPC—State/Province/DXCC Entity
HP—High Power
LP—Low Power
Entity—DXCC Entity

There is no contest activity on the 30, 17 and 12-meter bands.

Jan 1

There are a number of short contests celebrating the New Year. For more information, view the Web sites for each contest.

ARRL Straight-Key Night—see page 114 of December 2001 *QST* or **www.arrl.org/contests/announcements/skn.html**.

New Year's Snowball Contest—sponsored by the Activity Group of Belarus (AGB) **www.qsl.net/eu1eu/**.

SARTG New Year RTTY Contest—sponsored by the Scandinavian RTTY Activity Group (SARTG), **www.citytorget.com/sartg**.

AGCW Happy New Year Contest—sponsored by the DL CW Activity Group (DL-AGCW), **www.agcw.de**.

Jan 4-6

ARRL RTTY Roundup—see page 112 of December 2001 *QST*, or **www.arrl.org/contests/**

Kid's Day, phone, sponsored by the Boring Amateur Radio Club, 1800Z to 2400Z Jan 5. Frequencies: 28350 to 28400, 21380 to 21400, 14270 to 14300 kHz, and 2-meter repeaters with permission of repeater control ops. Exchange name, age and favorite color. If the operator has changed, a station can be contacted again. No scores or logs are required—every participant is eligible to receive a colorful certificate—send a 9×12 SASE to: Boring Amateur Radio Club, PO Box 1357, Boring, OR 97009. For more information, **www.jzap.com/k7rat/**.

Jan 11-13

North American QSO Party, CW, sponsored by the *National Contest Journal*, 1800Z Jan 12-0600Z Jan 13 on the 160-10-meter bands. SOAB-LP and M2 categories with max power 100 W, operating a maximum of 10 hours (off times must be at least 30 min and M2 entries may operate the entire contest). Exchange name and SPC. Score is QSOs × States + Provinces + NA DXCC entities (count each once per band). For information, see **www.ncjweb.com/naqprules.html**. Logs must be emailed or postmarked by Feb 12 to Bob Selbrede, K6ZZ, 6200 Natoma Ave, Mojave, CA 93501 or **cwnaqp@ncjweb.com**.

Japan International DX Contest, CW, sponsored by *Five Nine Magazine*, 2200Z Jan 11-2200Z Jan 13, work JA stations only. Frequencies—160/80/40-meter bands (20/15/10-meter contest in April); remember that JA can operate between 1810-1825 and 1907.5-1912 kHz. SOAB-LP/HP (<100W/>100W), SOSB-LP/HP, MS, Maritime Mobile categories with 30-hour time limit for non-JA stations (off times min. of 60 min). 10-min rule applies to MS entrants—see web site. Exchange RST and CQ Zone, JA stations send prefecture number. QSO Points: 160—4 pts, 80—2 pts, 40—1 pt. Score is QSO points × JA prefectures (maximum of 50 per band). For information—**www.jzap.com/je1cka/jidx/jidxrule-e.html**. Logs must be emailed or postmarked by Feb 28 to JIDX Contest, c/o Five-Nine Magazine, PO Box 59, Kamata, Tokyo, 144, Japan or **jidx-log@dumpty.nal.go.jp**.

Hunting Lions in the Air, CW and Phone, sponsored by the International Association of Lions Clubs, 0000Z Jan 12-2400Z Jan 13. Frequencies: 80–10 meters, work stations once per band regardless of mode. SOAB and MS categories. Exchange RST and serial number, Lion club members also sign /L or "Lion" and send name, district and club name. Melvin Jones Memorial Club (W7YU/MJM) members sign "Melvin." QSO Points: non-Lion station—1 pt, with Lions—5 pts, 20 points for MJM club members, 50 points with W7YU/MJM. Score is QSO points × number of Lions clubs (count only once). For information: **www.sarl.org.za/public/contests/lionita.htm**. Logs must be postmarked by Jan 31 to Lion Rad Handfield-Jones, ZS6RAD, Lions Club of Midrand, PO Box 1548, Halfway House, 1685, South Africa or emailed to **rad.handfield-jones@pixie.co.za** or **aiatolla@hotmail.com**.

Jan 19

070 Club PSK Contest, sponsored by the Penn-Ohio DX Society, 0000Z-2400Z Jan 19. 80-10 meters. SO-QRP, MP (<50 W), HP (<100 W). Exchange RST, serial number and SPC. Each QSO counts 1 pt. Score is QSO points × DXCC entities (count each only once). For information, **members.aol.com/n3dqu/podxc070.htm**. Logs (with dupe sheet if >100 QSOs) must be received by Feb 19 by mail to Steve Dominguez, N6YIH/7; 070 Club PSKFEST; 5657 Elkhorn Ave, Boise, ID 93705-2817, or by email as a text (.txt) file to **spdomingue@aol.com**.

Jan 19-20

ARRL January VHF Sweepstakes—see page 111, December 2001 *QST* or **www.arrl.org/contests/**.

North American QSO Party, Phone, 1800Z Jan 19-0600Z Jan 20 (see Jan 12-13). Logs must be emailed or postmarked by Feb 19 to Bruce Horn, WA7BNM, 4225 Farmdale Ave, Studio City, CA 91604 or **ssbnaqp@ncjweb.com**.

MI-QRP CW Sprint—sponsored by the Michigan QRP Club, 1200Z 19 Jan-2359Z 20 Jan. 160 through 6-meter bands, SOAB, entry classes A (<250 mW), B (<1 W), C (<5 W), D (>5W). Exchange RST, SPC, and MI-QRP number or power output. QSO Points: MI-QRP members are 5 pts, non-member W/VE are 2 pts, and DX 4 pts. Score is QSO points × SPC (count each once per band, US/VE do not count as entities). If homebrew RX or TX, multiply by 1.25. If both RX and TX are homebrew, multiply by 1.5. For information, **www.qsl.net/miqrpclub**. Logs must be sent to L. T. Switzer, N8CQA, 427 Jeffrey Ave, Royal Oak, MI 48073-2521 or **n8cqa@att.net**.

Jan 25-27

CQ WW 160-Meter Contest, CW, sponsored by *CQ Magazine*, 2200Z Jan 25-1600Z Jan 27 (Phone portion is Feb 22-24). SO-QRP (<5 W) -LP(<150 W) -HP, MO categories; no time limit. Enter as MO if packet or spotting nets are used. Exchange RST and SPC. QSO Points: own entity—2 pts, same cont—5 pts, diff. Cont—10 pts, /MM stations count 5 points, but no multiplier. Score is QSO points × states + VE call areas + DXCC entities (KH6 and KL7 count as DXCC only). For information, **www.cq-amateur-radio.com/cq160rules.html**. Logs (Cabrillo format preferred) must be emailed (no paper logs) by Feb 28 to **cq160@kkn.net**.

Kansas QSO Party—1800Z Jan 26-1800Z Jan 27 on any band and mode. Categories are SOAB and MS or MM, no time limit. Kansas stations exchange RST and county (HF) or grid (VHF); others exchange RST and SPC or grid. QSO Points: HF—SSB 1 pt, CW—2 pts, all other modes 3 pts; VHF 2m—SSB/FM—1 pt, CW/AM—3 pts; 6m/220-SSB/FM—2 pts, CW/AM—4 pts; 440-SSB/FM—3 pts, CW/AM—5 pts; 902 and higher—8 pts; ATV, digital, EME or other modes above 50 MHz—10 pts. Score is HF-QSO points × counties (count only once), VHF—QSO points × grid squares (count only once), total score is HF + VHF + 1000 points for each QSO with K0S. For information, **www.ksarrl.net/qso/2002ksqso.htm**. Logs must be emailed or postmarked by Mar 1 to Kansas QSO Party c/o Rick Carver, WA0KS, 13425 W 56th Terr, Shawnee, KS 66216 or **wa0ks@arrl.net**.

REF French Contest, CW, sponsored by the Reseau des Emetteurs Francais, 0600Z Jan 26-1800Z Jan 27 (Phone contest is Feb 24-25). Contact French stations (including Corsica, Overseas Territories and EU Council station TP2CE) on 80-10 meters. Categories are SOAB, MS and SWL. Non-French stations exchange RST and serial number, French exchange RST and department number or prefix. QSO Points: different continent—3 pts, 1 pt otherwise. Score is QSO points × departments and prefixes (count each once per band). For more information, **www.ref.tm.fr**. Logs are due by Mar 15 (CW) or Apr 15 (SSB) by mail to Reseau des Emetteurs Francais, REF Contest, BP 7429, 37074 Tours Cedex, France, or by e-mail to **f5lbl@ref-union.org**.

UBA Contest, Phone, sponsored by the Royal Union of Belgian Amateur Radio, 1300Z Jan 26-1300Z Jan 27. Contact ON stations on the 80-10 meter bands according to the IARU band plan. Categories are SOAB and SOAB-QRP, SOSB, MS, no time limit, and packet is allowed for all classes. Exchange RST and serial number, ON stations will add their province abbr. QSO Points: QSOs with ON stations—10 pts, with other EU—3 pts, outside EU—1 pt. Score is QSO points × ON provinces + ON prefixes + DXCC entities (count each once per band). For information, **www.uba.be**. Logs must be emailed or postmarked within 30 days of the contest to Michel Le Bon, ON4GO, UBA HF Contest Manager, Chée de Wavre 1349, B-1160 Bruxelles, Belgium, or **berger@cyc.ucl.ac.be**.

BARTG RTTY Sprint—sponsored by the British Amateur Radio Teletype Group, 1200Z Jan 26—1200Z Jan 27 on the 80-10 meter bands. Categories are SOAB, MO and SWL. Operators with a Top Ten log in the past three years must enter as an Expert. Exchange serial number only, each QSO counts for 1 pt. Score is QSO points × DXCC entities + W/VE/JA/VK + continents (count multipliers only once). For more information, **www. bartg.demon.co.uk/**. Logs in Cabrillo format must be received by 1 Mar by mail to John Barber, GW4SKA, PO Box 611, Cardiff, CF24 4UN, Wales (only logs with 50 or fewer QSOs may be submitted as printed logs) or by email to **ska@bartg.demon. co.uk** with the call and entry class in the subject line and the log included as an attachment. QST

H. Ward Silver, N0AX ♦ 22916 107th Ave SW, Vashon, WA 98070 ♦ n0ax@arrl.org

SPECIAL EVENTS

Bethlehem-Nazareth, PA: Christmas City ARC and Delaware-Lehigh ARC, WX3MAS. 1200Z **Dec 15** to 2400Z **Dec 16**. Celebrating the Annual Season Greetings from the Twin Christmas Cities. 28.465 21.365 14.265 7.270 3.970. Certificate. CCARC/DLARC WX3MAS, Greystone Bldg, Gracedale Complex, RR 8, Nazareth, PA 18064-9211.

Merchantville, NJ: Amateur Radio Lighthouse Society (Member 001), K2JXW. 0001Z **Dec 22** to 2359Z **Jan 2**. Celebrating Lighthouse Christmas Lights 2001. 28.373 21.373 14.273 7.273. QSL. Jim Weidner, K2JXW, 114 Woodbine Ave, Merchantville, NJ 08109. Visit **ARLHS.com** for details.

Riverton, NJ: Amateur Radio Lighthouse Society (Member 100), KC2HOU. 0001Z **Dec 22** to 2359Z **Jan 2**. Celebrating Lighthouse Christmas Lights 2001. 28.368 21.368 14.268 7.268. Certificate. ARLHS, Box 2178, Riverton, NJ 08077. Visit **ARLHS.com**.

Atkinson, NH: Atkinson Amateur Radio Club, K1D. 0500Z **Dec 22** to 0500Z **Jan 6**. K1MOM and W1DAD Present Kid's Day Amateur Radio Awareness. 28.370 21.370 14.270 3.895. QSL. Peter Schipelliti, 7 Dearborn Ridge Rd, Atkinson, NH 03811.

Clarksburg, WV: Stonewall Jackson Amateur Radio Association, K8DF. 1300Z to 2200Z **Jan 19**. Celebrating General Thomas (Stonewall) Jackson's 174th Birthday. 28.425 14.280 7.250. QSL. SJARA, PO Box 752, Clarksburg, WV 26302.

Boise, ID: Voice of Idaho, W7BOI. 1600Z **Jan 25** to 2400Z **Jan 26**. Olympic Torch Relay through Boise. 28.380 14.293 7.225. QSL. Richard Dees, 22765 W Sandalwood Dr, Meridian, ID 83642.

Dade City, FL: East Pasco Amateur Radio Society, K4EX. 1300Z to 2200Z **Jan 26**. Commemorating the kumquat from the Kumquat Capital. 28.450 21.340 14.250 7.245. Certificate. EPARS Special Event, PO Box 942, Dade City, FL 33526.

San Diego, CA: Challenger Middle School ARC, KI6YG. 1500Z to 2400Z **Jan 28**. Commemorating the 16th anniversary of the Challenger tragedy. 146.52 28.350 21.350 14.250. QSL. Frank Forrester, KI6YG, Challenger Middle School, 10810 Parkdale Ave, San Diego, CA 92126.

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9×12 inch self-addressed, stamped envelope to the address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

Special Events Announcements: For items to be listed in this column, you must be an Amateur Radio club, and use the ARRL Special Events Listing Form. Copies of this form are available via Internet (**info@arrl.org**), or for an SASE (send to Special Requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Events Form" in the lower left-hand corner). You can also submit your special event information online at **www.arrl.org/contests/spevform.html**. Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; that is, a special event listing for **Mar** *QST* would have to be received by **Jan 1**. Submissions may be mailed (Attn: Maty Weinberg), faxed (860-594-0259) or e-mailed (**events@arrl.org**) to ARRL HQ. QST

Maty Weinberg, KB1EIB ♦ Special Events

STRAYS

IT'S ALL RELATIVE

◊ At 2200Z October 9, 2001, I checked 14 MHz and found signals from Europe were strong but not plentiful in my pet spectrum (022 to 030). The CQ from DJ5IL was outstanding and snappy. I gave him my call once and he bounced back to me with flawless CW:

TNX OM FOR CALL YOU ARE 599 AND MY NAME IS KARL THE QTH IS PFORZHEIM AT THE NORTH END OF THE BLACK FOREST BK.

I replied that I know the Black Forest well, since my mother came from Haiterbach and years ago I had some relatives in Pforzheim. I am not sure of their name, I continued, but I believe it was Karl Fischer who was married to my cousin, and he had a store selling watches and clocks. Would you know of them?, I asked.

DJ5IL's reply was startling:

SOLID COPY FRITZ MY NAME IS KARL FISHER AND THE STORE IS STILL IN THE FAMILY WE ARE RELATED I NEVER KNEW MY GRANDFATHER KARL FISCHER HE HAD DIED BEFORE I WAS BORN BK

A good CW op in the relationship was too much for me to contemplate! We exchanged e-mail addresses and signed. Were my old legs in better shape, I'd pack my bag and meet my new-found relative. Despite my 90 years, I am still pursuing the greatest hobby this side of heaven—our ham radio!—*Fritz Hauff, W3NZ, Royersford, PA*

ILLINOIS VETS DISCOVER AMATEUR RADIO

◊ In 2001, members of the Starved Rock Radio Club asked the staff of the LaSalle, Illinois Veterans' Home if any residents were interested in learning more about Amateur Radio. Five men said they were interested in learning more about the hobby.

The Ottawa American Legion graciously donated copies of *Now You're Talking*, *Alpha and Zulu* and the *ARRL Technician Video Course*. Also, a Chicago electric utility donated a laptop computer for learning the code and demonstrating packet.

The books and tapes allowed the residents to learn at their own pace. They also got hands-on demonstrations and help with questions during weekly visits from local hams.

Thus far, one resident has completed the course. He earned his Technician license at a VE session held at the Veterans' Home. But, he does not intend to stop with Technician—he is currently working on the code and the upgrade to General.

Several hams gave new life to their old equipment when their donations became the first 2 meter ham shack at the Home. A packet station has just been added.

Amateur Radio is a great hobby that gives us a way to reach others. Many veterans once had the skills needed to get a license. All they need is a little help and encouragement to brush off those skills and get their license.

If you know of other Veterans' Homes with active shacks, please drop a note to **kb9ezz@arrl.net**.—*Joe Tokarz, KB9EZZ, 881 Knottingham Dr, Ottawa, IL 61350-4223*

LIGHTHOUSE OPERATION

◊Amateur Radio operators in Pensacola, Florida will activate W4UC from the Pensacola Lighthouse January 1, 2002. It will mark the first operation ever from the lighthouse on its 143rd anniversary. Activity will be on 15-20 meters, and possibly 40, from 9 AM to 3 PM Central Standard Time. Any station that makes contact with the lighthouse and sends in an SASE will receive a Pensacola Lighthouse W4UC Special Event QSL card with a history brochure. The lighthouse, located on the Naval Air Station in Pensacola, is tended by the Aids to Navigation Team of the US Coast Guard. For more information, contact Tim Weikert, tel 850-457-1649, e-mail **kc7dcw@arrl.org**.

I would like to get in touch with . . .

◊ anyone with a clean copy of the circuit diagram for the DigiMax D612/D1200 frequency counter.—*Bill Fishback, W1IKU, 6 Locust Grove Rd, Harwich, MA 02645-2203*

◊ anyone who has used a Heakthkit HO-10 Monitor Scope.—*Morgan Godwin, W4WFL, 166 W 87 St, #901, New York, NY 10024-2901*

Friends for Life: Craig Larson, W3MS (left), and Steve Sauer, WA9ASZ, first met via ham radio in 1961, the year they both received their Novice licenses. At the time, they were students who lived in different parts of Indianapolis. Craig was Steve's first contact ever—on 15 meters CW on October 25, 1961. They later met in person and rode bicycles across town to see each other. Their friendship grew over the years and in 1972 Steve was the best man in Craig's wedding. Although Craig now lives in Maryland while Steve is still living in Indiana, they keep in contact almost daily. This summer they met in Virginia Beach, Virginia, where they visited Craig's daughter, Kristen, KB3BMR. Craig writes: "Ham radio truly is a wonderful hobby, and a great way to establish friendships that last for life!" QST

Previous Strays

By Dan Henderson, N1ND
Contest Branch Manager

2001 ARRL June VHF QSO Party Results

It was an emerging wonderful summer-like weekend—June 9-11. The long snowy nights were long passed, having ceded their territorial reign to the renewal of spring. In most places, the horizon was glistening with verdant greens, inviting one to flourish in the warmth of the great outdoors. And if you looked carefully on some of those beautiful mountaintops, you would see the glint of aluminum and antennas, because it was the weekend of the 2001 ARRL June VHF QSO Party.

A total of 680 logs were received, representing a total of over 1000 participants in this year's contest. The June QSO Party numbers are always a bit lower than those from the January VHF Sweepstakes, in part because it falls just two weekends before the largest operating event sponsored by the ARRL (Field Day). However, the enthusiasm continues to run high as the die-hard aficionados of the VHF-UHF-Microwave spectrum always seem to emerge in large numbers as they continue to push the envelope of technical design and operating expertise.

In 2000, the ARRL separated the Single Operator category into separate High and Low power categories. The change has produced great results. In 2001 Single Operator Low Power was the most popular category, just edging out Single Operator High Power—253 to 243. A total of 3.6% of the entries came from the renamed Single Operator Portable category. Of the 95 multioperator logs received, 62 were Limited Multi and the remaining 33 from Multi-unlimited operations. Rovers accounted for a total of 8.6% of the total number of logs received—which holds right at the average for rover entries over the past several years. Overall, the number of logs received was down compared to 2000.

The highlight of the contest seems to be the continuing heavyweight battle between two of the great Multioperator Unlimited stations—W2SZ and K8GP. The RPI Radio Club, W2SZ, and the Delmarva VHF and Microwave Society, K8GP, continue their log battle. Last year, K8GP broke the category record that had been set the previous year by W2SZ. This year, K8GP turned in an excellent effort—breaking the mark they had set in 2000. Only problem was that W2SZ turned out in force, and reclaimed the record, posting a substantial margin of victory by over 500K points—2,459,850 to 1,917,480. As sure as the trees turn green in the spring, you can bet on the sharp competition continuing between these two outstanding multioperator powers.

Two stations from the Roanoke Division claimed top honors in the Limited Multioperator category. The AA4ZZ operators in North Carolina rode what they called "an amazing two hour opening to Europe on 6 meters" and took top honors with a score of 473,308. Many stations reported outstanding conditions on 6 meters, with great multipliers being added to improve scores. Finishing second in the category was W4IY from Virginia, with a great score of 315,425. Most of the Limited Multioperator stations focused on the 50, 144, 220 and 432 MHz bands.

Jeff, K1TEO, continued his outstanding series of performances in the Single Operator High Power category. After being edged out last year, Jeff's knowledge of the bands, accompanied by a well-

Division Leaders

Single Operator Low Power

Atlantic	W3OR	65,987
Central	K9PW	319,825
Dakota	KA0PQW	59,210
Delta	N8UM	95,116
Great Lakes	KB8U	58,437
Hudson	K2KIB	49,784
Midwest	N0URW	47,808
New England	WB1GQR	135,900
Northwestern	W7YOZ	35,405
Pacific	N6MU (@N6NB)	101,250
Roanoke	W4VHH	14,980
Rocky Mountain	K5RHR	12,975
Southeastern	W4ZRZ	55,144
Southwestern	N6PI	72,000
West Gulf	W5SXD	77,922
Canada	VE7DXG	68,707

Single Operator High Power

Atlantic	K1RZ	260,260
Central	N2BJ	269,798
Dakota	WA2HFI	37,398
Great Lakes	K8TQK	176,890
Hudson	WB2SIH	38,400
Midwest	KM0T	285,471
New England	K1TEO	433,347
Northwestern	K7RAT (N6TR, op)	77,784
Pacific	KJ6KO	71,788
Roanoke	W4RX	159,200
Rocky Mountain	K0GU	194,010
Southeastern	N4IS	44,608
Southwestern	AA7A	98,808
West Gulf	N5HHS	9,869
Canada	VE3AX	144,966

Single Operator Portable

Atlantic	N3FTI	32,712
Central	K9AKS	49,400
Dakota	KF0Q	53,190
Delta	W4RXR	5,720
Great Lakes	N8XA	9,639
Hudson	W2XL	22,842
New England	W1JN	288
Northwestern	W7KN	1,320
Pacific	K6MI	68,234
Roanoke	AF4HX	71,760
Rocky Mountain	AA5B	1,364
Southwestern	N7IR	10,260

Limited Multioperator

Atlantic	W3SO	90,482
Central	NI9E	175,392
Dakota	N0QJM	284,886
Great Lakes	K9IZ	22,363
Hudson	K2BAR	236,394
New England	W1QK	140,868
Northwestern	K7CW	32,542
Pacific	W7KK	79,180
Roanoke	AA4ZZ	473,308
Rocky Mountain	W0LSD	13,908
Southeastern	KF4DGS	52,397
Southwestern	W3SE	176,540
West Gulf	K5CM	219,224
Canada	VE6JW	34,317

Multioperator Unlimited

Atlantic	K3MQH	817,548
Central	W9ICE	319,158
Dakota	N0UK	357,564
Great Lakes	WW8M	241,332
Hudson	N2UZQ	49,280
Midwest	KA0MR	18,360
New England	W2SZ	2,459,850
Northwestern	K7ZL	39,750
Pacific	N7LQ	105,000
Roanoke	K8GP	1,917,480
Rocky Mountain	W1XE	272,384
Southeastern	K4RF	118,400
Southwestern	W6TOI	215,270
West Gulf	K9MK	57,330

Rover

Atlantic	N2JMH	125,020
Central	N9RLA	7,056
Dakota	KB0ZKX	4,699
Delta	N4OFA	63,020
Great Lakes	K4EFD	3,683
Hudson	N2MH	54,840
Midwest	N0DQS	72,810
New England	KB1EAA	7,406
Northwestern	W7DHC	63,063
Pacific	K6ALF	5,244
Roanoke	W3IY	222,090
Rocky Mountain	KB0CY	3,741
Southeastern	K4GSX	180
Southwestern	N6VHF	183,150
West Gulf	AB5SS	142.932
Canada	VE3NPB	97,893

The antenna farm at the AB2I limited multioperator station that placed sixth nationwide.

Barry, KT4GG, took advantage of great weather and was rewarded with this great vista from his operating QTH in Utah.

planned station, and lots of practice paid off as he won the category with a score of 433,347. This outdistanced a great effort from the runner-up Mike, KM0T, who edged third place finisher Barry, N2BJ, by a score of 285,471 to 269,798.

The Single Operator Low Power category saw a repeat winner as Pete, K9PW, held on to the title by beating fellow Illinois resident Bob, K2DRH, by a score of 319,825 to 157,548. Mitch, WB1GQR, finished third, while reporting that he was able to parlay quite a few Qs from the great 6 meter opening.

The Single Operator Portable category (formerly known as QRP portable) continued to attract adventurous-types that look for operating challenges. Leading the way in 2001 was Larry, AF4HX, with a score of 71,760. He was able to successfully fend off the challenge of John, K6MI, in the category with the smallest margin of victory—a mere 3526 points. Congratulations also go to Matt, KF0Q, who posted a fine third place finish for the weekend.

It is hard to imagine a better way to enjoy a June weekend than spending it wandering the countryside on a well-planned Rover expedition. Leading the way in the Rover category was Bill, W3IY, with Brian, ND3F as the second op. This adventurous duo posted an outstanding score of 222,090 for the contest while activating 12 grids along the way. Finishing in a strong second place with a final score of 183,150 and 12 grids was Neil, N6VHF, with Paul, N6DN, in the second chair. John, AB5SS, with Dan, W5DF, riding

Top Ten and Plaques

Single Operator, Low Power		Plaque Donor (if sponsored)
K9PW	319,825	K2RIW & K2OVS, NLI Section
K2DRH	157,548	ARRL Contest Branch
WB1GQR	135,900	
N6MU (@N6NB)	101,250	
N8UM	95,116	
W5SXD	77,922	
W1PM	72,141	
N6PI	72,000	
N5RZ	71,298	
W6KBX	70,372	

Single Operator, High Power		
K1TEO	433,347	W2SZ/1, Mt Greylock Expeditionary Force
KM0T	285,471	K9NS, Mt Frank Contesters
N2BJ	269,798	Ed Parsons, K1TR
K1RZ	260,260	Wellesley ARS, Mt Equinox Contest Crew
K1GX	226,572	N0KQY, W0LD, N0JK, WB0DRL, N0LL
K0GU	194,010	K3MQH, South Mountain Contest Team
K8TQK	176,890	In Memory of John Chambers, W6NLZ
K2SMN	167,316	
KE8FD	166,531	Southeastern VHF Society
N0LL	161,760	

Single Operator Portable		
AF4HX	71,760	West Coast VHFer
K6MI	68,234	Robin Gist, K4VU
KF0Q	53,190	
K9AKS	49,400	
N3FTI	32,712	
W2XL	22,842	
N9NJY	20,424	
N9TZL	11,288	
N9MYK	10,624	
N7IR	10,260	

Unsponsored plaques for Top Ten finishers in a category may be purchased from the ARRL Contest Branch for $60. Contact **contests@arrl.org** for information.

Limited Multioperator		Plaque Donor (if sponsored)
AA4ZZ	473,308	W3EP, K9AKS, W9IP
W4IY	315,425	K1TEO, W2GKR, W2GKO, KA1FVG
N0QJM	284,886	
K2BAR	236,394	
K5CM	219,224	
AB2I	207,270	
N2NK	179,350	
W3SE	176,540	
NI9E	175,392	
W5KFT	168,948	

Multioperator		
W2SZ	2,459,850	Randy Stegemeyer, W7HR
K8GP	1,917,480	N2LIX & Ten-X Group
K3MQH	817,548	Mt Airy VHF Club
W3CCX	763,130	Rochester VHF Group
K3YTL	726,271	W1XE VHF Contest Team
N2PA	463,150	K2AE, Schenectady ARA
K1WHS	434,644	In Memory of Sid Krauss, WA2VNK
N0UK	357,564	
W9ICE	319,158	
W1XE	272,384	

Rover		
W3IY	222,090	W2SZ/,1 in memory of Dick Goodman, WB1HIH
N6VHF	183,150	Wayne King, N2WK
AB5SS	142,932	Northern Lights Radio Society and W0UC
N2JMH	125,020	Southeastern VHF Society
N6TEB	107,328	
VE3NPB	97,893	
N0DQS	72,810	
W7DHC	63,063	
N4OFA	63,020	
N2MH	54,840	

DX Single Operator Low Power		
ZF2MU (K4BI, op)	46,311	K8GP & C3I
CO2OJ	10,868	K8GP & C3I

shotgun took third place with 142,932 points while activating 15 grids.

The 2002 June VHF QSO Party promises to be yet another intriguing chapter. Why not join these "boys of summer" as they challenge themselves and their fellow VHF/UHF/Microwave enthusiasts on the weekend of June 8-10, 2002? It's a great way to learn something new in the hobby, as well as share in the spectacular seasonal wonders.

Soapbox

We plan on bringing a spare light bulb next year. Our green alien mascot was not able to glow all night due to some complications (AA1VL)… We worked 10 countries in Europe on 50 MHz CW during an amazing two-hour opening (AA4ZZ)… Saturday not good but Sunday was… get 'em next year (AA6DX)… Too bad I went to sleep for the big 6 meter opening (K1UHF)… First time I heard Europeans on 6 m during a Contest (K2KIB)… This is the "Last Hurrah of the South Mountain Contest TEAM." Dick, K3MQH, is selling the mountaintop and moving to Florida (K3MQH)… From the Marconi Site on Cape Cod to Home: Never look for a motel room on graduation night (K4THY)… Can't believe I worked 45 stations on 432 and 13 Europeans on 6 (K7RAT)… Other than 50 MHz conditions were worse than bad (K8GP)… Wow! My personal best score, despite no tropo! Very long sporadic E openings on six after midnight Sat and Sunday daytime and evenings gave me my most QSOs and grids on 50 MHz ever (K8KD)… A great mix of tropo, Es and aurora made for an exciting contest (K8MD)… The good double hop opening on Sunday saved the day so to speak (K9HUY)… My first contest 3.4 and 47 GHz contacts. My 47 GHz narrow-band contact was with WA1MBA over 29 mile path with my TX power level of 2 µW. WA1MBA TX power level was a loud 200 µW (KA1OJ)… An exercise in sleep deprivation (KC3WD)… Houston flooding curtailed much of my route (KI5DR/R)… Tropical Storms and VHF contests don't mix (KM5TY)… Highlight of contest was being the center of a pileup to Europe on 6 meters for over an hour 100 QSOs in 37 grids (KN4SM)… Stayed up all night for the 6 meter opening made the contest very exciting (N2JMH)… This just keeps getting better every year (N3FTI)… Thanks to all the rovers and portables who really add to the fun of this event (N4GN)… Tropical Storm Allison took precedence over the contest, still I managed to put in a few Q's (N5BA)… Conditions on 6 m started off fair and fell off on Saturday; Sunday was more exciting with many varied openings. Best DX was EK99, ZF1DC and ZF2MU, and BP51 from Alaska's KL7HFQ was there as well (N7LQ)… Wow, 40 different grids on 6 Meters with just 50 contacts (N8DGD)… Flat band conditions on 2 m, three nice 1-2 hour openings on 6 m. High gas prices must have kept some rovers home (N9DG)… Great finish! Best contest in years (NK5W)… June Contest turned into a Six Meter Contest. When is the June Contest? (NQ2O)… What wonderful conditions this year! And what a treat to be on the air listening to a world radio first when VE7s and W7s worked Europe! Congratulations to all those who managed this remarkable achievement (VE7VDX)… You know conditions are poor when the screensaver on the logging PC activates between QSOs (W0FY)… I was glad that 6 meters finally opened to the North (W4AME)… WOW! A personal best score. Maybe a 100K-plus score is possible from the Pacific Northwest (W7DHC/R)… Had a 2 m loop connected to a broom handle, then to a C clamp to the luggage rack on the car. Used an RS 2 m 5/8 whip for 6 meter operation. I was not planning on roving but once I crossed the Grid line I was hooked (WA6TMJ)… First VHF Contest, First use of 6 Meters (WB0VGI)… The openings were there on 6 meters but they were sure sneaky. I was just getting ready to go to bed at 0430 when, BOOM the band was wide open. At 0830 both the band and the operator crashed! Outside of 6 meters, all other bands were a yawn. Flattest conditions I've seen in years (WB1GQR)… A big thanks, N0DQS/R, I had a great time. It is fun to be back (WQ0P)… What a great contest! ... (WW8MGM)

QSO Leaders By Band

Single Operator, Low Power

50 MHz

VE1YX	516
N5RZ	466
K9PW	464
W5SXD	377
WD5K	376

144 MHz

WB1GQR	252
K9PW	204
K6TSK	131
N6MU (@N6NB)	123
KG4BMH	120

222 MHz

WB1GQR	69
K9PW	56
W6KBX	34
W1PM	34
K2DRH	32

432 MHz

WB1GQR	115
K9PW	96
N6MU (@N6NB)	71
VE7DXG	70
K6TSK	68

902 MHz

K9PW	13
WA1MBA	13
W3OR	12
KU2A	10
N8UM	9

1296 MHz

K9PW	24
K6TSK	23
WA1MBA	21
W6KBX	21
N6PI	18

Single Operator, High Power

50 MHz

K0GU	718
K5AM	510
AA7A	431
N0LL	428
W6OAL	406

144 MHz

K1TEO	327
K1UHF	315
K3TV	261
K2SMN	204
2 tied with	185

222 MHz

K1TEO	82
N2BJ	67
K1UHF	61
KE8FD	59
K8TQK	55

432 MHz

KE6GFF	175
K1TEO	127
N2BJ	92
W4RX	88
K1UHF	84

902 MHz

K1TEO	33
KM0T	32
K1RZ	21
KE8FD	20
3 tied with	17

1296 MHz

K1TEO	49
K1RZ	37
VE3AX	32
K1UHF	31
KM0T	31

Multioperator

50 MHz

W2SZ	909
K8GP	795
W1XE	748
W1XX -L	652
K1WHS	632
W3CCX	625
K2BAR -L	594
K5CM -L	577
AA4ZZ -L	574
K3MQH	572

144 MHz

W2SZ	607
K8GP	558
K3MQH	538
K3YTL	465
W3CCX	453
AA4ZZ -L	350
W4IY -L	340
AB2I -L	288
N2PA	276
W1QK -L	270

222 MHz

W2SZ	237
K8GP	154
K3YTL	142
W3CCX	128
K3MQH	119
N2PA	113
AA4ZZ -L	82
W4IY -L	76
W9ICE	64
W6TOI	56

432 MHz

W2SZ	400
K8GP	251
K3MQH	228
K3YTL	215
W3CCX	190
AA4ZZ -L	138
N2PA	129
K1WHS	112
W3SE -L	110
W4IY -L	109

902 MHz

W2SZ	121
K8GP	75
N2PA	39
W3CCX	32
WW8M	28
K3MQH	27
K1WHS	19
K3YTL	14
N0UK	13
W6TOI	13

1296 MHz

W2SZ	151
K8GP	92
W3CCX	52
WW8M	47
N2PA	40
K3MQH	39
W6TOI	29
K1WHS	25
K6AAA	23
2 tied with	21

-L denotes Limited Multioperator

Multiplier Leaders By Band

Single Operator, Low Power

50 MHz

N5RZ	153
ZF2MU (K4BI, op)	129
K9PW	125
WD5K	123
W5SXD	121

144 MHz

K9PW	52
K8MR	44
KA0PQW	39
KG4BMH	38
K2DRH	37

222 MHz

K9PW	24
WA8RJF	23
K8MR	23
K2DRH	22
2 tied with	19

432 MHz

K9PW	31
K2DRH	29
K8MR	25
W6KBX	24
2 tied with	23

902 MHz

K9PW	11
W3OR	10
WA8RJF	8
W5ZN	8
4 tied with	7

1296 MHz

K9PW	13
K2DRH	13
W3OR	12
W4VHH	11
3 tied with	10

Single Operator, High Power

50 MHz

K5AM	184
K0GU	183
AA7A	152
N0LL	145
KN4SM	134

144 MHz

KE8FD	59
N2BJ	59
KM0T	57
K8TQK	55
K1TEO	52

222 MHz

KE8FD	35
K8TQK	34
KM0T	33
N2BJ	30
VE3AX	30

432 MHz

N2BJ	45
KE8FD	38
K8TQK	36
W4RX	35
3 tied with	34

902 MHz

KM0T	25
KE8FD	19
K1TEO	19
WQ0P	16
K8TQK	13

1296 MHz

KM0T	24
K1TEO	20
VE3AX	19
KE8FD	17
2 tied with	16

Multioperator

50 MHz

K8GP	229
N0QJM -L	218
AA4ZZ -L	195
W1XE	186
N0UK	185
W2SZ	171
K5CM -L	171
K3MQH	164
K1WHS	161
W5KFT -L	160

144 MHz

K8GP	89
AA4ZZ -L	79
K3MQH	72
N0UK	72
W4IY -L	63
K3YTL	58
N0QJM -L	57
W9ICE	57
K5CM -L	56
W3CCX	56

222 MHz

K8GP	57
K3YTL	52
K3MQH	47
N2PA	41
W9ICE	39
W2SZ	39
N0QJM -L	38
AA4ZZ -L	35
W4IY -L	35
W3CCX	35

432 MHz

K8GP	61
K3MQH	52
K3YTL	47
W2SZ	45
W9ICE	45
N0QJM -L	44
W4IY -L	39
AA4ZZ -L	38
N2PA	37
W3CCX	34

902 MHz

K8GP	33
W2SZ	28
N2PA	22
WW8M	17
K3MQH	15
W3CCX	13
K1WHS	13
N0UK	10
W9ICE	9
N8KOL	9

1296 MHz

K8GP	37
W2SZ	32
WW8M	23
N2PA	22
K3MQH	17
W3CCX	16
K1WHS	12
K3YTL	11
W6TOI	11
N7LQ	10

-L denotes Limited Multioperator

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)			Southeast Region (Delta, Roanoke and Southeastern Divisions)			Central Region (Central and Great Lakes Divisions; Ontario Section)			Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)			West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)		
WB1GQR	135,900	A	N8UM	95,116	A	K9PW	319,825	A	W5SXD	77,922	A	N6MU (@N6NB)	101,250	A
W1PM	72,141	A	W4ZRZ	55,144	A	K2DRH	157,548	A	N5RZ	71,298	A	N6PI	72,000	A
W3OR	65,987	A	W5ZN	49,773	A	KB8U	58,437	A	W3XO	70,224	A	W6KBX	70,372	A
K1TEO	433,347	B	W4RX	159,200	B	N2BJ	269,798	B	KM0T	285,471	B	AA7A	98,808	B
K1RZ	260,260	B	K2UOP	70,060	B	K8TQK	176,890	B	K0GU	194,010	B	K7RAT (N6TR, op)	77,784	B
K1GX	226,572	B	N4IS	44,608	B	KE8FD	166,531	B	N0LL	161,760	B	KJ6KO	71,788	B
N3FTI	32,712	Q	AF4HX	71,760	Q	K9AKS	49,400	Q	KF0Q	53,190	Q	K6MI	68,234	Q
W2XL	22,842	Q	W4RXR	5,720	Q	N9NJY	20,424	Q	AA5B	1,364	Q	N7IR	10,260	Q
AA3SD	1,806	Q				N9TZL	11,288	Q				W7KN	1,320	Q
K2BAR	236,394	L	AA4ZZ	473,308	L	NI9E	175,392	L	N0QJM	284,886	L	W3SE	176,540	L
AB2I	207,270	L	W4IY	315,425	L	K9RN	61,377	L	K5CM	219,224	L	KF7NP	84,078	L
N2NK	179,350	L	KF4DGS	52,397	L	VE3TMG	25,920	L	W5KFT	168,948	L	W7KK	79,180	L
W2SZ	2,459,850	M	K8GP	1,917,480	M	W9ICE	319,158	M	N0UK	357,564	M	W6TOI	215,270	M
K3MQH	817,548	M	K4RF	118,400	M	WW8M	241,332	M	W1XE	272,384	M	N7LQ	105,000	M
W3CCX	763,130	M	K4HUM	39,790	M	N8KOL	147,126	M	K9MK	57,330	M	K6YR	99,550	M
N2JMH	125,020	R	W3IY	222,090	R	VE3NPB	97,893	R	AB5SS	142,932	R	N6VHF	183,150	R
N2MH	54.840	R	N4OFA	63,020	R	N9RLA	7,056	R	N0DQS	72,810	R	N6TEB	107,328	R
KB1EAU	21,084	R	KC3WD	30,750	R	NE9O	6,909	R	K0DAS	38,304	R	W7DHC	63,063	R

Scores

Each line score lists call sign, score, stations worked, multipliers, power level (A=low power, B=high power, Q=QRP, R=Rover), and bands (A= 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, I = 10 GHz). Band wins are listed in **boldface** type. If Rover, number of grids activated are also listed.

1

Connecticut

NT1N 11,440 176 65 A **A**
N1JMM 9,128 144 56 A A**BD**
WA1FUS 884 48 17 A AB**C**
KA1SZP 112 14 8 A AB
K1TEO 433,347 1004 293 B A**BCD9EFGI**
K1GX 226,572 696 237 B ABCD9EFG**HI**
K1UHF 133,152 642 146 B ABCDEFI
W3EP 81,090 477 159 B ABD
K1KI 16,790 222 73 B ABD
K1WVX 4,370 87 38 B ABCDE
WY1U 779 41 19 B AB
KA1KOJ 136 17 8 B B
W1JN 288 22 12 Q ABD
N1QVQ 30 9 3 Q BD
W1QK (+K1XS, K1PHG, KA1SYG, K2ZZ, W1NG) 140,868 824 156 L ABCD
NZ1U (KB1DFB, N1XS, N7PRD, KE1LI, ops) 30,212 322 83 L ABD
NM1K (+KA1VED) 1,092 44 21 L ABCD
K1ZE 83,022 485 137 M ABCD9E

Eastern Massachusetts

W1PM 72,141 400 139 A A**B**C**D**9E
WG1Z 50,398 346 113 A A**B**CD**E**
K5MA 24,024 222 91 A ABCD
KA1OJ 8,607 103 57 A ABD**GHIK**
KA1EKR 7,770 114 42 A BCDE
K1YZ 5,160 120 43 A AB
W1DYJ 3,420 95 36 A AB
N1EKV 3,367 68 37 A ABCD
KV1J 3,366 80 34 A ABCD
N1FDX 3,162 102 31 A AB
N1VQR 2,144 57 32 A ABD
W1GHZ 77,484 409 132 B **ABCD9EI**
N1YQE 4,186 91 46 B AB
K1VU 777 31 21 B ABD
N1BC 352 26 11 B ABD
N1ZGY 2 2 1 Q B
N1DJB (+K1SG) 22,950 234 85 L ABD
AA1VL (+KB1FXY) 10,257 232 39 L ABD
W1XM (KB1CGZ, KT1D, KB1GRS, KB1FMP, N1UEJ, KD1KY, KC8KEO, KB1FCL, W1GSL, WA1VRB, KB1FPJ, ops) 92,272 546 146 M ABCDE

Maine

KQ1V 6,649 109 61 B **AB**
W1XX (+ K1JX) 122,578 711 167 L ABCD
K1WHS (+ K1DY,K1BX,K1CA,K7KX,K0ZK, W1MRQ,N1LBI) 434,644 1088 301 M ABCD9EFGHI

New Hampshire

W1BQ 61,680 398 120 A **ABCD**9**EF**
KU2A 40,215 257 105 A AB**CD**9E**FG**
N1NUM 2,760 78 30 A ABCD
AF1T 142,932 590 172 B A**B**C**D**9**EFGHIP**
AC1J 18,870 210 74 B ABCD
WW1Z 10,626 144 66 B ABCD
W1ZC 9,460 158 43 B **BD**
N1JHJ 540 24 20 B ABCD
WA1T 0 425 0 B ABCDE
WA1ZYX (+N1NCI, N1BAC, N1KWF, KB1EKA, WK1P, K1ZO) 30,952 258 106 L ABD

Rhode Island

W1BAT 1,456 56 26 A **A**

Vermont

WB1GQR 135,900 722 150 A **ABCD**
W1AIM 35,816 250 121 A ABCD**9E**
K1LPS 19,800 173 90 A ABCD
K1UC 4,753 89 49 B **ABC**D
W1KMH 1,925 68 25 B A**B**CD

Western Massachusetts

WA1MBA 27,440 172 70 A B**CD9EFGHIK**
N1MHH 1,856 53 32 A ABCD
N1VOR 602 43 14 A **B**
W1RZF 13,468 171 52 B **BCD**
W2SZ (AA1AA, K1EP, K2AD, K2JJB, K2TR, KB2WLK, KB2YQE, N1SV, N1SZ, N1XSY, N2BNY, N2XRE, N2YCA, N2YZO, W1SZ, W1UW, W1VE, WA1ZMS, WA2AAU,WA2SPL, WA8USA, WS2B, WW2R, ops) 2,459,850 2846 465 M ABCD9EFGHIJKLNP

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Eastern New York

W3HHN 34,500 257 100 A **ABCD9E**
N2TY (W2JHO,op) 4,292 120 29 A ABCD
N2UD 636 45 12 A ABD
WA2BAH 4 4 1 A B
N2TJQ 2 2 1 A B
WB2SIH 38,400 271 100 B A**BCDE**
WA1RKS 12,150 153 75 B **A**BCD
W2LGB 4,326 92 42 B ABCD
N2TMT 3,668 131 28 B A
WA2YEI 468 29 12 B ABCD
KB2TSA 96 13 6 B ABD
KA2MCU 84 8 6 B ABCD**9E**
W2FW 12 3 3 B ABD
W2XL 22,842 207 81 Q ABCD9E
AB2I (+K2KJ,WC2J,WA2IID,WN2Y,WB2DVV, KB2SSS,W2AWX, K2CSS,KC2DMH) 207,270 857 210 L ABDE
K2TVI (N2GDY,N2GKM,N2NWZ,WA2VQH, WB2NVR,WB2VVS, ops) 94,164 673 118 L ABCD
N2UZQ (+N2TJQ,WA2BAH) 49,280 344 112 M ABCD9E

NYC-Long Island

WA2ZFH 7,000 110 40 A AB**CDE**
KA2VZX 5,454 101 54 A **AB**
KF2XF 848 53 16 A **B**
K2LCK 7,535 118 55 B **AB**D
KB2NOW 2,970 68 33 B AB**C**D**E**
WA2YJF 1,892 86 22 B **B**
K2OVS 1,050 34 25 B ABD
WA2OJK 21 7 3 B A
WB2AMU 1,064 44 19 Q ABD

Northern New Jersey

K2KIB 49,784 294 127 A **ABCD9EF**
K2YSY 4,140 86 45 A ABCD
W2UDT 2,484 72 27 A ABC
W2YR 2,070 56 30 A ABCD
N2OML/R 1,748 84 19 A ABD
WA2NXK 161 15 7 A BD
W2JEK 152 19 8 A AB
WB2CUT 2,320 116 20 B **B**
WA2BKN 1,104 48 23 B **AB**
KC2FYA 416 40 8 B B**D**
W2CVW 180 18 10 B A
K2BAR (NA2AA,WI2W,KC2DTA,WA2QHL, WK2M,K2YLH,K2AMI, ops) 236,394 988 207 L ABCD
N2NK (K2BM, N2WM, K2BJG, N2IEL, N2HMM, WV2V, ops) 179,350 739 211 L ABCD

Northern New York

K3KYR 6,496 112 58 A **AB**
NS2P 1,863 60 27 A AB**C**D
N2YEV 1,760 55 32 A AB
WB2KLD 912 33 24 A AB**D**
W2CFY 600 28 20 A ABD
KC2GHT 943 41 23 B **AB**
WB2BAU 20 10 2 B B
W2NNY (W2IB, KC2BEZ, NT2W, ops) 15,760 159 80 L ABCD

Southern New Jersey

N2SCJ 14,478 200 57 A **ABCDE**
WK8G 2,924 80 34 A ABD
N2MPU 377 29 13 A AB
K2SMN 167,316 563 219 B **ABCD9EF**

Western New York

KB3WL 9,420 118 60 A A**B**C**D**
K2OEQ 3,710 93 35 A AB**D9**
WA2ZNC 264 18 11 A ABCD
K2AXX 92,530 340 190 B **A**BCD9EFG**I**
NQ2O 59,736 312 114 B A**BCD9EF**G
K2AN 25,848 211 72 B ABCD9EF**G**
W2WGL 3,159 60 39 B BD
KB2NFS 360 28 10 B ABCD
KB2SGX (+N2VJV, N2VR, W2JEF, W2JWM) 9,735 140 55 L ABCD
AA2YG (+N2SLN) 1,081 47 23 L AB
N2PA (N2KG, N2JQR, W3OAB, N2JDQ, N2YB, ops) 463,150 982 314 M ABCD9EFGIJL
N2JH (+KB2OAZ,K3EKE,W3YZR) 12,285 136 65 M ABCD9E

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Delaware

W3OR 65,987 301 151 A A**BCD9EFG**
WA3BZT 5,480 137 40 A A**B**
KE3WH 126 21 6 B **AB**

Eastern Pennsylvania

WA3KFT 135 15 9 A **AB**
W8IJ 12 3 3 A AB**D**
K8RS 30,080 160 160 B **A**B**D**
K3TV 9,918 261 38 B **B**
W3SZ 2,407 44 29 B BCD**EF**
K3IB 1,860 60 31 B AB
KB3EXB 1,456 50 26 B AB**C**D
WA3CSP 714 34 21 B A
N3JNX 608 28 19 B ABD
W3JM 273 21 13 B A
WA3UGP 140 10 10 B ABCD
N3FTI 32,712 258 94 Q ABCD9EFG
AA3SD 1,806 64 21 Q ABCDE
W3HZU (AD3E, N3JDQ, N3NBT, KE3YR, ops) 13,952 195 64 L ABD
W3CMA(KB3DYJ,KB3FJJ,KB3FSU,KB3CFV,KB3DYI, NI3H,W3TI,W3ZRQ,AA3TL,ops) 3,300 75 44 L AB
N3JFM (+N3JXB, NM3N, W1LBY, W9QY) 252 21 6 L D
K3MQH (+AI3M,K3IXD,K3RA,N3EYB,W2GG, W3EKT) 817,548 1552 386 M ABCD9EFGI
W3CCX (K3DMA, N3PLM, W2SK, KF6AJ, WA3RLT, AA3GN, WA3DRC, N3FUJ, ops) 763,130 1558 335 M ABCD9EFGHIJL
K3YTL (WA1HHN,N1SFF,KA3EEO,KA3ZHT, KE3OA,K3CKO,K3MKZ,K3TOW,N3EMF,N3FA, ops) 726,271 1477 347 M ABCD9EFGHIJ
KF3DT (+ KB3CPL) 20,898 203 86 M ABCDE

Maryland-DC

K3HCE 46,443 317 137 A A**B**E
N3II 36,663 303 121 A A**B**
N3UM 5,952 124 48 A AB
K3DSP 3,440 86 40 A AB
WN3C 1,898 65 26 A AB**D**
K1RZ 260,260 696 260 B **ABCD9EFI**
N3HBX 54,960 383 120 B ABCDE
K3ZO 42,212 346 122 B AB
WA3EOQ 18,644 144 79 B BCDE
N3KNI 8,201 108 59 B ABCD9
WA4PRR 1,260 40 30 B ABD
W3GN 406 29 14 B AB
N3WMT 396 29 12 B ABC
K3TW 128 16 8 B AB
W3SO (WR3Z, W3TEF, WX3B, N3SB, W9NET, W3YOZ, ops) 90,482 497 161 L ABD
W3FT (N3WD, W3WDJ, KB3FOX, ops) 2,850 75 38 L AB
WA3ZKR (+KA3EJJ) 39,600 262 100 M ABCD9EFGHI

Western Pennsylvania

AA3GM 3,850 60 50 A **ABCDE**
WB0IWG 72 9 8 Q AB

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Alabama

W4ZRZ 55,144 364 122 A **ABCDE**
WB4NIX 4,284 84 51 A AB
WB4WXE 3,655 85 43 A AB
AI4CW 1,508 50 29 A ABD
N4JDB 27,494 213 118 B **A**BD
KU4WW 7,980 103 60 B **ABCD**
W4OZK 6,384 97 56 B ABD**E**
W2GFF 120 12 10 B A
KF4DGS (+ KS4YT, KV4T) 52,397 325 151 L ABD
KU4IU (+ NV4B) 34,100 254 124 L ABD

Georgia

K4KAZ 5,200 80 52 A **ABCD9**
N4WD 308 22 14 A AB
W4ATL 160 16 10 A AB
KD4K 18,601 173 89 B **ABCD**
WA4IOB 11,550 138 70 B ABCD**9**
W4EUH 45,018 311 122 L ABCD
K4NGA (WB4AEG,KB4OXA,WA4LXU,ops) 4,692 94 46 L ABD
K4RF (+K4SZ, K4EA,W4KXY) 118,400 493 200 M ABCD9EFGI
K4HUM (W4GCL,KG4CPF,KD4HLV,KE4VBR, KR4TG,KF4VZV,K4JJL,KF4LEX, ops) 39,790 285 115 M ABCDE

Kentucky

N4GN 29,154 258 113 A **AB**
KD4EVB 651 31 21 A AB
K4TO 73,359 328 171 B **ABCD9**

North Carolina

W4VHH 14,980 118 70 A **BDEFG**
NG4C 29,631 212 119 B **ABCD**
N4AWA (WA4IAM,op) 4,600 92 50 B A
K2IUK 81 9 9 B A
AF4HX 71,760 406 138 Q ABCD
AA4ZZ (+AA4S,K2SD,K4DXA,K4MQG,W4GRW, W4MW,W4VHF) 473,308 1144 347 L ABCD

Northern Florida

KU4WD	9,450	134	63	A	**ABCD**
KE4ISN	6,496	104	58	A	ABD
KE4YYD	1,425	55	25	A	**AB**D
WB4IHI	510	30	17	A	AB
K4JAF	418	22	19	A	A
NW5E	31,392	251	109	B	**ABCD**E
W2BZY	26,772	224	97	B	AB**CD9EF**
KS4KP	84	12	7	B	AB

Puerto Rico

WP4LNY	275	25	11	B	**AB**

South Carolina

N4UFP	11,700	136	78	A	**ABCD**
N4JZH	7,434	118	63	A	AB
N2FY	2,196	61	36	A	AB
K4YYL	1,836	46	36	B	**ABDE**

Southern Florida

N8PR	10,650	150	71	A	**A**
W4SLR	190	19	10	A	A
N4IS	44,608	315	136	B	**AB**DE
K0VXM	12,400	145	62	B	AB**CD9EF**
W2YX	1,848	73	24	B	ABD
KD4GVP	1,595	54	29	B	ABD
WA4OFS	901	40	17	B	ABCDE
W2DGJ	315	21	15	B	AB
KB2SFA (+ KB2TRD)	5,160	111	43	L	ABCD

Tennessee

N8UM	95,116	412	172	A	**ABCD9EF**
KD4HIK	39,098	279	113	A	ABCD
KV4EB	13,114	166	79	A	AB
KG4BMH	7,776	144	54	A	AB
W4AME	968	41	22	A	ABD
W9WI	391	23	17	A	AB
KE4OAR	156	13	12	A	AB
W4OGG	117	13	9	A	A
W4RXR	5,720	104	52	Q	ABCD

Virginia

N4HB	13,920	125	80	A	AB**CD9E**
KC4AUF	9,900	121	66	A	**AB**CDE
AD4TJ	8,640	112	64	A	AB**D**
K4FJW	6,536	123	43	A	**AB**CD
K4WYS	2,128	49	38	A	ABD
W4RX	159,200	578	199	B	**ABCD9EFI**
KN4SM	43,010	237	170	B	**AB**D
K4RTS	15,622	138	73	B	ABCD9E
K4FTO	2,352	68	28	B	ABCD
KE4BVP	1,450	49	29	B	ABD
K4MTS	620	31	20	B	AB
W2YE	608	32	19	B	A
K4ME	377	29	13	B	B
W4IY (W4AD, KA4CKI, W4DC, K4SO, WB4ZNH, KG4HTL, W4CE, KG4DFJ, WA0DYJ, NL7TK, ops)	315,425	962	275	L	ABCD

West Central Florida

K9HUY	24,130	248	95	A	**AB**D
K4FB	19,440	224	81	A	AB**D**
KG4EGV	2,448	72	34	A	AB
N4PK	1,000	42	20	A	AB**CDE**
N4BSA	336	23	12	B	**ABCDE**

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Arkansas

W5ZN	49,773	179	141	A	A**BCD9EFGHI**
AA5CH	4,816	86	56	A	**AB**
N5QYC	1,995	54	35	A	ABD
W5MRB	5,096	75	52	B	**ABDE**

Louisiana

N5ASA	2,040	51	40	A	**A**
K5CZD	1,702	45	37	A	**ABD**
WA5KBH	288	18	16	A	A
KD5HPT	37,398	258	138	B	**ABD**
WA5RT	15,834	175	87	B	ABD

Mississippi

W5RCI	6,431	88	59	A	A**BCDE**
N5JGK	2,960	73	40	A	**AB**D
N5KDA	4,312	88	49	B	**AB**
KJ5RC	3,402	81	42	B	**A**

New Mexico

K5RHR	12,975	157	75	A	**AB**CD
N5XZM	7,696	120	52	A	AB**CDE**
KB5ZSK	902	33	22	A	ABCDE
K5AM	112,312	546	202	B	**ABC**D
NK5W	18,920	207	86	B	AB**D**
KD5JAA	4,590	95	45	B	ABCD**E**
AA5B	1,364	56	22	Q	ABD

North Texas

W5SXD	77,922	441	162	A	AB**CDE**
WD5K	46,248	376	123	A	**A**
K5LOW	35,264	270	116	A	**ABC**DE
W5USJ	8,510	114	74	B	**ABD**
KB5VPR	20,553	212	93	L	ABD
K9MK (+WB5VYE)	57,330	388	126	M	ABCD9EF

Oklahoma

WH6LR	8,400	140	60	A	**A**
NL7CO	4,284	119	36	A	**B**
KM5NU	3,174	69	46	A	AB
N5PMP	1,971	72	27	A	AB**D**
WO7GI	1,734	51	34	A	A
KM5ES	1,508	52	29	A	B
K5SW	880	22	20	B	**C**
K5CM (+N5KW, W5AO)	219,224	762	268	L	ABCD
W5OK (KD5DLL, KB5HMZ, KD5MFQ, KB5ZGL, ops)	63,232	388	152	L	ABCD

South Texas

W3XO	70,224	385	154	A	AB**CD**9EF
K5IUA	49,594	254	137	A	AB**CD9EFGHIP**
K5LLL (NN5DX, op)	32,832	222	114	A	ABCD9E**F**
W5BXX	10,579	149	71	A	A
AJ4F	902	41	22	A	AB
K5EJL	520	26	20	A	A
N5BA	432	21	16	A	ABCD
KC5YOV	384	24	16	A	AB
N5HHS	9,869	139	71	B	**A**
AA5XE	6,076	98	62	B	AB
W5OE	4,420	78	52	B	AB**C**D
KM5TY	4,176	86	48	B	AB**D**
W5UWB	2,432	54	38	B	ABC**DE**
W5KFT (+K5TR, WM5R, NE5RO, KD5JZV)	168,948	663	228	L	ABCD
NX5M (+KB5ZFO, KA5BKG, KB5MRP, + logger)	39,627	323	119	L	ABD

West Texas

N5RZ	71,298	466	153	A	**A**
W5ZO	12,225	163	75	A	A
KA5PVB	3,105	69	45	B	**A**

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East Bay

W6OMF	7,950	105	50	A	AB**CDE**
KM6QJ	5,940	115	44	A	**AB**CD
KE6QR	2,900	88	29	A	**AB**D
KF6GYM	34,684	303	92	B	**ABCDE**

Los Angeles

W6IST	10,920	155	52	A	**AB**CD
W7IXL	5,600	151	28	A	**AB**CD
WB2KXC	17,204	219	68	B	ABD
KD6RUH	17,110	215	58	B	**ABCDE**
K0DI	14,641	121	121	B	**A**
KE6AXJ	2,983	102	19	B	ABCD
N5BF	96	14	6	B	ABD
W3SE (+ N6OPR, K7LA)	176,540	814	182	L	ABCD
K6OUE (+KF6YVV)	37,720	372	82	L	ABCD
W6TOI (KB6WKT, KE6HPZ, N6RV, KB6ATT. Ops)	215,270	741	206	M	ABCD9EFI
W6IVA (+ K6EOC, K6AGF)	8,658	162	39	M	ABDHI

Orange

K6TSK	50,760	327	108	A	**ABCDE**
KE6GFI	14,094	207	58	A	ABD
K6IBY	10,192	132	56	A	ABCD
KC6UIX	9,372	123	66	A	ABD
WK6I	9,272	152	61	A	**A**
WD6AWP	1,975	63	25	A	ABD
N6JX	1	1	1	A	B
KE6GFF	5,600	175	16	B	**D**
KE6QCB	245	27	7	B	**BD**
AD6IJ (+KC0HEN,KG6EQR)	7,276	169	34	L	ABCD

Santa Barbara

N6PI	72,000	355	150	A	ABCD**9EFI**
WB6AAG	59,321	340	137	A	**AB**CDE
KC6NBI	8,576	134	64	B	**A**
KE6RCI	1,836	86	17	B	**BD**
W9EC	1,395	36	31	B	AB**CDE**
K6YR (+W6WE,KD6NRU,W6NS,KF6SHU)	99,550	431	181	M	ABCD9E
AB6CF (+K6WLC,K0BGL)	32,421	254	107	M	ABCDEF

Santa Clara Valley

W6RXQ	20,646	203	74	A	**ABCDE**
KF6MXK	2,565	80	27	A	ABD
W6NL (K2KW, op)	49,536	384	129	B	**A**
N6JET	20,020	204	65	B	A**BCD9E**
W6GYD	8,120	160	35	B	ABCDE
N6ZKV	225	25	9	B	B
K6MI	68,234	385	109	Q	ABCD9EF
K6PVJ (KF6MXK,KE6HCK,K6HSV,N6KKX, K6GWV,W6KNS, ops)	1,200	57	16	L	BCD

San Diego

K6ZH	3,476	79	44	A	**AB**
WA6HXD	580	29	20	A	AB
KB5MY	28,728	266	108	B	**AB**
KF6JBB	12,012	153	66	B	A**BCD**
W6OYJ	2,093	54	23	B	BCD**EI**
WB6DTA (+K6DYD)	31,400	276	100	L	ABCD
NF6L (+ K6FQ)	11,178	156	69	L	ABD

San Francisco

K6UM	1,944	54	36	A	**A**
AA6DX	63	9	7	A	A**B**
W6MMM (WD6HDY, WA6OEM, KD6LTB, ops)	56,120	370	122	L	ABCD

San Joaquin Valley

N6MU (@N6NB)	101,250	554	162	A	**ABD**
NI6G	12,629	126	73	A	ABD**9EF**
KG6GMT	30	6	5	A	A
K6IRZ	16,281	190	67	B	**ABCDE**
KM6WO	2,277	58	33	B	ABD
KF6CNV	2,040	75	20	B	ABCD
K6ARP (KG6ALE,KG6AWG,KF6DDT,KF6DST, KG6FGK,KG6GQJ,KB6HRB,N6JXL,KF6KDC,KB6LQV, KD6MQG,WA6PRE,KB6QNP,KE6SVI,N6VYT, KF6YLR,KF6YLS,N6ZGY,KF6ZQY, ops)	37,332	248	102	M	ABCDEIL

Sacramento Valley

W6KBX	70,372	353	146	A	**ABCDE**
KJ6KO	71,788	391	131	B	**ABCDE**
KC6TEU	46,090	313	110	B	ABCDE
KC6ZWT	29,580	250	85	B	ABCD
K7QXA	5,175	89	45	B	ABD
K6ME (+ KE6NDG)	22,359	232	87	L	ABD
W6YM (K6FEE,K6KLY,ops)	81,037	450	139	M	ABCDE
K6AAA (+W6JEX,KE6JDS)	40,131	326	91	M	ABCDE

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Arizona

AC7BN	3,240	76	40	A	**ABD**
AA7A	98,808	513	184	B	**AB**DE
KE7FC	20,352	168	106	B	ABC**DE**
KE7NR	19,201	180	91	B	AB**CDE**
K6IAH	9,417	121	73	B	ABD
KF7JS	3,243	64	47	B	ABD
K1SC	2,698	71	38	B	A
N7IR	10,260	126	76	Q	ABD
KF7NP (+NU8I, KE7OT)	84,078	450	173	L	ABCD

Eastern Washington

W7GHZ	15,403	152	73	A	**ABCDE**
N7AU	26,780	212	103	B	**ABCD**
AB7IZ	2,332	53	44	B	AB

Idaho

K0IP	27,456	244	104	A	**ABD**
KC7ESB	2,479	67	37	A	A
W7USB	3,780	79	45	B	**ABD**
K7TM (+KB7WDV)	2,920	61	40	L	ABDE
KM7VU (K7SMA,KC7NAX,ops)	1,296	47	24	L	ABD

Nevada

N7NTN	2,480	62	40	A	**A**
NW7O	5,742	86	58	B	AB**C**DE
N7ROJ	3,220	75	28	B	ABC**DE**
WB6YIY	2,331	63	37	B	**A**
KC6UCN	1,458	48	27	B	A**BC**D
W7GE	456	23	19	B	ABD
W7KK (+NS9E)	79,180	417	185	L	ABCD
N7LQ (+ K7UI, KB7UIF, AE7I)	105,000	447	200	M	ABCDE

Oregon

W7DSA	14,912	171	64	A	A**BCD9E**
K0JJ	1,450	50	29	A	**AB**
KA6T	450	41	10	A	ABD
K7RAT (N6TR, op)	77,784	398	168	B	**ABCD**
N7DB	19,039	207	79	B	ABCD
K7HSJ	2,272	53	32	B	ABCD**E**
K7DLT	1,218	67	14	B	ABCD
KK7E	864	72	12	B	B
KJ7CY	492	41	12	B	B
KC7FLQ	336	28	12	B	B
K7CW (+N7EPD,KB7DQH)	32,542	249	106	L	ABCD
W7LT (KC7AOI, KC7PDI, ops)	8,624	169	44	L	ABD
K7ZL (+N6ENU,K6MPG)	39,750	236	150	M	ABCDE

Utah

N7DBW	12,322	162	61	A	**AB**C**DE**
KE7NS	9,324	119	63	A	AB**C**DE
KC7PVD	1,470	47	30	A	ABD
KT4GG	780	51	13	A	ABD
N7YOQ	84	24	3	A	ABD
WJ7L (+ K7RJ, KK7SB)	3,210	73	30	M	ABCDE

Western Washington

W7YOZ	35,405	305	97	A	**ABCDE**
W7FI	10,660	164	65	A	AB
N0AX	858	65	13	A	ABC
NU7Z	45,837	313	99	B	ABCD**9EFGHI**
K7ND	41,100	276	100	B	A**BCD9E**F
K7JX	19,966	248	67	B	ABCDE
W7DMN	1,900	75	25	B	ABD
W3JPT	1,764	90	18	B	ABD
W7KN	1,320	80	15	Q	ABD
KD7LXL (+KA7EXM)	1,258	58	17	Q	ABD
N7NGO (+ KB7LLB, KC7EXJ, KC7UTE)	4,031	121	29	L	ABD

Wyoming

AC7AF	3,234	77	42	B	**A**

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Michigan

KB8U	58,437	300	151	A	A**BCD9EF**
K8KD	28,676	248	107	A	**AB**D
KB8GOY	8,308	134	62	A	A
N8OC	7,062	103	66	A	ABD
KB8GC	6,519	108	53	A	ABD
N8DGD	2,050	50	41	A	A
N8IA	1,862	47	38	A	ABD
W8RU	1,836	54	34	A	A
KC8HYU	1,064	38	28	A	AB
K8MD	125,568	450	218	B	**ABCD9E**
K2YAZ	77,140	313	190	B	ABCD9E**FHI**
WD8KUF	11,160	138	72	B	ABD
N8ZVB	4,646	101	46	B	A
W8LOJ	1,290	42	30	B	ABD
WA8YLZ	760	37	20	B	ABD
K8GMW	252	18	14	B	A
K9IZ (KE9I, N9LAH,AJ9C, ops)	22,363	206	107	L	ABD
WW8M (+K8DAZ,NE8I,WA8VPD)	241,332	534	221	M	ABCD9EFGHIJK

Ohio

K8MR	58,140	309	153	A	**ABCD**
WB8K	16,008	159	87	A	ABD
W8MA	15,222	154	86	A	ABD**E**
N8BJQ	14,450	170	85	A	AB
KB8VUJ	5,600	92	56	A	ABD
WA8RCN	1,300	50	26	A	A
K9NW	1,104	48	23	A	AB
W8IDM	924	37	22	A	ABD
KC8CFI	220	15	11	A	BD
K8TQK	176,890	481	245	B	**AB**CD9E**FG**
KE8FD	166,531	462	241	B	AB**CD9E**F
WA8RJF	61,304	264	158	B	ABCD9EFG**H**
KC8OKJ	20,657	227	91	B	AB
W8PLZ	5,886	94	54	B	ABCD
KF8UN	2,542	62	41	B	AB
KB8VAO	2,242	46	38	B	ABCDE
N8GLS	900	36	25	B	B
KC8OHQ	900	36	25	B	AB
W8KNO	756	36	21	B	A
W8MGM	6	2	2	B	BD
N8XA	9,639	116	63	Q	ABCD9EI
KC8AAV (N8MWK, N8UVM, KC8QDP, KC8QKL, W8LXC, KI8CA, KA8LGK, AA8EZ, KC8PND, WD8LWC, KC8QDQ, KC8MZB, KA8URX, KC8MNA,ops)	4,644	80	54	L	ABD
N8KOL (+K8ROX, N8LIS, KC8AQF)	147,126	516	226	M	ABCD9EF

West Virginia

W8TN	5,510	91	58	A	**ABD**
K8KFJ	2,494	58	43	A	A
K2UOP	70,060	307	155	B	**ABCD9EF**
N4MM	23,124	246	94	B	**AB**
K8MN	20,412	173	108	B	ABD
KC8KSK	304	19	16	B	A
K8GP (W4XP,K6LEW,KC7MYE,K8ISK,ops)	1,917,480	2100	570	M	ABCD9EFGHIJP

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Illinois

K9PW	319,825	877	275	A	**ABCD9EFGHI**
K2DRH	157,548	558	228	A	ABCD9E
N9TF	17,612	199	74	A	ABCDE
NV8V	16,425	219	75	A	AB
WO9S	10,846	167	58	A	ABD
KG9IL	8,670	159	51	A	ABD
AB9BH	5,842	119	46	A	ABD
W9LYA	1,078	44	22	A	ABD
KB9II	714	38	17	A	ABC
N9KO	574	34	14	A	ABD
WK9O	45	9	5	A	B
N2BJ	269,798	722	277	B	**ABCD9EF**
KA9UVY	27,370	208	115	B	ABD
W0KT	14,450	154	85	B	ABD
W9RM	11,040	160	69	B	A
N9OBB	1,802	49	34	B	ABD
WD9IYT	1,000	40	25	B	A
KA9CLP	578	31	17	B	ABC
N9NJY	20,424	187	92	Q	ABCDE
N9TZL	11,288	137	68	Q	ABD
KB3AFT	7,296	76	76	Q	ABCDE
W9GKA	3,072	73	32	Q	ABCD
W9SZ	936	25	24	Q	BCD
K9LY	208	16	13	Q	A
K9RN (N9REP,K9TMS,KB9JZY,KB9VRW,KD6KHK, KB9RSO,KB9ZBZ, ops)	61,377	428	123	L	ABCD

Indiana

KB9OQC	2,535	65	39	A	**A**
N9LF	714	34	21	A	A
K9EA	83,961	415	171	B	**ABCD**
W9SR	14,418	178	81	B	AB
K9RU	8,968	135	59	B	ABCD
K9MQ	7,395	131	51	B	ABCD
WB9DRB	6,300	91	63	B	ABCD
KC9RG (+ KA9CCR)	15,312	145	88	L	ABCD
W9ICE (WB9YCZ,WB8ERB,N8NQG,N8JLZ, K9YDO,K9ZX,WE8N,KA8STM,WA0JTL, KE4OED,KA9BFM,N8ILW,ops)	319,158	874	298	M	ABCD9E

Wisconsin

WA1UJU	21,483	231	93	A	**AB**
KB9PJL	6,344	107	52	A	AB**D**
W9GM	5,916	102	58	A	AB
WD9ISG	276	20	12	A	BD
N0AKC	30,969	230	111	B	A**BCD9E**
K9MAL	28,917	235	119	B	**AB**CD
N9DG	28,034	232	107	B	AB**C**D
KB9Q	13,703	162	71	B	ABCD
KB9TLV	13,224	161	76	B	ABD
WA9LZM	12,580	156	74	B	ABD
KB9VSG	3,588	92	39	B	AB
W9JOT	3,280	72	41	B	ABD
N9NDP	374	34	11	B	B
W9HR	270	18	15	B	A
K9AKS	49,400	260	152	Q	ABCDE
N9MYK	10,624	132	64	Q	ABCDE
NI9E (+KA9WXN, N9FH,N9LLT,N9VA,WB9UAI, W9RN)	175,392	685	224	L	ABCD

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Colorado

K0CS	1,728	72	24	A	**B**
KA0MWA	1,632	51	32	A	AB
K0CO	1,170	45	26	A	**A**
K0GU	194,010	816	223	B	**AB**CDE
W0ETT	84,546	417	183	B	**ABD**E
W6OAL	82,490	502	146	B	ABCD**9EGHI**
K7VNU	11,690	167	70	B	AB
K0MF	1,224	68	18	B	AB
W0LSD (+ N0KIS, WD0BGZ)	13,908	180	76	L	ABD
N0IO (+ W7SAO)	6,222	85	61	L	ABCD
W1XE	272,384	938	256	M	ABCD9EFIJP
W0KVA (+N0WBW, W0KU)	23,485	264	77	M	ABCDE

Iowa

N0URW	47,808	302	144	A	**ABD**
N0SM	8,820	126	70	A	AB
N0SPP	3,136	56	56	A	AB
KM0T	285,471	524	327	B	**ABCD9EFG**
WB7OHF	192	16	12	B	A

Kansas

W0EKZ	14,168	132	92	A	A**BCDE**
K0BJ	6,156	114	54	A	**A**
KA0EIC	1,110	37	30	A	A
N0LL	161,760	583	240	B	A**BCD**E
WQ0P	104,742	429	198	B	ABC**D9EHI**
N0KQY	99,102	430	199	B	A**BC**DE
N0JK	64	8	8	B	A
KA0MR (+KA0KCI)	18,360	180	90	M	ABCDE

Minnesota

KA0PQW	59,210	331	155	A	**AB**CD
K0MHC	42,930	159	159	A	AB**CD9EFGH**
W0AUS	11,928	146	56	A	ABCDE**FI**
W0PHD	8,174	102	67	A	ABDE
K0JO	6,832	92	61	A	ABCD9E
N0UR	6,405	105	61	A	A
KC0HTB	5,796	94	46	A	ABCDE
K0GCJ	3,168	70	36	A	AD
WB0VGI	1,920	64	24	A	ABD
KC0HEW	1,102	45	19	A	ABD
N0AT	525	35	15	A	AB
WA2HFI	55,357	197	197	B	**ABCD**9E
W0GHZ	51,728	267	122	B	ABCD**9EFGHI**
K0SQ	17,920	166	80	B	ABCDE
K0SHF	10,296	154	44	B	ABCD9EI
WA2VOI	5,304	85	34	B	ABCD9EF
KB0LYL	3,145	185	17	B	B
KB0QLI	28	14	2	B	B
KF0Q	53,190	278	135	Q	ABCD9EF
N0BEL (+KB0ZEV,KB0NES)	36,472	306	94	L	ABCD
N0EO	16,830	163	99	L	ABD
N0UK (+ W9FZ, WA2PHW, W0ZQ, N0HJZ, WB0GGM, KC0FXY)	357,564	872	332	M	ABCD9EFI

Missouri

K0ETC	26,795	227	115	A	**ABCD**
K4SSO	10,988	141	67	A	**ABDE**
KI0MB	2,210	65	34	A	**AB**
W0HL	322	20	14	A	**BD**
KI0HA	4	2	2	A	**A**
KR0I	11,869	143	83	B	**AB**
W0FY	7,168	96	64	B	**ABD**
W0JRP	6,072	89	66	B	**ABCD**
KA0GGI	1,998	55	27	B	**BD**
WA0FQK	1,392	48	29	B	**A**
WB0IXI	180	18	10	B	**B**

North Dakota

NT0V	12,750	127	85	B	**ABCDE**
N0UD (WB0OAJ, N0LVW, KC0HXF, KC0JVJ, ops)					
	15,308	173	86	L	**ABD**

Nebraska

W0BJ	23,845	244	95	A	**ABDE**
AE0G	2,106	54	39	A	**AB**
KB0TYO	1	1	1	A	**A**
KG0LD	6,545	119	55	B	**AB**

South Dakota

WB0HHM	11,760	110	80	A	**ABCD**
KE0Z	609	29	21	A	**B**
WB0ULX	9,176	112	74	B	**ABD**
KI0BV	240	16	15	B	**AB**
N0QJM (+ WD0T, W0SD, W0DB, WB0TEM)					
	284,886	696	357	L	**ABCD**

Maritime-Newfoundland

VE1SKY	10,309	169	61	A	**A**
VE1YX	56,244	516	109	B	**A**
VE1JC	5,616	117	48	B	**A**

Nova Scotia

VA1LW	20,174	262	77	A	**A**

Newfoundland-Labrador

VO1GO	2,844	79	36	B	**A**

Quebec

VA2ADB	8,165	112	71	A	**ABD**
VE2ZP	1,300	40	26	A	**ABD**
VE2WBK	221	17	13	B	**A**
VE2CUA (+VA2SMF)					
	507	32	13	L	**ABCD**
VE2/VA3RCB (+VE3XJ)					
	216	15	9	L	**ABDE**

Ontario

VE3KZ	34,410	273	111	A	**ABD**
VE3SXE	5,106	99	46	A	**ABD**
VE3MQW	2,584	65	34	A	**ABD**
VE3CVG	2,465	56	29	A	**ABCDEI**
VE3CWJ	1,134	42	27	A	**AB**
VE3AX	144,966	463	222	B	**ABCDE**
VA3FIN	14,400	158	80	B	**ABCDE**
VE3SMA	12,928	143	64	B	**ABCDEFHIJ**
VE3OJN	2,964	57	38	B	**ABCDE**
VE3TMG (+VE3RNG)					
	25,920	237	96	L	**ABD**

Alberta

VA6AN	24,453	246	99	A	**ABD**
VE6JW (+ VE6JY, WA2TMC, VE6LDX, VE6MAA)					
	34,317	346	93	L	**ABDE**

British Columbia

VE7DXG	68,707	444	127	A	**ABCD**
VE7AGG	11,620	166	70	A	**A**
VE7SKA	8,905	136	65	A	**ABD**
VE7VDX	3,960	90	44	A	**A**
VE7NUT (+VE7MVF, VE7KED, VE7HHS, VA7DX, VE7BEE)	28,000	276	100	L	**ABD**

Cuba

CO2OJ	10,868	143	76	A	**AB**

Mexico

XE1/AA6RX	324	18	18	A	**A**
XE2HWB	81	9	9	A	**A**

Cayman Islands

ZF2MU (K4BI, op)					
	46,311	359	129	A	**A**

Rovers

Atlantic

N2JMH (+ N2WVK)					
	125,020	509	140	R	10 ABCD9EFGHIL
KB1EAU (+ KB1EFZ)					
	21,084	225	84	R	7 ABDE
K1DS	13,821	125	51	R	5 ABCD9EFGHIL
N1XKT	950	20	19	R	2 BCD9EFGHI
W3HMS	812	25	14	R	2 BGHI
N4TW	232	20	8	R	4 BCD
KB3XG	80	5	5	R	3 CJ

Central

N9RLA	7,056	144	49	R	6	AB
NE9O	6,909	126	47	R	4	ABCD
KF9US	5,612	71	61	R	7	ABCD9E
N8KWX	2,842	85	29	R	3	ABCD
WA6TMJ	1,675	65	25	R	4	ABC

Dakota

KB0ZKX	4,699	105	37	R	4	ABD
K8DXN	2,266	83	22	R	4	ABD
W0GC	273	15	13	R	2	BD

Delta

N4OFA (+ KB4NVD)						
	63,020	368	115	R	4	ABCD9EF
KF4VZQ	14,213	194	61	R	3	ABD
WA4JA	575	25	23	R	3	AB

Great Lakes

K4EFD	3,683	51	29	R	6	BDEFGHI
K8NFT	644	28	23	R	3	AB

Hudson

N2MH	54,840	367	120	R	12	ABCD
KB1EKZ (+ KB0WJO)						
	7,525	104	35	R	6	ABCD9EFGP
N2SZ	5,550	78	25	R	6	BCD9EFGHIJ

Midwest

N0DQS	72,810	440	90	R	16	ABCD9EFG
K0DAS (+N0LNO)						
	38,304	256	126	R	6	ABCD
N0QE (+ KB0YFN)						
	7,378	118	62	R	10	ABD

New England

KB1EAA (+ KB1EUH)						
	7,406	137	46	R	5	ABD
KE3HT	4,862	72	34	R	5	ABCD9EFGH

Northwestern

W7DHC	63,063	481	91	R	12	ABCD9EF
N7TIN (+ KA7YOU)						
	37,746	351	81	R	10	ABCDE
N7CFO	31,535	419	53	R	6	ABCD9EF
N7MX	15,750	177	70	R	10	ABCD
KA0TP (+ KD7FHZ)						
	7,289	186	37	R	2	ABD
N7IJ	2,052	55	36	R	3	ABD
K7PX (+K7VK)						
	504	24	21	R	4	A

Pacific

K6ALF	5,244	103	38	R	2	ABCD
W7PW	3,239	63	41	R	9	ABCD

Roanoke

W3IY (+ ND3F)						
	222,090	595	165	R	12	ABCD9EFGHI
KC3WD	30,750	173	75	R	12	ABCD9EFGHI
K4THY (+W4LLK)						
	13,398	194	58	R	13	ABD
K9OYD	10,922	117	43	R	5	BCD9EFI
NK4Q	8,112	134	48	R	6	ABD
W4BFB (AD4IE, WB2NHQ, ops)						
	4,859	101	43	R	6	ABD
KS4S	1,716	46	33	R	4	ABD
KE4MFH	861	41	21	R	2	AB

Rocky Mountain

KB0CY (+KA0DEH)						
	3,741	73	43	R	7	ABD
NJ7A	1,682	58	29	R	9	AB
N4LGY	1,365	39	35	R	6	AB
K0UK (+KB0QAA)						
	324	18	14	R	4	AB

Southeastern

K4GSX	180	20	9	R	2	AB

Southwestern

N6VHF (+N6DN)						
	183,150	653	165	R	12	ABCD9EF
N6TEB (+AD6HT)						
	107,328	474	129	R	12	ABCD9EF
AD6AF	1,215	60	15	R	4	ABD
N6ZE	299	23	13	R	3	AB

West Gulf

AB5SS (+W5DF)						
	142,932	382	172	R	15	ABCD9EFGHIJL
KI5DR (+ N9TX)						
	2,680	60	40	R	6	ABD
NH6CJ	2,080	52	40	R	2	AB

Canada

VE3NPB (+VE3OIL)						
	97,893	458	149	R	6	ABCD9EFG
VE3FHM	2,158	83	26	R	3	B

Checklogs: K0JQA, K4QI, K5MAT, K7ICW, WA4GPM

NEW PRODUCTS

ELECRAFT EC1 AND EC2 CUSTOM PROJECT ENCLOSURES

◊ Want your next home-brew radio project to look sleek and elegant? Check out the new enclosures from Elecraft, the EC1 and EC2. Both units are attractive, professional-grade blank enclosures that are the same size and color as Elecraft's K1 and K2 transceiver kits, respectively.

Both cabinets feature a textured powder-coat finish and are ideal for ham or electronics projects, whether standalone or as transceiver accessories. Their modular construction is especially well suited to RF equipment such as antenna tuners or switches, amplifiers, transverters and filters. Builders who prefer a finished product that doesn't look home-built will appreciate the modern, all-metal design.

The EC1 (about 2×5×6 inches HWD) and EC2 (about 3×8×8 inches HWD) take advantage of Elecraft's versatile, multi-panel construction. Any of the chassis elements can be quickly removed to facilitate drilling or cutting. The enclosures are held together using the company's unique "2-D" fasteners, which have excellent thread depth (1/4 inch), and are much more durable than tapped holes in sheet metal or plastic. Both cabinets include rubber feet, but the same tilt stands used on the K1 and K2 transceivers can also be used and ordered separately.

Price: $49 (EC1); $59 (EC2). For more information, point your Web browser to **www.elecraft.com/**.

IMPROVED LC METER FROM ANTENNEX

◊ Tired of not knowing the values of all of those capacitors and inductors in your junkbox? The LC Meter IIB, available from antenneX in kit form or assembled, should handle your LC measuring chores without breaking the bank.

The auto-ranging, standalone meter measures inductors from 1 nH to 100 mH, and capacitors from 0.01 pF to 1 mF (capacitors must be non-polarized), with a claimed average accuracy of 1%. Other features include self-calibration, a 16-character LCD and four-digit resolution.

Prices: $129.95 (assembled and tested); $99.95 (kit); $19.95 (upgrade kit for users of existing LC Meter II and IIA models). For more information, point your browser to **www.antennex.com/**.

2002 CATALOG FROM ANTIQUE ELECTRONIC SUPPLY

◊ Antique Electronic Supply announces the release of its new, large 2002 catalog, which has grown to 100 pages this year and includes many new products from Jensen, Celestion, Fender, Gibson, Weller, Xcelite, One Electron and more.

Antique Electronic Supply offers a diverse line of vacuum tubes, transformers, capacitors, parts, supplies and literature, including the largest inventory of NOS tubes in the US. From Tempe, Arizona, AES ships domestically worldwide each day.

For more information, or to get your free catalog, contact AES at 6221 S Maple Ave, Tempe, AZ 85283; tel 480-820-5411, fax 480-820-4643, **info@tubesandmore.com**; or at **www.tubesandmore.com/**.

NEW *PKTERM* SUPPORTS PSK31 AND TIMEWAVE PK-232

◊ In addition to a long list of existing data communication features, CSS's *PKTerm* '99 v1.5 software now supports sound card and hardware interfaces for PSK31 via Timewave's PK-232 PSK31 terminal. The multimode terminal program runs under *Windows* 95/98/Me and *Windows* NT/2000/XP as a true 32-bit *Windows* application.

Price: $79.95 (*PKTerm* '99); $29.95 (PK-232/PSK enhancement if upgrading from a previous version of *PKTerm* purchased before May 15, 2001). For more information, see your favorite Amateur Radio products dealer or point your Web browser to the Creative Services Software info site (**www.cssincorp.com/**), where you can download a demo version of *PKTerm*.

Previous • Next New Products

By Jean Wolfgang, WB3IOS

The 15th Annual School Club Roundup: 2002

School Club Roundup (SCR) is sponsored by the Council for the Advancement of Amateur Radio in the New York City Schools (CAAR/NYCS), the ARRL and the ARRL Hudson Division Education Task Force to foster contacts with and among school radio clubs. The SCR is a great way to get young operators on the air. Very often a new operator will be intimidated by the fear of not knowing what to say to the stranger on the other side of the radio. The exchange information helps to overcome this fear in a low pressure contest format. Operators are encouraged to take some time to chat beyond the contest exchange.

Award certificates will be issued for separate Elementary, Middle/Intermediate/Junior High School, High School and College/University levels for USA and DX entries.

Allan Cameron, N7UJJ, the advisor to the Carl Hayden Community High School ARC, comments:

Our club began "doing the test" in 1991. We haven't missed a year since. The kids absolutely *love* it. Many new kids start hanging around the radio room during and after the contest. Quite a few go on to earn their licenses. Our first year, we worked a few stations with an old Heathkit 101 and a 10 meter dipole strung between two buildings. We operated mainly during lunch. We didn't even send in our results. The next year we worked over a hundred stations in 10 hours. We sent in our results. Lew [Malchik, N2RQ] sent us a certificate that went on the wall. Each year we try to improve our previous effort. As we have gained experience, we have included more activities and equipment so every student can comfortably participate in as many roles as possible. You'll be amazed how the kids respond to the thrill of the chase!"

The week of the School Club Roundup is a prime time to introduce and expand students' awareness of ham radio. During this week, kids hear other hams calling schools for a quick QSO. Students evolve from mike-shy newbies to fast-talking pileup operators. Often we will switch from contest mode to ragchew mode and chat with other school stations for a half-hour or so, making friends and swapping stories.

The techie kids like setting up the equipment, constructing antennas, tuning rigs, operating the computers, and being responsible for the many technical details that occur before, during and after the week's roundup. Other students are attracted to the social aspects of the contest. They become interested in who and where they can talk. They like the conversations with other students and cultures.

All the kids respond to the competitive aspects of the week. The Nintendo generation wants to rack up a high score. As the week goes on, they talk about rates, propagation, efficient exchanges and multipliers. Often we have to insist that they go and eat lunch, attend class, go home. The SCR is addictive!

Arizona State University, W7ASU, took first place in the 2001 SCR college/university class. Their operators include several alumni from Carl Hayden Community High School ARC, KC7KFF.

Table 1
School Club Roundup Frequencies

Phone (kHz)	*Novice Phone*	*CW (kHz)*	*Novice CW*
1855-1865		1800-1810	
3850-3880		3530-3580	3685-3705
7225-7255		7030-7080	7110-7130
14,250-14,280		14,030-14,060	
21,300-21,330		21,050-21,080	21,110-21,130
28,550-28,580	28,350-28,400	28,050-28,080	28,110-28,130

Rules

1. **Object**: All stations exchange QSO information as below with as many other stations as possible, especially school clubs.

2. **Contest Period**: Monday through Friday in the second full week in

February. Start 1300 UTC on Monday February 11 and end 0100 UTC on Saturday February 16, 2002 (0800 EST Monday through 2000 EST Friday, February 11-15). Operate no more than 24 of the possible 108 hours. There is a maximum of 6 hours in any 24-hour period. Logs must clearly show on and off dates and times. Off periods must be at least 30 minutes.

3. **Entry Classes**, single transmitter only:

(I) Individual or Single Operator (non-club);

(C) Club or multi-operator group (non-school);

(S) School club or group (grades k-12, colleges and universities). (Any station operated at a school for the contest period. This includes any group formed for the sole purpose of participating in the SCR.).

If multiple transmitters are used, such as for demonstration purposes, care must be taken to include only the results from one at a time.

4. **Exchange**: Your call sign, RS(T), class ("I," "C" or "S"), US state, Canadian province or DXCC entity. For example, W2CXN answers N2RQ's call by sending N2RQ DE W2CXN 57(9) S NY. (Multi-operator group stations must choose one and only one call sign to use for the whole contest.)

5. **Scoring**: Stations may be contacted once each on phone and CW (Packet, RTTY and other modes count as CW). No repeater contacts except satellite and "real time" packet. Count one point for each phone QSO and two points for each CW QSO.

Multiplier: [Number US states plus Canadian provinces plus DX entities] plus 2× ["C" class QSOs] plus 5× ["S" class QSOs]. School stations get a multiplier of 5, which should make them the most desirable stations to work. Contacts with Marty, KA2NRR, will also count as a 5× multiplier. (KA2NRR was the founding Chairman of the CAAR/NYCS and creator of the contest that became the SCR).

Final Score: Multiply QSO points by multiplier. *Please use our summary form to avoid errors*, especially if this is your first time in the SCR. (See 6, below.)

Suggested frequencies: All amateur bands except 30, 17 and 12 meters are permitted. On VHF and UHF, repeaters are not to be used. Only recognized simplex frequencies may be used. US examples include 144.90-145.00; 146.49, .55, 58; and 147.42, .45, .48, .51, .54 and .57 MHz. The national calling frequency, 146.52 MHz, may not be used. Similar restrictions apply in other countries.

6. **More info**: Sample *log* and *entry* forms are available for a large, self-addressed, stamped envelope (SASE) or a label and postage. The latest version of *SCR-LOG** by AD8B is included with email requests to: **caarnycs@yahoo.com** or **n2rq@arrl.net**. It is available for download from **www.groups.yahoo.com/group/SCR-L**. KC7MOD's logging software, *Log It!*, can be found at **www.asu.edu/clubs/amateur_radio_society/logit/index.html**. Also, check **www.arrl.org/contests**. Subscribe to the SCR-L list by sending a message to **SCR-L-subscribe@yahoogroups.com**.

7. **Reporting**: You should clearly list the Callsign used, entry class, type of school, return address, phone number, e-mail address, number of operators/loggers, and number of hours. Logs must include exchange information, bands, and signature of all operators (and authorized club official or trustee and address, phone number and e-mail). Dupe check sheets are *required* for entries over 100 QSOs. (Computer entries on disk are appreciated. Use *SCR-LOG* or follow the ARRL Format. Please include a printed summary sheet and instructions including file names and formats. If you are not sure if we can handle your files, please send an email to **caarnycs@optonline.net**, call or write and ask us.) Entries should be mailed to School Club Roundup, c/o Lew Malchick, N2RQ, Brooklyn Technical HS, 29 Fort Greene Pl, Brooklyn, NY 11217. Entries must be postmarked not later than March 18, 2002.

8. **Awards**: 8.5×11 inch certificates for the top three entries in each class. The School Club class will be divided into Elementary, Middle, High School and College/University. DX will be listed separately at the end of the US entries in each category. A certificate is issued for any station contacting 10 or more school clubs. Send a large (9×12 inch) SASE or a mailing label and sufficient postage or IRCs for complete results. (Note: We have always sent a certificate for each entry. Due to increased participation and the associated workload, those who do not send appropriate postage or IRCs and an envelope or mailing label cannot be assured of getting a certificate.)

Jean Wolfgang, WB3IOS, is Educational Program Coordinator at ARRL Headquarters. She can be reached at **wb3ios@arrl.org**.

**SCR-LOG* is being revised at this time. Watch for *Windows* and Macintosh versions.

NEW PRODUCTS

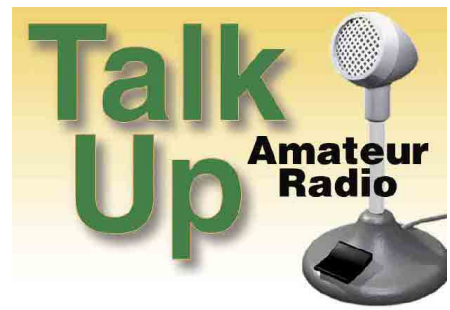
FLUIDMOTION STEPPIR REMOTELY ADJUSTABLE ANTENNAS

◊ Fluidmotion Antenna Systems has introduced its SteppIR series remotely adjustable antennas. The antenna is available as a dipole, and as a 2- or 3-element Yagi. The SteppIR antenna is unique in that it allows for continuous coverage (every frequency) between 20 meters and 6 meters, with an SWR of nearly 1:1.

Each antenna element consists of two spools of flat copper strip conductor mounted in the antenna housing. The copper strips are perforated to allow a stepper motor to drive them simultaneously with a sprocket. Stepper motors are well known for their ability to index accurately, thus giving precise control of the antenna length. In addition, the motors are brushless and are said to provide extremely long service life. The copper strip is driven out into hollow, lightweight fiberglass support elements, forming an element of any desired length up to 36 feet long. The fiberglass poles are telescoping, lightweight and very durable. When fully collapsed, each element measures 48 inches in length, making it an ideal choice for either permanent or portable installation. The antenna is connected to a microprocessor-based controller via cable.

The design of the Yagi offers several unique features, including the 180° mode, which reverses the direction of the antenna by changing the lengths of the reflector and director—all in under 3 seconds. The Yagi also has a bidirectional mode, which allows the user to have gain in two different directions simultaneously. Prices: dipole $439.95; 2-element Yagi $739.95; 3-element Yagi $995.95. For more information contact Fluidmotion Inc, 1075 Bellevue Way NE, #107, Bellevue, WA 98004; tel 425-456-0200; fax 425-454-1106; **www.fluidmotion.ws**.

Previous New Products



SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall K Carlson, WB0JJX—On January 1, 2002, I will begin another 2-year term as your Section Manager. No one does it alone, and I appreciate all the support I have received over the last 10 years, when I first took on the position. I look forward to the next term to do what I can to serve the ARRL members of the Delaware Section. Please mark your calendars for the upcoming Delaware QSO party. Sponsored again by the FSARC radio club, the QSO party will be held Feb. 2-3, 2002. Rules should appear in an upcoming issue of QST or will be available at the FSARC Web site WWW.FSARC .ORG. I urge all of you to participate sometime during the event. Traffic (Oct) DTN QNI 174 QTC 16 in 23 sess. DEPN QNI 29 QTC 0 in 4 sess. K3JL 27 N3HMQ 6. 73, Randall.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL — SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. BM: Fredric Serota, K3BHX. OOC: Alan Maslin, N3EA. PIC: Robert Josuweit, WA3PZO. STM: Paul Craig, N3YSI. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO, Pietro DeVolpi, K3PD. Dave Heller, K3TX, George Law, N3KYZ, Harry Thomas, W3KOD. DXCC Card Checker E. Pa.: Glenn Kurzenknabe, K3SWZ. I am pleased to welcome Glenn Kurzenknabe, K3SWZ, to the post of DXCC Card Checker for E. Pa. Glenn lives in New Cumberland, Pa. and has in excess of three hundred confirmed countries to his credit. Glenn will be a huge asset to the DXCC organization. The Anthracite Repeater Association in Hazelton, Pa. was presented with their twenty-five year ARRL affiliation certificate. It was a real privilege to meet with the members or ARA at the October monthly meeting. The cordial reception provided by the ARA was second to none. Special thanks to Emil Yannes, W3GFE. Emil provided the arrangements for my attendance at the ARA meeting. The following day I was off to visit the Warminster Amateur Radio Club. The Warminster Club hosted an excellent meeting and a whole lot more. At the Warminster meeting Russell Tobias, KB3UI, volunteered to work with SEC Mike Miguelez, N3IRN, in order to formulate a Section Emergency Plan for E. Pa. Thanks to Tony Simek, N3YNH, and the rest of the members of the Warminster Club for their great hospitality. I was also fortunate enough to attend both the Pack Rats Hamfest and the RF Hill Hamfest earlier in October. There were six trips to Bucks County in 2001 and it really was delightful to see so much Amateur Radio activity in one county. As I drove out of Bucks County I thought I saw someone lock the gate so that I could not get back in. October also was the time for the Pa. QSO Party and unfortunately my HF rig decided to develop some problems and participation in the contest amounted to about twelve contacts. I guess this means that I will have to make twice as many contacts next year. I will say that this year was really a great experience. Everyone has been very congenial and the problems have been few. I have learned quite a bit in the past twelve months and I am determined not to let it go to waste. My future efforts will be toward getting more people involved. Tfc: K2BCL 285, N3EFW 260, N3YSI 170, W3IPX 113, W3HK110, N3SW 70, W3UAQ 64, W3NNL 48, W3TWV 46, W3JKX 34, K3TX 26, KB3CEZ 17, KB3BBR 14, KB3DCT 12, KB3CVO 11, N3AO 10, AD3X 9, N8JSO 8, K3ARR 6, KB3DDL 3, N3AS 3, W3BNR 3, N3HR 3, N3KYZ 2, KB3CKD 2. Net Reports: EPA 101, PTTN 77, EPAEPTN 74, CATN 12, D3ARES 9, PFN 9, MARCTN 8, SEPPTN 6.

MARYLAND/DC: SM, Tom Abernethy, W3TOM, 301-292-6263-w3tom@arrl.org—ASM/RACES, Al Nollmeyer, W3YVQ (w3yvq@arrl.net). SEC: Mike Carr, WA1QAA (bamcc@erols .com) 410-799-0403. MDC Section Web page: *http://www.qsl.net/w3tom/*. Congratulations to the Baltimore ARC for earning their Special Services Club certification! PRGE EC/RO WI3N reports the Prince George's County EOC was activated on Sept 24 due to an F-3 to F-4 tornado. The tornado caused damage to the University of Maryland campus (including two deaths), Beltsville, and Laurel, Maryland. A communications link was established between the EOC and Laurel American Red Cross Chapter. Thanks to K3HDM for handling net control duty during the crisis and to the GMRA and WB3GXW for the use of their repeaters. CHAR EC/RO KA3GRW-Congratulations is in order for Mike Tackish, KA3GRW, recently appointed EC/RO for Charles County (CHAR). Mike reports 10 ARES members participated in SET 01 including KE3RE, N3DMI, N3SBT, N2OMC, K3GRG, N3YWZ, KB3GHI, AA3WS, and KA3GRW. FRED EC N8AAY reports FRED County ARES was activated in response to a Frederick ARC Sept 11 request. Overall, about 25 Amateurs participated. CALV EC N3QHC reports CALV members KR3A, N3ZIZ, and N3IDX provided assistance to Pentagon Salvation Army communication operations. Six ARES members participated in SET 01. CARR RO and Acting EC WX3F reports 30 members and five sessions of the CARET net on 145.410 MHz. SET 01 was great emergency operations training for KF3AK, N3YIM, N5LBJ, KE3FL, WB8YYY, and WX3F. ANAR EC N3QXW reports the ANAR EOC was activated on Sept 11 in support of county relief efforts at BWI. ARES members supporting the effort included N3QXW, WB4OGP, N3GT, W3CA, N3WOF, N3SEO, W3OL, N3ZOC, N8ECG, KB3DCA, KB3GIT, AA3FB, and K3BMV. 73, Tom. With the nets. Net/NM/QND/QTC/QNI: MSN/KC3Y/31/52/336, MEPN/N3WKE/30/100/489, MDD/WJ3K/62/167/594, MDD top brass AA3SB 199, K3JL167, AA3GV 132, BTN/AA3LN/30/48/380. Tfc: KK3F 2905, AA3SB 108, W3YVQ 84, N3DE 77, AA3GV 65, KC3Y 49, N3WKE 47, N3WK 43, K3CSX 38, WA1QAA 22, W3CB 19, N3ZKP 19, N3KGM 14, KE3FL 10, N3OR9, August AA3GV 75, Sept WA1QAA 3. PSHR: KK3F 191, W3YVQ 158, N3ZKP 153, AA3SB 146, N3WKE 127, KC3Y 119, W3CB 116, KE3FL 112, N3WK 110, AA3GV 104, WA1QAA 87, K3CSX 82, August AA3GV 91.

NORTHERN NEW YORK: SM, Thomas A. Dick, KF2GC—http://www.northnet.org/nnyham, e-mail: kf2gc@arrl.org.—ASMs: KD2AJ, WZ2T, WB2KLD, N2ZMS, WA2RLW. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: WN2F. STM: N2ZGN. TC: N2JKG. As we look forward to this New Year in Amateur Radio in NNY, we want to remember all the amateurs that have gone on before us and have helped make it a great privilege to hold a license. So many have given of themselves in their time and money to make our hobby unique. They took great pride in getting their license. And all those that I have known value it. I look forward to this coming new year, especially when you see more and more people wanting to get their amateur license. I would also like to encourage you to get your up-grade this year make that a goal. What is so great about this country? You can achieve all that you are capable of achieving with hard work and study you have the opportunity to better your license. It is up to you to take advantage of our wonderful VE testing teams. Hope to see you at the next session. 73. Web site: www.geocities.com/nnyara.

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA) e-mail ka2ykn@voicenet.com.—ASM: W2BE K2WB W2OB N2OO N2YAJ N2XYZ. SEC: KC2GID. STM: K2UL. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. TC:W2EKB. TS: W2PAU. WB2MNF AA2BN KD4HZW WB3IJB WA2NBL N2QNX N2XFM. Thinking about doing new things? Retired and looking for something different? Be a docent on Battleship New Jersey. Just go on the Web for info or contact me. (QST) Volunteerism will be big in 2002. We offer traffic handling, public service, MARS activities. Whatever you choose, GET MORE INVOLVED in life and in amateur radio. Because of the recent problems with our mail, it's important to put your RETURN ADDRESS ON THE OUTSIDE OF THE ENVELOPE when sending an SASE. To be sure, put it on all mails. Traffic for October: QNI rpts. NJM 112, WA2OPY NJN (E) 228, AG2R NJN (L) 182, AG2R NJPN 177, W2CC, NJSN 199, K2PB (above with NNJ) Local nets JSARS 271, K2ATQ SJTN 54, KB2RTZ SJVN 327, WB2UVB. Tfc:K2UL 68, WB2UVB 55, AA2SV 47, KB2RTZ 47, WA2CUW 41, K2UL-4 41, W2AZ 13, N2VQA 13, KA2CQX 12, WJ2F 11, KB2VYD 11, KB2YJD 4, N2WFN 3, N2ZMI KB2VSR KB2YBM, KC2ETU 1 each. PSHR: KB2RTZ 173, K2UL 165, WB2UVB 154, AA2SV 120, KA2CQX 108, WA2CUW 93, WJ2F 73, N2VQA 55, N2HQL 50, KA2YKN 53, N2WFN 41, KB2YJD 28, W2MC 14.

WESTERN NEW YORK: SM, Scott Bauer, W2LC—Silent Key: Earl H. Mann, "Howie", W2FR, Liverpool NY, born September 16, 1927. Howie Mann, W2FR, passed away at the age of 80, peacefully in his sleep, early Saturday morning October 27, 2001. Licensed for approximately 65 years, original call sign W8SEI. Howie served in the Navy during WWII, partly as a radio operator, and worked with GE for about 40 years in Lynchburg VA, and in Syracuse NY. Howie was an icon in the National Traffic System, Eastern Area Net, and Transcontinental Corp, TCC Director, Second Region Net manager. Howie, W2FR, was an ARRL member, an active DXer with 356 countries confirmed, a contester, a great CW operator, a member of the Salt City DX Association (SCDXA), and the A1 Operators Club. SCDXA used W2FR for many years when operating in ARRL Field Day. I remember using W2FR during FD. It was quite an honor using Howie's call sign. W2FR was an inspiration to many, he seemed to have endless energy even at 80. Howie will be missed by one and all. Thanks to Bud, K2KIR, for providing much of this information. Hamfests: Skyline ARC Winter Hamfest, Jan 21, Marathon Civil Center; ARA of the Southern Tier Winterfest, Feb 23, National Guard Armory in Horseheads NY. A great showing by WNY in this year's Field Day. Congratulations to the Rochester DX Association placing FIRST in the very competitive 3A category! Congratulations guys & gals! Congratulations as well to W2L and the Buffalo Lighthouse Group who placed #2 in 1A battery. Welcome new STARS officers: Bob, KA2WYE, Pres; John, KB2VWC, VP; John KB2ESM, Treas; Keith, KC2DGC, Sect; Judy, N2TEZ, Finances; Scott, KB2KOL, BOD. Good luck to Charles, K2OC, a WNY Assistant Section Manager, moving to sunny and warm AZ. How's DX? Happy New Year everyone! 73 Howie. Net Summaries (Oct 2001): Net Manager (Sessions) QNI QSP. Sessions in () if less than 31. CNYTN WA2PUU 334 81; EBN WB2IJZ (23) 378 0; ESS WI2G 491 125; NYPHONE N2LTC 249 461; NYPON N2YJZ 353 147; NYS/E WB2QIX 372 234; NYS/L W2YGW 301 199; NYS/M KA2GJV 197 85; NYSCN W2MTA (4) 20 3; NYSPTEN WB3CUF 322 57; OARC N2KPR (5) 41 6; OCTEN/E KA2ZNZ 1553 300; OCTEN/L KA2ZNZ 614 233; OMEN N2UC (1) 9 1; STAR N2NCB 278 24; TIGARDS W2MTA (4) 27 5; VHFTHIN N2JRS (1) 11 0; WDN/E N2JRS 494 91; WDN/L W2GUT 450 84; WDN/M KA2IWK (8) 104 24. Traffic (Oct 2001), * for PSHR, # for BPL: N2LTC#* 1447, KA2ZNZ#* 534, KA2GJV* 476, NN2H* 390, WB2IJH* 368, W2MTA* 329, KB2KOJ* 229, WI2G* 206, WB2QIX* 121, KG2D* 120, KC2EOT* 82, N2CCN* 81, N2KPR* 81, W2LC* 80, KA2DBD* 77, W2FR* 73, W2GUT* 64, W2PII* 46, KA2IWK* 40, N2JRS* 66, AF2K* 52, KB2ETO* 40, WA2GUP* 33, N2WDS* 31, KA2BCE* 19, K2DN* 18, KB2WII* 4. Digital, Rx/Tx: KA2GJV 33/4, N2LTC 433/240.

WESTERN PENNSYLVANIA: SM, John Rodgers, N3MSE—ASM: N3MYZ. SEC: N3SRJ. ASM-ARES: WB3KGT. ASM-Packet: KE3ED. OOC: W3ZPI. PIC: W3CG. STM: N3WAV. TC: WR4W. DEC: N3YEA, DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: N3BZW. DEC-Rapid Response: N3HJY. DEC-OES: K3TB. In September during the section emergency coordinators meeting Rich Beaver, N3SRJ, announced the appointment of Jeff Leach, N3YEA, as a district emergency coordinator. Jeff will serve as Rich's chief assistant and will also help in plans for training classes in emergency communications. Congratulations to Jeff and welcome to the ARES leadership team. As this year winds to a close, I want to thank all the volunteers that have willingly given of their time and talents to help during the many varied activities that have occurred here in Western Pennsylvania. Your service has been a great help to everyone in the section. During the winter months ahead, I would encourage amateurs to consider studying and upgrading your license class. If you need help in studying, ask at your local club meeting and I am sure someone will step forward willing to serve as an "Elmer" to you. There is a great deal of activity on the HF bands that could use more volunteers to help in the communications efforts. Areas such as emergency nets, both ARES and Races, traffic nets, contests, and special event stations. Remember you can provide needed assistance in the event of any emergency scenario. I know your help would be greatly appreciated. Join a traffic net on hf or vhf and help with message handling. The section traffic net meets on 3983 kHz every evening at 6 PM. My best wishes to everyone for a very Happy Holiday Season. 73 de John Rodgers, N3MSE, WPA-SM n3mse@arrl.org.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W: KB9AIL. Work on a club station at the Illinois Veteran's Home in Quincy is moving forward according to the Western Illinois ARC. The club has received permission from the home to install antenna, however the shack is not yet ready. The Kankakee ARS reports the NWS has installed two VHF transmitters in the area. The new stations, on 162.525 and 162.500 MHz, fill a gap in the NOAA weather coverage. KARS members had been pressing for the addition for several months. The Sangamon Valley RC is upgrading their TNC to operate APRS. SVRC is also working on a PSK31 setup. According to the Fox River Radio League newsletter, the city of Aurora is beginning a major volunteer recruitment campaign. One goal of this effort is to expand and improve the city's communications capability by enlisting the aid of amateur radio operators as volunteers in the Communications Division. The Egyptian RC trailer project is continuing. They have installed paneling and at last report were about to pull wire and put countertops in place. The Kishwaukee ARC W9S special event station made 487 contacts at the Northern Illinois Steam Show. KARC members were also making plans to assist on the annual Crop Walk. Macoupin Co. EC WA9RUM reports the yearly hospital disaster drill was cancelled this year because of concerns that all the ambulances going to the hospitals could get the public upset. ARES groups that have not yet conducted a Simulated Emergency Test may elect to conduct a tabletop exercise. October traffic: K9CNP 87, W9HLX 52, WB9TVD 35, KD9YV 18, NN9M 17, W9FIF 13, NC9T 12, N9GZ 10, KA9IMX 9, WA9RUM 7. From WB9TVD: ISN report for 10/01, QNI-209, QTC-57, Sessions-31 D9RN report for cycles 1 & 2. Sessions-62, Traffic-181, Average per session-2.91, rate of traffic-4.18, time-758 min. 87% of Illinois traffic handled by: NN9M, N9PLM, W9HLX, KD9YV, N9GZ, WA9CZA, AND KB9WRE. W9VEY Memorial Net report de K9AXS 7 with 254 check-ins.

INDIANA: SM, Peggy Coulter, W9JUJ—SEC: K9ZBM. ASEC: WA9ZCE. STM: WA9JWL. OOC: AA9WD. SGL: K9JZZ. PIC: KB9LEI. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys: 10/4, James F. Allman, WD9EOI, Marion; 10/6, Michael Anderson, KA9LQM, Evansville. They will be missed. The Internet has greatly reduced the volume of formal message traffic on the NTS nets to a level that indicates formal training in message handling is strongly needed. During a severe emergency or disaster, the public telephone network will likely be overloaded or inoperable. Those who have Internet access will likely not be able to send or receive e-mail as approximately 90% of these individuals use a dial-up access. (No dial tone - no Internet). The Indianapolis Repeater Association has started a "Youth Net" on Sunday evenings at 6:30 PM. The net operates on the 146.10/70 repeater and is run by and for youth as long as they have a technician license and are no more than 18 years old. All check in's again 18 years or younger are welcome. NMs ITN/WA9JWL, QIN/K9PUI/KJ9J,ICN/K8LEN, VHF/WA9JWL.

Net	*Freq*	*Time/Daily/UTC*	*QNI*	*QTC*	*QTR*	*Sess*
ITN	3910	1330/2130/2300	2617	203	1585	86
QIN	3656	1430/0000	186	60	692	54
ICN	3705	2315	63	18	222	25
Hoosier VHF nets(6 nets)			417	6	490	26

D9RN total QTC 181 in 62 sessions IN represented 100 % by KB9NPU, K9QBR, WB9QPA, N9KNJ, W9UEM, NT9G and WA9JWL. 9RN total QTC 139 in 62 sessions IN represented by K9PUI, KO9D, WB9OFG, KJ9J, N9HZ, WB9UYU and W9FC. Tfc: N9KNJ 127, WA9JWL 113, KJ9J 72, K9RPZ 46, KB9NPU 42, W9JUJ 39, K9PUI 31, K9GBR 30, KA9EIV 29, KA9QWC 29, WB9OFG 22, WB9QPA 18, K8LEN 17, WD9HII 12, W9EHY 11, WB9NCE 8, K9DIY 7, AB9AA 6, K9CUN 3.

WISCONSIN: SM, Don Michalski, W9IXG—SEC: WB9RQR. STM: K9LGU. ACC: K9FHI. SGL: AD9X. OOC: W9DGI. PIC: OPEN. TC: K9GDF. ASM: K9UTQ, W9RCW, W9CBE. BM: WB9NRK. With deep regret, I inform you of the passing of Gordon Fedder, Sr., W9YFW. AB-368 antenna bill has successfully passed the Senate hearing on October 31 with a 6 to 0 vote! Now it is on to the Senate floor for vote in January.

Continued on page 122.

Steve Ewald, WV1X ♦ Public Service Specialist

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Please send in letters of support to your Senator. Check www.w9ixg.eboard.com for more information. The FCC has reassigned W9BCC to the Rib Mountain Repeater Association under the memorial call-sign program. Our thanks to everyone who participated in the October 6 SET. These are important training sessions in these troubled times so we best be prepared. Watertown ARC received certificates of appreciation from students of the Riverside Middle School for helping them understand Amateur Radio. The club purchased 5 Technician license manuals for students and club instructors in teaching them. Well done and a good example of how we can promote Amateur Radio to youngsters so hope your club can follow their example. Early Birds wishing to provide the NWS with information on their daily local weather can check into the Badger Weather Net from 5-7:15 AM everyday on 3985 kHz. All you need is a temperature gauge that records 24 hour high and low temperature and a means of measuring rain and snow fall. 73, Don, W9IXG. Tfc: K9JPS 745, K9GU 608, W9IHW 586, N9VE 514, W9YPY 488, W9RCW 348, N9TVT 310, K9LGU 120, W9CBE 89, N9BDL 88, N9FHI 77, KG9B 60, AG9G 59, N9KHD 59, KE9VU 53, W9UW 49, W9YCV 41, WA7UVX 40, NK9P 36, KB9ROB 35, W9BHL 34, AA9BB 27, WB9ICH 24, WD9FLJ 17, W9RSX 13, N9JIY 11, K9UTQ 8.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, KMØD—Tis the season! This year we saw some flooding around Minnesota. We had a spring that seemed to drag on with wet weather. Then in July into early August we had very hot and muggy days with dewpoints that held consistently in the 70's. August finally brought some great weather. We again were reminded of Mother Natures' power after Siren WI was torn by a tornado in July. We all remember 9-11-01 and where we were as the events were unfolding. Each time I see a jet fly overhead (and I live near the MSP airport) I look at them in a different way. We've all heard the stories from the people in New York who were in and around the WTC. Perhaps we all view life in a different way since that day. While we strive to live our daily lives in a normal manner, we can't help but realize how fast all that can change, and certainly how it did on that day. It used to seem corny to some people when they saw others who "flew the flag" so patriotically. Now we see them as stickers in rear windows, on the antennas of cars, in front of houses, all over. Now it even makes more sense why we should. I'd like to thank everyone for their past support and I hope all of you continue to keep up the great work! Happy Holidays to all of you. 73 de KMØD.

Net	*Freq*	*Time*	*QNI/QTC/Sess*	*Mgr*
MSPN/E	3860	5:30 P	799/169/31	KBØOHI
MSPN/N	3860	12 P	390/70/31	WAØTFC
MSSN	3710	6 P	N/A	vacant
MSN/1	3605	6:30 P	291/63/31	KØWPK
MSN/2	3605	9:50 P	133/31/31	KØPIZ
PAW	3925	9A-5P	2390/81/77	KAØIZA

SAR: KBØOHI, WAØTFC, WØLAW, KØPIZ, WØGRW, WØHPD, KBØAII, KCØHAW, KØWPK, KAØIZA, KØPSH, KBØAIJ, KN9U, WDØGUF, NØJP, WAØYSL.

NORTH DAKOTA: SM, Kent Olson, KAØLDG —Happy New Year to all! Congratulations and thanks to Mark, WBØOAJ, who has graciously volunteered to be a Section Technical Specialist for Dickinson. Looking for more folks to join the ND Section Team and help further Amateur Radio. All those interested, contact me, or please check out the Section's web site at: http://home.earthlink.net/~qtipf16/. ND clubs have been very active in the last few months. The Dickinson club showed off Amateur Radio at the local mall, and helped out with JOTA. The Grand Forks club helped with the American Diabetes Walk and is hosting a Technician class. The Fargo club helped with the Alzheimer's walk and hosted a Technician class, which had 100% of the class getting their Tech License. Bismarck hamfest to be held on February 23rd. Fargo hamfest to be held on March 9th. Great job to all! Send me what your club has been up to, and I'll print the good news in this column. HF NM KEØXT reports Goose River Net, 4/45/0; WX Net 31/793/19; Data Net 31/682/14.

SOUTH DAKOTA: SM, R. L Cory, WØYMB—The WWII Memorial Dedication Special Events Station was held by the Pierre Amateur Radio Club on September 15. They made over 400 contacts. They are looking at the possibility of club along the River having Lewis and Clark special event stations on successive weekends so hams could collect a series of certificates. KCØCHJ and KAØSFV are taking the ARRL Level I Emergency Communications Course. Eleven Hams from the Watertown Club set up a station with a generator for Wal-Mart Safety Day and made a number of contacts in a 4-hr period. At this writing, KØERM is out of the hospital and is home recovering nicely from very serious illness. The Ten Net for October handled 200 messages with 62 sessions. South Dakota was represented 100% with W6IVV and KAØKPY. Mark your calendar for a reminder to check in on the South Dakota Novice Net on Sun at 7 PM on 3700.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH—It's time! It may almost be too late! What, you ask? I'm talking about going outside and securing, checking, & adjusting your antennas for the remaining winter weeks. YOU may be needed to provide communications should our state have any bad weather like last year's ice storm. No antenna is worth risking your life for, so if ice is present, then WAIT for some better temperatures before doing any tweaking. 2001 was a fast year with lots of activities and events in clubs throughout our section. This year, with more resolve, let's get back to the basics again by continuing your efforts to help your club by going to club meetings and volunteering for major committee positions. My deepest appreciation is extended to Elmer Langston, N5OCG, for developing our successful section Web site. It's full of useful information and hopefully will continue to grow with your suggestions and input into making it even more useful. The first few days it was in operation, and at the time of this reporting, it reminded me of the TV commercial of a new start up business on the Internet. It was a lot of fun seeing the number of hits being made on the site. Hope you continue using it. Net reports for October includes 133 pieces of traffic handled with

TECH TALK

Antenna Tuners for the IC-706MKIIG

Since the introduction of the first ICOM IC-706, there have been many different ways to get on the air in a mobile and base station environment. In this installation of "Tech Talk" we will attempt to the answer the question; "when will ICOM come out with a simple antenna system for the '706 series?"

Since the introduction of the IC-706, two accessories have been available for automatic control of the antenna systems; the AT-180 and the AH-4. With either one of these gems, band hopping has never been easier. Fully automatic, the '706 supplies the power as well as operating band information.

INTELLI-TUNER. The heart of the ICOM AT-180 and AH-4 is the on-board CPU. This "Intelli-Tuner" configuration utilizes 75 and 45 memories respectively, to store tune settings from the last time the band was used. Using this memory eliminates the need to transmit to search for the proper tune, thus reducing the amount of QRM on the band due to tuning requirements.

ICOM AT-180 Antenna Tuner

Although both the AT-180 and AH-4 sound a lot alike, there are some very important differences and if we have not answered all your questions please contact the ICOM Technical Support Department at 425-454-8155.

AT-180. An automatic antenna matching system for a coax, or unbalanced feed line antenna system. Of all feedlines, coax has become the hams favorite choice due to the seemingly endless applications for mobile and base operations.

EXTENDED RANGE. Designed to extend the operating range of a resonant antenna system, the AT-180 matches the impedance of the antenna system to the '706 for maximum radiated power. Why have an AT-180 on a resonant antenna? The perfect antenna would be flat on all portions of a band, but many antennas do not give low SWR across the entire band. This is where the AT-180 comes into play! With your antenna resonant for the middle portion of the band, the AT-180 extends the range of your antenna system to cover the entire band. With the IC-706MKIIG, AT-180 and a multi-band antenna you will be able to move around the bands will little effort. Check out www.icomamerica.com for more details.

AH-4. An automatic antenna TUNING system! While the AT-180 is used with resonant antenna systems and matches impedance, the AH-4 actually changes the resonance of the antenna. Whether using a whip for mobile, a long wire antenna, or ladder line for a dipole, the AH4 is an integral part of the antenna system.

REMOTE INSTALLATION. Designed for remote installations, the AH-4 is constructed in a plastic enclosure, fully gasketed and sealed to protect from water intrusion. Although it is not submersible, the AH-4 is perfect for mounting on the side of a house, tree or under a vehicle.

- Perfect for the RV'er! Use a 102" whip for traveling down the highway and work 40-6M. When you set up camp, attach a strong alligator clip to the end of the whip and 15' feet of wire, to cover 80-6M.
- For hams who sail, the AH-4 is perfect for tuning an insulated backstay.
- For those with strict CC&R restrictions, the AH-4 can be used to create a very stealthy all-band antenna.
- For the QTH, check out the October 1998 *QST*. Author Steve Ford, WB8IMY, has an excellent installation suggestion.

As with all antenna systems, RF safety should come first. Check out www.arrl.org/news/rfsafety for more information.

ICOM AH-4 Antenna Tuner

Visit your authorized ICOM dealer today or call for a free brochure, 24 hours a day: 425-450-6088

Find out more!

www.icomamerica.com

ICOM

individual contributions by KC5TMU 49, K5BOC 34, K7ZQR 31, W5RXU 14, W9YCE 12, KA5MGL & WB5HIL 10, WA5KQU 6, N5SAN 5, AB5ZU & KC5VQW 4, AD5AM 3, & K5KM 2. Good job and keep up the good work.

LOUISIANA: SM, Mickey Cox, K5MC — For the first time in many years our section conducted a SET exercise. On October 6, two special net sessions were held on 3910/7280 kHz in which 25 formal messages were handled. Participating stations included WB5ZED (NCS), W5GAD (AC5TM, op), K5IQZ, W5NK, N5IX, KM5IX, K5DPG, KB5SDU, WA5LQZ, WA5CAV, K5AZR, KM5QB, KA5IJU, and K5MC. In addition, local ARES groups in St. Bernard, Orleans, Jefferson, and Calcasieu parishes conducted SET exercises on VHF. In late September, Calcasieu Parish also conducted a combined SET/Fox Hunt that was a great success according to WB5TUG, with a special thanks to WA5LQZ for heading up the effort. WB5FBS reports that the Southeast LA ARC helped provide communications for the Multiple Sclerosis Fall "Tour for Cure" on October 6 and 7. The SELARC has participated in this event for the past 15 years, with WB5FBS serving as the club's communications chairman over that same time span. The following SELARC members earned PSC certificates for their participation: N5HAY, KC5IHR, K5CAV, KD5GUQ, KC5PAL, N5YHV, N5OUN, N5OUH, N5TPH, N5TPG, WB5FBS, AG5AT, KD5LWJ, KD5PKS, K5EEB, WA5FEQ, KB5SKW, and KC5BXU. Thank you all for your fine public service work! Tfc: K5IQZ 118, K5MC 93, KM5YL 27, W5PY 17, K5DPG 13, N5JU 7. PSHR: KM5YL 138, K5IQZ 134, K5DPG 118, K5MC 112, W5PY 77, N5JU 44. Net Reports: sessions/QNI/QTC. LTN: 31/419/75.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Mississippi Section Web Page at arrlmiss@org—Web Master K5IBM at k5ibm@arrl.net. STM: KJ5YY, NM: WJ5K, KB5W, N5YNY, KM5UH. The Starkville and Columbus ARCs provided safety and coordination communications for the J-3 Ranch Cross Country Horse Trials. Seventy-three riders went through their paces. Hams participating were AA5MT, AC5MR, KD5IKG, W5BJM, KD5JHA, KM5UH, KC5OXI, KD5LDT, W5VWV, and K5VVA. The SW MS ARES Team and the SE La ARC conducted a joint communications support exercise for over 1000 bike riders in the 18th annual MS Tour for Cure. The riders participating in the 150 mile - 2 day event raised over a half a million dollars for MS research. Those supporting this effort were N5HAY, KC5IHR, K5CAV, KD5GUQ, KC5PAL, N5YHV, N5OUN, N5OUH, N5TPH, N5TPG, N5ZNT, WB5FBS, N5VYW, KD5JXD, KD5KRX, KC5YUX, KK5EQ, AG5AT, KD5LWJ, KD5PKS, K5EEB, WA5FEQ, KB5SKW, and KC5BXU. Skywarn got a great write up in the Jackson Clarion Ledger as a result of an interview with AB5WF and KD4NLJ during the storm event of October 13. Regret to report the passing of AE5H in Arkansas. Steve was a Past President and very active member of the Jackson ARC. Also regret to report the passing of W5WQ of McComb and W5TDC of Morgantown. Congratulations to K5VV who achieved the DXCC Honor Role. Also congratulations are in order for WA9KEN, who completed the ARRL Level 1 Emergency Communications Course. The Jackson ARC set up HF/VHF Jamboree-on-the-Air stations at the Hood Scout Reservation in Copiah County as part of the 2001 Eastern District Fall Fishoree. Some 150 scouts got an operational introduction to ham radio. Those hams participating were AB5WF, KM5GE, N5OH, AC5SU, N5ZNT, WB5TEB, KD5PGV, KD5JXD, and W5XX. In addition, JARC provided communications support between rest stops and congested areas during the Walk for Diabetes sponsored by the Diabetes Foundation of Mississippi. Those helping were K5TMA, W5GEJ, KD5JPB, KC5WYY, K5RWB, KD5NHJ, KB7IWX, KZ5JEF, KC5OSM, W5QW, and K5XU. I trust Santa will bring plenty of new ham goodies to all the deserving. Merry Christmas from Vicksburg! PIO Report: W5KWB, KB5MPW. DEC/EC Reports: NN5AF, KD5EWB, KD5FUO, N5MZ, N5NQ, WB5OCD, KB5RQK, AB5WF, N5ZNT. Net Reports: sessions/QNI/QTC: MSPN 31/3657/41, MTN 30/99/42, MSN 31/1274/16, MSSN 16/69/0, Jackson Co ARES/RACES 31/395/11, PBRA 31/716/21, WCMS ARES 14/176/4, LARC-Jones Co ARES 5/79/4, MCARA 5/67/0, JARCEN 5/82/0, Attala Co ARES 5/42/1, NW MS ARES 5/50/0, Lowndes Co ARES 5/69/0, MLEN 4/74/1, MBHN 4/35/0, SW MS ARES 4/50/0, Bluff City Em Net 4/94/0, Central Miss SKYWARN 1/17/0. PSHR: WB5ZED 226, K5VV 128, W5XX 101, KJ5YY 79. Traffic: WB5ZED 713 (BPL), K5VV 47, KJ5YY 15, W5XX 4, W5LEW 2.

TENNESSEE: SM, O.D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU. TC: KB4LJV. Notice to all Tennessee section appointees: The new Section Manager is now in the process of selecting his field staff and getting his programs in place for the next two years. You should contact him if you are interested in continuing your present appointment and ask him for an endorsement and let him know your desires in any other areas you may have interest. I certainly extend my appreciation to all of you for your services and support during my ten years as Section Manager. I hope you will support the incoming SM as you have me—thereby maintaining the integrity in the Tennessee section. Those who get a copy of SPARKS, Oct 10 issue, and read "Ham Radio Shrinks the Globe," written by KB4KA, very good story. Remember the new net time for Anderson Co ARES on 146.88 at 8 PM ET. RACK members KG4KVQ W4FN KB4G KG4KVP WI8X & N4KNX provided communications for the Alzheimer's Memory Walk. The following NARC members furnished communications for the Multiple Sclerosis Bike-a-thon: KC4TMV, KC4ZOA, KC4ZOA, N4SYJ, KE4TQO, KF4OAH, KG4BHH and Mrs Pitkin, KG4OYU, N4BHO, N4VHM and Mrs Baker, KG4HAF, K3OI, KF4DHK, K4WME, KFØSI and Mrs Hodges, KE4JSW and Miss Nutter, WC4MBS and Mrs Carroll, K5LKT, K4ANH and the NARC motorcycle calvary KA4CPO, KF4ZVU, K3HI, W4HCL, KF4OXO, KF4MCU and Mrs Hamilton. Thanks to KG4DEU and AG4HG, the Red Cross had adequate support from the CARC for the Missionary Ridge Rd Race and Clark Tate, Charles Goodner, Wally Bell, Greg Boots, Gail Boots, Tom Wolf, Garland Eubanks, Peyton Carter, Lou Carter, Dan Clark, Charlie Curle, Joe Anderson, Ray Bowman, David Lankford, Harold Camp, Charles Chauncy, John Harris and Charlie Wheaton helped with the MS bike ride. DRN-5 rpt 62 sess, 512 msg, TN rep 82% by KE4GYR & W4OGG. Net sess/QTC/QNI: TMPN 31/22/2688; TCWN 23/32/172; TEMPN 23/58/828; TEPN 27/56/2935; N4PU 27/11/109. Tfc: WA4HKU 38, N4PU 30, WB4DYJ 20, W4SYE 18, KE4GYR 15, WA4GLS 14, K4QQ 11, KI4V 6.

GREAT LAKES DIVISION

KENTUCKY: SM, John D. Meyers, NB4K—ASMs: Bill Uschan, K4MIS; Jim Hicks, WB4CTX; Bob Drake, N4VGI; Bill Call, KJ4W; Fred Jones, WA4SWF; Patrick Spencer, KD4PWL. STM: Bill Slayman, KE4JFS. TC: Joe Pollock, K4ULW. SEC: Ron Dodson, KA4MAP. PIC: Steve McCallum, W2ZBY. OOC: Bill Hilyerd, K4LR. SGL: Bill Burger, WB4KY. ACC: Marie East, KE4MZP, and Silent Key Administrator, Tom Lykins K4LID. Silent Keys this month as reported KF4DJ, Chester Yunt, and N4WWD, Albert Kendall. The first of the year and time to look at what is ahead for 2002. Out of 22 affiliated clubs there are only 4 Special Service Clubs among them. It is a goal of this administration to hopefully increase this number by 4 and at the end of the year see 26 affiliated clubs and 8 SSCs. If your club would like information on being an SSC or would like for me or one of the ASMs to come and give a talk on being an SSC please contact me via the information on page 12 of the QST. At this time it has been decided to have the Ky State ARRL Convention in Lexington on August 4th with a Banquet Saturday August 3. All section awards will be presented that evening.

Net	*QNI*	*QTC*	*Sess*
KRN	697	23	23
KSN	255	25	31
KTN	2586	95	62
KYN	330	23	30
KEN	129	1	4
WARN	127	8	5
WTEPN	38	5	1
TSTMN	532	31	31
K4MSU	54	1	5

PSHR: NB4K 129, KO4OL 110, KE4JFS 76. Tfc: NB4K 17, KO4OL 15, KE4JFS 5.

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net); ASM: John Freeman, N8ZE (n8ze@arrl.net); ASM: Lyle Willette AB8CB (ab8cb@arrl.net); ASM: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). SEC: Ray DeVlieg, kb8vni@arrl.net. STM: James Wades, WB8SIW (wb8siw@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (kb8rji@arrl.net). SGL: Ed Hude, WA8QJE (wa8qje@arrl.net). TC: Dave Smith, W8YZ (w8yz@arrl.net). Youth Activities: Steve Lendzion, N8GQ (n8gq@arrl.net). BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net) HAPPY NEW YEAR 2002! Another new year is upon us and it's once again time for those New Years Resolutions. When we turn over the last page of our old calendar and open the new, it is a good time to reflect on some of the mistakes we made last year and attempt to do things a little differently. We are all communicators and often we forget to communicate with each other and let others know of our needs. One good means of communicating to others is through our club or organizational newsletters. We have many fine newsletters in our section and each one is unique. It reflects the pulse of our clubs as well as providing much needed news of our local organizations. Have we become complacent over the years and got the feeling that keeping current is no longer important? With the problems we have endured, on our own soil and abroad, it is now even more important to continue our training activities, getting involved in your ARES and becoming proficient in traffic handling within our many fine NTS Nets, and yes, even getting some much needed exercise in running a net as net control. Ask if your clubs can provide some supplemental training by offering some classes and don't forget about the fine Independent Study Programs offered by FEMA online, all free! ARRL also offers the Emergency Communications Courses in three levels. Please take advantage of this if you can. I would like to take this opportunity to thank Debbie Kirkbride, KA8YKK, for her four years of service as our Section Emergency Coordinator (SEC) and State RACES Officer. She has helped to bring about many positive changes within our Section, and I am pleased to announce her new appointment as Assistant Section Manager for Amateur Radio Public Service Corps (ARPSC). I would also like to welcome Ray DeVlieg, KB8VNI, of Milford as our new SEC and State RACES Officer. Ray has served us as District Emergency Coordinator for National Weather Service at White Lake and brings to us a wealth of talent. I would also like to thank Roger Edwards WB8WJV for his service to the Section as ASM for ARPSC as well as his previous appointments as SEC/RO and EC for Tuscola County. Roger has agreed to continue on as our ASM for Administration and will be providing me with some much needed help. Please join me in congratulating these fine people for their dedication to public service and giving of so much of their personal time and talent. Traffic reports for October 2001: K8GA 498, KB8ZYY 319, N8FPN 195, W8RTN 153, K8KV 141, K8LJG 138, KA8DDQ 136, WX8Y 123, K8AE 106, WI8K 63, WR8F 52, W8RNQ 51, K8FE 50, N8EXV 46, W8YIQ 36, K8UPE 33, N8JAT 30, WA8DHB 26, K8ZJU 23, K8YB 23, N8UN 23, K8AI 19, K8AMR 16, KI8GR 13, NX8S 4, W8NGO 3, KA8LAR 3. Deadline 5th of the month.

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12 and check out the Section Page at www.maser.org); ASM-NE: Bob Winston, W2THU, Cleveland; ASM-NW: Ron Griffin, N8AEH, Findlay; ASM-Central: Mary Carpenter, N8OAM, Westerville; ASM-SW: John Haungs, W8STX, Cincinnati; ASM-SE: Connie Hamilton, N8IO, Marietta; SEC: Larry Rain, WD8IHP, Mansfield; STM: Jack Wagoner, WB8FSV, Hilliard; ACC; Brenda Krukowski, KB8IUP, Toledo; TC: Tom Holmes. N8ZM, Tipp City; PIC: Scott Yonally, N8SY, Mansfield; OOC: Richard Kuns, KC8TW, Fairfield; SGL: Jeff Ferriell, K8ZDA, Columbus... Obviously as we start a New Year it means new officers and dues are due for most of our Ham Radio clubs. Join your local club, participate and make Ohio Ham Radio stronger in the process...After reading several months worth of 40 Ohio Ham Radio Newsletters, a fact often discussed by ARRL leadership is becoming crystal clear. The Ohio Section is taking the national lead as the hotbed of Direction Finding (DFing) and Fox (transmitter) Hunt competition. More and more newsletters list fox hunt schedules as they do area hamfests and VE tests. Two Cincinnati area hams (Bob Frey, WA6EZV, and Dick Arnett, WB4SUV) participate in worldwide fox hunting competition and the number of Ohio

hams who participate in local events grows monthly. Along with the regular competition (regular skills practice), the number of Ohio hams who build antennas and interface DFing equipment all over the state also grows. Not only do they provide a valuable source of hams who have interference locating skills for our OO program, Ohio continues to be in the forefront of Local Interference Committee formation. Another major benefit is that these hams seem among the most enthusiastic about their individual mode in all of Amateur Radio. Amazing things you can learn from reading Ohio Ham Radio Newsletters...The 2002 Dayton Hamvention in May will feature Amateur Radio emergency communications and preparedness as the general theme in answer to the attack on our country 9/11/01 and ham radio's outstanding call to duty...Please do not forget the 16th annual Southwest Ohio Digital Symposium, 9 AM. January 12th at Miami University-Middletown. Both veterans and novices at digital modes will find something of interest...As well as the Ohio Sect Web Page listed above, please visit the Great Lakes Division Web page (www.mrrace.com) for complete information on ARRL services...OHIO SECT CONGRATS TO: All Ohio Section members elected to local school boards, township, county or municipal civic offices in the November elections...OHIO SECT HAMFESTS: (20) Sunday CreekARF at Nelsonville and (27) TuscoARC at Dover...Plus may I be granted a personal note to thank Rupert, 6Y5RW; and Norman, 6Y5NS, both of Montego Bay, Jamaica for many courtesies during our October visit....de K8QOE.

Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	1241	28	188	31	1845	3.577	WD8KFN
BN (L)	207	63	266	31	2200	3.577	NY8V
OSN	12	38	488	31	1810	3.708	WB8KQJ
OSSBN	2096	727	3504	107	1030, 1615, 1845	3.9725	N8IO

Tfc: N8IO 538, K8PJ 253, N8IXF 201, WA8EYQ 165, WD8KFN 157, W8STX 144, N8BV 121, N8DD 119, N8RRB 117, W8QIW 107, W8PBX 101, N8TNV 100, N8OD 99, N7CEU 95, WB8KVM 93, WA8SSI 92, KA8FCC 75, N8WLE 75, KD8HB 71, W8RPS 71, KB8SIA 70, WB8SIQ 69, KC8DWM 64, WB8HHZ 63, AB8KB 58, KC8HYP 57, KC8HJL 55, KC8PDY 54, W8RG 48, KI8IM 47, KA8VWE 43, N8CW 39, W8PMG 36, N8IBR 34, KC8HTP 33, NS8C 32, K3RC 31, K8QIP 29, W8BO 26, WD8KBW 23, NY8V 23, N8GOB 22, KI8O 20, KB8SBK 20, N8YWX 17, KC4IYD 15, WB8IOW 8, N8RAK 8, KB8ESY 5, KC8RXL 5, K8WC 1.

HUDSON DIVISION

EASTERN NEW YORK: SM: Pete Cecere, N2YJZ— STM: Jim Peterson, K2CSS. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. Happy New Year to everyone in our Eastern New York Section. Last year was one of best in terms of public service. We will never forget the events that happened but we will learn and grow from them. May 2002 be a better year for everybody. 73 de Pete, N2YJZ, October - PSHR: KC2DAA 173, N2JBA 171, N2YJZ 168, W2AKT 156, WA2YBM 150, KC2HUV 149, WA2ZCM 142, K2YS 109, N2RTF 99, K2SLY 94, KB2YUR 91. Station Traffic: K2YS 120, N2YJZ 90, N2JBA 76, KC2HUV 72, N2TWN 64, KC2DAA 57, WA2ZCM 45, K2SLY 45, W2AKT 34, N2RTF 23, WA2YBM 23, KC2HUT 8, KL7JCQ 6, WA2WMJ 4, KC2BUW 1, KB2YUR 1. Net Reports: QNI/QTC+QSP AES 41/8 CDN 267/123 CGESN 41/6 ESS 491/250 HVN 809/303 SDN 399/190 NYPHONE 249/938 NYPON 353/304 NYS/E 372/500 NYS/M 197/174 NYS/L 301/434 NYSPTEN 317/110.

NEW YORK CITY / LONG ISLAND: SM, George Tranos, N2GA—ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SEC: KA2D. ACC: N2MUN. PIC: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. SGL: N2GA. Happy Holidays from the NLI Section Staff. The NLI Web site has moved - its new address is www.hudson.arrl.org/nli - please make a note of it. HRU 2002 is the ARRL NYC/LI Section Convention - Ham Radio University 2002 is Sunday, January 20, 2002, in North Babylon.Talk-in is on 146.685. A full program of education seminars is planned. 21 different forums are planned on all aspects of Amateur Radio. New this year are forums on "Debunking antenna myths", "Emergency antennas and power", "The Art of QSLing", "Skywarn / Severe weather" and "Disaster Communications". The focus will be "hands on" with many demonstrations. Clubs and organizations will set up information tables. There will be forums geared to the non-ham as well as seasoned veterans. The event will take place rain, snow or shine! More information is on the NLI Web site or contact Phil N2MUN at n2mun@arrl.net or 631-226-0698. NLI CW Traffic Net meets Monday thru Friday at 7:30 PM Local Time on 3630 kHz. The monthly NLI Section e-happenings newsletter is being e-mailed to all ARRL members in the section who have subscribed to Division / Section bulletins. If you have not received this newsletter, go to the ARRL Web site (www.arrl.org) and update your profile. Check the box that indicates you want Division / Section bulletins. Previous newsletters are available on the NLI site. Please e-mail me with your club's information and I will get it in the newsletter! Volunteer Exam sessions, club listings, upcoming events and more are available on the NLI Web site - www.hudson.arrl/nli. Tfc: WB2GTG 566, N2AKZ 170, KB2KLH 81, WA2YOW 72, KE2SX 35, WA2VZK 22, N2AVY 21, KA2YDW 18, KA2UEC 15, KB2RIF 8, AB2IZ 4, N2TEE 4.

NORTHERN NEW JERSEY: SM, Bill Hudzik, W2UDT—ASM: K2WJ. STM: WB2FTX. ACC: N3RB. SEC: K2SO. OOC: K2ZD. SGL: K1VX. Web page: www.arrlhudson.org/nnj. A new year is starting and let's hope this one brings some peace to the world. We need to offer our services to our towns. The best way is through ARES/RACES. If you have not done so please take the on-line Emergency Communications course. It will be the best money you have ever invested. Our SEC, K2SO is a certified instructor and hopes to plan in-person classes in 2002. Data on the NWS SKYWARN program can be found at the Bergen Skywarn page: www.bergenskywarn.org. Congrats to the new officers of the GSARA and the returning officers of the NJDXA. The 10-70 club operated special event NX2ND November 11 aboard the submarine USS Ling in honor of Veteran's Day. ASM N2WJ and SEC K2SO spoke at the November CLARA meeting. Both are available to explain RACES/ARES to other clubs. Check the NNJ Web page for info on status of the ham radio license plate bill. Our plate team will have met with the Transportation Committee in late November. The W2UDT family sends its best wishes to yours for a happy holiday season and a healthy new year. 73, Bill Hudzik, W2UDT.

Net	NM	Sess	QNI	QTC	QSP	
NJM	WA2OPY	31	112	38	32	223
NJPN	W2CC	35	177	47	30	
NJSN	K2PB	31	199	20	16	
NJN/E	AG2R	31	228	107	79	
NJN/L	AG2R	31	182	52	49	
CJTN	KB2VRO	30	201	39	33	
NJVN/E	N2RPI	31	578	68	55	
NJVN/L	N2OPJ	31	418	49	47	

Tfc: W2MTO 82, N2GJ 59, WA2MWT 56, W2JG 48, N2RPI 40, KB2VRO 37, N2OPJ 35, KC2ANN 29, K2PB 25, KJ2N 25, K2DBK 19, N2BVM 15, K2VX 13, W2CC 13, N3RB 4.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD—SEC: NA0R. ACC: N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. STM: KB0RUU... I have heard of SET plans that have changed as well as those that are continuing. Both the Des Moines and the Davenport hamfests went well. Did you participate in the Skywarn special event? EIDXA is still working on new name badges. Should look good. The FMARC successfully went Nowhere again this year. But that is good! I received a copy of the FMARC rag last month that noted: "Virus-Proof Copy." It was sent by USPS! They also elected officers: WB0B, KC0KKU, and KA0DX. Note the loss this month of W0WMP. Did you work 9K2USA? Remember that in this new time of turmoil, that as a league member you can file your license renewal through the ARRL VEC. At this time, FCC is not taking envelopes, and this is a good route. Have you looked at the ARRL Web site? There is a lot of information there in a small space. Take a look and see what you can find. Also the AView QST on CD is fantastic. I think I have worn my CD drive out with it. Time for a new one! I hope to get my new antenna up in the next few weeks. It is almost cold enough! 73 de N0JL. Newsletters were received from Story Co ARES, DMRAA, EIDXA, CVARC, FMARC, OARC. Tfc: W0SS 178, KB0RUU 146, WB0B 38, N0JL 17, KB0FB 4.

KANSAS: SM Organ Cook, W0OYH—ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankton, WD0DMV. STM: Ron Cowman, KB0DTI. PIC: Scott Slouch, KC0DYA. TC: Rick Carver, WA0KS. SET reports from last month are either slow coming in or there are few and may all be in. Please welcome new appointees, EC Ken Kopp of Topeka, W0NXS, and thanks you John, N0LJR, for the fine job he has done. New OES Craig, KC0IUW. EC June, KB0WEQ, reports 122 ARES members with 9 new ones. The Kaw Valley ARC 75th anniversary banquet was a big success with 73 in attendance and ARRL International Affairs V/President Rod Stafford, W6ROD, being the main speaker. Congrats Preston W0WWR for 669 PSHR again. Thanks, Rick, WA0KS, for the fine KAR Web site http://www.ksarrl.net/. Anyone wishing to receive the KAR e-mail newsletter, drop me an e-mail. Thanks to all of our Kansas appointees for being there for your communities. ARRL Ks Conv Aug 18/02 Sep. Kansas Nets: sessions/QNI/QTC, KSBN 30/993/65 KPN 22/312/25 KMWN 30/643/503 KWN 30/856/504 CSTN 25/1784/ 84 QKS 60/275/77 QKS-SS 6/10/2 SEC 66/709/15 QNS KB0AMY KC0AUH N0BTH KC0CFL KC0CIG WD0DDG AA0IQ N0LKK KB0WEQ KB0ZWK WD0DMV Joseph SEC. TEN Ks 77% 60/162/QNS AA0FO K0PY W0WWR NB0Z WB0ZNY W0SS/Mgr.TRN60/546/416 Ks 91.93% with KB0AMY W0FE N0KJ AA0OM W0WWR. Ks tfc: W0WWR 669, W0OYH 40, KB0ODT 35, NB0Z 19, NB0Z 13, W0FCL 7 N0ZIZ 5, KC0GL 4, WA0DTH 1. Room for your report here. 73, Orlan, W0OYH.

MISSOURI: SM, Dale Bagley, K0KY—ASM: John Seals, WR0R. ASM: Bill Coby, KB0MWG. ASM: Larry Ballew, AB0HP. ACC: Keith Haye, WE0G. BM: Brian Smith, KI0MB. OOC: Mike Musick, N0QBF. STM: Charles Boyd, KE0K. SEC: Patrick Boyle, K0JPB. Best wishes to everyone for a Happy New Year. The coming of the new year is a great time to assess where you've been and where you want to go. I want to express my appreciation to all MO Section ARRL members that have contributed so much to making Amateur Radio the most fun, inventive, challenging, and worthwhile hobbies ever. Together we have accomplished much in the past year, but there is still more to do. As a Section, we need to strive to do a better job bringing new people into the hobby. We need to stress the importance of Amateur Radio to our communities and the entire state. These and many other goals are best addressed by the energized membership of local radio clubs and the efforts of ARRL Section membership. I encourage all clubs to take part in the $15.00 per new ARRL member sign-up program. It will be good for the club and for Amateur Radio. Patrick Boyle, K0JPB, MO SEC has added a couple of new EC and a DEC to the Section ARES program. Richard Ebbesen, KB0VZP, EC for Johnson County and Keith Wilson, K0ZH, EC for Franklin County. Fred Langeneckert, WA0US, is the new DEC for district C. If Fred's name is familiar, it is because he was SEC before his employment required him to leave the Section. It's great to have Richard, Keith, and Fred as part of the Section ARES program. Let's all resolve to support the MO Section Hamfests in 2002. It would be good to start with the 145.49ers Hamfest in Springfield Jan. 12th, the St Joseph ARC Hamfest Jan 19, and the St. Louis Repeater Winterfest Jan 27th in Collinsville, IL. On Dec 3, 2001, it became mandatory for Amateur Radio Operators to use the FCC Registration Number (FRN) when filing with the FCC. If you haven't signed up for this number, go to the MO Section Web site and utilize the hyperlinks provided. Net Sess/QNI/QTC: Jackson Co ARES 4/46/0 Audrain Co ARES 4/55/5;WB0SEN WAARCI 4/103/2; MTN 31/517/91 Sullivan ARC 4/70/3; N0ATH 4/59/0; MON 142/152/33 K9ZTV. 10th Reg 62/200. Rollabillboard 31/466/19. Tfc: KI0BM 17, K0VNB 20, KE0K 55.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. It is with deep regret to inform you that Janice, K0RWX is a Silent Key. She is survived by husband, Cecil, W0RMB. Our deep sympathy also goes out to W0WHY, for the loss of his wife, Ramona. 20 members of Lancaster County ARES were called out on October 23rd in support of a telephone outage in southwest Lincoln. They staffed 5 strategic intersections in the affected area so citizens could have a source for emergency calls if necessary. Nine members of the Ashland Radio Club participated in the

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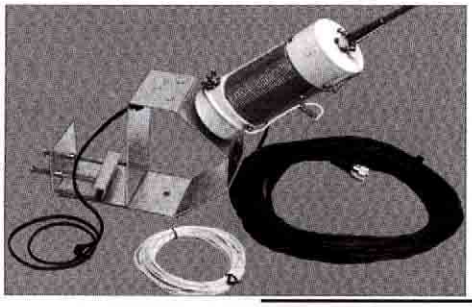

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Highly efficient air wound "bug catcher" loading coil and telescoping 5½ foot radiator lets you really get out! Radiator collapses to 2½ feet for easy storage and carrying.

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The MFJ-1904 is a 2x2 foot *stainless steel* square with reinforcing bends that greatly strengthens it. Folded and tapered six-inch *stainless steel* legs firmly anchor the MFJ-1904 into the ground.

Built-in antenna mount with SO-239 coax connector and two U-bolts lets you mount most standard and homebrew vertical antennas.

Standard 3/8-inch x 24 mobile mount is built-in for MFJ Mobile Whips, bug catchers, *Hustlers* and screwdriver antennas.

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Low angle of radiation for DXing, omni-directional, handles 1500 watts PEP, low SWR.

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Highly efficient 40 - 6 Meter base-loaded 5½ foot Bugcatcher mobile antenna . . . Use light duty mounts

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Attach a simple mount to your vehicle (*mounts*: trunk lip, MFJ-347, $39.95; mirror or luggage, MFJ-342, $9.95; tri-magnet, MFJ-338T, $19.95) . . . **Screw** in your MFJ *mini-bugcatcher* . . . **Throw** your rig into your car, plug into cigarette lighter and turn power down to 20 Watts (to avoid overloading your cigarette lighter; MFJ-1624 handles 300 Watts PEP). **Operate!**

Bugcatcher design uses large highly-efficient *air-wound* inductor -- far out performs other compact HF antennas. *Exclusive* built-in inductive matching network keeps SWR low. 5½ foot whip collapses to 2½ feet for easy storage and low garages. Base loaded for minimum wind load and light duty mounts. Change band by moving *wander lead*. 3/8x24 in. mount.

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MFJ-1621 **$89.95**

Operate from apartments, homes, hotels, campsites, beaches or any antenna restricted area. Work all bands 40, 30, 20, 17, 15, 12 and 10 Meters.

DXCC, WAZ, WAC, WAS have been won with the MFJ-1621! Compact 6x3x6 inch cabinet has 4½ foot telescoping whip, built-in antenna tuner, field strength meter and 50 feet coax. Handles 200 Watts.

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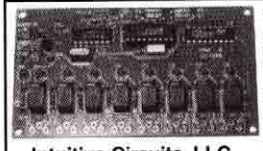

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Halloween Patrol for Saunders County on October 31. Members of the Bellevue ARC provided communications for the Veteran's Day parade on Saturday, November 10th. I want to thank all section appointees for your hard work in 2001. Net Reports: MIDNE ARES: QNI 315, QTC 2 & 31 sessions. NPPARC: QNI 38, QTC 2 & 5 sessions. NE Storm Net: QNI 842, QTC 20 & 31 sessions. NCHN: QNI 175, QTC 2 & 30 sessions. NE 40 Meter Net: QNI 254, QTC 4 & 31 sessions. MARES: QNI 125, QTC 2 & 4 sessions. WNE Net: QNI 1505, QTC 91 & 27 Sessions. Tfc: K0PTK 112, KE0XQ 20, WY0F 6, W0UJI 5, W0DED 2, W0EXK 2, KA0O 2, WA0ZCN 2, WA0ZCM 2. PSHR: KB0YTO 38, KC0HOX 23, KA0DBK 99.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—ASMs: KZ1Z, NK1J, N1API, K1STM. BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: KB1CTC. SGL: W1UTQ. STM: K1HEJ. TC: W1FAI. A very Happy New Year to you all. Thank you for your support and encouragement during the past year. I look forward to our working together even more closely as we strive to meet the challenges ahead. Emergency communications seems to be the topic on everyone's mind. Unfortunately, Darrow, WA1D, had to resign as Section Emergency Coordinator (SEC) due to his work commitments as reported in last month's column. I am pleased to announce two new cabinet appointments: Mike, KB1CTC, of Avon, as SEC kb1ctc@arrl.org, and Steve, W1UTQ, rolyats@aol.com, as State Government Liaison (SGL) replacing longtime SGL Bill, K1AH, who, for some time, has asked me to find a volunteer to serve. I would like to publicly thank Bill for his longtime support and willingness to help when asked. He has been on my cabinet since 1991 and was instrumental years ago in getting Amateur Radio included in the State emergency plan. He has served for many years as our Amateur Radio contact with the State OEM. Steve, W1UTQ, is active in his community and holds the appointment of local government liaison. He is anxious to be of help and is looking forward to serving as SGL. Mike, KB1CTC, is currently NM of The Nutmeg VHF Traffic Net and is completing the Level III Emergency Certification course. He is a retired physicist, has taught part-time and is looking forward to working as CT's SEC. A huge thank you to Darrow, Mike, Bill and Steve. Once the New Year begins, a member of my cabinet or I will be contacting those of you appointed in the Field organization to inquire about your availability so that your appointment can be renewed. Every so often, the SM really should touch base with all appointees and I intend to do that most likely in January. It will be fun to say hello. Have a safe Holiday! Net Sess/QNI/QTC/NM: NVTN 30/222/41/KB1CTC; WESCON 28/254/64/KA1GWE; ECTN 31/229/170/WA4QXT; CPN 30/207/60/N1DIO; CN 29/93/47/N1AEH; BOMN 25/195/210/NM1K. Tfc: NM1K 1956, KB1CTC 211, WA4QXT 210, K1UQE 153, KA1GWE 89.

EASTERN MASSACHUSETTS: SM, Phil Temples, K9HI—ASMs: WA1ECF, N1GTB, WA1IDA, N1UGA, AA1MO. ACC: N1DHW. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SEC: W1MPN. SGL: K3HI. STM: NZ1D. TC: N1UEC. e-mail list: ema-arrl@qth.net, Web: http://www.qsl.net/ema-arrl. Like many Americans, EMA amateurs are responding to the events of 9/11 in the spirit of community service. Clubs are offering more licensing classes; there is renewed interest in emergency communications preparedness. Let's all do our part to keep America rolling! Members of the Algonquin ARC held a successful "Halloween watch." Boston ARC's first JOTA was a great success. Over 50 scouts participated, along with 20 boys and girls from a Brockton youth group. Pix at: http://community.webshots.com/user/n1dhw. USS Salem ARC's recent scout operation was also a resounding success, reports K1RV. 150 scouts operated various stations, including a two-meter/internet link! Photos at: http://www.picturetrail.com/k1rv/477002. The Winthrop School in Ipswich may soon have a ham station, according to KB1DAH, an Ipswich teacher. Speaking of youths, the following needs to be shouted at every radio club meeting: "THE FUTURE OF AMATEUR RADIO LIES WITH RECRUITING TODAY'S YOUTHS." Framingham ARA's fall flea market and VE session garnered a good turnout. ACC N1DHW and SM K9HI presented 25-year ARRL affiliation certificates to the Algonquin ARC and the Pilgrim ARC, respectively. Cape Ann ARA has made great shack improvements: heat, hot water, kitchen facilities, and an additional station on the first floor! This SM recently visited the CAARA gang for a cup of coffee and a tour. Marconi RC is gearing up for the 100th anniversary celebration in 2003 of the Marconi station "CC" on Wellfleet. Both the Sturdy Memorial Hospital ARC and Harvard Wireless Club report ARRL Sweepstakes activity from their respective club stations. Sturdy reminds Attleboro area amateurs of its ECOM Practice Net on the 147.195 repeater at 2030 ET. North Shore RA held a Silent auction. WA1ECF is assisting the town of Sandwich's Board of Health on RF radiation hazard issues. Massasoit ARA operated a three-day special event station at the Edaville Railroad Cranberry Festival. Among those participating was W1JOE/"railroad mobile". Cape Cod ARES Net meets each Wednesday at 2000 ET on the 146.955 BARC repeater except on Barnstable ARC meeting nights. 73 de K9HI.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: N1JBD. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: N1RY. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: KA1TKS, K1NIT. Web Site: N1WFO. The Maine Marathon in Portland was helped out by local hams, including K1GAX, K4JAG, N1GRO, W1ZE, KB1GLV, KB1GLW, N1XP, W1IF, NX1A, K1AOK, and KB1FOG. Participation in events like this is not only good for the exposure to the public, but also good training for emergency preparedness. Looking forward to seeing everyone at the Maine State Convention at the Ramada Inn in Lewiston on March 29 & 30. Remember that the seminars and talks are always free, and the Ramada is offering a special reduced room rate for those wishing to stay overnight. When reserving rooms, be sure to mention the Ham Radio event. Tfc: W1KX 100, W1QU 54, W1JX 44, KA1RFD 30, KA2ZKM 29, N1JBD 26, W1JTH 20.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org) (www.nhradio.org)—Lots to report. Don, KA1GOZ, has stepped down as the NH Public Information Coordinator. Thanks for his years of service and helpful advice. Congrats to the grads of W1SJ's Manchester ham class held in October. In particular Judi, KB1HHY (my XYL). Congrats to CVRC new officers, Pres: KB1CKT, VP: N1PHV, Treas: N1PHZ, Sec: N1ZIH. NH-ARES is about to ink a new MOU with Army MARS. Signing to be announced in next month's column. K1SNH gave a presentation to NARC in Nov. on AO-40 operations, microwave comm. as well as discussing the benefits of ELMERing. I spoke to number of new hams in the weeks following the Manchester class. It is apparent we need an initiative to help ELMER new hams. N3CLZ (SEC) has EC positions avail in the following districts: Cheshire, Sullivan, Carroll, N. Grafton and E. Rockingham. Anyone interested should contact N3CLZ or N1FIK. The Emg. Dir. of New Ipswich has contacted NH-ARRL looking to forge a working alliance with NH-ARES. The NHARA has elected to transfer the responsibility for NH QSO Party to the NH-ARRL. Look to NH Web Site for additional contest info. Continue to be safe this holiday season 73-Al. Net/NM/Sess/QNI/QTC: GSFM/N1RCQ/31/179/32; GSPN/WB1GXM/31/151/66; VTNH/WA1JVV/31/130/81. Tfc: W1PEX 1254, N1NH 110, WA1JVV 73, W1ALE 53, WB1GXM 24, N1CPX 9, K1TSV 6.

RHODE ISLAND: SM, Armand Lambert, K1FLD—ASM: W1YRC. SGL: NN1K. OOC: W1AOM. STM: KA1JXH. PIC: WB1P. SEC: N1JMA. BM: KA1BNO. TC: K1DFT. ACC: WA1RI. ASM Bob, W1YRC, is visiting Rhode Island radio clubs and presenting commendations to radio amateurs who went the extra mile to help with the disaster relief efforts in New York City after the disasters of September 11. Thank you.

VERMONT: SM, Bob DeVarney, WE1U—ASM: N1RJF, W1AD, KD1R. STM: KB1DSB. SGL: WB1AJG. TC: W1SJ. BM: WA1SQO. Nets and traffic compiled by STM Karl, KB1DSB. Net sess/QNI/QTC/NM: VT YL Net 5/26/0/KA1LDS. Green Mtn Net 27/636/21/N1HXC. VTNH 31/130/81/WA1JVV. VT Phone Emergency Net 4/32/0/WA1DLA. VT Phone Traffic Net 31/231/43/KB1DSB. Central VT Traffic Net 31/279/64/KB1DSB. Tfc: KB1DSB 294, AA1PR 65, W1KMH 53, KB1EYP 21, W1RFP 10.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org—ASM: N1MAP. ASM (digital) KD1SM. STM: NZ1D. SEC: K1VSG. OOC: WT1W. Two months have passed since the World Trade Center disaster. We, in WMA, have had an opportunity to appraise our overall preparedness. Under the capable guidance of K1VSG, our marginal points have been strengthened. We have a working emergency system. In the event of a disaster, make yourself available on your local repeaters. Monitor 3943 kHz. This frequency is the call-in frequency for both the Eastern and Western MA Emergency Traffic Net. Traffic should be routed via your local repeater if operable or via the E/W MA 75 meter frequency. w1ud@juno .com is another outlet or there is a phone answering machine at the same number. Being innovative will move traffic. The 10-meter band is open to the world on a daily basis. All the clubs in the area have a full schedule planned. Attend your local organization and spend an enjoyable evening with fellow amateurs. When you read this, the Sweepstakes will be over. I hope you all participated. Send in your log with 100 or more contacts and the amount necessary for the SS pin. It is a great lapel decoration for that new suit. A sure conversation piece. You couldn't ask for a better chance to get that missing state for your WAS certificate. 73, Bill.

NORTHWESTERN DIVISION

ALASKA: SM, Kent Petty, KL5T—All section areas need to reevaluate effectiveness of ARES interface with local and state government agencies, as well as with emergency relief agencies. HF Pactor stations and amateur PACSAT stations needed throughout the section to interface communications networks between districts....can you help? Contact KL5T or AD4BL. Richard Lampe, KL1DA, of Glennallen, assigned as HAARP Liaison. Contact Richard if interested in participating in any HAARP related activities. HF nets: Sniper's Net 3920 1800 AST, Bush Net 7093 2000 AST, Motley Group 3933 2100 AST, and Alaska Pacific Net 14292 M-F 0830 AST. ALL HAMS – Please report communication drills and exercises, emergency communication activations, and public service activities via our online interactive FSD-157 (Public Service Activity Report) form at: http://www.qsl.net/aresalaska/fsd157/public_service.html.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—On Nov. 4, 2001 SEC Gordon Grove, WA7LNC, hosted a Section ARES/RACES Leadership Summit meeting to discuss emergency plans, activation procedures, ARES/RACES identification, the Simulated Emergency Tests, the 2001 fire season, and leadership strategies. Thanks to you leadership people from Whitman, Walla Walla, Chelan/Douglas, Yakima, Okanogan, and Spokane counties with DEC, EC, AEC, and OES appointments for taking the time and effort to help EWA have a better leadership team! Net Activity: WSN: QNI 900, tfc 216; Noontime Net: QNI 8979, tfc 264; WARTS: QNI 3662, tfc 106. Tfc: K7BFL 108, K7GXZ 94, W7GB 86, KA7EKL 67, KK7T 15. PSHR: W7GB 130, K7GXZ 121.

IDAHO: SM, John Cline, K7BDS — OOC: W7ZU. SEC: AA7VR. STM: W7GHT. I am honored to have the opportunity to represent ARRL members in Idaho. It has been a long time since I was an ARRL Section Manager, so clearly, I will need the help of all Idaho radio amateurs during this very sensitive time in our national History. I especially need help of Section appointees and the officers of Idaho's Amateur Radio Clubs. I urge all Idaho hams to periodically check my web page (Idahohamradio.com) for ARRL, ARES and RACES information. With your help, I hope to live up to the high standard that Mike, K7BOI, set for Idaho's Section Manager. Thanks, Mike – I think. Tfc: W7GHT 251, KB7GZU 121, WB7VYH 48, W6ZOH 37. PSHR: W7GHT 251, WB7VYH 55. Nets: FARM-31/3184/37/W7WJH; NWTN 31/1215/103/ KC7RNT; IDACD 23/471/11/WB7VYH; IMN 31/425/ 159/ W6ZOH. http://id_arrl.homestead.com/mainpage.html

MONTANA: SM, Darrell Thomas, N7KOR—October Amateur Radio activity in the Montana Section included two very nice events. The first one was the Bozeman Hamfest hosted by the Gallatin Ham Radio Club and the Sacajewea Middle School Radio Club in Bozeman, MT, on October 13th. This was a very nice event providing swap table, seminars, raffles and VE Exams for the 150 plus who attended. The second event was the Goblin Patrol in Great Falls, MT. The Great Falls Area Amateur Radio Club set up the Goblin Patrol on Halloween. The city was separated into districts and about twelve mobile were assigned to patrol the districts. They reported to another club member manning the Amateur Station in the EOC next door to the 911 Dispatch center. A city police officer was assigned to act as coordinator between the two operations. This event also received area wide public service news coverage about the clubs efforts. Net/QNI/QTC/NM MSN 118/1 W7OW, MTN 1629/38 KD7HWV, IMN 425/159 W6ZOH.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—There

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MFJ HF/VHF/UHF Antenna Analyzer

All-in-one handheld antenna test lab lets you quickly check and tune HF, VHF, UHF antennas anywhere. Covers 1.8-170 MHz and 415-470 MHz

Measures: SWR...Return Loss...Reflection Coefficient...Antenna Resistance(R), Reactance(X), Impedance(Z) and Phase Angle(degrees) ... Coax cable loss(dB) ... Coax cable length ... Distance to short or open in coax ... Inductance ... Capacitance ... Resonant Frequency ... Bandwidth ... Q ... Velocity Factor ... Attenuation ... Has: LCD readout ... frequency counter ... side-by-side meters ... Ni-MH/Ni-Cad charger circuit ... battery saver ... low battery warning ... smooth reduction drive tuning ... One year No Matter What™ warranty...

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Read Complex Impedance (1.8 to 170 MHz)as series equivalent resistance and reactance (Rs+jXs) or as magnitude (Z) and phase (degrees). Also reads parallel equivalent resistance and reactance (Rp+jXp) -- *an MFJ-269 exclusive!*

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Measures inductance in uH and capacitance in pF at RF frequencies, 1.8-170 MHz.

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Just plug in your UHF antenna coax, set frequency and read SWR, return loss and reflection coefficient simultaneously. You can read coax cable loss in dB and match efficiency.

You can adjust UHF dipoles, verticals, yagis, quads and others and determine their SWR, resonant frequency and bandwidth.

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New 12-bit A/D converter gives much better accuracy and resolution than common 8-bit A/D converters -- *an MFJ-269 exclusive!*

Super Easy-to-Use

Select a band and mode. Set frequency. Your measurements are instantly displayed! Smooth reduction drive tuning makes setting frequency easy.

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Take it anywhere - to remote sites, up towers, in cramp places. Fully portable -- battery operated, compact 4Wx2Dx6¾ in., weighs 2 lbs. *Free* "N" to SO-239 adapter.

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Tote your MFJ-269 anywhere with this *genuine* MFJ custom carrying case. Has back pocket with security cover for carrying dip coils, adaptors and accessories. Made of special foam-filled fabric, the MFJ-39C cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

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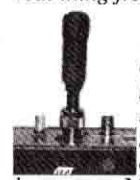

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are new appointments for Western Washington. First is for Terry Dettman, WX7S, of Kirkland and the appointment is as a Technical Specialist and OES station. At the moment, Terry is working to resolve interference from the ARES HF station to city equipment. Bill Herzberg, AA7PI, and Dick Radford, WA7NIW, both of Kirkland, are new OES stations and Ed Braaten, K6EKB, has just moved to Washington and has an ORS appointment. Stations taking the Level III emergency communications course are KD7KUN and KB7DFL. I'm serving as a Mentor for the course. In reviewing the OO reports sent, it is refreshing to see that the majority are complimentary for good operating. Only two cases of hum recently reported. SEC N7NVP has filed this report: Once again SET is behind us. The events of 9/11/01 caused many of us to revamp our plans and steer away from scenario base exercises to eliminate the possibility of eavesdroppers misinterpreting what they heard. Some jurisdictions kept their scenarios but changed their exercises to tabletop exercises that effectively accomplished the same goal. To those who took part in SET, thank you! In typical Clark Co. fashion, K7YFJ's team was out on Safety patrol providing extra eyes and ears for the local police force on Halloween. Chuck Radcliff, KD7MOU, has replaced Bob Dickerson, KD7ITV, as San Juan Co. EC. Dan Crane, KB7DFL, has replaced Alan Jones, W7SAY, as the Thurston Co EC. Thank you very much to Rob and Alan, and welcome to Chuck and Dan. The bywords for the new year are recruiting and training. Let's be careful out there. 73.

PACIFIC DIVISION

EAST BAY: SM: Andy Oppel, N6AJO—ASMs: NJ6T. KE6QJV. SEC: KE6NVU. DECs: KE6QJV/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. OOC: KD6FFN. STM: W6DOB. ACC: NJ6T. EB Web Page: http://www.pdarrl.org/ebsec/. Webmaster is KB6MP. SARS provided communications for the Providian Relay Race and for Fire Safety Day. ROVARC reported good success advertising their club and ship via a special event station. CCCC had a fun and successful fox hunt with 5 foxes and announced their 2002 Board Members as KD6NRD, K6USW, WA6QVM and KE6ZFP. Hats off to MDARC for sponsoring another successful Pacificon. Congrats to EBARC Pres KF6HFA for his upgrade to Extra! LARK wishes KE6YCW (Past Pres, EC, Newsletter Editor and Webmaster) and spouse KE6YKN the best in their move to Kentucky. ACSCT congratulates their County OES coordinator on becoming KG6HYT; having seen amateur radio in action, he knew he had to get his ticket. Oct tfc: W6DOB 553, WB6UZX 33, KE6QR 9, AK6DV 13. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7PM; NCN2-SLOW SESSION/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Jan Welsh, NK7N—SEC Paul, NN7B, has the level III emergency course under his belt. If you're qualified to administer the exams in NV, please notify NN7B, W6OLD or me. I attended LVRAC meeting and expanded my knowledge from N6BG-Byon's byon@mail.com program on radio controlled 'bots', believe it or not! Byon's Amateur Radio knowledge expands with the hobby. Elections coming up or already done (LVRAC) for most clubs, and holiday party's having lots of publicity in NV newsletters from RARA, FARS -(changed meeting location to IHOP on Trop), CVRC, ELKO ARA, SIERRA, LVRA, SNARS and LVRAC. The S. NV RACES repeater scheduled to go back on Angels. Higher mountaintops will soon be inaccessible, if not already. LV Repeater ASSOCs. 146.88 is down due to hazardous road conditions to the site at this time. The following web addresses contain handy info www.arrl.org, www.cvrc.net, www.cvrc.net/emcom/index.html, www.hxo.com, www.qsl.net/w7lko/NEW.html, www.qsl.net/elkorara, and www.pdarrl.org/nvsec/officers.html. ARRL appointee listing. Interested in an appointment? nk7n@arrl.org or 702-565-0242. Tfc: W7TC 64, N7CPP 15, K7NHP 12, NV7YL 8.

PACIFIC: SM, Ron Phillips, AH6HN—The Hawaii State Amateur Radio Convention was held on 13 October 2001 at the Pearl Harbor Community Center in Honolulu. Due to the problems of last month, the turn out was smaller than expected. However, about 200 or so hams did make the event and was enjoyed by all. Many thanks to the Koolau Club and to EARC for providing the activities and the coordination. Also, many thanks to Ed Hare, W1RFI from ARRL who did a terrific job. Lee Wical reports that Ms. Dene Hager, ICOM Trade Show coordinator, supplied ICOM band plans and ICOM America flyers and they were well received. Dean Manley, KH6B, reports that on Friday evening, October 12, the Hilo Amateur Radio Club held their 70th Anniversary Celebration at the Honolulu Airport Hotel. The club's president Kenny Bell, KH6AFQ, gave a brief history of the club's beginning in 1931. Otis Hill, K6AJA, (K6 was Hawaii's prefix before WW2), organized the club and boasted that all amateurs on the Big Island of Hawaii were members during the 1930s. Hilo ARC became affiliated with ARRL in 1946. Dean Manley, KH6B, conducted the prize drawing after the celebration dinner. Just about everyone went home with prizes. Featured speaker for the event was ARRL's Ed Hare, W1RFI. His talk was "The Incredible Saga of the Tuna Tin 2." The event was attended by KH6AFQ, KH6BMM, KH6HME, KH7T, KH6BBC, AH6HB, KH6KT, NH7D, WH6WI, KH6GQM, WH6JL, N6KB, K6FK, NH6DR, W1RFI (+xyl Suli) and KH6B. Also, for October, the daily morning sessions at Hilo Jack in the Box restaurant totaled 291 for October for a new record. That's an average better than nine per day. Special visitors in October were Jens DC0OQ, Germany and Charlie AH6OI/W7, Oregon. Aloha and 73.

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ—A happy New Year to all. January of each year offers a "new beginning". New resolutions motivate us. Let's all include giving something back to Amateur Radio among our resolutions. Introduce a prospective new amateur to the excitement and fascination of our service. Do all you can to truly welcome newcomers to this avocation we call "ham radio." Help re-invigorate the local radio club. Write an article for a ham magazine or your club newsletter. Try a new operating mode. Elicit support from your member of Congress or State Senator for the Amateur Radio Spectrum Protection Act. Become involved in amateur radio emergency communications if you are not already. Make 2002 a year of renewed enthusiasm in terms of your Amateur Radio career. Sorry to pass on the report from the Yolo Amateur Radio Society that WA6ANI is now a SK. A reminder that EMCOMM 2002 is coming up in a few months. This third offering will be the best

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Research shows that nearly *half* the speech intelligibility is contained in 1000 to 4000 Hz range, but contains a miniscule 4% of total speech energy.

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To dramatically improve your ability to understand speech, you must:

First, drastically increase the speech energy above 500 Hz, where 83% of the speech intelligibility is concentrated.

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The MFJ-616 splits the audio speech band into four overlapping octave ranges centered at 300, 600, 1200 and 2400 Hz. You can boost or cut each range by nearly 20 dB.

A balance control and separate 2½ Watt amplifiers let you equalize perceived loudness to each ear so both ears help.

By boosting high and cutting low frequencies and adjusting the balanced control, speech that you can barely understand become highly understandable!

Even if you *don't* have high frequency hearing loss, you'll dramatically improve your ability to understand speech. You'll get an edge in contesting and DXing and enjoy ragchewing more.

Here's what *QST* for April, 2001 said . . . *"I expected a subtle effect at best, but I was astonished . . . The result was remarkably clean, understandable speech without hissing, ringing or other strange effects . . . made a dramatic improvement . . ."*

Immuned to RFI. Has phone jack, on/off speaker switch, 2 inputs, bypass switch. 10Wx2½Hx6D". Needs 12 VDC.

MFJ-1316, $19.95. For 110 VAC operation. Provides 12 VDC/1.5 Amps.

MFJ-72, $58.80. *All-in-one MFJ-616 Accessory Pack.* Includes MFJ-392 headphones, two MFJ-281 speakers and MFJ-1316 power supply. ***Save $7!***

Try it for 30 Days

Order from MFJ and try it -- No obligation. If not delighted, return it within 30 days for refund less shipping.

MFJ Contest Voice Keyer

Transformer-coupled -- No RFI, hum or feedback . . . 75 seconds total, 5-messages . . . Records received audio . . .

MFJ-434
$179.95

Let this *new* microprocessor controlled MFJ *Contest Voice Keyer*™ call CQ, send your call and do contest exchanges for you in your own natural voice!

Store frequently used phrases like "CQ Contest this is AA5MT", "You're 59" . . . "Qth is Mississippi" . . . Contest by pressing a few buttons and save your voice.

Record and play back five natural sounding messages in a total of 75 seconds. Uses *eeprom* -- no battery backup needed.

You can repeat messages continuously and vary the repeat delay from 3 to 500 seconds. Makes a great voice beacon and calling CQ is *so* easy.

You can also record and play back off-the-air signals -- great help if you didn't get it right the first time! No more "*Please repeat*".

A playing message can be halted by the *Stop Button*, your microphone's PTT/VOX, remote control or computer.

Has jack for remote or computer control (using CT, NA or other program). Lets you select, play and cancel messages.

Your mic's audio characteristics do not change when your MFJ-434 is installed.

All audio lines are RF filtered to eliminate RFI, audio feedback and distortion. An audio isolation transformer totally eliminates hum and distortion caused by ground loops.

It's easy to use -- just plug in your 8 pin mic and plug the MFJ-434 cable into your transceiver. Internal jumpers let you set it to your rig. Use your mic or its built-in mic for recording.

Built-in speaker-amplifier. Speaker/phone jack. Use 9 Volt battery, 9-15 VDC or 110 VAC with optional MFJ-1312B, $14.95. 6½Wx2½Hx6½D in.

MFJ-73, $29.95. MFJ-434 Remote Control with cable.

60 dB Null *wipes out* noise and interference

MFJ-1026
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Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise -- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker! Interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequences from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network.* You can combine two antennas to give you various directional patterns. Null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312B, $14.95. 6½x1½x6¼ in.

MFJ-1025, $159.95. Like MFJ-1026 less built-in active antenna, use external noise antenna.

MFJ *tunable* Super DSP filter

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Only MFJ gives you *tunable* and *programmable* "brick wall" DSP filters.

You can continuously *tune* low pass, high pass, notch and bandpass filters and continuously *vary* bandwidth to pinpoint and eliminate interference.

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ever, and will be a full day and a half in length. Additional info available on the Section Web site. Kudos to the Mt. Vaca Radio Club for not letting something as minuscule as a forest fire deter "Happy Hour" during the club camping trip...even if they did have to evacuate one campsite and move to another. Good article on using the expanded receive capability of most 2 meter radios (or using a separate scanner) in the North Hills Radio Club newsletter. GEARS Newsletter had good, basic article on Yagi antennas. Until next month 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. KQ6YH is the new DEC for Lake County. Thanks, Dick, for volunteering. Congratulations to all the new club officers and directors. Let's make this a super year for the section. Welcome to the West Marin Amateur Radio Society. This is a new club at Pt Reyes. They monitor 147.420 simplex. They are into teaching new hams, public service, traffic handling, and enjoying the hobby. Contact KF6RXA, KF6RXB, K6JOQ to begin with. SCRA of Santa Rosa had KM6TN of the USS Pampanito (a WW II submarine) Radio Club for a most interesting talk. Sharing of club speakers is a good way to further enjoy Amateur Radio. KF6SZA ran a very successful SET with Sonoma County hospitals, shelters, fire bases, and the Salvation Army. SFARC shared use of their repeater for other area public serve events, and have been closely monitoring conditions in the area due to September 11. K6LGR of Lake County has made a very interesting very short 40/80 dipole for small properties. Several WARS hams are into Geocaching and are putting up caches in Central Mendocino County. W6FQX is working on a small rolled helix antenna for vhf. It is called a TASH (Tapered Area Small Helix). With the heavy rains upon us, check all your winter emergency equipment. Happy New Year.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN—ASM: Mike Siegel, KI6PR. ASM: John Lee, K6YK. SEC: Kent LeBarts, K6IN. ACC: Charles McConnell, W6DPD. OOC: Victor Magana, K1VM. STM: Fred Silveira, K6RAU — Section Traffic NCN report for Oct. as follows: from Walt KB6QIB 1. 60 2. 21 4. 2 5. 1 6. 10 Ttl: 94 Activity recv'd. 11, sent 10 DLD 2, Ttl 23 X 73 Fred K6RAU PSHR = (1) 17 (2) 3 (6) 20 / Ttl 40 Thanks for handling the traffic, gentlemen. Report for Pacificon: Attended meeting with FCC. Enforcement going forward well with help of OO staff. The California State Office of Emergency Services was represented once again this year at a meeting with the Section Managers. There was concern expressed by Section Managers and ECs alike that Amateur Radio operators do not seem to be appreciated as resources to the State. The State O.E.S. representative committed to a meeting with Section Managers and SECs from all Sections of the Pacific Division and Southwest Division for the purpose of ironing out ways to better interface with ARES. Present for the meeting was the ARRL President, Pacific Division Director, Southwest Division Director, Section Managers, SECs, and ECs. Skywarn is very active in S.J.V. Listen for morning nets during bad weather and consider getting involved. Write me an e-mail for more information at w7wn@arrl.org. I cannot stress enough the need for Amateur Radio operators in S.J.V. Section to become involved in ARES. We need you. Contact Kent LeBarts, K6IN, SEC, to put you in touch with your local ARES group. If you don't have a local group, form one. We can help. Emergency communication services in these trying times is more important than ever. Kent LeBarts e-mail address is k6in@elite.net.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W—SEC: KQ6FM. PIC: K6ALZ. BM: WB6MRQ. TC: WA6PWW. OOC: KB6FPW. SCV Homepage is http://www.pdarrl.org/scvsec - Info on license exam sessions is also available on the SCV homepage... We have a new District Emergency Coordinator. After many years of excellent service as DEC for Santa Cruz County, Jim Piper, KD6YKL, has asked to be relieved. Stepping up to the plate is Rich Hanset, KI6EH. Rich has been DEC in the past and so has "hit the ground running." Many thanks to Jim and welcome back to Rich! Planning is moving along for Radiofest 2002 in Monterey. Hopefully I'll have more details in next months column. Speaking of conventions, I saw many of you at Pacificon'01. We had a great time and am looking forward to next year. As far as I know, no one got wet. The Lockheed-Martin ARC held a meeting recently in Sunnyvale. They seem to be on an upswing of activity. For more information, contact newsletter editor Terry Nakashima, WB6PVU, at tnak@pacbell .net. (thanks Terry!) Santa Cruz County ARC meetings are at 7:30 PM on the 3rd Friday of each month at Dominican Hospital, 1515 Soquel Drive, Santa Cruz. Visit their Web site at www.k6bj.org for more info...The Palo Alto Amateur Radio Association meets on the first Friday at 7:30 PM in the Menlo Park Recreation Center, 700 Alma Street, Menlo Park. West Valley ARA meets on the 3rd Wednesday of each month at 7:30 PM in the Mary Campbell room (Q-84) at the Campbell Community Center. Check out their Web page at www.wvara.org. The South County ARES has a new URL for their Web page, http://www.K6MPN.org. They have a wonderful ARES/RACES group in San Mateo County and also one of the better newsletters. They meet third Thursdays in the San Carlos City Hall. Room 207 at 7:30 PM.- See you next month! 73 de Glenn, WB6W.

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC - SEC: KE4JHJ. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl .org. Great SET activity this year in North Carolina - thanks for your participation. The most important thing we learn from the SET are our strengths and weaknesses. Make sure you let your EC know how you think your group did - good and bad. On Thursday, November 8, I attended the opening of the Amateur Radio exhibit at the Robeson County Museum in Lumberton. The members of the Robeson County ARS (one of our Special Service Clubs) have gone all out to put together three rooms of displays chronicling the history of Amateur Radio and setting up working HF, VHF FM and APRS stations. The exhibit runs through April and is an excellent opportunity to show the public who we are, where we've been and where we are going. Try to visit it if you can. We are very fortunate to have several museum exhibits in North Carolina. The Natural Science Center in Greensboro and Discovery Place in Charlotte have been very active at coming up with creative programs to attract the interest of museum visitors, especially young people. These exhibits and others offer a great opportunity to show others why we are so enthusiastic about what we do. Let's make sure we take advantage of it. I'm sad to report that Doug Moore, W4WDM, of Sunset Beach became a Silent Key. Doug was a delight to converse with,

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Is your CW rusty?

Relax and place this tiny pocket size MFJ Morse Code Reader near your receiver's speaker . . .

Then watch CW turn into solid text messages as they scroll across an easy-to-read LCD display.

No cables to hook-up, no computer, no interface, nothing else needed!

Use it as a backup in case you mis-copy a few characters - - it makes working high speed CW a breeze - - even if you're rusty.

Practice by copying along with the MFJ-461. It'll help you learn the code and increase your speed as you instantly see if you're right or wrong.

Eavesdrop on interesting Morse code QSOs from hams all over the world. It's a universal language that's understood the world over.

Automatic Speed Tracking

MFJ *AutoTrak*™ automatically locks on, tracks and displays CW speed up to 99 Words-Per-Minute.

Simply place your MFJ-461 close to your receiver speaker until the lock LED flashes in time with the CW.

Four Display Modes

1. Bottom line scrolls and fills with text, then that entire line is displayed on top line until bottom line refills -- makes reading text extra easy! Automatically displays speed in WPM.

2. Same as **1**, without speed display -- gives you maximum text display.

3. Top line scrolls, bottom line displays speed in Words-Per-Minute.

4. Both top and bottom lines scroll.

Two-line LCD display has 32 large 1/4 inch high-contrast characters.

MFJ Instant Replay

The last 140 characters can be instantly replayed. This lets you re-read or check your copy if you're copying along side the MFJ-461.

High Performance Modem

Consistently get solid copy from MFJ's high performance *PLL* (*phase-lock loop*) modem. Digs out weak signals. Even tracks slightly drifting signals.

Of course, nothing can clean up and copy a sloppy fist, especially weak signals with lots of QRM/QRN.

Computer Interface

The MFJ-461's serial port lets you display CW text full screen on a bright computer monitor -- just use your computer serial port and terminal program.

More Features

When it's too noisy for its microphone pickup, you can connect the MFJ-461 to your receiver with a cable.

Battery saving feature puts MFJ-461 to sleep during periods of inactivity. It wakes up and decodes when it hears CW.

Uses 9 Volt battery (not included).

True Pocket Size

Fits in your shirt pocket with room to spare - smaller than a pack of cigarettes. Tiny 2¼x3¼x1 in. 5½ ounces.

No Instruction Manual needed!

Super easy-to-use! Just turn it on -- it starts copying instantly!

Accessories

MFJ-26B, $4.95. Soft leather protective pouch. Clear plastic overlay for display, push button opening, strong, pocket/belt clip secures MFJ-461.

MFJ-5161, $14.95. MFJ-461 to computer serial port cable (DB-9).

MFJ-5162, $5.95. Receiver cable connects MFJ-461 to your radio's external speaker 3.5 mm jack.

MFJ *Pocket* Morse Tutor

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Learn Morse code anywhere with this tiny *MFJ Pocket-sized Morse Code Tutor*™! Practice copying letters, numbers, prosigns, punctuations or any combination or words or QSOs. Follows ARRL/VEC format. Start at zero code speed and end up as a high speed *CW Pro!* LCD, built-in speaker.

MFJ Code Oscillator

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MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base -- stays put on your table! Portable. 9-Volt battery or 110 VAC with MFJ-1312, $14.95. Earphone jack, tone and volume controls, speaker. Adjustable key. Sturdy. 8½x2¼x3¼ in.

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Built-in Iambic Paddle. Thumbwheel speed control. Adjustable weight. Adjustable sidetone with speaker. Iambic modes A or B. Fully automatic or semi-auto "bug" mode. Reversable paddle. Tune mode. RF-proof. Battery Saver. Tiny 2¼x3¼x1 in.

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and exemplified the kinds of operating standards we should follow. As one ham put it, Doug was the definition of gentleman. That says it all. Hamfests: Elkin February 24. Traffic: W4EAT 375, NC4ML 190, K4IWW 144, KB5WY 124, AB4E 106, KI4YV 97, KE4JHJ 66, AA4YW 58, K4RLD 58, W4IRE 54, AD4XV 52, W3HL 37, KE4AHC 35, W4CC 34, N0SU 31, K4WKT 20, WA4SRD 13, N4TAB 13, KB8VCZ 10, W4EHF 10, N4NTO 8, NT4K 7, KE4YMA 5, N8UTY 4, KT4CD 4, WD4MRD 3.

SOUTH CAROLINA: SM, Patricia M. Hensley, N4ROS — Happy New Year 2002! We are afforded the opportunity for this year to build the finest ARRL organization in SC with your cooperation. As you know, club participation is one of the most important factors in supporting ARRL state-wide. I am happy to appoint Mary Favaro, AE4BX, as our new Affiliated Club Coordinator. Mary brings a tremendous amount of club organizational experience to the SC ARRL. She has been past president of several Charleston area clubs and is now very active in the Grandstrand ARC since moving to Surfside Beach. Please send club reports to both Mary and me. This ACC appointment completes my section staff and along with the Presidents' Council will help me provide the most effective leadership for the ARRL in SC. I am now ready to accept applications for section appointments according to the following procedure: A hardcopy application form will be sent to the SM after an endorsement by a member of the Presidents' Council/local club president or endorsement by two fellow amateurs if not a member of a local club. Notification of an appointment will be sent to the applicant by the appropriate section coordinator. Application forms can be downloaded from the ARRL Web site or requested from the SM. Recent reports indicate that we have 20 new technician licensees and one upgrade to general, KG4PWR. Remember the SET on Saturday, December 15 beginning at 8:00AM. HF stations report to 3993.5 kHz and VHF stations report to your local repeaters. Tfc: AF4QZ 152, KA4LRM 88, KA4UIV 64, WD4BUH 19, K4BG 18, KG4FKG/K4JIF 16, N4VVX 9, W4DRF 7, K3LM 4. PSHR: KA4UIV 128, AF4QZ 127, N4VVX 112, KA4LRM 110, K4BG 102, KG4FQG 83. SEC Report: 293.

VIRGINIA: SM, Carl Clements, W4CAC—SEC: N4NW. STM: N1SN. PIC: W4PW. ACC: W4IM. OOC: W4NEZ. TC: W4RAH. Web page; www.arrlva.org. Here is hoping that all amateurs and their families had a good holiday season. The New Year is upon us and by now we have all made our New Year's resolutions. I hope that one of your resolutions is to work with us to make the ARRL's programs in the section even better than they have been. There is plenty of room for all that wish to help. If there is a particular field that interests you, please contact the appropriate appointee above and offer your services. Want to know more about what is going on? Take a look at the Web page that Pat Wilson (W4PW) has put online. The page can be found at www.arrlva.org. Pat has done an excellent job with the page. He is also looking for material for the page. If you know of an activity, or club happening that would be of interest to everyone please forward on to Pat. A big Thank You to all that are currently working with the programs now! As I have said many times, it is the members that make the ARRL the fine organization that it is. I was saddened to learn of the passing of Radio Joe (W4CFV) at the end of October. Joe was well known on many of the nets including the Virginia Fone Net. Our condolences to Joe's family, his voice will be missed by all who knew him. 73 de Carl, W4CAC. Tfc: W3BBQ 464, K4YVX 144, WA4DOX 139, N1SN 130, KØIBS 97, K4MTX 92, WB4ZNB 74, WD4MIS 63, AA4AT 61, KE4PAP 56, W4VLL 43, KV4AN 43, N4ABM 29, KG4OTL 25, KU4MF 19, WB4UHC 18, W4JLS 14, W4CAC 11, W4YE 11, KU4TM 11, W4MWC 8, K4JM 8, K3SS 7, KB4CAU 4, N4FNT 2.

WEST VIRGINIA: SM, Hal Turley, KC8FS—ARES Net on 3.865 MHz is now "Mountain State Emergency Net" (MSEN) & follows WVFN 2nd & 4th Thurs. each month. Jim, N8TMW, MSEN Mgr. looking for few more net controllers & lots of check-ins. Kudos to Dennis, W8YS, & GL in new role as 8RN, Cycle 2 Mgr! W.Va. Section e-mail reflector 'wvarrl' provides new forum for info-sharing across the state at www.yahoogroups .com Great statewide effort with JOTA-300+ Scouts. Tnx to JOTA es W.Va. Club partners including: Monongalia Wireless Assoc.W8MWA; Kanawha ARC w/ K8BS; Tri-State ARA W8VA; East River ARC W4OF & KU4RK; Black Diamond ARC KE8YB, KC8PAR, KC8PAQ. Mark KB8YJV reports Nov.5 comm. drill at Martinsburg V.A. Med Center with lessons learned & realization that more frequent drills needed. KB3GN and KB8NIO manned radios in contact with V.A. Centers in Philly, Richmond, N.Y. and Boston during the training exercise. Martinsburg V.A. hams also sponsoring amateur classes Mon. nights. Cabell/Wayne EC Fred WD8AGH reports his ARES members involved in LEPC drill on Nov. 10 w/ 4 hams on scene to setup portable rptr. & standby net w/ 10 check-ins and one amateur available at Tri-State Red Cross. 73 es tnx de Hal. Tfc (Oct.) WD8DHC 118, N8NMA 76, W8YS 73, KC8CON 59, WW8D 38, N8FXH 04. PSHR: W8YS 158, WD8DHC 128, KC8CON 113, WW8D 93, N8NMA 90. WVMDN 760/29/454 WW8D; WVN E 154/85/310 N8NMA; WVN L 135/39/250 N8NMA; WVFN 951/102/779 KC8CON; 2 Mtr—BDARC 340/4/717, EPTN 09/0/20.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Jeff Ryan, NØWPA— ASM: Tim Armagost, WBØTUB. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, KØTER. ACC: Ron Deutsch, NKØP. PIC: Erik Dyce, WØERX. OOC: Karen Schultz, KAØCDN & Glenn Schultz, WØIJR. SGL: Mark Baker, KGØPA. TC: Bob Armstrong, AEØB. BM: Jerry Cassidy, NØMYY. I attended the JOTA event held at Calhan. With an EOSS balloon launch as part of the festivities, a fine time was had by all. Congrats to Dan Scott, KBØPPM who organized (again!) and thanks to everyone who volunteered to make it a successful event. Arapahoe County ARES supported the Red Cross during the September World Trade Center Disaster. ARES members, alongside Red Cross Communicators manned shelters and transported stranded passengers to and from DIA. Stan Morris, NØJOQ, is the lead Red Cross Communicator and he coordinated the response. On a sad note, Kent Douglass, KAØTTH of Windsor became a Silent Key the first week of November. Kent was a former president of NCARC and also served as ARES District 10 EC. We extend our sympathy to his family and friends. Pikes Peak ARES participated in a Weapons of Mass Destruction exercise with the US Army (Fort Carson) and the city of Colorado Springs. In the wake of last September's tragic attack and the resultant heightened awareness of such events, we can expect to see more agencies conducting similar exercises. ARES/RACES and other Amateur Radio emergency responders may be expected to participate in more advanced training or subject members to more rigorous security such as I.Ds and background checks if not already in place. On behalf of your Colorado Section staff, I wish everyone a happy, safe, and prosperous 2002. 73, de NØWPA. NTS Traffic: ADØA 184, KØTER 83, WØZZS 18. CAWN: WØWPD 912, K4ARM 716, AAØZR 579, WØGGP 494, WØLVI 382, NØNMP 376, ABØPG 340, WØNCD 227, WBØVET 219, KØHBZ 163, KIØND 141, WDØCKP 137, NØFCR 63.

NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5BIS, N5ART & KM5FT. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. At this writing, the American/United Flag Run has just cleared Socorro, NM, and is headed for the VLA. All the Hams and the NMSAR Support Team have done a fantastic job. The FLAG RUN from Socorro to the AZ Border on Hwy 60, will be a real challenge! We are sure our team will persevere! The Eastern NM ARC did a good job in covering their area of the Flag Run. ABQ Hams continue to do a fine job. A huge celebration was held at the ABQ Civic Plaza. The Valencia County ARA took their turn, and the Socorro Group continued their support in a team effort. The Socorro ARA and the Hams at the VLA have a tough job to support the Flag Run to the VLA, and west to the AZ border. The Socorro Hamfest was a nice one and brought together hams from all over the state. It was great to see old friends and to meet many new ones! Good Newsletters from the Valencia County ARA, Mesilla Valley Radio Club, the Deming ARC, the Albuquerque ARC and e-mail newsletters from the Pecos Valley ARC and the ABQ DX Association. N5ZGT and others around the state performed well in the JOTA operation. AC5ZO is to be commended in his efforts to get PRB1 legislation in NM. Very sad to report the passing of old timer, Glenn Howard, W5BWV, also KF5PM & N5PVS. They will certainly be missed. 73, W5PDY.

UTAH: SM, Mel Parkes, AC7CP— Happy New Year! Next month will be the Olympics! I would like to thank all those who have spent many hours training and getting ready to support this monumental event. Also if you haven't heard next month, Feb 9 to 11 will be the dates for the combined Utah QSOParty/Olympics QSO Party. Look for the specific details in the Feb QST next month. If you have questions, contact Jon Utley, K7CO, uqp@vcr.com. Due to conflicts the VHF Society will have to schedule the annual swap meet around the Olympic Activities so look for the specific date and location that will be announced as soon as the Officers determine what will work best. The Utah Hamfest for 2002 will be held at Ruby's Inn on July12-14. If you would like to work on one of the committees please contact Kathy Rudnicki at jimkatpa@aol.com. Help your club! Bring a friend to the next meeting and introduce them to your club activities and events. 73 de Mel, AC7CP.

WYOMING: SM, Bob Williams, N7LKH—Our condolences to ASM Jerry Pyle, WB7S, and his family, on the death of his father. University ARC, in Laramie, has been upgrading their club station, located in the tower of the Student Union Building on the University of Wyoming campus. The centerpiece of the upgrade will be a new station, including a Kenwood TS540S HF transceiver, donated by Susanne Donnelly of Jackson, in memory of her late husband. The club recently participated in the CQ WW SSB DX Contest, using their existing TS140S station barefoot into a 10m sloping dipole at about 70 feet. The crew, consisting of KD7KMU, NQ7Q, KD7NAF, KD7KMT, and N7JT, made 54 QSOs with 25 different countries in about 3 hours of operation, including such exotic places as Andorra, Ireland, Norway, Nicaraugua, Switzerland, and Hawaii (seems pretty exotic when you're in Wyoming! - ed. note). More group HF operations from the Tower, including at least one 160m contest, are in the planning stages. The Section Staff wishes everyone a happy holiday season, with special thanks to all who have helped out in these difficult times. Tfc: NN7H 347. PSHR: NN7H 186.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ – ASMs: W4XI, WB4GM, KB4KOY. SEC: W4NTI. STM: AC4CS. BM: KA4ZXL. OOC: WB4GM. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. PIC: KA4MGE. Happy New Year! It's time for our New Year's resolution, and we should make our resolution is to improve the state of amateur radio in our Section. We need to revive our local Amateur Radio clubs, attend the hamfests in our section, and become more active on not only the Section nets, but the local nets too. Regardless of who won the Section Manager's election last year, we need to work together to improve OUR Amateur Radio service in Alabama. Why not make another New Year resolution to send your SAR and PSHR to the Section Traffic Manager and Section Manager every month. If you don't know what a SAR or PSHR is or you need a little help filling one out, feel free to contact someone in the Alabama Section staff and they will be glad to help you. One last thing, Butler County and Pike County RACES will have their Hamfest at the Butler County Fairgrounds on January 26, 2002. For more information contact Thomas Johnston, KC4FIG, at 334-566-1373 or kc4fig@arrl.net. I hope to see you there! God bless & 73, Bill Cleveland KR4TZ. Tfc: W4ZJY 177, AC4CS 106, WB4GM 63, W4CKS 58, KC4VNO 45, WB4BHH 26, W4QAT 18,W4DGH 16.

GEORGIA: SM: Sandy Donahue, W4RU—ASM/South Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. Asst SM/IT: Mike Boatright, KO4WX. SEC: Lowry Rouse, KM4Z. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JNL. ACC: Susan Swiderski, AF4FO. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. Website www.qsl.net/arrl-ga. Happy New Year! I hope 2002 is a happy and prosperous one. It is a sad duty that I report the passing of Jean Butler, XYL of our division Director, Frank Butler, W4RH, after a long illness. The funeral was Nov 17. Mark your calendar now for the first hamfest of the year in Georgia-Dalton on Feb 23 at the fairgrounds. Congratulations to the Gans, Victor W4VEG, and Carol KG4ETR, who were named the Gwinnett ARS Amateurs of the Year. Our sympathies go out to the family of Gene Fox, WB4UCC, Newnan, who became an SK in Nov. Athens RC has new officers for 2002: Pres KE4OGD, V Pres KC4UL, Sec AF4TQ, Tres K4AHN. The club created a Disaster Preparedness Committee to work with ARES when needed. K4ZRA heads. Columbus ARC lost two members in October. Lloyd Cornwell, KN4VUE, and Andy Anderson, AC4KK, both are SK. Our regrets to their family and friends. Georgia will host the 2nd Annual Amateur Radio Direction Finding Championships on April 19-21 in Pine Mountain. The Ga Orienteering Club and N4MAP will host. The Richards Middle

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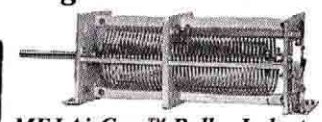

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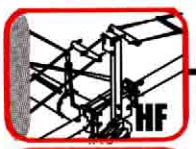

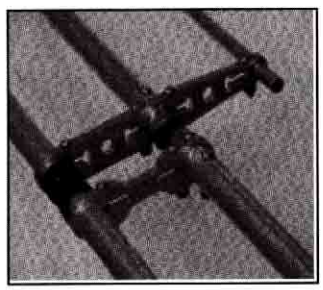

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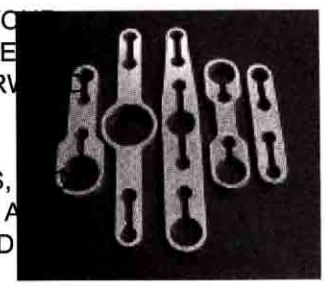

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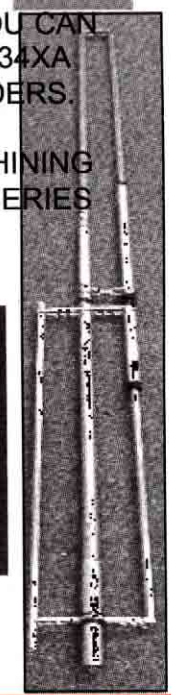

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Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

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MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

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All are protected by MFJ's famous No Matter What™ one year limited warranty.

School in Lawrenceville has been selected as the next pilot school in the ARRL Big Project to teach science and ham radio to middle schoolers. In Oct, ARRL staffer, KH6HU, was in town to kick off the project. Richards MS science teacher, Sharon Carter, KG4HKO, coordinates. Alford ARC happy with the turnout for their annual hamfest at the Gwinnett Cty Fairgrounds. It was profitable for both the club and most vendors. 73, Sandy. Tfc Oct W4WXA 93, AF4NS 92, KG4FXG 88, KE4R 55, K4BEH 54, AF4PX 46WB4BIK 32, K1FP 27, K4WKT 26, KA4HHE 7.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP— District ASMs: W Panhandle: KO4TT, E Panhandle: WA4NDA, Capital: N4VRT, Crown: N4UF, Suwanee, W2DWR, E Central: K1CE, W Central: vacant. Staff Appointments: ACC: WA4B. BM: N4GMU. OOC: KD4NLF. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. The Jacksonville Hamfest was considered a success the last of October. The attendance at the forums was light, but discussions were very good. The Division Director, W4RH, attended the meeting and provided the group with matters of interest outside the Section. The antenna support legislation presently been worked by the three Sections was discussed, and in the near future a message will be put out on the arrl.net. You will be given the details and your support contacting your legislators will be most important. We seem to have one more hurdle and then we can release the intent of the legislation to the amateurs of Florida. Hopefully, it will be in December. This could be the gift Santa Claus has for everyone. While on the subject of Christmas, may Santa be good to all of you as you deserve it. It is regrettable I have to report the SEDAN mode in the last months QST has been canceled. The person responsible for the SEDAN mode has been ill and at present cannot provide the service. While on the subject of communications, it seems there is still confusion or lack of understanding about the Gateway System. The DECs in each District is responsible to designating the Station and usually does it at the time the ARES Net is activated. It is normally not determined until the Section's ARES Net is activated, and is requested to provide the Station ID. Some people think anyone or any station can be one, but not true. That is like some clubs think they can name the EC for their County, which is not true. Their advice is considered, but the SEC has to be certain and assured the person is capable and can perform the duties as described in the ARRL material. The National Hurricane Conference will be in Orlando Fl next April. Those wishing to attend may do so without paying registration fees. The day for the amateur presentations is not know at this writing, but will be put out on the ARES Net. This is a good opportunity to participate and learn about other aspects of amateur radio and how they respond to emergency situations. 73 de Rudy. Tfc: WX4H 996, NR2F 192, AG4DL 133, KE4DNO 117, KF4WIJ 103, K1JPG 86, KG4EZQ 83, N9MN 58, WD4GDB 56, K4JTD 39, AF4PU 37, WA1VOP 23, WB9GIU 15, W4KIX 15, AB4PG 14, K4DMH 9, W8IM 9, KJ4HS 7, WD4ILF 6, WA4EYU 1.

PUERTO RICO: SM, Víctor Madera, KP4PQ — ¡Un Prospero Año Nuevo a todos! Luego de los acontecimientos desafortunados y dejando atrás la temporada de huracanes, esperamos una Navidad placentera y tranquila. La radioafición prestó valiosa ayuda en cuanto a comunicaciones de emergencia. Solicitamos de todos un ambiente positivo, evitando rumores y conversaciones de mal gusto durante este tiempo cuado nuestra nación necesita todo nuestro apoyo. Los planes para reorganizar ARES siguen en pie. Hemos notado poco interés en las organizaciones de servicio en cuanto a los programas conducentes a programas de comunicaciones de emergencia. Es tiempo de comenzar temprano para tener una organización sólida y bien entrenada para el 2002. El PRARL celebrará en enero su Asamblea Anual en el Albergue Olímpico de Salinas PR. Ponce estuvo de pláceme este mes. Se completó el primer ciclo de exámenes auspiciados por el ARRLVEC. Felicitamos a la administración de la Universidad Interamericana de PR por cedernos sus facilidades en toda la isla para las sesiones de exámenes. Este año se rompieron todos los records anteriores en cuanto a personas examinadas. Los interesados en el programa para certificarse en Comunicaciones de Emergencia y ARES, comuníquense con el Section Manager por correo regular, la dirección aparece en la página 12 del QST, por teléfono, o vía email a kp4pq@arrl.org.

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI—SEC: W4SS. STM: WA2YL. ACC: WA4AW. PIC: W4STB. OOC: K4GP. BM: KC4ZHF. SGL: KC4N. DEC/ASM: N4LEM, K9SHT, AA4BN, KD4GR. Web Page: http://www.sflarrl.org. JOTA was observed in many SFL counties. WB5ZGA in Brevard, logged 124 scouts and 25 others on Sunday (they were called up for hurricane relief work Saturday). N4XEO with four helpers from the Fort Pierce ARC found the planned "Challenge on the Beach" cancelled so simply took ham radio to the 6 troops at the local scout camp and all had fun. The Broward JOTA, run by N4CU and KD4GR, included demos of SSB, PSK-31, satellite, and SSTV. They'll be at Camp Seminole next year. Many thanks to N4YQU in Boca Raton, who worked overtime as SFL JOTA Coordinator, contacting scout councils to encourage ham/scout coordination. WD4JR, at the NWS station, W4EHW, reported on the 9 shifts they operated during Hurricane Iris. They received many reports from V31 stations and ships at sea. The station has been active for 21 years! Kudos to ACC, WA4AW, for attending 20 club activities in the last couple months. His efforts yielded several reactivations including Pompano Beach ARA as the latest. Brevard's Titusville ARC and the Indian River ARC meet weekly to work on emergency comm. vehicles/site equipment and review assignments. It keeps them ready for things like the Oct. 25 tornado they kept track of for NWS Melbourne. Next is the Boy Scout Food Drive. Broward County very successfully used the new UHF portable repeater (built by KD4GR/WB4YUC) for the Lighting the Way Center for Ed. Walkathon. They're now signing up 50 hams for the Winterfest Boat Parade. The Dade County ARPSC carried their public service focus to the 1996 Flight 592 ValuJet Everglades Crash Memorial site. That special group of hams put in 40 vol. hrs. removing weeds and debris, refilling sand, and re-leveling brick walkways. Before and after pictures on http://sffma.net/cleanup.htm. Kudos to Joe Chwick, AC4TV, Elmer extraordinaire, for earning the title "South Florida Elmer." In his late 70's, Joe conducts classes, works in ARES/RACES/CERT as a trainer, and volunteers with the Boy Scouts. He is an organizer of Citizens' Ham Mobile/Marine Patrol – cosponsored by the Miami-Dade Police Department, the Citizens'/Youth Crime Watch of Miami-Dade, and SFFMA. WOW! Time to mark calendars for Lee County's hamfest on Jan. 11 and 12. Martin County's KE4UEI, was interviewed by The Discovery Health Channel reporters, who spent an entire day at home with him, interviewing and filming. Ham radio was an item of major interest to them. Time/date of airing later. Great work, Dave! The Palm Beach Packet Group is developing an extensive packet network throughout the county. In addition to a CAT, PB is discussing a First Responder team. Those interested contact N4QPM. The Wellington ARC published an excellent "how to" column on handling health and welfare traffic as they prepared for an October SET. October Traffic by STM WA2YL: WA9VND 367, KA4FZI 200, KD4GR 154, WA2YL 121, KC4ZHF 117, K4FQU 91, KD4HGU 89, KE4UOF 60, KG4MLD 57, KE4WBI 45, WA4EIC 40, K4VMC 39, WB4PAM 36, KG4MLC 35, AA4BN 33, KT4XK 30, KG4CHW 29, KE4OMB 26, WA4CSQ 24, KG4ILJ 16, KN4JN 11, AF4NR 10, W4WYR 9, K4OVC 7, W3JI 7. 73, Phyllisan West, KA4FZI, Section Manager, Southern Florida.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St. Croix— ASM: Ron, KP2N, St. Thomas. ASM: Mal, NP2L, St. John. Sect. Internet Mg, SIM: Jeanette, NP2C, St. Croix. SEC: Duane, NP2CY, St Thomas. PIC: Lou, KV4JC, St. Croix. ACC: Debbie, NP2DJ. St. Thomas. NM: Bob VP2VI/W0DX, Tortola. News this month is that Drew, NP2E, and his XYL are returning to the states. Thank you, Drew, for your hard work as ASM and also as QSL manager. Taking over for Drew will be Ron, KP2N, who was the first SM for the VI. Welcome back Ron! This past month saw a lot of folks from the Westerdam on the QCWA cruise. Locals greeting the cruisers at Magens Bay on St. Thomas included NP2L Mal, KP2L Jim, WP2AGL Patsy, KP2N Ron, VP2VI/W0DX Bob, NP2DJ Debbie & myself. St. Croix had the unexpected pleasure of welcoming David Clark, KB6TAM, the oldest sailor to circumnavigate the world solo, for a two-day stay. Hams attending the luncheon for David included KV4JC, Lou;W9UKK Merv; KJ6OI Carl; N4WWH Nancy; KB4TLX Bob; NP2R Wayne; NP2C Jeanette; NP2EF Bill; and yours truly. N4BP Bob came down again this year and operated NP2B in the CW Sweepstakes, and it looks like, once again, took the division. Section Web site www.viaccess.net/~jellis, repeaters 146.63 St. John, 146.81 St. Thomas & 147.25 St. Croix. 73, John, NP2B.

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR, ae4mr@arrl.org http://www.wcfarrl.org—ASM NA4AR, ASM-Web N4PK, ASM-Legal K4LAW, SEC KD4E, TC KT4WX, BM KE4WU, STM AB4XK, OOC W4ABC, SGL KC4N, ACC AC4MK, PIC WX1JAD. My October Amateur Radio class has yielded 14 new technicians with 5 scoring a perfect score! Florida Gulf Beaches Marathon on Jan. 20 will require over 100 amateur radio operators. There will be 19 Aid Stations and we anticipate the operation of an Operations Net, a Logistics Net and a Medical Net before and during the event. Please lend a hand if you can. Contact your EC if you can participate. Hamfests: Sarasota Jan 19-20, DeSoto Jan 26. Silent Keys: George Parker, KC4QNT, Donald Buffington, AE3K. SEC KD4E reports no change in ARES membership total of 447. In October there were 48 ARES Nets. 6 public service events, 29 drills and 1 emergency for a total of 35 ops. The total man hours reported for October is 786.5 hours. ECs reporting: KB0EVM, KN4YT, KF4LEB, K4ZVO, AC4MK, KC8AOK, AI4ET, K4FB and WD4AHZ. STM AB4XK reports October's net report is available on the section's Web page. October PSHR: K4RBR 168, K4SCL 142, KF4KSN 119, KT4TD 118, WB2LEZ 112, W4AUN 110, AB4XK 103, AE4MR 99, KF4OPT 97. SAR: K4SCL 188, AB4XK 131, KT4TD 37, KF4OPT 35, K4RBR 33, W4AUN 14, AE4MR 10, KF4KSN 9, WB2LEZ 6. 73, Dave, AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—I want to thank Fried and Sandy Heyn, WA6WZO and WA6WZN, for the many years of devoted service to the Southwest Division and the state of Arizona. Fried and Sandy has been a good supporter of all ARRL events in this state and they will be missed. They made a great team. Art Goddard, W6XD, is now our new director and we wish him well in his duties. He plans to be at the Mesa Hamfest on 1 December, so come out and talk with him. The last half of year 2001 has been very dramatic for Amateur Radio and the country in general. My question to you is, in regards to Amateur Radio: What did you learn during the last year and how will you apply it to the year 2002? We handled many messages during the last part of the year, and many of us (me included) have become sloppy in our operating habits and our ability to generate, receive, and relay message traffic. There are many emergency nets throughout the state that we can use to practice this message handling skills. Practice and improvement in operating skills can also be accomplished by participating in community service activities. Remember that we represent an elite group of people throughout the world who share a common interest/hobby. We should be good examples to the rest of the world. I am trying to put together a folder on how others (individuals and/or clubs) have fought the CC&Rs throughout the state. We need to band together and see if we can change this restriction on antennas. If you have been successful or not, please call me and provide any documentation you used. I will make this documentation available to others. Don't forget to checkout our state web site at www.qsl.net/arrlaz/. This site has all the latest state information and links to the many clubs here in Arizona, throughout the country, and has the latest listing or all the ARRL volunteer's for this section, club listings, and links to other activities. If your club or organization has changed officer's or address, I need to know so I can keep up with my "Club Listing" up-to-date. I have several new Ham's that ask for local clubs so this listing is important. The Scottsdale ARC will hold its "Spring Hamfest" on 9 March 2002 at the Scottsdale community college. I also need many more volunteers to help with the many duties involved within the state (i.e. Technical support, ECs, etc). 73, Clifford Hauser KD6XH. Net: ATEN 1003 QNI, 33 Tfc, 31 sess. Tfc: W7EP 48, K7POF 26.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF— Five good hams that I know still get together on the air after 63 years. The five of us have been in radio contact over the air from Iowa, Texas, Florida, Alabama and California. WØDNS, Spud, still lives on the home farm in Iowa. WØSEG, Luke, still lives in Cedar Rapids, near Collins Radio Co., where four of us worked together at one time, back in the 1940s. K5WFK, Corwin, lives in Texas and Floyd, W4LNK, lives in Alabama. This may be a record for corn-fed, Iowa ham radio operators if not for the "Guinness Book of Records," at least for the back inside cover of the ARRL

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RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.19/FT	.17/FT	.15/FT
RG223/U SOLID SC 2 95% BRD NC/DB/UV JKT 2.0 dB/600 WATTS @ 30 MHz	.69/FT	.62/FT	.56/FT
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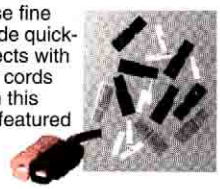

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handbook. - Our Club Coordinator (ACC) Bill Leslie, WA6POK is available to assist your club with information about ARRL services. We have an up to date listing of club speakers and their favorite subjects. www.qsl.net/arrlsw/lax. Bill also has copies of ARRL educational tapes for free loan to clubs for special classes or club programs. WA6POK@arrl.net. Our TC, Technical Coordinator, is Edgar Brown, N6OU, and I know that he has a new ARRL handbook with some of those technical answers that you may be seeking. n6ou@arrl.net. Conversations about really small towns on 7203 kHz on Monday evenings with W7MAD, Ed, and KØDT, Jim, in Colfax, Iowa, led to these two Iowans asking me questions about small towns in Iowa. They wanted me to prove that I was from Iowa. So they ask me where Carnsforth was located. Since I was born only about eight miles from there, I was able to tell them that it was where the old rail road line crossed the old coast to coast highway #6, the Lincoln Hwy. They were impressed and accepted me to be truly from Iowa. (So now I really have two friends on 40 meters.) I thought that this was really a good question. So at a church dinner last night, a friend from Iowa stopped by to relate the latest gossip. I thought this question was a good test to try on this lady from North English. She immediately knew precisely the correct answer and elaborated by asking me if I had ever eaten at the Carnsforth Inn. She took her daughter there recently for a great meal. Her daughter's comment was, "Mother, I didn't think that they served food in the middle of a cornfield". de vy 73, Phineas, W6BF.

ORANGE: SM, Joe, W6UBQ, 909-687-8632—ASM: Riv. Co. Brett, N6NLN, 760-436-6291. ASM Org. Co Richard, WA6NOL. 714-835-3295. ASM S.B.Co. Jeff W6JJR, 909-886-3453. From the Circle City Communicator: We are at the peak of the SOLAR CYCLE. The HF bands are hotter than they will be for next several years. DON'T MISS OUT! Upgrade BEFORE IT'S TOO LATE! The Inland Empire ARC Pres sez take care everyone. Please keep your AR Club in your plans, and let's continue to make your Amateur Radio club a great club and a great asset to the Ham Radio community. Thank you! God bless America and the Americans! John Fort, W6SIN, was selected for "Volunteer of the Month" for August by Huntington Beach CERT. John puts in hours helping CERT Communicators hone their skills. His communications team was awarded Team of the Year 2000. The Anaheim ARA Prez sez many will say one of our greatest freedoms deserving of praise is that we vote for our national, state, and local governments. We have orderly transitions. WE ARE A DEMOCRACY. The Beach Cities Wireless Society. Words of Wisdom, Sharing Spectrum with other Services a Ham Reality (Oct 31, 2001)—Amateur Radio Operators can get mighty territorial when they perceive that some other radio service is intruding upon "their" turf. What many hams often don't understand, however, is that Amateur Radio is a secondary service in the US on several popular bands or subbands. As such, it's subject to interference from primary radio service occupants and by law, must avoid interfering with them. And of course, ham bands are not all the same everywhere in the world. NEW YORK City District Emergency Coordinator Charles N2NOV, has expressed his appreciation to the Amateur Community. 'THANK YOU for the support." We appreciate all the Amateurs who have volunteered their time and equipment. Traffic: KC6SKK 170, K6IUI 152, W6QZ 94, W6JPH 73, W6QZ NTS BBS 105. PSHR: W6QZ 153, W6JPH 97, KC6SKK 92, K6IUI 78. SCN/S NET MGR W6JPH, reports 21 sessions, ONI 111, QTC 71, Avg time 17 mins. Well, the holidays are just around the corner, the Orange Section wishes you all a very worry-free happy holiday. MERRY CHRISTMAS. 73, Joe Brown, W6UBQ, Orange SM.

SAN DIEGO: SM, Tuck Miller, NZ6T—619-434-4211; We are at the start of a new year, a new beginning for many, with new year resolutions being started, and for many stopped just a few days later. I want to thank the many people who without them, the Section would not run as smoothly as it has. First, my Assist. Section Manager Harry, W6YOO. Here is a guy who will step in and do what ever it is that needs to be done. A guy that you can definitely learn from. Al, W6WYN, has double duty, well maybe triple duty. He is an ASM for Red Cross duties, a DEC for San Diego's central district, and also keeps the EMS program running the way it should. Dave, KC6YSO, our SEC for the past 4 years, has kept things running very smoothly. Our ARRL appointments, what can I say? Steve, K6PD, our OBC keeps everyone informed about the latest bulletins, and also edits the ARES Alert newsletter. Tom, KC6NXZ, a newly appointed STM is doing a great job, and thanks go to outgoing STM Warren, KT6A, for all his hard work. Bill, K6TWO, served as OOC for a spell, found the famous "ditter" and did an outstanding job. Coming back as OOC is Del, N6JZE, who always does an outstanding job. Our PIC, Steve, N6QEK, does a good job along with his other job, the 6th area QSL manager. Evelyn, N6EVE, our ACC works hard, also double duty, not only is she ACC, but my YL. What a job! To the other DECs, Rich N6NKJ, Fred, W6FFF, Dennis, K7DCG, and Kent, K6FQ. To all the other appointees, ECs, AECs, well the list goes on and on. To the many ARES liaisons from the many agencies, we thank you. On a personal note, many thanks go out to our outgoing Division Director Fried Heyn, WA6WZO. I have known Fried for almost 10 years now and know first hand how much he loved ham radio and his job as DD. We wish only the best to him and Sandi. I urge you to drop him a note either by snail mail or by e-mail at wa6wzo@arrl.org and let him know how much you appreciated his hard work. Tfc: N6TEP 54, KD6YJB 57, KC6NXZ 50, K6DAY 29, WA6IIK 27, K6CD 49. 73, Tuck, NZ6T.

SANTA BARBARA: SM, Robert Griffin, K6YR, (k6yr@arrl.org or k6yr@arrl.net)—SEC: Jack Hunter, KD6HHG (kd6hhg@arrl.net). STM: Ed Shaw, KF6SHU (kf6shu@arrl.net). SGL: Paul Lonnquist, NS6V, (paul@dock.net). ACC: Michael Atmore, KE6DKU (ke6dku@aol.com). OOC: Howard Coleman, N6VDV (N6VDV@arrl.net). PIC: Jeff Reinhardt, AA6JR (jreinh@ix.netcom.com). TC: Warren Glenn, KM6RZ (wglennrz@ix.netcom.com). ASMs: Ventura, Don Milbury, W6YN (w6yn@arrl.net). Santa Barbara, Marvin Johnston, KE6HTS (ke6hts@sbarc.org). San Luis Obisipo, Bill Palmerston, K6BWJ, (bpalmers@fix.net) & for Internet, Jack Bankson, AD6AD (ad6ad@arrl.net) & DECs: Santa Barb-Dave Lamb, WA6BRW (wa6brw@arrl.net); SLO-Bill Peirce, KE6FKS (ke6fks@arrl.net) & Ven-Dave Gilmore, AA6VH (aa6vh@arrl.net). To Fried (WA6WZO) & Sandy (WA6WZN) Heyn: your service to amateur radio has been unfailing and will not be forgotten. Stay tuned you two! CLUB LEADERS! I encourage you to be active in the Section's Council of Clubs. Contact our ACC, Michael Atmore, KE6DKU. FREE instant Section news updates? Join the SB Reflector! E-mail majordomo@qth.net the message subscribe arrlsb.

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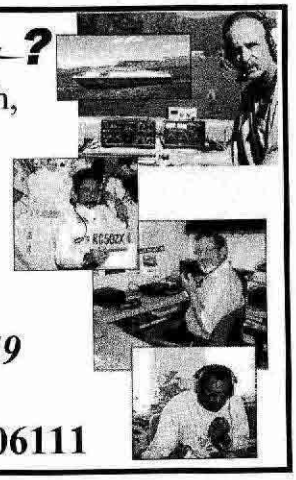

SB Sec Web: www.qsl.net/arrlsb/.SCN slow speed NTS Net, M-F, at 1915 local on 3598 kHz & SCN/SB at 2100 local on 147.000+(131.8), 224.90-(131.8) & 449.300-(131.8). In memory of Silent Keys K6JG and W6JY, that's 30. Rob, K6YR.

WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL— ACC/OOC: John Fullingim, WN5PFI. SEC: Bill Swan, K5MWC. STM: Carolyn Womack, KC5OZT. Well by the time you read this, the holidays will be in high gear. I hope that everyone has a wonderful holiday season. And as the New Year begins, a lot of the clubs have elections and bring in new officers for the upcoming year. I ask that all affiliated clubs in North Texas update their data with League headquarters. It's simple and easy to do online. It is great for helping to recruit new members as they check the Web site for local clubs and they can't join if they don't know your club is there. Something else to bring to the attention of new club presidents is the new ARRL rebate program. It is a great fundraiser for your club. For every new ARRL member that your club recruits, your affiliated club gets to keep $15. It was good to see the turnout for the Texoma Hamfest outdoor flea market and at Belton a few weeks earlier. And my hat's off to Jay Miller, KK5IM, Glen Kitto, N5OD, Bob Peters, K1JNN/5, for setting up the Collins User's Conference last month. And to everybody that traveled to Dallas for the conference after the events of Sept 11, a big Texas Thank You for attending and participating in the true spirit of Amateur Radio. A special thanks to Mac McCullough, W5HPM, for hosting a heck of a true Texas BBQ. 73, KA5TXL. Oct SAR: K5UPN 512, KC5OZT 184, K5NHJ 132, W5AYX 110, W5RDM 79, KB5TCH 62, AC5Z 28, WA5I 19, N8QVT 1.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL Happy New Year! It was good to see everyone down at the Texoma Hamarama. There was a good crowd. I got to go visit the Tulsa Amateur Radio Club and speak to them about the ARRL. It was good to see a lot of old faces. I really had a good time. I also found out that the TARC had provided some assistance to EMSA by allowing them to use one of their repeater antennas while until the EMSA antenna was repaired. The Tulsa Area Emergency Management Agency, TAEMA, is reorganizing their operations and are incorporating amateur radio closely in their emergency plans. If you would like additional information on becoming a part of the TAEMA volunteer team please drop me a note. Won't be long now until the Green Country Hamfest is upon us. Start making your plans. The location is different this year. It will be held at the new Claremore Convention Center, northeast of Tulsa. Oklahoma now has 17 ARRL affiliated clubs. That number has increased substantially this year. If your club is not ARRL affiliated but would like to be, check http://www.arrl.org/FandES/field/club/ for additional information about the benefits of being an ARRL affiliated club. The structure for commission of new ARRL members for clubs has changed. Clubs can now receive a $15 commission on new league members. This makes it much more enticing to utilize this benefit for affiliated clubs. You could even make a fundraiser out of the program. 73, Charlie. Tfc: KF5A 848, WB5NKC 449, N5IKN 494, KK5GY 346, WA5OUV 318, WB5NKD 265, K5KXL 212, KI5LQ 115, KM5VA 109, WA5IMO 80, W5VBD 29.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, W5JAM. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. PIC: KD5HOP. January 2002, how time flies. Looking back to Friday night October 12, 2001, SKYWARN was activated early in the evening which would prove to be a nightmare for some here in South Texas. Shortly after 9 PM we had an F-0 touch down in Sabinal, TX, with 70-MPH winds, heavy rain and large hail. 9:45 PM De Hanis, TX, was hit with 75 and 80 MPH winds, golf ball size hail, and a F-1 tornado. 10:40 PM Hondo, TX, was hit with a F-2 tornado, downbursts and 100 MPH winds, and large hail. 25 people injured. The Army National Guard Armory and the airport received heavy damage. Houses and business buildings were either damaged or destroyed. At 10:00 PM about 100 mile North, Stonewall, TX was hit with a F-3 tornado. One man hospitalized. One concrete building fell in walls and all. Many houses and buildings damaged or destroyed. Total buildings damaged or destroyed was 600 from the 4 tornadoes. We ran SKYWARN until 4 AM. We do want to thank all those Hams that assisted with communications and their time. San Antonio and Corpus Christi have been running tests linking 2-meter repeaters together, between EOCs, with some success. You always need backups during an emergency. I want to thank all the clubs that send me their newsletter, especially those by e-mail. I want to thank KK5CA for assisting K5RAV at the ARRL booth at the Clark Radio Club hamfest. I heard it was a great success. Corpus Christi had a good turn out for their hamfest. They had testing, so I'm waiting to see how many new hams we got. I hope to hear a lot of new hams on the air as a result of the testing that goes on when there is a hamfest. I want to congratulate Jim Robinson, K5PNV, Mike Fleifel, and Robert Timmone, KD5HCR, who were the recipients of The Walter J. Bennett Public Service Award for developing and running the Houston EMWIN Weather system to alert Emergency Management people of any pending weather danger. This is a very prestigious award, and I'm proud to have Jim and his group in my section. As I'm finishing this article, New York has another airline crash. May we remember them in their time of trouble. I hope all of you a Happy Holiday Season and prosperous New Year. God Bless America. Tfc: KA5KLU 285, AC5XK 255, W5GKH 155, W5KLV 153, N5SIG 138, W5TUK 122, W5ZX 94, N5OUJ 45, KØYNW 40, N5NAV 39, KD5GM 21.

WEST TEXAS: SM, Lee Kitchens, N5YBW— Many thanks to Bill Brooks, KE5OG, for the great update on the Big Bend ARC. This is a small group of 30 hams in a remote area of West Texas that are very active in many aspects of ham radio. They host the Big Bend emergency net and participate in Field Day and SET scoring very high in their class. They finished second in the Texas QSO party as a club and took first and third in the event. They just finished a search for a lost piece that fell off of an aircraft. I plan to visit with the BBARC during their annual banquet. Thanks to the Odessa hams for an enjoyable hamfest. Coy Day, our Director, gave us an update on League activities and issues relating to our space in the spectrum. Lets start off the New Year with a resolution to participate as much as possible on the air and face to face in the New Year.

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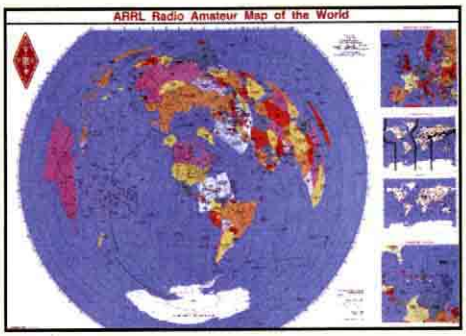

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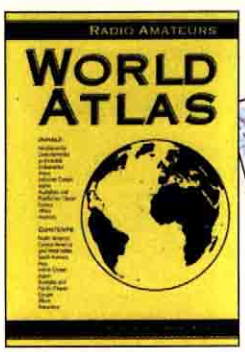

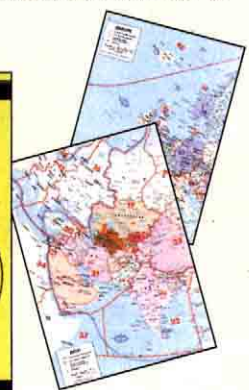

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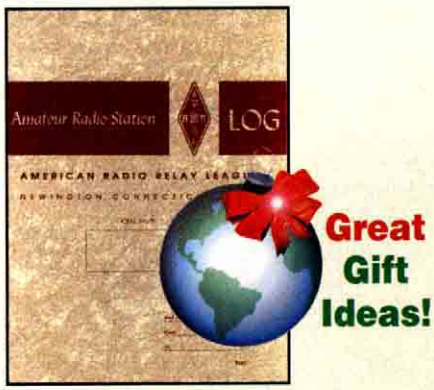

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IC-Q7ABC 2M/440 transceive; wide band receive. (left) The ultra-compact, 350/300mW Q7ABC supplies features of a dedicated wide band scanner within a dualband handheld transceiver. The large built-in speaker provides loud, crystal clear audio while protected by a drip-resistant body. Tone squelch is standard on the 200-memory Q7ABC which employs an easy band switching system. Only two alkalines or NiCads are needed to drive this economical, lightweight "2-in-1." 2.28"w x 3.38"h x 1.06"d, 6 oz **$124.99**

IC-V8 Quality, simplicity, anywhere. The V8 144MHz FM transceiver was designed with durability and ease-of-use in mind. The front panel and chassis are constructed of tough polycarbonate and die-cast aluminum. The powerful, 5.5W V8 offers a 16-button keypad providing easy access to all functions and 100 alphanumeric memory channels. CTCSS, DTCS and DTMF encoder are all standard. Other features include reversible up/down switches, rotary selector, 40 channel per second scanning speed, and backlit LCD. 2.13"w x 5.19"h x 1.38"d, 12.3 oz **$154.99**

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VX-1R Power out of the pocket. (left) This 500mW dualband (144/430MHz) handheld transceiver gives the user wide receiver coverage in a pocket-sized package. Despite its size, the 1R offers a great list of features: 291 memory channels, ARTS™, high quality internal speaker, SmartSearch™, and dual watch. It also provides one-touch emergency access and built-in CTCSS/DCS encoder/decoder while operating for more than eleven hours on a single battery charge. In addition, it sports impressive memory and scanning capabilities. 1.9"w x 3.2"h x 1"d, 4 oz ..... © **$129.99**

FT-50RD/41B Commercial-grade, military spec. It's rugged, reasonably priced, and simple to operate. Boasting 5 Watts output power, the 50RD covers 144 and 430MHz while also offering the "widest" band receive allowable. Perfect for participating in and monitoring outdoor activities. The 50RD is built with 112 alphanumeric memories, DCS and CTCSS encode, and ARTS. 2.2"w x 3.9"h x 1.2"d, 11.5 oz... © **$204.99**

FT-90R Big power, big performance, micro-mini size! This 144/430MHz FM mobile is a high-power dualband with high reliability...that fits in your coat pocket. The 90R features 50/35W output, user-programmable function keys, high-capacity 186 memories, versatile scanning, CTCSS/DCS, and direct frequency entry. 3.9"w x 1.2"h x 5.4"d, 1.4 lbs... © **$309.99**

FT-2600M Powerful, reliable, and certified Mil-Spec. Not only is the 2600M built for mechanical and thermal stability, with extended receive, you can monitor weather, public safety and other land mobile communications. 60W of true FM power on 2M provides excellent coverage and enhanced clarity. Its features include 175 memories, CTCSS/DCS, and SmartSearch™. 6.3"w x 1.6"h x 6.3"d, 2.9 lbs..... © **$164.99**

FT-840 Performance forward. Blending high performance digital frequency techniques with operating convenience, the 840 is a base station that beginners and seasoned operators will appreciate. Throwing out 100W on the 160-10M bands, the 840 adds a choice of two optional remote auto antenna tuners and a wealth of functions. 9.4"w x 3.7"h x 9.6"d, 12 lbs ..... © **$569.99**

FT-1000MP MK V Improving the 1000 series Elite-Class. Building on the success of the 1000 series, the Mark V offers five new developments. This HF all-mode adds 200W of output power and features Class-A PA operation, interlocked digital bandwidth tracking system, a variable RF front-end filter, and enhanced ergonomics. 16"w x 5.3"h x 13.7"d, 31 lbs..... © **$2574.99**

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TH-G71A Sharp Distinction: The brighter side of handy communications. (right) This FM dualbander (144/440MHz) boasts a brightly illuminated keypad and LCD, high-performance antenna, and a typically stylish yet ergonomic design. The 5W G71A also offers convenience with its memory name function, menu mode, PC compatibility and 200 multi-function memory channels. 2.31"w x 4.44"h x 1.44"d, 11.6 oz..... **$264.99**

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TM-V7A Cool Blue: The look of mobile communication. The V7A 144/440MHz FM transceiver marks a bold departure in ergonomic design with its easy-to-operate control panel and reversible LCD. The "5-in-1" programmable memory, 50/35W, DTSS and pager functions, and receive of two frequencies on one band make the V7A a pace-setter. 5.5"w x 1.56"h x 7.44"d, 2.65 lbs. **$409.99**

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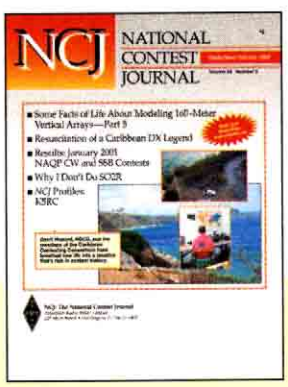

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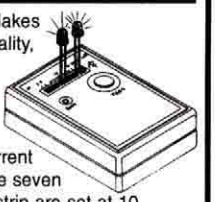

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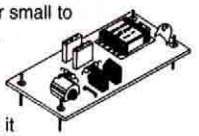

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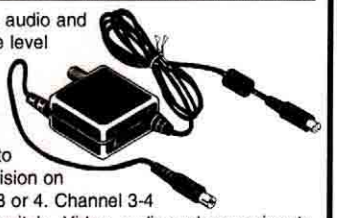

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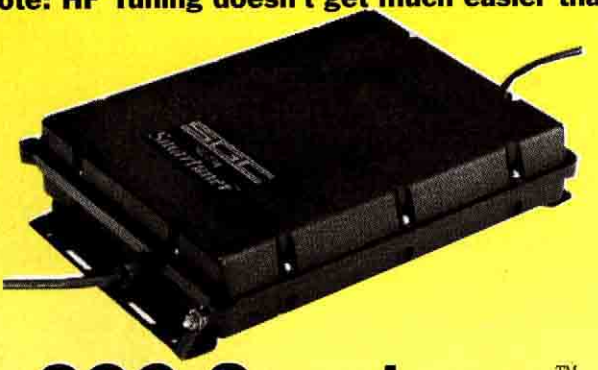

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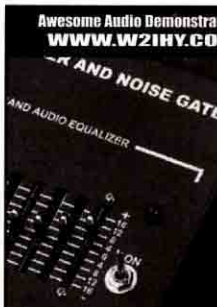

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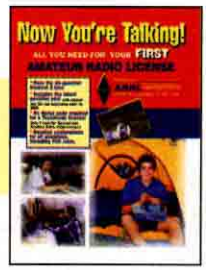

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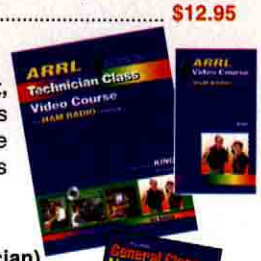

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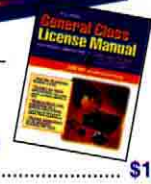

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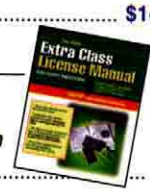

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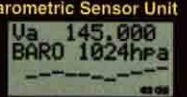

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